Timescales of continental subduction: Constraints from ultrahigh-pressure metapelites in the Western Gneiss Region, Norway

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TIMESCALES OF CONTINENTAL SUBDUCTION: CONSTRAINTS FROM ULTRAHIGH-PRESSURE METAPELITES IN THE WESTERN GNEISS REGION, NORWAY

ULTRAHIGH-PRESSURE METAPELITES IN THE WGR

ABSTRACT

The Western Gneiss Region (WGR), Norway is an archetypal continental ultrahigh-pressure (U)HP terrane with an extensive metamorphic history, recording the subduction and subsequent exhumation of continental crust to depths exceeding 120 km. The vast bulk of past work within the WGR has focused on mafic eclogites. In this study, data from rare garnet-kyanite metapelites in (UHP) domains of the WGR is presented. U–Pb geochronology and trace element compositions in zircon, monazite, apatite and rutile were acquired, and *P–T* conditions were calculated by mineral equilibria forward modelling and Zr-in-rutile thermometry. The Ulsteinvik metapelite prograde path traverses through ~600–710 °C and ~11–14 kbar. Minimum peak conditions are ~750 °C and ~2.9 GPa in an inferred garnet-kyanite-coesite-omphacite-muscovite-rutile-quartz-H_2O assemblage. Plagioclase-biotite-quartz intergrowths developed after omphacite-phengite-rutile breakdown on the early retrograde path, followed by cordierite-spinel-plagioclase symplectites after garnet-kyanite-biotite, defining a retrograde *P–T* point at ~740 °C and ~7 kbar. Late Ordovician-Early Silurian (~470–440 Ma) zircon and rutile age data in Ulsteinvik pre-dates the major Scandian UHP subduction episode in the WGR, interpreted as recording early Caledonian subduction within the Blåhø nappe. Monazite and apatite U–Pb geochronology and trace element data suggest exhumation occurred at ~400 Ma. The Fjørtoft metapelite is a constituent of the Blåhø nappe. Minimum peak *P–T* conditions are ~1.8 GPa and ~750 °C, with poor peak mineral fidelity attributed to extensive retrograde deformation. Negative Eu anomalies in ~423 Ma monazite suggest retrograde conditions were reached by ~423 Ma. Ulsteinvik and Fjørtoft may have experienced pre-Scandian subduction together within the Blåhø nappe but record dissimilar histories after this. Two potential scenarios are presented: (1) Ulsteinvik resided within the mantle for 20 million-years longer than Fjørtoft during Scandian subduction, or (2), the samples were exhumed at different times during pre-Scandian subduction of the Blåhø nappe.

KEYWORDS

Metapelite, subduction, ultrahigh-pressure, Western Gneiss Region, U–Pb geochronology, *P–T* pseudosection

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INTRODUCTION

The sensitivity of metamorphic mineral assemblages to pressure-temperature (*P–T)* changes within the Earth make them an ideal proxy for inferring past conditions (e.g. Brown & Johnson, 2018). When coupled with robust geochronological constraints, metamorphic rocks form the foundation for decoding the evolution of underlying geodynamic processes (e.g. Kornprobst, 2002; Brown, 2014; Lanari et al., 2019). Continental collision is one of the most dramatic and visible manifestations of plate tectonics on Earth, comprising a fundamental role in the evolution of modern continents (e.g. Batt & Braun, 1999; Nance & Murphy, 2013). The relative buoyancy of continental crust compared to oceanic crust allows subducted continental ultrahigh-pressure (UHP) terranes to be more frequently exhumed than subducted oceanic slabs (e.g. Ernst et al., 1997; Hacker et al., 2011). Thus, exhumed continental crust can provide valuable insight into UHP geodynamic processes, where UHP metamorphism refers to crustal rocks that have been subject to pressures high enough (> 2.8 GPa) to stabilise coesite (the UHP polymorph of quartz) and/or diamond (Chopin, 1984; Smith, 1984; Sobolev & Shatsky, 1990).

The Western Gneiss Region (WGR) preserves one of the best examples of continental subduction known, as it not only experienced the burial of continental lithosphere to mantle depths in excess of 120 km, but over 30,000 km^2 of the subducted continental crust was also subsequently exhumed (Walsh & Hacker, 2004; Hacker, 2007; Hacker et al., 2010; Walsh et al., 2013). Consequently, the WGR is among the largest, best-exposed, and most-studied UHP terranes in the world (Terry et al., 2000a; Root et al., 2005; Kylander-Clark et al., 2007; DesOrmeau et al., 2015). It provides the unique opportunity to investigate the timescales of deep continental burial and exhumation, as

well as the structural processes associated with UHP metamorphism (Roberts, 2002; Butler et al., 2018; Cutts et al., 2019).

The identification of coesite, microdiamond and polycrystalline quartz grains (after coesite) within mafic eclogites (Dobrzhinetskaya et al., 1995; Cuthbert et al., 2000; van Roermund et al., 2002) has aided in defining three distinct UHP domains within the WGR; Nordøyane, Sørøyane and Nordfjord (Fig. 1; Root et al., 2005). *P–T* conditions increase north-westwards within these domains (Cuthbert et al., 2000), indicative of the past coherence of Nordøyane, Sørøyane and Nordfjord and their oblique subduction (E. J. Krogh, 1977; Griffin & Brueckner, 1985; Cuthbert et al., 2000; Carswell & Cuthbert, 2003; Carswell et al., 2006; Hacker et al., 2010). UHP domains are dominated by quartzofeldspathic host gneiss with minor amounts of quartzite, marble, calc-silicate, anorthosite, gabbro, peridotite and metapelitic gneiss (Gjelsvik, 1951; Bryhni, 1966; Dransfield, 1994; Robinson, 1995).

There has been a large amount of work focused on understanding the timing and subduction behaviour of continental crust within the WGR and its associated *P–T* conditions, the vast bulk of which has concentrated on the mafic eclogites of the region (Griffin & Brueckner, 1985; Cuthbert et al., 2000; Carswell et al., 2003; Kylander-Clark et al., 2007; T. E. Krogh et al., 2011; Corfu et al., 2013; Beckman et al., 2014). *P–T* analysis on the eclogite facies rocks have relied on techniques such as inverse thermobarometry, and the presence of diagnostic minerals such as coesite and diamond to constrain *P–T* conditions (Wain, 1997; Terry et al., 2000b; Carswell et al., 2003; Vrijmoed et al., 2006; Vrijmoed et al., 2008; Smith & Godard, 2013; Walczak et al., 2019). Contrary to mafic eclogites, the volumetrically minor metapelites of the WGR have received little attention in past studies, with the minor research that has been

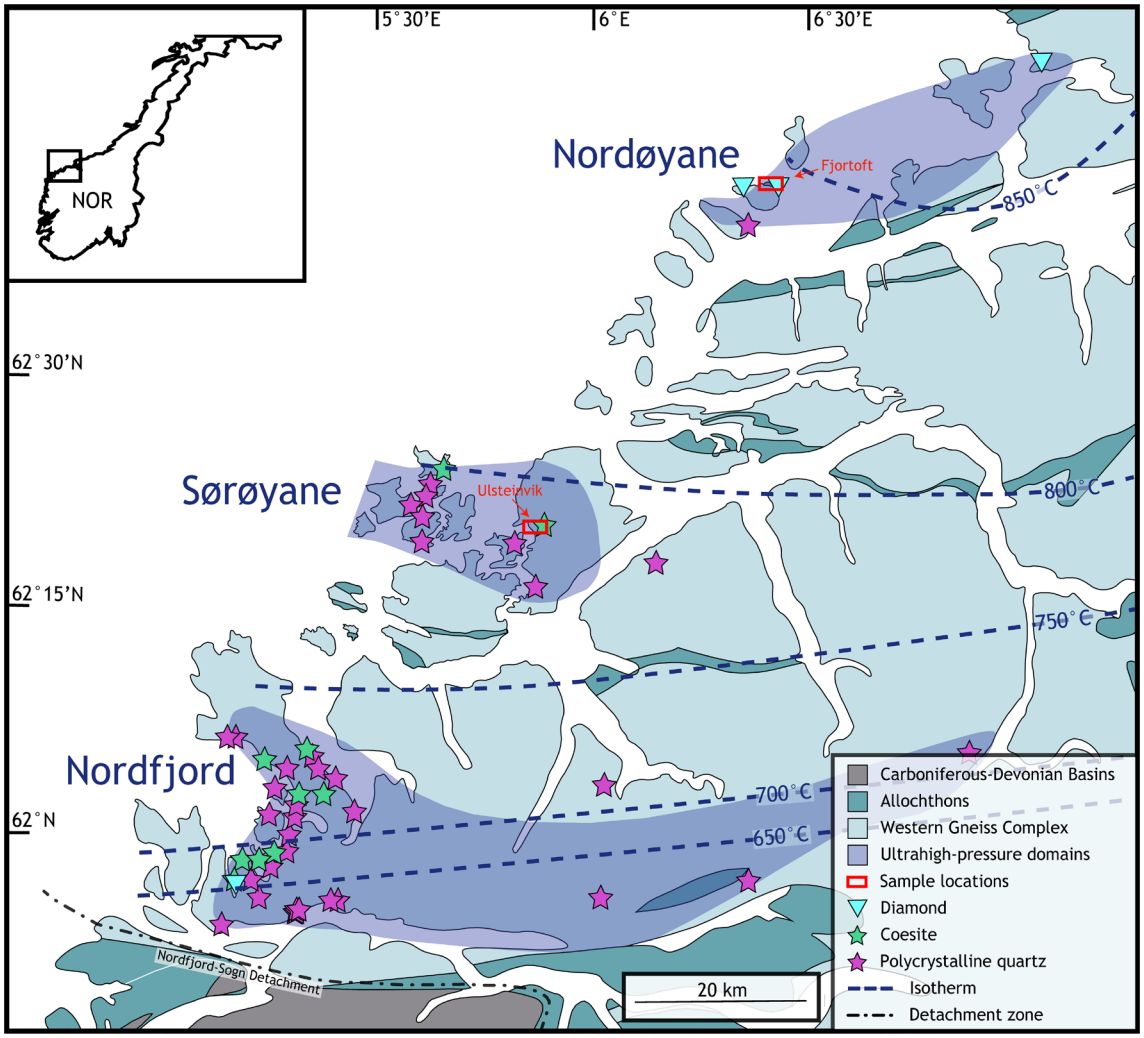


Figure 1: Geologic map of the Western Gneiss Region, Norway, highlighting UHP terranes and sample locations, modified from Walsh et al. (2013). Coesite and polycrystalline quartz locations from Wain et al. (1997), Cuthbert et al. (2000), Carswell et al. (2003), Root et al. (2005) and Spengler et al. (2006) , where polycrystalline quartz aggregates are interpreted to indicate the former presence of coesite. Diamond locations from Dobrzhinetskaya et al. (1995), van Roermund et al. (2002), Vrjimoed et al. (2008) and Smith and Godard (2013). Isotherms from Kylander-Clark et al. (2008).

undertaken primarily being focused on geochronology (Terry et al., 2000b; Cuthbert & van Roermund, 2011; Hacker et al., 2015; Holder et al., 2015; Walczak et al., 2019). Metapelitic rocks typically contain higher concentrations of U and Th and can therefore provide greater potential to correlate evolving mineral assemblages with geochronological data.

Improving the current understanding for the *P–T–time* history of the WGR facilitates comparison with previously calculated geodynamic numerical simulations of

continental subduction and exhumation (e.g. Sizova et al., 2019). Sizova et al. (2019), predicts that continental material will take ~10 million-years (Myr) to enter a subduction zone and reach peak UHP conditions. Metapelitic rocks are an ideal proxy to explore this modelled evolution, due to their progressive growth of useful geochronometers such as zircon and monazite that may track the prograde and retrograde history.

The aim of this study is to undertake *P–T* forward modelling coupled with U–Pb multi-mineral geochronology in metapelitic rocks from the WGR. By using minerals from different textural locations, a thermal system can effectively be tracked. The results from this study will improve the current understanding for *P–T* paths associated with continental subduction and subsequent exhumation. Samples are derived from two key localities: (a) a newly discovered set of metapelitic outcrops in close proximity to the renowned Hareidland eclogite in Ulsteinvik (Mysen & Heier, 1972; Carswell et al., 2003), and (b) a diamond-bearing outcrop on the island of Fjørtoft (Fig. 1; Dobrzhinetskaya et al., 1995; van Roermund et al., 2002; Cuthbert & van Roermund, 2011).

GEOLOGICAL BACKGROUND

Overview of the Western Gneiss Region

The Western Gneiss Region consists of an autochthonous polymetamorphic terrane, referred to as the Western Gneiss Complex (WGC), overlain by a series of oceanic and continental-derived allochthons. The WGC is dominated by granodioritic-tonalitic intrusive rocks that formed during the Gothian Orogeny, from ca. 1700–1500 Ga (Åhäll & Connelly, 2008). The Sveconorwegian Orogeny (ca. 1100–900 Ma) imparted a

granulite-facies overprint over the WGC, and was accompanied by migmatisation, plutonism and mafic dyke emplacement (Brueckner, 1972; Tucker et al., 2004; Kylander-Clark et al., 2008; Corfu et al., 2013).

The Caledonian Orogeny spanned from ca. 480–380 Ma, with early deformation, metamorphism, and juxtaposition of continental and oceanic allochthons. The final phase of the Caledonian Orogeny is termed the Scandian Orogeny (~430–380 Ma). During the terminal Scandian collision: (1) the Iapetus Ocean closed and allochthonous terranes were thrust over the autochthonous Baltican basement from ca. 430–415 Ma (Gee, 1975; Roberts, 2003; Hacker & Gans, 2005); (2) the Baltican basement and portions of overlying allochthons beneath Laurentia experienced westward subduction to UHP depths (Griffin & Brueckner, 1980; Andersen et al., 1998; Terry et al., 2000b; Root et al., 2005; Kylander-Clark et al., 2009; T. E. Krogh et al., 2011); and then (3), near-isothermal exhumation to shallow crustal levels from ca. 400–385 Ma (Andersen et al., 1998; Terry et al., 2000b; Tucker et al., 2004; Hacker, 2007; Walsh et al., 2007). A two-stage exhumation is suggested for the UHP rocks of the WGR: (1) rapid buoyancy-driven exhumation from the mantle to crustal depths (e.g. Andersen et al., 1991); and (2) a slower period of crustal exhumation related to extension (Walsh et al., 2013).

The Scandian Laurentia-Baltica collision and exhumation resulted in the exposure of high-pressure (HP) and UHP terranes across the WGR. The spatial distribution of coesite-bearing eclogites and $^{40}Ar/^{39}Ar$ ages have been used to conclude that these UHP terranes (Fig. 1) outcrop in three east-southeast plunging antiforms along the west coast; Nordfjord, Sørøyane and Nordøyane (Root et al., 2005). The WGR is structurally

imbricated by discontinuous remnants of Caledonian thrust nappes, for example, the Seve-Blåhø nappe (e.g. Terry et al., 2000b).

Metamorphism of the Western Gneiss Region

Incomplete overprinting reactions have allowed the sequence of metamorphic events in the WGR to be relatively well constrained (Bryhni & Andréasson, 1985). The Sveconorwegian amphibolite- to granulite-facies metamorphism was associated with peak conditions of ~800–900 °C and 1.0 GPa. (Tucker et al., 1990; Corfu & Andersen, 2002; Root et al., 2005)

Relicts of this event within the WGC are rare but tend to be more prevalent within allochthons that were thrust over the Baltican basement during the early stages of the Caledonian Orogeny (Jolivet et al., 2005). Low H_2O contents, coarse grain size and limited deformation have been attributed to the sporadic preservation of these granulite-facies assemblages during the subsequent Caledonian Orogeny (Austrheim, 1987; Krabbendam et al., 2000). Pre-Scandian Caledonian metamorphism potentially involved multiple episodes of amphibolite facies metamorphism, with peak conditions of ~725 °C and 1.2 GPa recorded in overlying allochthons of the WGR (Gee, 1975; Hacker &

Table 1: Summary of the metamorphic deformation events experienced in the Western Gneiss Region. Modified from Hacker et al. (2010).

Event			Timing (Ma)	Pressure (Gpa)	Temperature (°C)
Caledonian Orogeny	Scandian Orogeny	Amphibolite-facies overprint	400–380	0.5–1.5	650–800
		Baltica-Laurentia HP-UHP event	430–400	1.8–3.6	600–750
	Early Caledonian allochthonous events		480–430	1.2	725
Sveconorwegian granulite-facies event			~1100–900	1	900
Gothian Orogeny			~1700–1500		

Gans, 2005). This phase of the Caledonian Orogeny has not been recorded within the WGC basement. Scandian subduction of the Baltican margin beneath Laurentia resulted in widespread HP-UHP metamorphism, evidenced by the presence of mantle peridotites, eclogites and eclogite-facies metagabbros (Wain, 1997; van Roermund & Drury, 1998; Cuthbert et al., 2000). Eclogites from these regions record *P–T* conditions of 1.5–3.9 GPa and 600–820 °C, with an overall northwestward increasing *P–T* gradient (Wain, 1997; Cuthbert et al., 2000; Labrousse et al., 2004; Root et al., 2005; Carswell et al., 2006; Young et al., 2007; Hacker et al., 2010; Butler, 2013). Nordfjord records the transition between HP quartz eclogites (~600 °C and 2.4 GPa) and UHP coesite- and microdiamond-bearing eclogites (750 °C and >3.5 GPa; Cuthbert et al., 2000; Young et al., 2007; Smith & Godard, 2013). Sørøyane, the UHP domain where Ulsteinvik samples are sourced from, yields peak conditions of 795 °C and 3.2 GPa (Carswell et al., 2003; Root et al., 2004). Nordøyane records the maximum *P–T* conditions across the WGR, with eclogites and microdiamond-bearing paragneiss recording peak conditions of 820–850 °C and 3.8–3.9 GPa (Terry et al., 2000b; Carswell et al., 2006). Fjørtoft exists in the northern region of this UHP terrane and records some of the highest peak *P–T* conditions in the WGR. The late Scandian exhumation and decompression of the WGR imparted a pervasive amphibolite-facies overprint and local partial melting. Peak conditions during this event reached 650–800 °C and 0.5–1.5 GPa, almost completely destroying the past record of UHP metamorphism (e.g. Dransfield, 1994; Labrousse et al., 2004; Walsh & Hacker, 2004; Root et al., 2005). The WGR was exhumed almost isothermally to depths of ~15–20 km during this period, causing some regions to undergo partial melting (Tucker et al., 2004; Kylander-Clark et al., 2008). The second stage of exhumation and cooling was slow and parts of the WGR are

thought to have remained above the closure temperature of rutile (~600 °C) until as late as ca. 375 Ma (Butler et al., 2018).

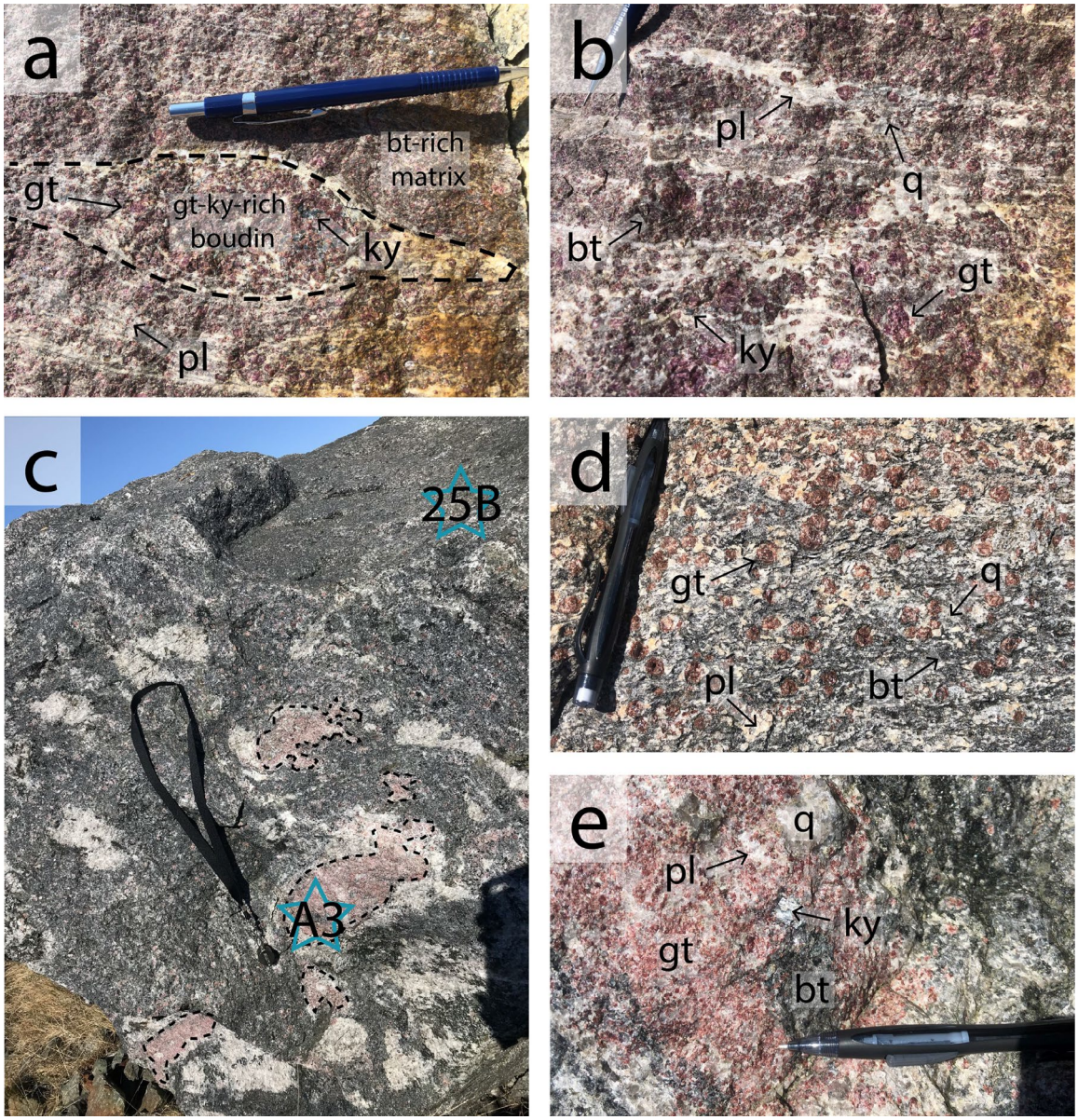


Figure 2: Field photos from sample locations. (a) Fjørtoft WGC2019J-30 garnet-kyanite-plagioclase rich boudin (dashed line) surrounded by a garnet-kyanite-biotite-plagioclase bearing matrix. (b) Fjørtoft WGC2019J-31C garnet-kyanite metapelite with felsic interlayers of plagioclase, suggesting partial melting. (c) Ulsteinvik WGC2019J-25B, WGC2019A-3 outcrop, showing garnet-rich patches (dashed line) with kyanite and quartz. Biotite-bearing gneiss encloses the garnet-bearing patches. (d) Ulsteinvik WGC2019A-25B: detailed view of garnet-plagioclase-biotite-bearing gneiss. (e) Ulsteinvik WGC2019A-3: detailed view of garnet-rich patches. Annotations: gt = garnet, ky = kyanite, pl = plagioclase, bt = biotite, q = quartz.

Past geochronological work in Nordøyane and Sørøyane

Over the past ~40 years, there have been numerous studies focused on constraining the evolution of the WGR. Past geochronological work for the Nordøyane and Sørøyane UHP terranes are summarised below and in Tables 2 and 3. A more extensive interpretation of age data can be found in DesOrmeau et al. (2015).

Samples

Sample WGC2019J-31A was collected from an allochthonous terrane called the Seve-Blåhø nappe on the island of Fjørtoft (32V 368303 6956199, WGS 84 UTM). Samples WGC2019J-25B and WGC2019A-3 are collected from the same outcrop in Ulsteinvik (32V 335031 6916093, WGS 84 UTM), proximal to the UHP Hareidland eclogite, a sheet-like body with an area of ~4 km^2 (Mysen & Heier, 1972). Both samples are garnet-kyanite metapelitic gneisses (Fig. 2).

Age	Method	Location	Rock type	Notes
374 ± 1 Ma	Single-grain isotope dilution-thermal ionization mass spectrometry (ID–TIMS) rutile $^{206}Pb/^{238}U$ age	Flem Gabbro	Gabbro pegmatite	(Krogh et al., 2011)
374.6 ± 2.7 Ma	EPMA monazite mean-chemical $^{206}Pb/^{238}U$ age	Fjørtoft	Kyanite-garnet mylonite	(Terry et al., 2000b)
374.9 ± 3.7 Ma	Laser-ablation inductively-coupled-plasma mass-spectrometry (LA–ICP–MS) rutile $^{206}Pb/^{238}U$ weighted mean age	Otrøy	Eclogite	(Cutts et al., 2019)
376 ± 2 Ma	Chemical abrasion TIMS titanite single concordant $^{206}Pb/^{238}U$ age	Harøya	Migmatitic gneiss	(Butler et al., 2018)
377 ± 1 Ma	ID–TIMS rutile $^{206}Pb/^{238}U$ age	Flem Gabbro	Eclogite margin of Flem Gabbro	(Krogh et al., 2011)
377 ± 1.6 Ma	Chemical abrasion TIMS and laser ablation multi-collector inductively coupled mass spectrometry (LA–MC–ICP–MS) rutile $^{206}Pb/^{238}U$ ages	Harøya	Migmatite	(Butler et al., 2018)
378 ± 1.6 Ma	Chemical abrasion TIMS and LA–MC–ICP–MS rutile $^{206}Pb/^{238}U$ ages	Harøya	Eclogite	(Butler et al., 2018)
379.0 ± 3.8 Ma	LA–ICP–MS rutile $^{206}Pb/^{238}U$ weighted mean age	Otrøy	Eclogite	(Cutts et al., 2019)
380.0 ± 2.0 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Otrøy	Migmatitic hornblende-K-feldspar gneiss	(Spencer et al., 2013)
380 ± 14 Ma	Four- and three-point Lu–Hf isochron	Otrøy	UHP eclogite	(Kylander-Clark et al., 2007)
381.0 ± 6.2 Ma	LA–ICP–MS rutile $^{206}Pb/^{238}U$ weighted mean age	Fjørtoft	UHP eclogite	(Cutts et al., 2019)
381.3 ± 7.2 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Gossa	Biotite gneiss	(Spencer et al., 2013)
384 ± 11 Ma	Three- and two-point isochron	Remøya	UHP eclogite	(Kylander-Clark et al., 2007)
384.5 ± 7.3 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Otrøy	Hornblende-plagioclase pegmatite	(Spencer et al., 2013)

Table 2: Geochronological summary of Caledonian ages from Nordøyane.

385 ± 1 Ma	ID–TIMS titanite $^{206}Pb/^{238}U$ age	Flemsøya	Granitic pegmatite	(Krogh et al., 2011)
386 ± 5 Ma	LA–ICP–MS $^{206}Pb/^{238}U$ rutile age	Fjørtoft	UHP microdiamond gneiss	(Zack et al., 2011)
388 ± 10 Ma	Three- and two-point isochron	Otrøy	UHP eclogite	(Kylander-Clark et al., 2007)
390 ± 2 Ma	ID–TIMS zircon $^{206}Pb/^{238}U$ age	Flemsøya	Granitic pegmatite	(Krogh et al., 2011)
390 ± 12 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Otrøy	Retrogressed eclogite	(Spencer et al., 2013)
392.5 ± 1.1 Ma	Chemical abrasion TIMS titanite $^{206}Pb/^{238}U$ age	Otrøy	Leucosome	(Kylander-Clark et al., 2008)
393.4 ± 3.4 Ma	Two-point Sm–Nd isochron	Svartberget	Garnet peridotite body and garnet websterite vein	(Vrijmoed et al., 2008)
ca. 395 Ma	Zircon $^{206}Pb/^{238}U$ age	Averøya, Fjørtoft	Pegmatite	(Krogh et al., 2004)
ca. 395–392 Ma	Chemical abrasion TIMS and LA–MC–ICP–MS zircon $^{206}Pb/^{238}U$ ages	Harøya	Migmatite hosting eclogite bodies	(Butler et al., 2018)
397.5 ± 4.4 Ma	Electron probe micro analysis (EPMA) monazite mean-chemical $^{206}Pb/^{238}U$ age	Fjørtoft	Matrix of UHP microdiamond gneiss	(Terry et al., 2000b)
399.4 ± 2.9 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Gossa	Calc-silicate gneiss	(Spencer et al., 2013)
400 ± 16 Ma	Three-point Sm–Nd isochron	Flemsøya	Eclogite	(Mørk & Mearns, 1986)
402.7 ± 4.6 Ma	Three-point isochron and two-point isochron	Vigra (~20km SW of Nordøyane)	Eclogite	(Kylander-Clark et al., 2007)
405.0 ± 0.9 Ma	ID-TIMS zircon weighted mean $^{206}Pb/^{238}U$ age	Midsund Bruk	UHP eclogite	(Krogh et al., 2011)
407 ± 24 Ma	Two-point Sm–Nd isochron	Frei (~45km NE of Nordøyane)	Eclogite	(Mearns, 1986)
407.0 ± 2.1 Ma	EPMA monazite mean-chemical $^{206}Pb/^{238}U$ age	Fjørtoft	UHP microdiamond gneiss and mylonite	(Terry et al., 2000b)
408.0 ± 5.6 Ma	EPMA monazite mean-chemical $^{206}Pb/^{238}U$ age	Fjørtoft	UHP microdiamond gneiss	Monazite inclusions inside garnet (Terry et al., 2000b).
409 ± 3 Ma	Weighted mean $^{206}Pb/^{238}U$ age	Flemsøya	Eclogite margin of Flem Gabbro	(Krogh et al., 2011)
409.6 ± 1.5 Ma	ID–TIMS zircon $^{206}Pb/^{238}U$ ages	~20km NE of Nordøyane	Eclogite	(Krogh et al., 2011)

410 ± 16 Ma	Three-point Sm–Nd isochron	Flemsøya	`Eclogite	Same sample as analysed by Mørk and Mearns (1986). Recalculated by Root et al. (2004).
410.8 ± 1.4 Ma	ID–TIMS zircon $^{206}Pb/^{238}U$ ages	~20km NE of Nordøyane	Eclogite	(Krogh et al., 2011)
411 ± 2 Ma	Weighted mean $^{206}Pb/^{238}U$ age	Flem gabbro	UHP eclogite	(Krogh et al., 2011)
412 ± 1 Ma	Weighted mean $^{206}Pb/^{238}U$ age	Lepsøya	Hornblende-eclogite	(Krogh et al., 2011)
ca. 400–413 Ma	Chemical abrasion TIMS and LA–MC–ICP–MS zircon $^{206}Pb/^{238}U$ ages	Harøya	Eclogite	Among these ages, an age of 413.1 ± 6.6 Ma was constrained from a UHP coesite-bearing eclogite (Butler et al., 2018)
413.9 ± 3.7 Ma	Four-point Sm–Nd isochron	Gossa	Eclogite	(Kylander-Clark et al., 2009)
415.0 ± 6.8 Ma	Secondary ion mass spectrometry (SIMS) monazite weighted-mean $^{206}Pb/^{238}U$ age	Fjørtoft	UHP microdiamond gneiss	Monazite inclusions inside garnet (Terry et al., 2000b).
416.3 ± 3.7 Ma	Four- and three-point Lu–Hf isochrons	Vigra (~20km SW of Nordøyane)	UHP eclogite	(Kylander-Clark et al., 2007)
418 ± 11 Ma	Sm–Nd garnet-clinopyroxene mineral-pair isochron	Tverrfjell (15km NE of Nordøyane)	Eclogite	(Griffin & Brueckner, 1980, 1985)
ca. 421–400 Ma	Split-stream LA–ICP–MS zircon separate ages	Midsund Bruk	UHP eclogite	Data from Krogh et al. (2011). REE abundances suggest three distinct groups; ca. 421 Ma, 409-404 Ma, 400 Ma (Kylander-Clark et al., 2013)
429.5 ± 3.1 Ma	Weighted mean age of two two-point isochrons and one three-point Sm–Nd isochron	Otrøy and Flemsøy	Garnet pyroxenite	(Spengler et al., 2009)

Table 3: Geochronological summary of Caledonian ages from Sørøyane.

Age	Method	Location	Rock type	Notes
369 ± 11 Ma	Four- and three-point Lu–Hf isochron	Remøya	UHP eclogite	(Kylander-Clark et al., 2007)
381.9 ± 1.9 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Nerlandsøya	Quartzofeldspathic ultramylonite	(Spencer et al., 2013)
386.1 ± 2.2 Ma	Chemical abrasion TIMS rutile $^{206}Pb/^{238}U$ age	Remøya	Unspecified	(Kylander-Clark et al., 2008)
387.0 ± 0.9 Ma	Chemical abrasion TIMS rutile $^{206}Pb/^{238}U$ age	Remøya	Unspecified	(Kylander-Clark et al., 2008)
388.8 ± 2.4 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Gurskøya	Sillimanite gneiss	(Spencer et al., 2013)
388.8 ± 3.1 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Ulsteinvik	Retrogressed eclogite (overprinted by garnet granulite)	(Spencer et al., 2013)
390.2 ± 0.8 Ma	Chemical abrasion TIMS titanite $^{206}Pb/^{238}U$ age	Hareidlandet	Leucosome	(Kylander-Clark et al., 2008)
390.3 ± 4.9 Ma	Split stream LA–ICP–MS monazite weighted mean $^{206}Pb/^{238}U$ age	Leinøya	Garnet-muscovite-kyanite gneiss	(Kylander-Clark et al., 2013)
390.5 ± 0.9 Ma	Chemical abrasion TIMS titanite $^{206}Pb/^{238}U$ age	Ulsteinvik	Leucosome	(Kylander-Clark et al., 2008)
390.6 ± 2.5 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Remøyholmen	Perthite-biotite mylonite with amphibolite facies fabric	(Spencer et al., 2013)
391 ± 13 Ma	Three-point Lu–Hf isochron	Sandvik	Eclogite	(Kylander-Clark et al., 2009)
392.7 ± 2.3 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Blankholmen	Single titanite rim on rutile in gneiss	(Spencer et al., 2013)
395.0 ± 3.9 Ma	Split stream LA–ICP–MS monazite weighted mean $^{206}Pb/^{238}U$ age	Leinøya	Garnet-muscovite-kyanite gneiss	(Kylander-Clark et al., 2013)
395.9 ± 1.4 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Hareidlandet	Biotite gneiss	(Spencer et al., 2013)
396.3 ± 4.6 Ma	LA–MC–ICPMS $^{238}U/^{206}Pb$-$^{207}Pb/^{206}Pb$ titanite isochron	Dimnøya	Hornblende-plagioclase-titanite leucosome	Discordant. (Spencer et al., 2013)
397.1 ± 4.8 Ma	Four-point Sm–Nd isochron	Sandvik	Eclogite	(Kylander-Clark et al., 2009)

398.3 ± 5.5 Ma	Three-point isochron and two-point isochron	NW Gurskøy (~5km S of Sørøyane)	Eclogite	(Kylander-Clark et al., 2007)
401 ± 20 Ma	Zircon multi-grain ID–TIMS weighted-mean $^{206}Pb/^{238}U$ age	Ulsteinvik	Eclogite	(Krogh et al., 1974)
401 ± 20 Ma	Zircon multi-grain ID–TIMS weighted-mean $^{206}Pb/^{238}U$ age	Ulsteinvik	Eclogite	(Krogh et al., 1974)
401.6 ± 1.6 Ma	Zircon (air) multi-grain ID–TIMS weighted-mean $^{206}Pb/^{238}U$ age	Ulsteinvik	Eclogite	(Carswell et al., 2003)
ca. 402 Ma	ID–TIMS zircon $^{206}Pb/^{238}U$ age	Ulsteinvik	Coesite-bearing eclogite	(Tucker et al., 2004)
408.8 ± 6.3 Ma	Split stream LA–ICP–MS monazite weighted mean $^{206}Pb/^{238}U$ age	Leinøya	Garnet-muscovite-kyanite gneiss	(Kylander-Clark et al., 2013)
ca. 401–410 Ma	ID–TIMS zircon $^{206}Pb/^{238}U$ age	Ulsteinvik	Eclogite	(DesOrmeau et al., 2015)
411.5 ± 4.1 Ma	Four- and three-point Lu–Hf isochrons	NW Gurskøy (~5km S of Sørøyane)	Eclogite	(Kylander-Clark et al., 2007)
412.0 ± 4.7 Ma	Four- and three-point Lu–Hf isochrons	NW Gurskøy (~5km S of Sørøyane)	Eclogite	(Kylander-Clark et al., 2007)
412 ± 12 Ma	Two-point Sm–Nd isochron	Eiksunddal	Eclogite	(Jamtveit et al., 1991)
412 ± 25 Ma	SIMS and LA–ICP–MS zircon concordia ages	~20km E of Sørøyane	Eclogite	(Walsh et al., 2007)
412 ± 4 Ma	Two-point Sm–Nd isochron	Eiksunddal	Eclogite	Same sample as analysed by Jamtveit et al. (1991). Recalculated by Root et al. (2004).
401–413 Ma	Split stream LA–ICP–MS zircon $^{206}Pb/^{238}U$ age	Ulsteinvik	Eclogite	(DesOrmeau et al., 2015)
423 ± 30 Ma	Sm–Nd garnet-clinopyroxene mineral-pair isochron	Ulsteinvik	Eclogite	(Griffin & Brueckner, 1980, 1985)
426.5 ± 5.6 Ma	Split stream LA–ICP–MS monazite weighted mean $^{206}Pb/^{238}U$ age	Leinøya	Garnet-muscovite-kyanite gneiss	(Kylander-Clark et al., 2013)
ca. 475–430 Ma	LA–ICP–MS zircon $^{206}Pb/^{238}U$ ages	Ulsteinvik	Eclogite	Nearly continuous spread of concordant data (DesOrmeau et al., 2015).

METHODS

Whole-rock geochemistry

Whole-rock chemical compositional data was acquired at Bureau Veritas, Adelaide for seven samples: two from Ulsteinvik and five from Fjørtoft. The data from two of these samples was used in the calculation of metamorphic mineral equilibria forward modelling. Geochemical assays and extended methods are presented in Appendix 1.

Electron Probe Micro Analyses (EPMA)

Mineral composition element analyses and element X-ray maps were acquired at Adelaide Microscopy, using a CAMECA SXFive Electron Microprobe under standard operating conditions (Table 4). Appendix 2 contains extended EPMA methods and results. Stoichiometric charges were effectively balanced with AX-62 software (Droop, 1987; Holland & Powell, 1990; Holland et al., 1998; Jennings & Holland, 2015; Holland et al., 2018) and then used to calculate the amount of Fe^{3+} present in iron-bearing phases within the sample (see Appendix 4A).

Table 4: EPMA operating conditions.

Analysis Type	Beam Current (nA)	Accelerating Voltage (15kV)	Spot Size (µm)	Dwell time (µs)	Step Size (µm)
Garnet composition element analysis traverse	20	15	5	-	-
31A garnet element x-ray map	200	20	-	30	16
25B garnet element x-ray map	200	20	-	30	9
Crd-sp reaction texture element x-ray maps	200	20	-	30	4-8

LA–ICP–MS: Geochronology

Zircon, monazite, rutile and apatite U–Pb isotopic data were acquired using a RESOlution LR 193nm Excimer laser system and coupled Agilent 7700s ICP-MS at Adelaide Microscopy, following the standard methods. Zircon was analysed in grain mount, while monazite, rutile and apatite data were collected in-situ. Operating conditions are detailed in Table 5. Data processing and reduction was done using Iolite 3.6 software (Hellstrom et al., 2008; Paton et al., 2011).

Mineral separate preparation, extended LA–ICP–MS methods, LA–ICP–MS standards, and data processing procedures are detailed in Appendix 3A.

Table 5: LA–ICP–MS operating conditions.

Mineral	Sample/Analysis type	Spot size (µm)	Fluence (J/cm^2)	Energy (mJ)	Frequency (Hz)	Scan speed (µm/s)
Zircon	WGC2019J-25B spot data	19	2	28	5	-
	WGC2019J-31A spot data	19	2	30	5	-
Monazite	WGC2019A-3 spot data	19	2	33	5	-
	WGC2019J-25B spot data	19	2	33	5	-
	WGC2019J-31A spot data	19	2	33	5	-
Rutile	WGC2019A-3 spot data	29	5	45	5	-
	WGC2019J-25B spot data	29	5	45	5	-
Apatite	WGC2019A-3 spot data	29	3.5	45	5	-
	WGC2019J-25B spot data	29	3.5	45	5	-
Garnet	WGC2019J-25B (1) spot data	51	3.5	45	5	-
	WGC2019J-25B (2) spot data	51	3.5	45	5	-
	WGC2019J-31A spot data	51	3.5	45	5	-
	WGC2019J-25B (1) map	61	3.5	45	10	90
	WGC2019J-25B (2) map	61	3.5	45	10	90
	WGC2019J-31A map	91	3.5	45	10	135

LA–ICP–MS: Trace elements

Trace element data for zircon, monazite and apatite were acquired using a RESOlution LR 193nm Excimer laser system and coupled Agilent 7700s ICP–MS at Adelaide Microscopy. In addition to spot analysis, 2D trace element mapping was undertaken on garnet. Iolite 3.6 software (Hellstrom et al., 2008; Paton et al., 2011) was used for data processing and reduction. Refer to Appendix 3A for extended LA–ICP–MS methods.

Mineral equilibria forward modelling

Mineral equilibria models were calculated using THERMOCALC v.3.40 software in the model system MnNCKFMASHTO (MnO-Na2O-CaO-K2O-FeO-MgO-Al2O3-SiO2-H2O-TiO2-O), using the internally consistent thermodynamic dataset 'ds62'. (Holland & Powell, 2011; Green et al., 2016). The most recent activity-composition (a–x) models (White et al., 2000; Holland & Powell, 2003; Smye et al., 2010; Holland & Powell, 2011; Diener & Powell, 2012; White, Powell, Holland, et al., 2014; White, Powell, & Johnson, 2014; Green et al., 2016) were used to calculate *P–T* pseudosections for samples WGC2019J-25B and WGC2019J-31A. An additional *P–Mo* pseudosection was used to constrain oxidation state in sample WGC2019J-25B (Appendix 4B), as whole-rock geochemical analyses are not considered representative of FeO and Fe_2O_3 content (e.g. Rapp & Watson, 1995; Rebay et al., 2010; Johnson & White, 2011; Kelsey & Hand, 2015; Palin et al., 2016a). In the initial *P–Mo* calculation, temperature was fixed at 790 °C while pressure and oxidation state were varied. The oxidation compositional axis varied from 90% Fe_2O_3 to 10% Fe_2O_3 (10-90% FeO). Oxidation state in WGC2019J-31A was estimated based on garnet and biotite abundance and respective average Fe^{3+} and Fe^{2+} cations calculated by EPMA. Water content in both samples was determined by multiplying total wt% biotite by EPMA-calculated wt%

H2O in biotite. Water content was determined based on the abundance of biotite in the rock.

RESULTS

Petrography

WGC2019J-25B

Peak minerals consist of porphyroblastic garnet (~1 cm), variably pseudomorphed relict kyanite (up to 3000 μm), rutile, quartz and apatite which occurs as a coarse-grained porphyroblast within the matrix (~2000 μm) or as finer-grained inclusions (~250 μm) inside garnet. Kyanite contains inclusions of rutile, apatite and quartz. The matrix is defined by coarse-grained domains of quartz interspersed with finer-grained polygonal quartz intergrown with plagioclase and unoriented laths of biotite (Fig. 3g), along with occasional clusters of coarse-grained biotite. These biotite-bearing intergrowths have sharply defined boundaries delineating elongate domains that parallel the gneissic layering. Garnet porphyroblasts contain inclusions of kyanite, ilmenite, rutile, zircon, apatite, muscovite, biotite and quartz. Quartz inclusions occasionally form mosaic structures reminiscent of polycrystalline quartz after coesite (Fig. 3i; Mosenfelder & Bohlen, 1997). Garnet is systematically separated from kyanite/sillimanite and biotite by either a monomineralic cordierite corona, or by a composite texture comprising symplectic cordierite, plagioclase and spinel associated with a simple corona of cordierite (Fig. 3a). Additionally, kyanite is locally partially replaced by sillimanite (Fig. 3c), and in rare instances, sillimanite has acted as a substrate for the cordierite-spinel bearing reaction textures.

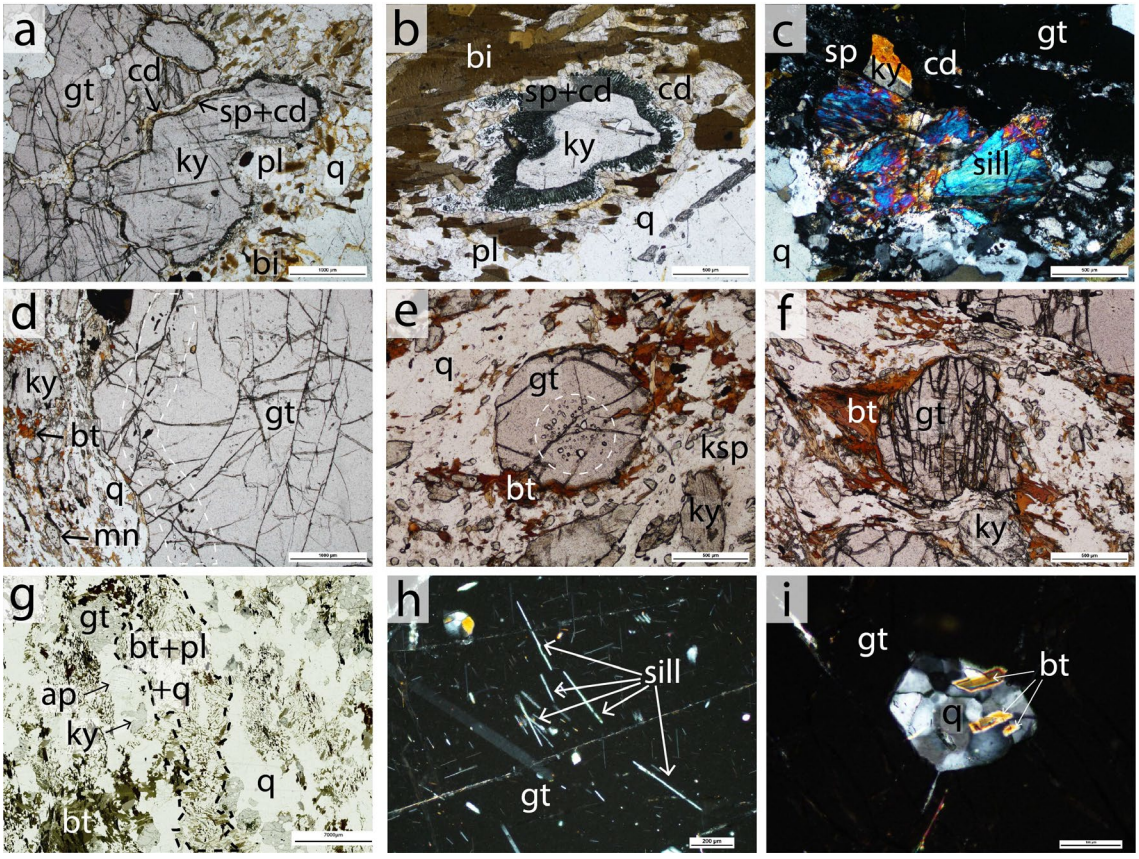


Figure 3: Photomicrographs from this study. (a) WGC2019J-25B: Porphyroblastic kyanite and garnet separated by symplectic cordierite and spinel, and a simple corona of cordierite. (b) WGC2019J-25B: Spinel-cordierite symplectite and cordierite corona isolating kyanite from biotite. (c) WGC2019J-25B. Sillimanite retrogression of kyanite. (d) WGC2019J-31A. A trail of inclusions (dotted line) concentrated in the rim of a coarse-grained garnet porphyroblast. (e) WGC2019J-31A. Inclusions (dotted line) concentrated in the core of a fine-grained garnet porphyroblast. (f) WGC2019J-31A. A retrograde biotite strain shadow adjacent to porphyroblastic garnet. (g) WGC2019J-25B. Fine-grained biotite-plagioclase-quartz domains that potentially formed after the breakdown of phengite and omphacite. (h) WGC2019J-31A: Sillimanite inclusions inside garnet. (i) WGC2019J-25B: Mosaic quartz inside garnet. Annotations: gt = garnet, ky = kyanite, pl = plagioclase, cd = cordierite, ksp = K-feldspar, bt = biotite, mn = monazite, q = quartz.

WGC2019J-31A

Porphyroblastic garnet within WGC2019J-31A is coarse-grained (up to 5 cm) and often intensely fractured. Garnet contains inclusions of kyanite, sillimanite, biotite, pyrite, pyrrhotite, chalcopyrite, zircon, monazite, apatite and quartz. With the exception of sillimanite, these inclusions are typically concentrated in a thin domain that occurs near the rim in coarser-grained garnets (Fig. 3d), and closer to the core in finer-grained garnets (Fig. 3e). The garnets are enclosed in a protomylonitic matrix consisting of plagioclase, K-feldspar, biotite, kyanite, quartz, rutile, pyrrhotite, chalcopyrite,

muscovite and graphite. Three generations of biotite are present: (1) fine-grained inclusions within garnet and kyanite, (2) matrix, foliation defining biotite, exhibiting partial replacement by chlorite, and (3) retrograde biotite localised in strain shadows adjacent to garnet (Fig. 3f).

Mineral chemistry

Representative endmember compositions of garnet, plagioclase and K-feldspar are presented in Table 6. Appendix 2 contains an extended summary of elemental oxide and cation values for each analysed mineral, along with additional garnet EPMA maps. Appendix 3B contains additional LA–ICP–MS garnet maps, trace element spiderplots and traverse plots.

GARNET

Garnet composition from WGC2019J-25B is dominantly almandine (Fig. 4c; Table 6), with X_{alm} (Fe^{2+} /(Fe^{2+} + Ca + Mg + Mn)) values of 0.48–0.54 in garnet cores, 0.49–0.64 in garnet rims and 0.64–0.71 in garnet partially consumed in retrograde reaction textures. Qualitative elemental maps (Fig. 4a, b) and quantitative traverse data (Fig. 4c) record prograde zoning. Almandine, grossular and spessartine are enriched in WGC2019J-25B garnet cores, and steadily decrease in concentration towards the rim. Pyrope is depleted within garnet cores and increases toward the rim. Resorption in the outermost rim of garnet records a steep increase in almandine and spessartine concentrations, and a decrease in pyrope and grossular (Fig. 4a, c).

WGC2019J-31A garnet is principally almandine (X_{alm} = 0.59–0.68) and preserves a flat zoning profile (Fig. 4f), indicative of compositional resetting after retrograde diffusion.

Table 6: Summary of mineral chemistry for WGC2019J-25B and WGC2019J-31A.

Mineral	End-member proportions	WGC2019J-25B		WGC2019J-25B reaction textures	WGC2019J-31A	
		Garnet rim	Garnet core		Garnet rim	Garnet core
Garnet	X_{gt}	0.59–0.73	0.60–0.70	0.65–0.73	0.65-0.74	0.67-0.72
	X_{alm}	0.49–0.64	0.48–0.54	0.64–0.71	0.59-0.67	0.63-0.68
	X_{py}	0.21–0.30	0.16–0.32	0.26–0.34	0.20-0.29	0.24-0.28
	X_{grs}	0.08–0.17	0.17–0.23	0	0.06-0.10	0.03-0.04
	X_{sps}	0.01–0.04	0.01–0.02	0.03–0.04	0.01	0.01-0.02
Plagioclase	X_{ab}	0.06–0.76		0.01–0.05	0.74–0.75	
	X_{an}	0.23–0.94		0.95–0.99	0.24–0.25	
K-Feldspar	X_{ab}	–		–	0.11–0.15	
	X_{or}	–		–	0.85–0.89	
Spinel	X_{sp}	0.61–0.65		0.72–0.78	–	
	ZnO (wt%)	1.43–2.36		–	–	
	Cr_2O_3 (wt%)	0.16–0.46		0.12–0.62	–	
	MnO (wt%)	0.08–0.21		0.13–0.22	–	
Biotite	X_{bi}	0.24–0.26		0.36–0.46	0.40–0.42	
	TiO_2 (wt%)	2.84–3.25		2.46–5.05	4.42–5.49	
	Al_2O_3 (wt%)	16.62–17.55		16.56–18.05	16.87–18.48	
	MnO (wt%)	–0.03–0.8		0	–0.02–0.08	
Cordierite	X_{crd}	–		0.22–0.25	–	
Ilmenite	**MnO**	–		0–0.42	–	
	TiO_2	–		44.01–47.98	–	

Unless indicated otherwise by the units (wt%), proportions are atomic/molar.
$X_{gt} = Fe^{2+}/(Fe^{2+} + Mg)$
$X_{alm} = Fe^{2+}/(Fe^{2+} + Mg + Ca + Mn)$
$X_{py} = Mg/(Fe^{2+} + Mg + Ca + Mn)$
$X_{gr} = Ca/(Fe^{2+} + Mg + Ca + Mn)$
$X_{sps} = Mn/(Fe^{2+} + Mg + Ca + Mn)$
$X_{ab} = Na/(Na + Ca)$

$X_{an} = Ca/(Ca + Na + K)$
$X_{or} = K/(Ca + Na + K)$
$X_{sp} = Mg/(Fe^{2+} + Mg)$
$X_{bi} = Fe^{2+}/(Fe^{2+} + Mg)$
$X_{crd} = Fe^{2+}/(Fe^{2+} + Mg)$

Almandine and spessartine exhibit subtle rim-ward depletion. Pyrope records limited variation throughout the zoning profile. Grossular occurs in low concentrations and records a primarily flat profile that abruptly rises toward the rim (Fig. 4d, g).

PLAGIOCLASE

Plagioclase is present in both samples. WGC2019J-25B yields X_{an} (Ca /(Ca + Na + K)) values of 0.23–0.99 and X_{ab} (Na/ Na + Ca) values of 0.01–0.076 (Table 6). Plagioclase that occurs in WGC2019J-25B reaction textures is more anorthitic (Xan = 0.95–0.99). Figure 5 shows rim-ward Ca-enrichment in plagioclase interacting with these reaction textures. WGC2019J-31A plagioclase calculates X_{an} values of 0.24–0.25, and X_{ab} values of 0.74–0.75.

K-FELDSPAR

K-feldspar occurs only in WGC2019J-31A. It records X_{ab} values of 0.11–0.15 and X_{or} (K /(Ca + Na + K)) values of 0.85–0.89 (Table 6).

SPINEL

Spinel is present in WGC2019J-25B. X_{sp} (Mg /(Fe^{2+} + Mg)) ranges from 0.61–0.78 and is higher in reaction texture spinel. It contains small amounts of ZnO (Fig. 5), Cr_2O_3 and MnO.

BIOTITE

X_{bi} (Fe^{2+} /(Fe^{2+} + Mg)) values in WGC2019J-25B range from 0.24–0.46, with reaction texture biotite recording the higher proportion of these values (X_{bi} = 0.36–0.46). WGC2019J-31A records X_{bi} values between 0.40–0.42. TiO_2 in WGC2019J-25B biotite

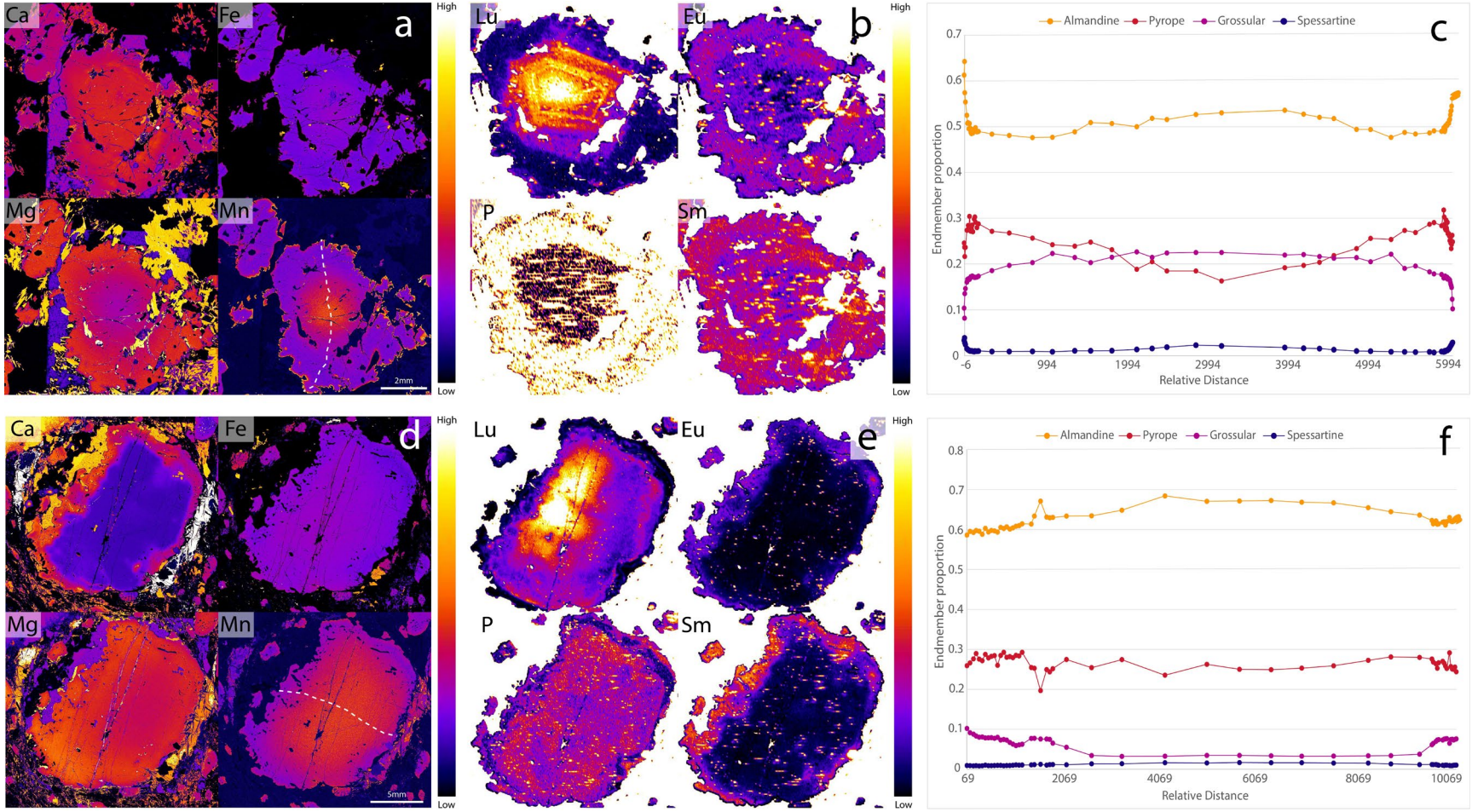


Figure 4: Garnet EPMA and LA–ICP–MS elemental maps and traverse data. *WGC2019J-25B:* (a) EPMA garnet major element maps for Ca, Fe, Mg and Mn. (b) LA–ICP–MS garnet trace element maps for Lu, Eu, Sm and P. (c) EPMA garnet major element rim to rim traverse, showing end-member proportions. Traverse path is traced in Fig. 4a with a dotted line. *WGC2019J-31A:* (d) EPMA garnet major element maps for Ca, Fe, Mg and Mn. (e) LA–ICP–MS garnet trace element maps for Lu, Eu, Sm and P. (f) EPMA garnet major element rim to rim traverse, showing end-member proportions. Traverse path is traced in Fig. 4d with a dotted line.

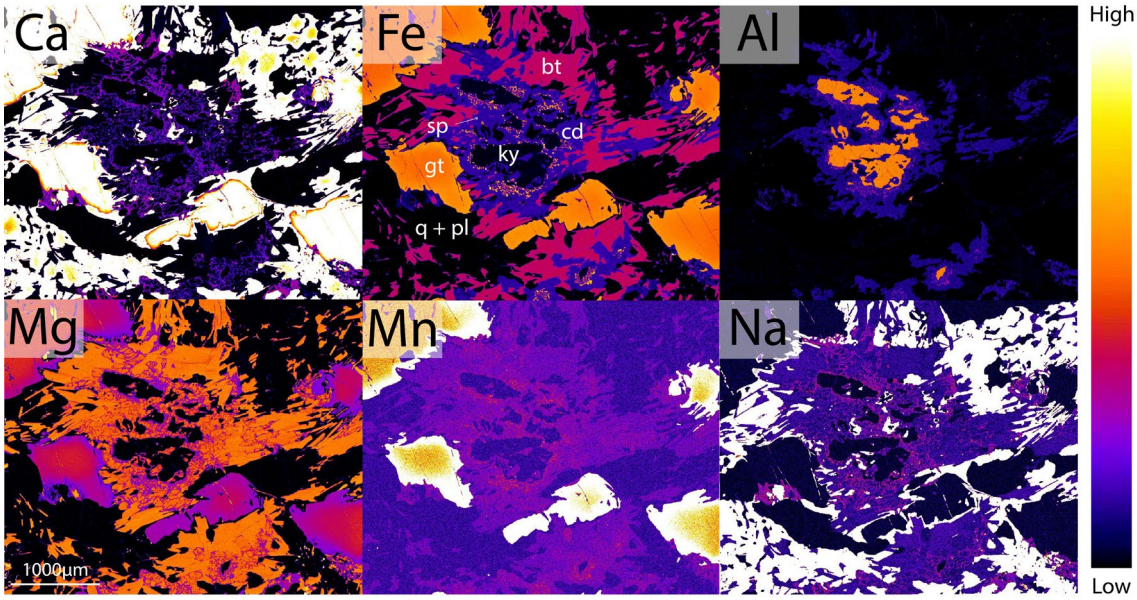


Figure 5: EPMA elemental maps for Ca, Fe, Al, Mg, Mn and Na in WGC2019J-25B reaction textures. Relative concentration is modelled using the scale bar to the right of the figure; where black indicates a low elemental concentration and white indicates higher concentrations. Minerals are labelled in the Fe map, where bt = biotite, sp = spinel, cd = cordierite, ky = kyanite, gt = garnet, q = quartz and pl = plagioclase.

ranges from 2.46–5.05 wt%, while WGC2019J-31A is comparatively enriched, with values between 4.42–5.49 wt%.

CORDIERITE

X_{crd} ($Fe^{2+}/(Fe^{2+} + Mg)$) in WGC2019J-25B reaction textures ranges between 0.22–0.25.

ILMENITE

Ilmenite in WGC2019J-25B has low MnO content, with values ranging between 0 and 0.42 wt%.

Zircon U–Pb geochronology and trace elements

U–Pb dating and trace element analysis was undertaken on mounted zircons from samples WGC2019J-25B and WGC2019J-31A. Calculated Tera Wasserburg concordia

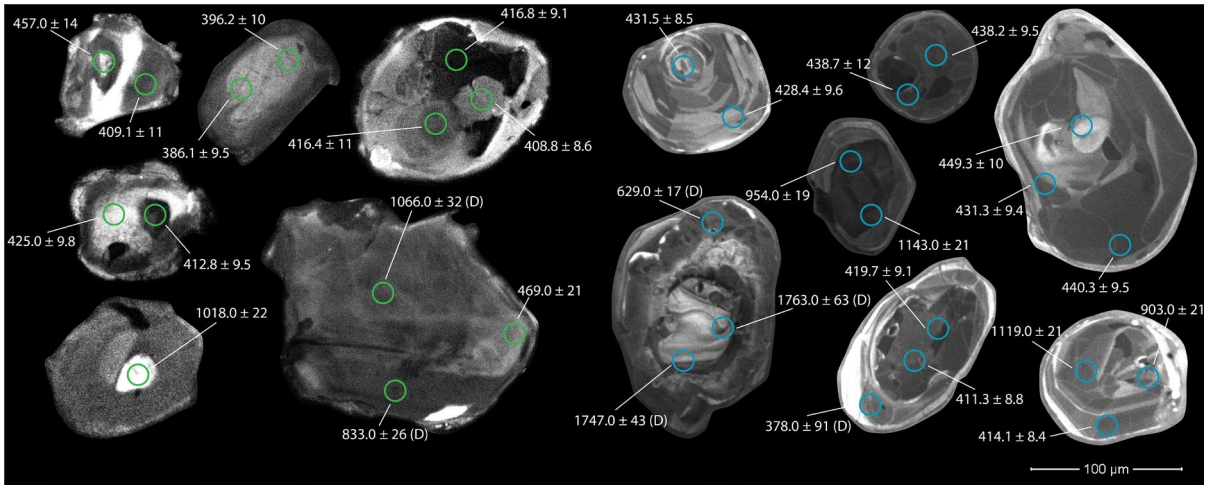


Figure 6: Representative examples of zircon SEM-CL metamorphic zoning in Ulsteinvik (green) and Fjørtoft (blue). Ages are in Ma. Discordant analyses are indicated by (D).

plots and probability density plots are in Figure 7. Extended morphological descriptions, U–Pb ratios and trace element concentrations for zircon are in Appendix 3C.

WGC2019J-25B

Zircons are ~50–200 µm, sub-rounded to rounded and commonly display spectacular metamorphic patchy to polygonal sector zoning in CL (Fig. 6). Analysis of eighty-five zircons reveal an almost continuous spread of ages from ~470–370 Ma (Fig. 7c), yielding a concordia age of 404.0 ± 4.3 Ma, with an MSWD indicating significant dispersion (Fig. 7a). Two Proterozoic-aged analyses (~1009 Ma) were also recorded. Palaeozoic-aged zircons are enriched in Y, exhibit no significant Eu anomaly, and record a flat HREE slope (mean Lu_N/Gd_N = 2.6, n = 131), with the exception of the two oldest Palaeozoic-aged analyses (Lu_N/Gd_N = 25.5–86.8, n = 2). Late Mesoproterozoic-aged analyses have notably higher HREEs (Lu_N/Gd_N = 22.7–39.6, n = 2) and slightly negative Eu anomalies (Fig. 8a).

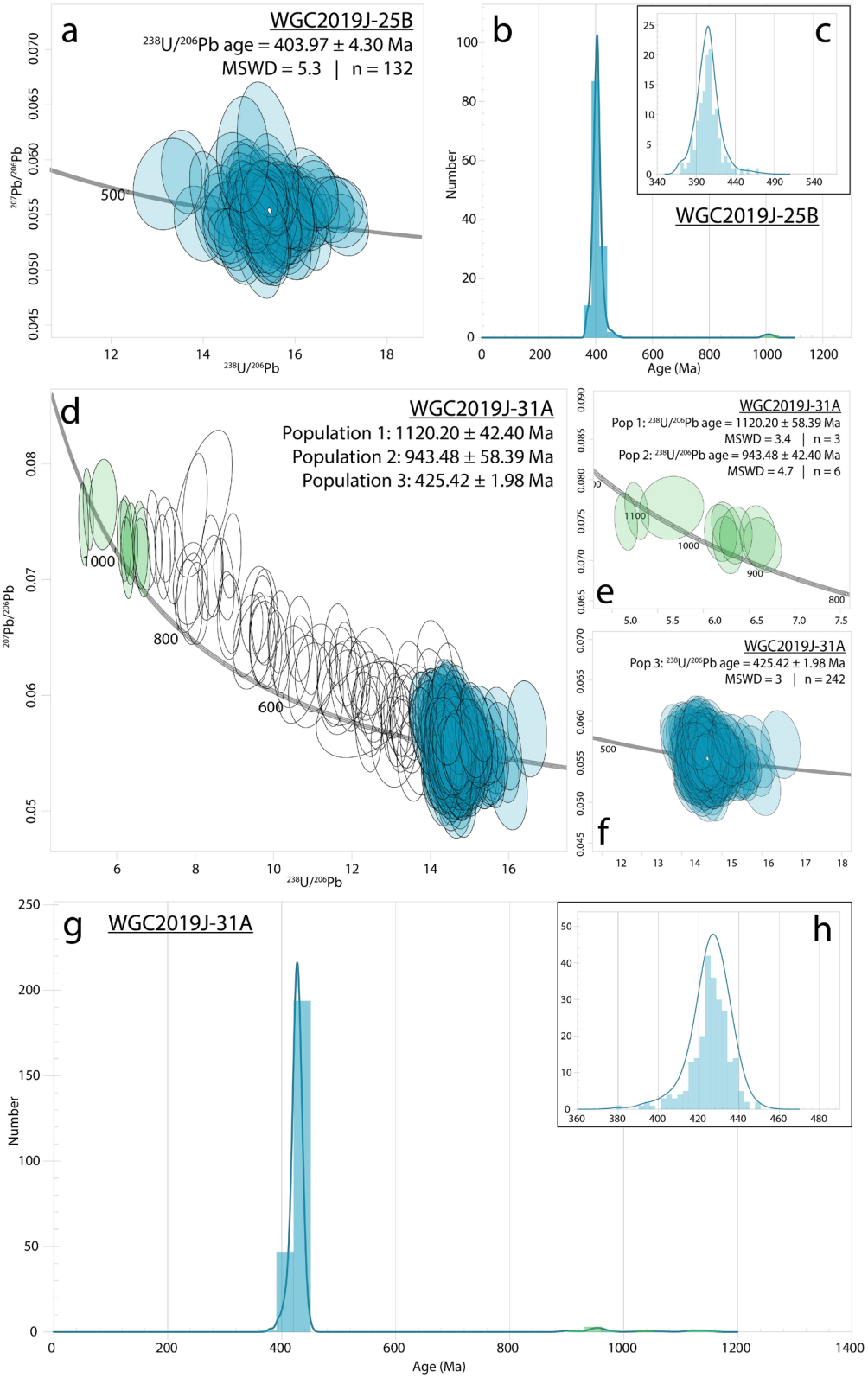


Figure 7: Zircon age data from Ulsteinvik and Fjørtoft. *WGC2019J-25B*: (a) U–Pb Tera Wasserburg concordia for concordant Paleozoic-aged data, (b) Probability density plot for all concordant U–Pb ages, (c) Probability density plot for concordant Paleozoic U–Pb ages. *WGC2019J-31A*: (d) U–Pb Tera Wasserburg concordia, (e) U–Pb Tera Wasserburg concordia for concordant Sveconorwegian-aged data, (f) U–Pb Tera Wasserburg concordia for concordant Caledonian-aged data, (g) Probability density plot for all concordant U–Pb ages, (h) Probability density plot for concordant Caledonian U–Pb ages.

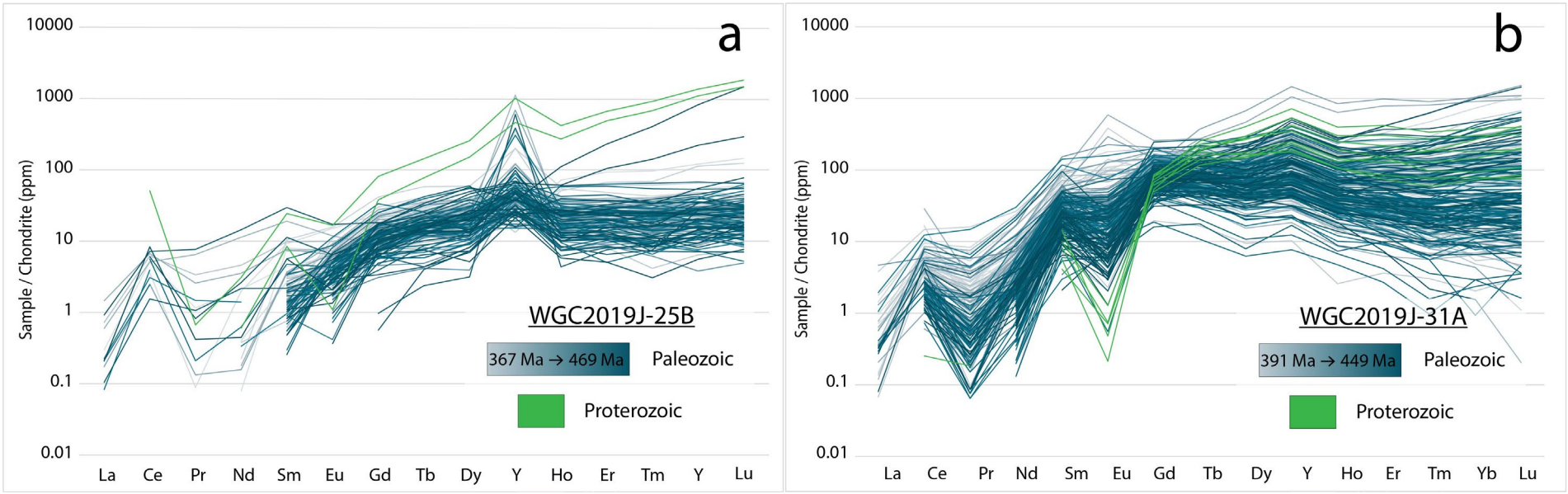


Figure 8: Chondrite-normalised zircon trace element data presented in REE spiderplots. A) WGC2019J-25B. B) WGC2019J-31A. Spiderplots are coloured by age: Proterozoic = green, Paleozoic = blue gradient, where pale blue lines represent younger zircon U–Pb ages.

WGC2019J-31A

Zircons are ~50–150 μm, are primarily equant and rounded, and display well-defined metamorphic internal morphology in CL similar to WGC2019J-25B but with the occasional atypical dark core (Fig. 6). One-hundred and seventy individual zircon grains generate a ~450–390 Ma range of Palaeozoic-aged data, yielding a concordia age of 425.9 ± 2.0 Ma (Fig. 7d), and nine isolated older analyses comprising two populations ranging in age from ca. 1143–903 Ma (Fig. 7e). Proterozoic-aged analyses occur exclusively within the dark cores of grains, but dark cores are not exclusively Proterozoic. Palaeozoic-aged REE patterns are variably enriched in HREEs (Lu_N/Gd_N = 0.002–38.2, n = 242). Younger Palaeozoic-aged analyses record positive Eu anomalies and higher concentrations of Ce. Eu anomalies become increasingly negative and Ce concentrations progressively decrease with increasing age. Proterozoic-aged zircons have the most negative Eu anomalies and flat HREE slopes (Lu_N/Gd_N = 1.1–6.6, n = 9; Fig. 8b).

Monazite U–Pb geochronology and trace elements

In-situ geochronology and trace element analysis were undertaken on monazite grains from various textural locations in samples WGC2019J-25B, WGC2019A-3 and WGC-2019J-31A. Samples WGC2019J-25B and WGC2019A-3 are from the same outcrop, with A3 from the edge of a garnet-rich domain, and 25B from the more biotite rich matrix (Figure 2c). Appendix 3D contains LA–ICP–MS U–Pb ratios, trace element concentrations and morphological descriptions.

WGC2019J-25B & WGC2019A-3

Monazite is not abundant, and ranges in size from ~75–1000 μm. Crystal habit is primarily anhedral and BSE-defined zoning is either non-existent or weak. A total of eight monazite grains were analysed; four from WGC2019A-3 and four from WGC2019J-25B. Texturally, all grains are located within the matrix, with the exception of a single monazite inclusion within kyanite. LA–ICP–MS results from one hundred and sixty-four analyses yield two distinct discordant populations. These results are anchored to a common $^{207}Pb/^{206}Pb$ ratio of 0.8593 ± 0.00068 acquired from matrix biotite (Appendix 3F) and yield well-defined ages of 401.9 ± 1.6 Ma and 376.7 ± 1.0 Ma (Fig. 9a). Population one (401.9 ± 1.6 Ma) consists of analyses from the monazite inclusion in kyanite. It is comparatively enriched in LREEs, less enriched in HREEs and calculates a steep middle rare earth element (MREE) slope (average Dy_N/Gd_N = 0.03, n = 26) relative to population two (average Dy_N/Gd_N.= 0.09, n = 135; Fig. 11a). An Eu anomaly is absent in population one. The majority of population two analyses have no Eu anomaly; however, four analyses have a negative Eu anomaly and are also enriched in HREEs relative to the remaining population.

WGC2019J-31A

In-situ WGC2019J-31A monazite grains range in size from ~75–700 μm, have variable crystal habit and exhibit weak to no zoning in BSE (Appendix 3C). One hundred and twenty-two spots within eighteen grains were analysed. Three populations are defined: 1053.2 ± 3.6 Ma (n = 51), 423.2 ± 2.0 Ma (n = 49) and 385.2 ± 6.7 Ma (n = 2; Fig. 9b, c, d). The ages of populations one and three are given by concordia ages, and an age for population two is constrained by an anchoring $^{207}Pb/^{206}Pb$ value of 0.8437 ± 0.002

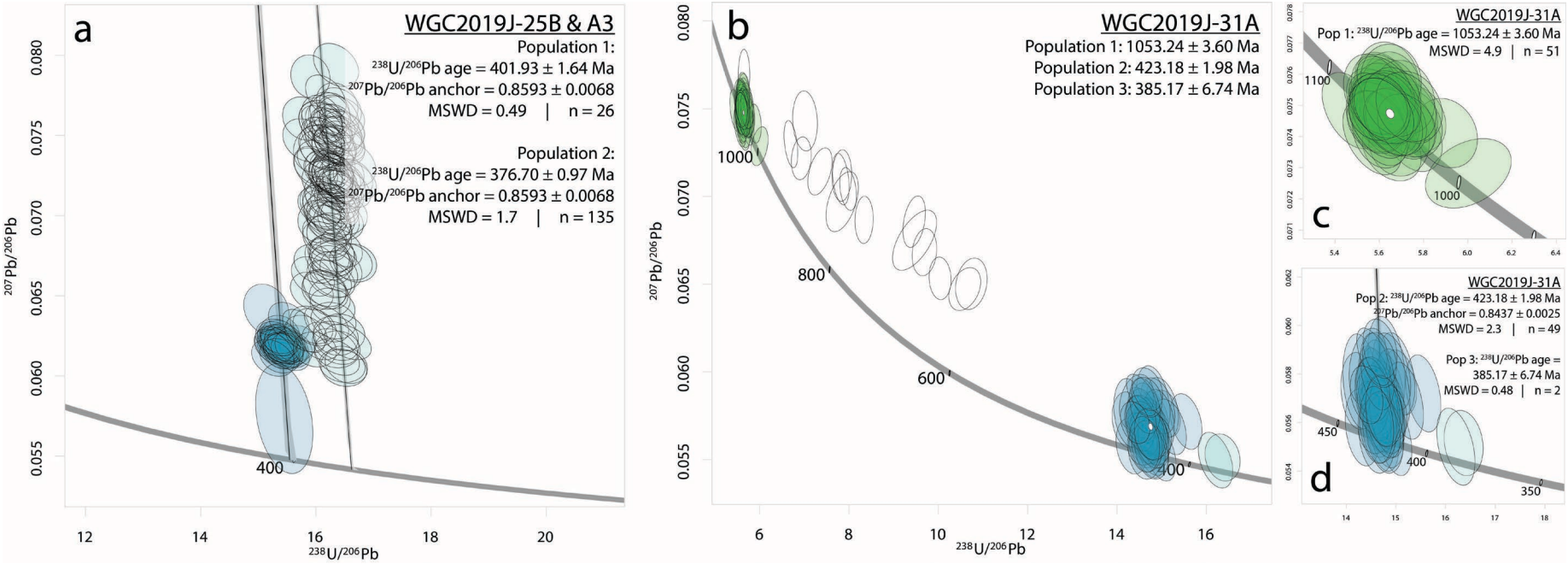


Figure 9: Tera Wasserburg concordia diagrams for monazite analyses from Ulsteinvik and Fjørtoft. Lower intercept ages for discordant or a combination of discordant and concordant data are anchored by a calculated $^{207}Pb/^{206}Pb$ ratio from biotite and K-feldspar (Appendix 3G). A) WGC2019J-25B & A3. B) WGC2019J-31A. C) WGC2019J-31A upper intercept, showing Proterozoic analyses. D) WGC2019J-31A lower intercept, showing Paleozoic analyses. Ellipses are coloured based on population.

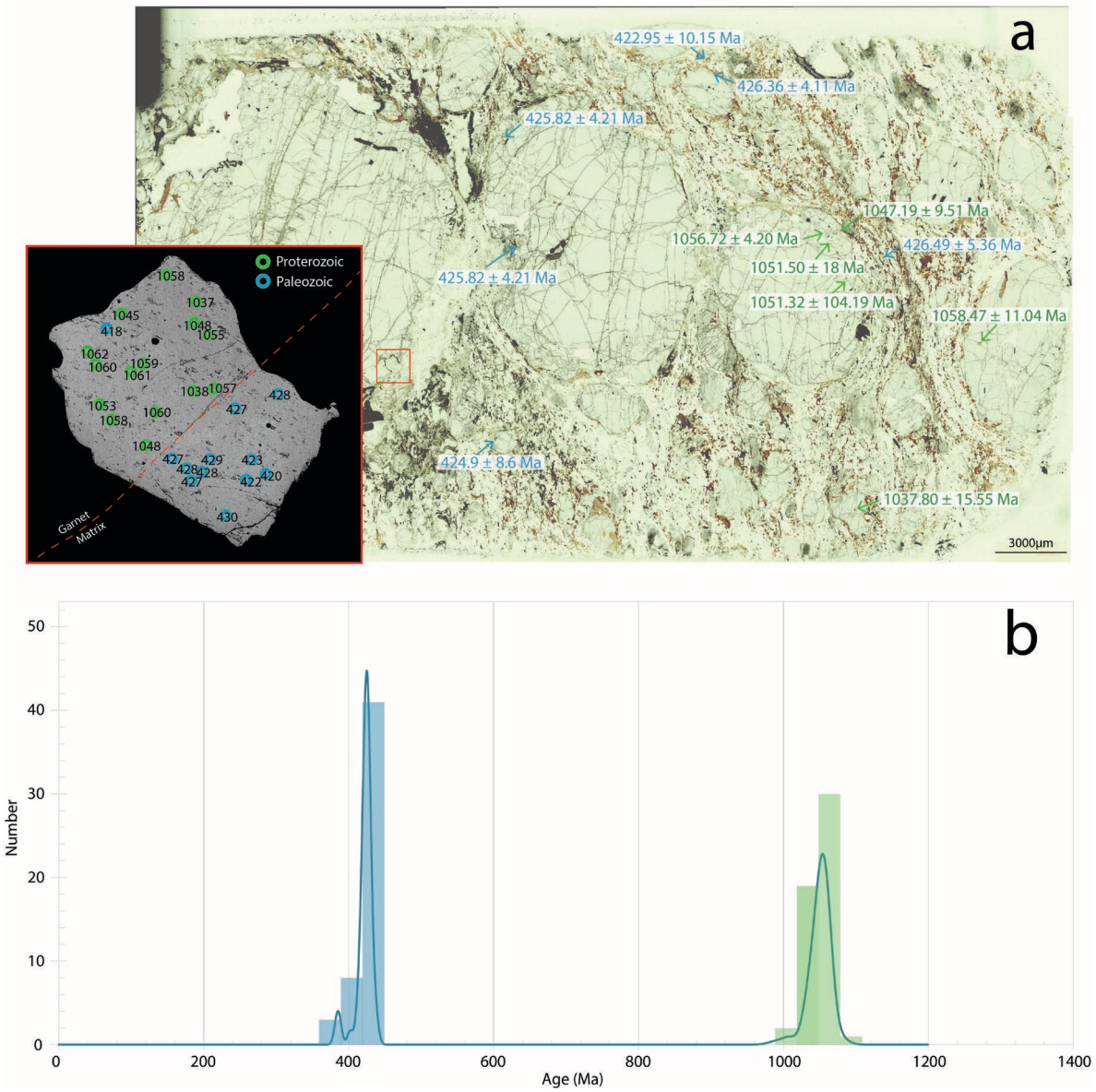


Figure 10: (a) WGC2019J-31A thin section scan annotated with monazite locations and weighted mean grain ages. Inset: monazite grain located at the edge of a garnet grain. A red dotted line marks the garnet grain boundary. (b) WGC2019J-31A cumulative probability distribution plot showing the spread of monazite data. In both plots: blue = Paleozoic, green = Proterozoic.

defined by biotite and K-feldspar (Fig. 9d). Texturally, older ages tend to be associated with monazites that occur as inclusions within garnet on the inner side of the inclusion trail rims (Fig. 3d). Figure 10a highlights the textural position of monazite ages, with the inset figure demonstrating the distribution and spatial organisation of individual Palaeozoic and Mesoproterozoic ages on the matrix versus garnet side of a monazite

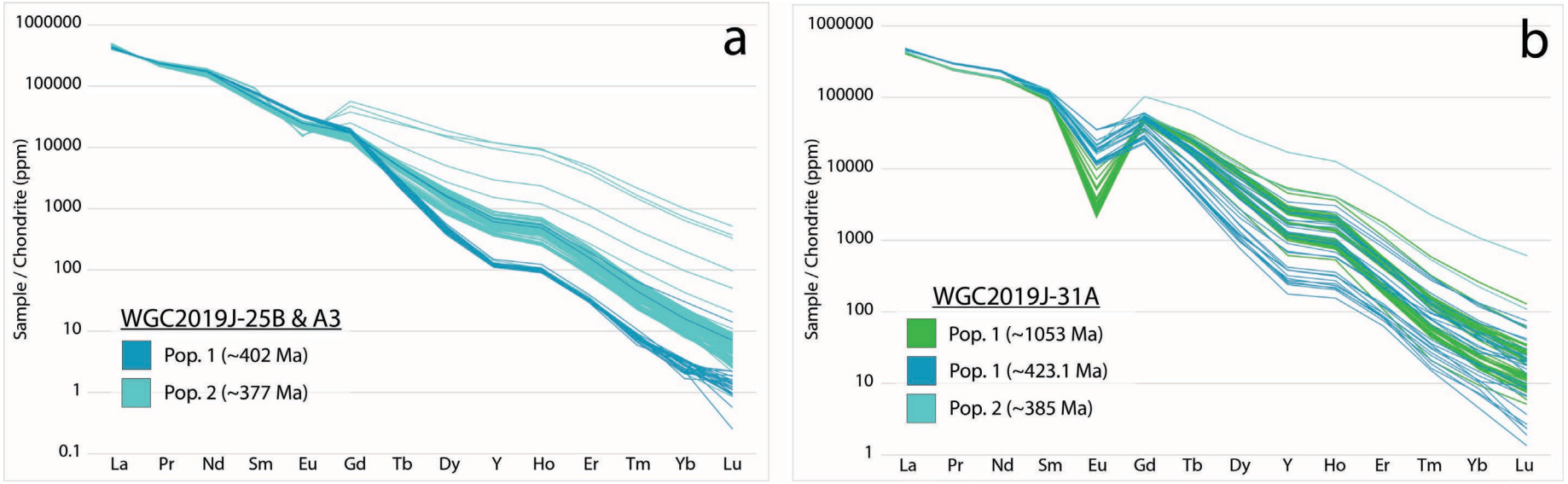


Figure 11: Chondrite-normalised monazite trace element data presented in REE spiderplots. (a) WGC2019J-25B & A3. (b) WGC2019J-31A. Plots are coloured by population. Green = Proterozoic, dark blue = old Paleozoic, light blue = young Paleozoic.

grain partially included within garnet. There is a distinct relationship between age and trace element concentration (Fig. 11b). Population two is the most enriched in LREEs. All populations exhibit a negative Eu anomaly, with the Paleozoic populations recording similar magnitudes (~0.2) and population one calculating the most negative anomaly (~0.04). HREEs are the most depleted in population two and the least depleted in population three. All populations record a similar MREE slope.

Apatite U–Pb geochronology and trace elements

WGC2019J-25B & WGC2019A-3

Geochronology and trace element analysis was undertaken in-situ from Ulsteinvik samples WGC2019J-25B and WGC2019A-3. Analysed grains range from ~250–2500 μm and occur within the matrix or within garnet. An extended summary of morphology, LA–ICP–MS geochronology and trace element data is presented in Appendix 3D. Nine apatite grains were analysed, totalling one hundred and eighty-three analyses which plot discordantly on a Tera-Wasserburg concordia. Anchoring of these analyses using the biotite $^{207}Pb/^{206}Pb$ ratio yields an age of 399.9 ± 1.9 Ma (Fig. 12a). HREE concentrations and Eu anomaly magnitude are directly related to textural location (Fig. 12b); apatite analyses texturally included within garnet lack Eu anomalies and exhibit depletion in HREEs (Lu_N/Gd_N = 0.0055, n = 33), while matrix apatite has a negative Eu anomaly and is comparatively enriched in HREEs (Lu_N/Gd_N = 0.087, n = 111). There is no obvious correlation between age and Eu anomaly magnitude (Fig. 11a).

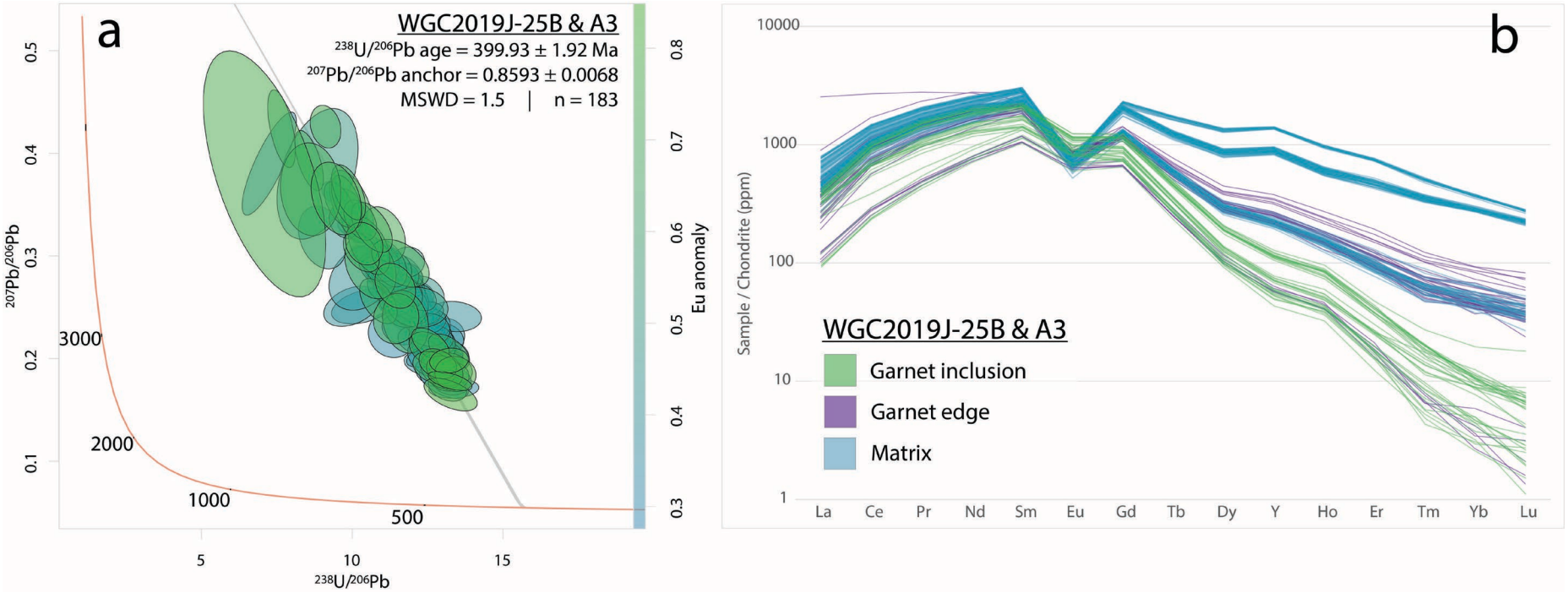


Figure 12: Ulsteinvik apatite geochronology and trace element data. (a) Tera Wasserburg concordia anchored by $^{207}Pb/^{206}Pb$ from biotite and coloured by the magnitude of Eu anomaly. (b) REE spiderplot for chondrite-normalised apatite trace element data coloured by textural location.

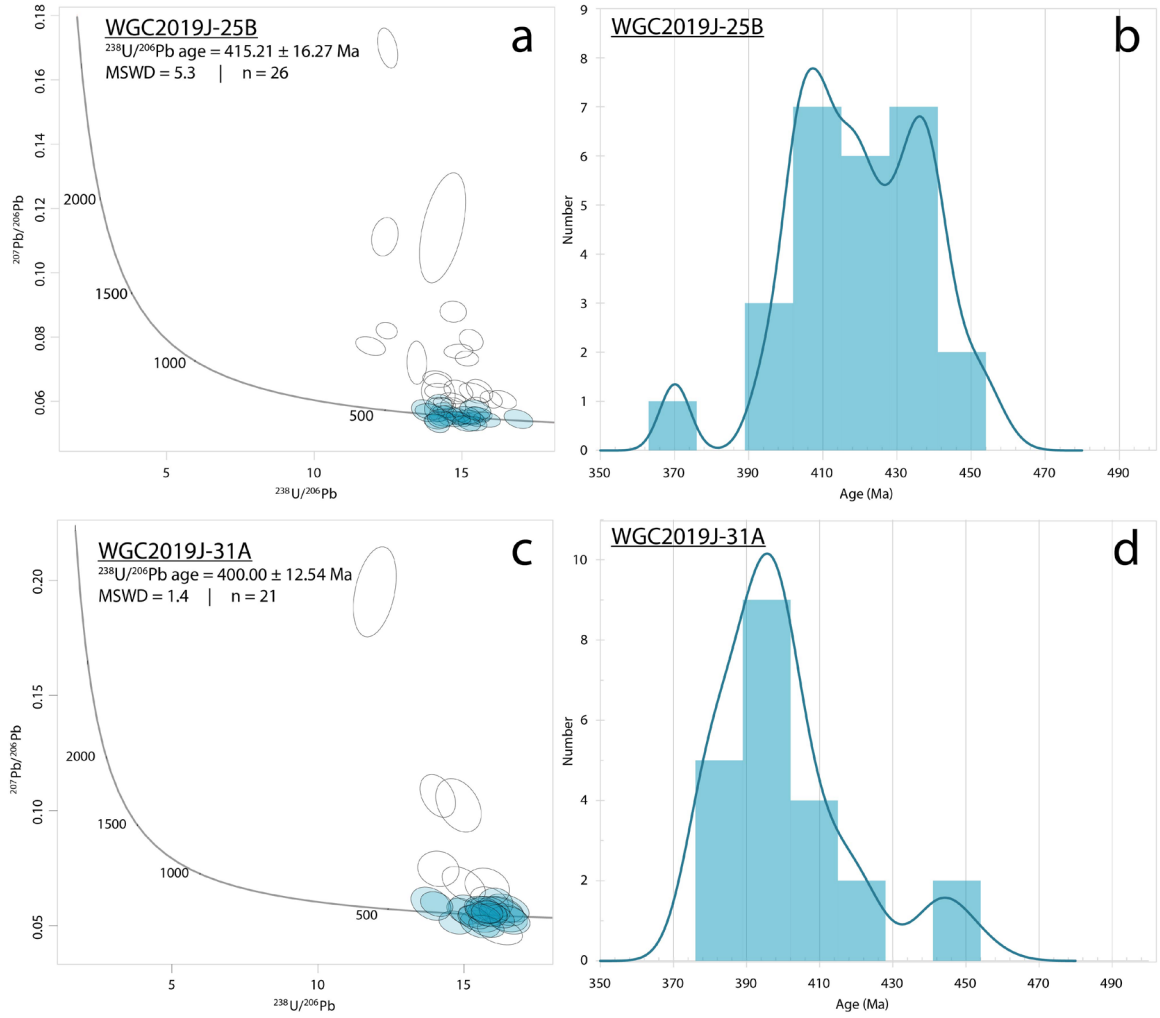


Figure 13: Rutile age data. (a) WGC2019J-25B Tera Wasserburg concordia, (b) WGC2019J-25B cumulative probability distribution plot, (c) WGC2019J-31A Tera Wasserburg concordia, (d) WGC2019J-31A cumulative probability distribution plot.

Rutile U–Pb geochronology

Geochronology and trace element analysis of in-situ rutile was undertaken for WGC2019J-25B and WGC2019J-31A. Extended morphology descriptions and results are presented in Appendix 3E.

WGC2019J-25B

Rutile grains vary in size between 50–400 µm and, with the exception of one matrix grain, are texturally associated with garnet. Out of forty-nine total analyses, twenty-six are concordant and define a spread from ~453–370 Ma (Fig. 13b), giving a concordia

age of 415.2 ± 16.3 Ma (Fig. 13a) with significant dispersion, suggesting the data do not represent a single age population.

WGC2019J-31A

Seventeen rutile grains ranging in size between 50–650 μm and from both matrix and inclusions in garnet were analysed, totalling thirty-one analyses. Twenty-one of these analyses plot concordantly, defining an almost continuous spread from ~449–379 Ma (Fig. 13d) and giving a concordia age of 400.0 ± 12.5 Ma (Fig. 13c).

Zr-in-rutile thermometry

Table 7: Average Zr-in-rutile temperatures for WGC2019J-25B and WGC2019J-31A data at 25 kbar.

Sample	Zr-in-rutile temperature (°C) (Kohn, 2020)
WGC2019J-25B	750.9 ± 72.2
WGC2019J-31A	788.6 ± 77.0

Trace element compositions of rutile were used for Zr-in-rutile thermometry in samples WGC2019J-25B and WGC2019J-31A (Kohn, 2020). Weighted means calculated from the thermometry are summarised in Table 7. There is little to no correlation between temperature and age (Fig. 14). Extended thermometry data is in Appendices 3C and 3E.

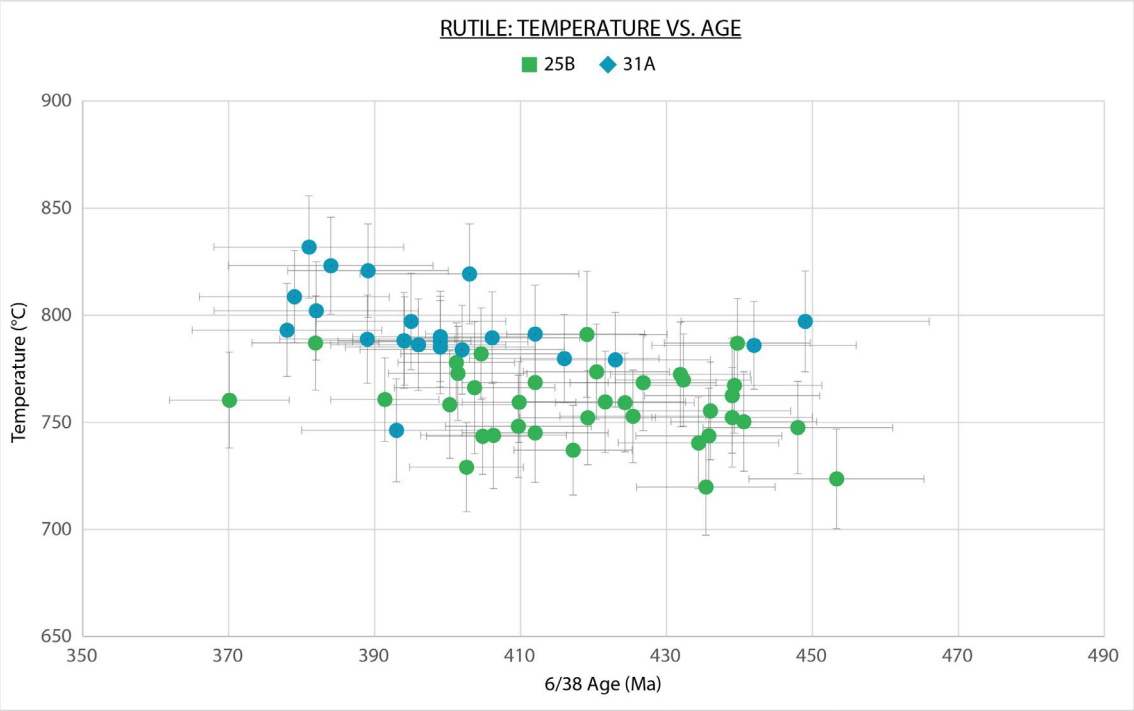


Figure 14: Zr-in-rutile temperature (Kohn, 2020) versus concordant $^{238}U/^{206}Pb$ age. Green = WGC2019J-25B, blue = WGC2019J-31A.

Mineral equilibria forward modelling

WGC2019J-25B

The inferred peak assemblage in WGC2019J-25B is located at M=0.150 in the *P–Mo* diagram calculated prior to *P–T* modelling (Appendix 4B).

The prograde path for Ulsteinvik is a conservative estimate based on inclusions observed within garnet. Thus, the rock is speculated to pass through ~11–13 kbar and ~600–700 °C, in a field containing rutile, muscovite and plagioclase (Fig. 15; Point 1). The peak assemblage (Fig. 15; Point 2) for the WGC2019J-25B metapelite is interpreted as garnet + kyanite + omphacite + coesite + muscovite + rutile + quartz + H_2O. Neither coesite nor omphacite are directly observed in the preserved assemblage but are inferred from secondary mineral textures (Fig. 3g, i). The transition from quartz to coesite occurs above the pressure window in Figure 15, ranging between 2.8 GPa at 600 °C and 2.9 GPa at 850 °C. A minimum *P–T* point for the peak assemblage is

thereby given where Zr-in-rutile intersects the quartz-coesite reaction at ~2.9 GPa and 760 °C.

Retrograde conditions have been inferred by computing independent thermobarometer reactions for the cordierite-spinel bearing symplectites (pers. comm. Hand, 2020). The intersection of these equilibria lines give a *P–T* point at ~7 kbar and ~740 °C (Fig. 15; Point 4). The position of this *P–T* point correlates with the known retrograde assemblage in the rock, plotting below the kyanite-sillimanite transformation within the sillimanite field, and almost directly on top of the cordierite-in line in Figure 5. The absence of spinel in Figure 15 reflects that it only forms in highly localised Al-rich areas of the rock, whereas Figure 15 is computed for the overall rock composition.

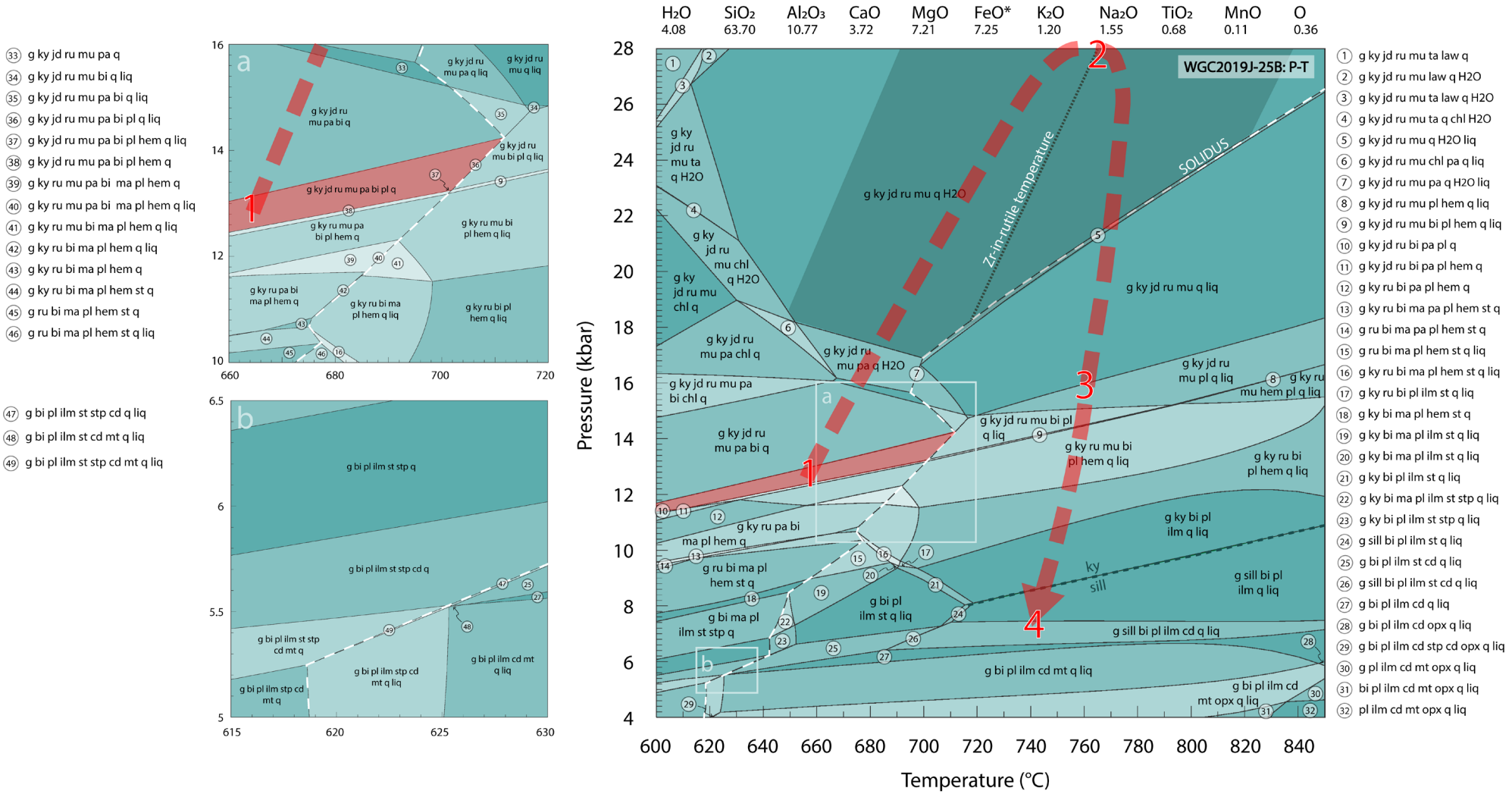


Figure 15: *P–T* pseudosection for metapelite WGC2019J-25B. The red arrow represents the inferred *P–T* path, defined by points 1-4. The red shaded area represents the prograde field (Point 1). Point 2 is a minimum peak constraint. Point 4 defines a *P–T* point calculated from a retrograde bulk composition. Variance increases with shading in the diagram. Complex regions are magnified in insets (a) and (b). Bulk composition used for the calculation of the phase diagram is listed in mol% at the top of the diagram. Oxidation (M_O) was constrained at 0.15 (see additional *PM_O* pseudosection in Appendix 4B). Abbreviations: g = garnet, ky = kyanite, sill = sillimanite, jd = jadeite, ru = rutile, mu = muscovite, ta = talc, law = lawsonite, pa = paragonite, ma = margarite, bi = biotite, chl = chlorite, pl = plagioclase, hem = hematite, ilm = ilmenite, st = staurolite, stp = stipnomelane, q = quartz, mt = magnetite, opx = orthopyroxene, cd = cordierite, liq = liquid, H2O = water.

WGC2019J-31A

Ambiguity surrounding the age of garnet cores within metapelitic WGC2019J-31A (pp. 33-37) prevents interpretation into the prograde history of Fjørtoft. Plagioclase inclusions do not occur within garnet rims, suggestive of peak conditions exceeding plagioclase stability. The peak field in WGC2019J-31A is therefore interpreted as garnet + kyanite + omphacite + muscovite + K-feldspar + rutile + quartz. By calculating the intersection between this field and the calculated Zr-in-rutile temperature, minimum peak conditions for Fjørtoft are constrained at ~17.8 kbar and ~750 °C (Fig. 16; Point 1). Limited constraints exist within the rock for retrograde *P–T* conditions. The only retrograde reaction observed in thin section is biotite rimming muscovite. As a result, point 2 of Figure 16 is defined based on the location of the first biotite-bearing field down-pressure.

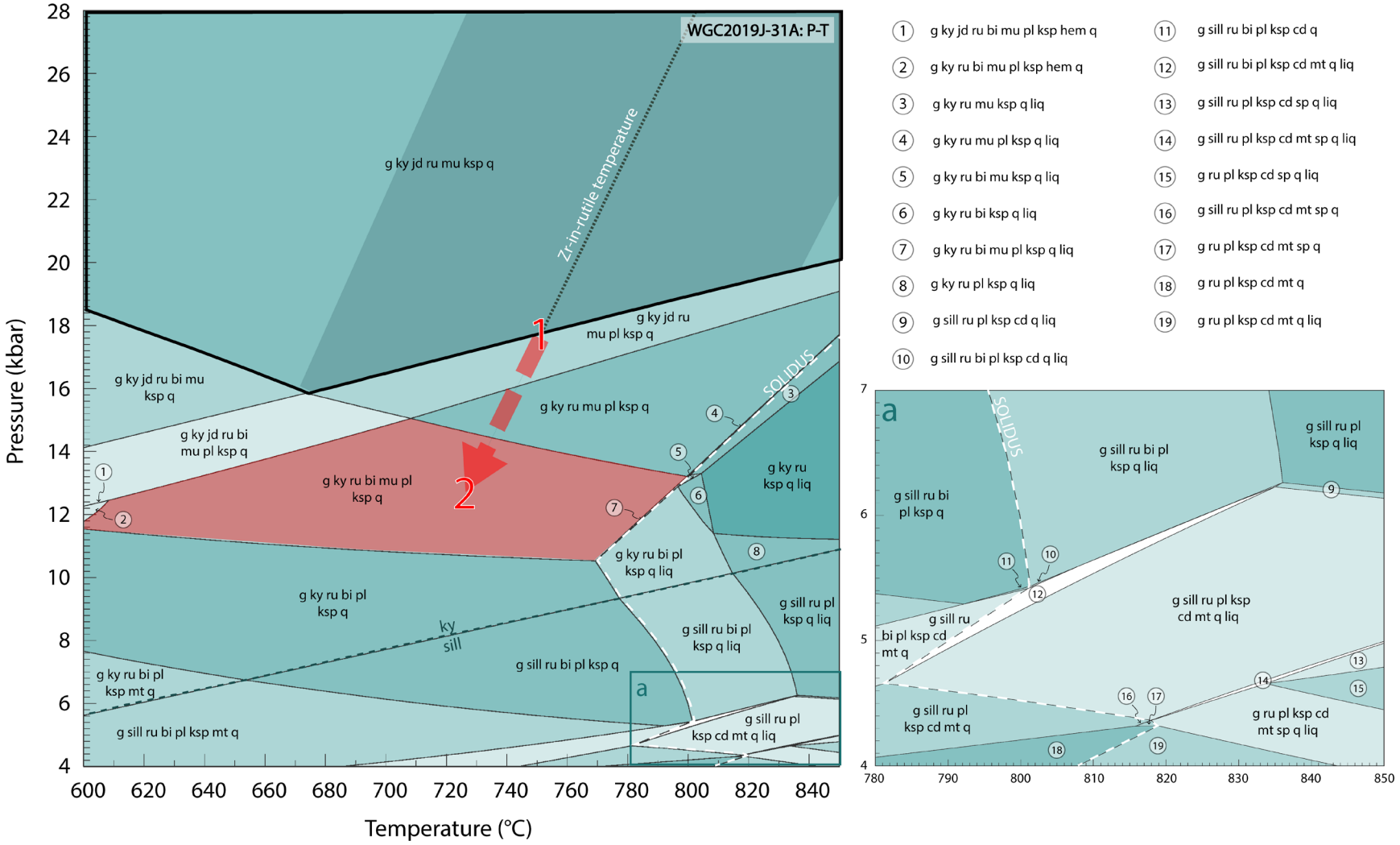


Figure 16: *P–T* pseudosection for metapelite WGC2019J-31A. The red arrow represents the inferred *P–T* path, where point 1 indicates the minimum constraint for peak conditions and the red shaded area indicates a retrograde field (Point 2). Inset (a) magnifies a complex region of the diagram. Bulk composition used for the calculation of the phase diagram is listed in mol% at the top of the diagram. Variance increases with shading in the diagram. Oxidation (MO) was constrained at 0.5 (see notes on calculation in Appendix 4B). Abbreviations: g = garnet, ky = kyanite, jd = jadeite, ru = rutile, mu = muscovite, ksp = k-feldspar, q = quartz, bi = biotite, pl = plagioclase, hem = hematite, cd = cordierite, mt = magnetite, sp = spinel.

DISCUSSION

Past geochronological work on (U)HP eclogites and the discovery of diagnostic UHP minerals such as polycrystalline quartz, coesite and microdiamond (Dobrzhinetskaya et al., 1995; Spengler et al., 2006; Smith & Godard, 2013) in the WGR have provided evidence for the deep burial and exhumation of continental crust during the Caledonian Orogeny between ca. 430–370 Ma. In this study, multi-mineral geochronology and *P–T* forward modelling offers further insight into the dynamics of continental subduction.

Interpretation of U–Pb geochronology and trace elements

U–Pb geochronology of zircon, monazite, apatite and rutile from Ulsteinvik documents a predominantly Caledonian-aged history, with the exception of two Sveconorwegian-aged zircon analyses (Fig. 7b). Caledonian zircon ages span from ca. 469–367 Ma (Fig. 7a, c), suggestive of a protracted period of (re)crystallisation. Despite this extensive history, REE concentrations in zircon do not vary systematically with age, and the majority exhibit relatively flat HREE profiles without Eu anomalies. (Fig. 7a). Rutile analyses record a similar prolonged history, with ages ranging from ca. 453–370 Ma (Fig. 12a, b). Ordovician to Early Silurian zircon and rutile age components within these results are generally uncommon or absent within the WGR, but are of similar age to the Seve-Blåhø nappe in Sweden, supporting the conclusion made by Root et al. (2005) regarding the potentially allochthonous history of rocks in the Ulsteinvik region. Ulsteinvik and the Blåhø nappe were initially correlated based on the similarity of their host-rock lithologies (Root et al., 2005), and have been further linked by zircon age data from mafic eclogite at Ulsteinvik, which shows a near continuous spread of older concordant Caledonian zircon ages ranging from ca. 475–430 Ma (DesOrmeau et al.,

2015). A similar record of pre-Scandian U–Pb zircon and rutile ages from metapelites in this study (Fig. 7a, c; Fig. 13a, b) corroborates data from DesOrmeau et al. (2015) and further validates the hypothesis made by Root et al. (2005). The ability of rutile to record ca. 450–440 Ma data without significant diffusional loss of Pb and resultant age resetting is attributed to its textural location as an inclusion within garnet, where it was effectively 'armoured' and allowed to retain diffusional elements above its nominal closure temperature (<640 °C; Kooijiman et al., 2010). Old rutile ages (ca. 450 Ma) are therefore interpreted to give the timing of garnet growth in Ulsteinvik, whilst younger ages record variable diffusional resetting.

In addition to the Early Caledonian ages, zircon and rutile preserve a pervasive record of concordant ages from ~430–370 Ma associated with Scandian subduction and exhumation of the WGR. Monazite occurs in two discordant Scandian-aged populations (~402 Ma and ~377 Ma; Fig. 8a) anchored by common $^{207}Pb/^{206}Pb$ in biotite (Appendix 3G). Monazite populations occur either within the matrix or within kyanite and are generally devoid of an Eu anomaly (Fig. 10a). Europium anomalies are used to infer whether a mineral crystallised in the presence of plagioclase. Negative Eu anomalies suggest coeval plagioclase growth, where Eu^{2+} was preferentially incorporated into plagioclase and substituted with Ca^{2+} (Weill & Drake, 1973; McLennan, 1989). Apatite U–Pb data plots discordantly and is anchored by common $^{207}Pb/^{206}Pb$ in biotite giving an age of 399.9 ± 1.9 Ma (Fig. 11a). An obvious relationship exists between textural location and REE concentrations in apatite, where apatite within garnet lacks an Eu anomaly and is characterised by flat HREE signatures, whilst matrix apatite exhibits a strongly negative Eu anomaly and comparative enrichment in HREEs (Fig. 11b). The geochemical differences in apatite grains of the same age can be explained by relative differences in diffusion, where REEs such as Eu tend to be less mobile than Pb (e.g.

Bau, 1991; Cherniak, 2000). As a result, apatite often preserves prograde REE signatures, but only records ages representative of cooling through a nominal closure temperature (620 °C; Krogstad & Walker, 1994). Due to apatite giving discordant age data (Fig. 12a), differentiating age populations is complex. However, based on REE signatures and textural location, it appears that apatite inclusions in garnet likely formed on the prograde path during garnet growth and when plagioclase was absent from the rock, accounting for the lack of an Eu anomaly. Comparatively, matrix apatite appears to have grown in the presence of plagioclase (based on the presence of an Eu anomaly) and is thus more likely to have formed during exhumation. The absence of an Eu anomaly in effectively age-equivalent monazite suggests the rock traversed from plagioclase-absent to plagioclase-bearing parts of *P–T* space at ~400 Ma (Fig. 15; Point 3). This provides a well-defined constraint for the end of UHP metamorphism and beginning of exhumation and retrograde plagioclase crystallisation. The retrograde *P–T* path traverses melt-bearing fields, accounting for leucosome patches within the sample outcrop (Fig. 2c). The lack of Eu anomaly in 377 Ma monazite is interpreted as inheritance from the previous 402 Ma monazite generation. This population likely formed in response to apatite breakdown (e.g. Finger & Krenn, 2007).

U–Pb results from monazite and zircon in the Fjørtoft metapelite record evidence of the Sveconorwegian Orogeny (e.g. Bingen et al., 2008). Zircon yields a small number of concordant upper intercept ages (3.6% of total concordant analyses) ranging from ca. 1143–903 Ma (Fig. 7g), while monazite retains a more ubiquitous record with 51 concordant analyses (64% of total concordant), giving a well-constrained age of 1053.2 ± 3.6 Ma (Fig. 9c, 10b). Sveconorwegian-aged zircon and monazite record strong negative Eu anomalies and enriched HREEs relative to Caledonian-aged populations, suggesting the Sveconorwegian assemblage contained plagioclase. Sveconorwegian-

aged monazite occurs predominantly in the interior of garnet (Fig. 10a), inside the internal boundary defined by fine-grained inclusion trails (Fig. 3d, e). Monazites in garnet rims and in the matrix define a bimodal distribution, comprised of the ~1053 Ma population and a second 423.2 ± 2.0 Ma age peak. This suggests either resetting of monazite or a second period of growth. The incidence of one monazite grain at the edge of garnet (Fig. 10a) may indicate partial resetting of monazite; the garnet side of the monazite grain records Sveconorwegian ages, and the matrix side records Caledonian ages. As discussed by Cuthbert and van Roermund et al. (2011), who reported analogous monazite U–Pb ages in garnet-kyanite gneiss from Fjørtoft, the prevalence of Sveconorwegian-aged monazite within garnet could result from three different scenarios: (1) Sveconorwegian-aged detrital monazite from the sedimentary protolith was reset when it became entrapped by garnet during Scandian UHP metamorphism; (2) monazites record Sveconorwegian-aged garnet growth, and then later diffusional resetting of garnet rim and matrix monazite grains during Scandian metamorphism; or (3), Fjørtoft garnet records two phases of growth, where monazite constrains the age of garnet cores at ~1053 Ma, and new garnet rim growth at ~423 Ma. The prevalence of Sveconorwegian-aged analyses across different studies (Cuthbert & van Roermund, 2011; DesOrmeau et al., 2015; Walczak et al., 2019) that are all within a narrow age bracket and frequently occur as inclusions within garnet is unlikely to reflect a detrital population. If monazites were detrital, an extremely uniform and proximal source would be required. Therefore, it seems likely there are two phases of garnet growth recorded at Fjørtoft: ca. 1053 Ma and ca. 420 Ma. Supporting this, Sveconorwegian-aged Lu–Hf garnet ages occur in NE Yell, Shetland (Walker et al 2020), a terrane that was subsequently incorporated into the Baltica-Laurentia collision with the Norwegian Caledonides; and in a Fjørtoft metapelite study, a Lu–Hf garnet age of 422.2 ± 2 Ma

was constrained (Tual et al., 2020). Tentatively, it is therefore suggested that Fjørtoft garnet cores are Sveconorwegian-aged, whilst rims formed at ca. 422 ± 2 Ma.

Similar to Ulsteinvik, Fjørtoft Caledonian zircon, rutile and monazite data are suggestive of an extensive period of (re)crystallisation. Concordant zircon ages range from ca. 449–380 Ma (Fig. 7h), with the oldest exhibiting overall lower REE concentrations and stronger negative Eu anomalies relative to the younger ages (Fig. 8b). Concordant rutile analyses span an identical age range from ca. 449–378 Ma (Fig. 13c, d), and monazite records dates between ca. 438–382 Ma. The Late Ordovician-Early Silurian components of this history are attributed to the imbrication of the Blåhø nappe, a sliver of which exists on the island of Fjørtoft (e.g. Terry et al., 2000a).

Monazite Caledonian U–Pb results are split into two populations: 423.2 ± 2.0 Ma and 385.2 ± 6.7 Ma (Fig. 9b, d). The older and more abundant population occurs both as inclusions within garnet rims and the matrix, while the younger population occurs solely within the matrix. Despite the ca. 423 Ma monazites occurring frequently within garnet, each of these grains are connected to the matrix through fractures. This direct interaction with the matrix means that monazite grains may have crystallised in response to fracture-hosted fluid migration (Tartakovsky et al., 2007). As a result, their age may not relate to textural location (Fig. 10b).

Both populations exhibit negative Eu anomalies, interpreted as coeval (re)crystallisation with plagioclase. The plagioclase-bearing matrix of the Fjørtoft metapelite is strongly foliated, and in some places protomylonitic. The prevalence of ~423 Ma monazites within this protomylonitic matrix provides convincing evidence for early exhumation of Fjørtoft, promoting the stability of plagioclase. Although the precise onset of Scandian Fjørtoft subduction is not constrained in this study, based on the assumption that Late Ordovician-Early Silurian ages are associated with the imbrication of the Blåhø nappe

and that exhumation had begun by at least ~423 Ma, Scandian subduction and exhumation of the Fjørtoft metapelite must have been rapid. The assumed timing of subduction onset within the WGR is 430 Ma (Terry et al., 2000b; Tucker et al., 2004; Kylander-Clark et al., 2007; T. E. Krogh et al., 2011), and applying this to the Fjørtoft metapelite gives a ~7 Myr window in which the terrane was subducted and exhumed.

Pressure–temperature conditions during metamorphism

The *P–T* conditions calculated from mineral equilibria forward modelling suggest cool thermal gradients were experienced by metapelites at Ulsteinvik (Fig. 15). Based on conservative estimations for the prograde path and minimum peak conditions, the thermal gradient ranges from 30–91 °C/GPa, consistent with conditions during subduction (Brown & Johnson, 2018, 2019).

The presence of rutile, muscovite and plagioclase inclusions within garnet are useful to determine a prograde assemblage. The intersection of the base of this field with Zr-in-rutile further constrains the prograde evolution of the rock, inferring that it traversed through conditions of ~13 kbar and 690 °C (Fig. 15; Point 1). Garnet is stable throughout the calculated *P–T* window (Fig. 15) and should grow during the prograde history. As a result, it would be expected to entrap early prograde inclusions. Contradictory to this, Zr-in-rutile thermometry conducted on inclusions in garnet would indicate that garnet only began nucleating at high temperatures (750.9 ± 72.2 °C; Fig. 14d), with the lowest Zr-in-rutile temperature calculated at 678 ± 43 °C. This suggests garnet experienced a degree of 'overstepping', where minerals may not immediately grow despite being subject to stable equilibrium conditions (e.g. Castro & Spear, 2016; Spear, 2017). Garnet nucleation has been known to occur after overstepping of up to 80 °C or 4–5 kbar (Wilbur & Ague, 2006; Spear et al., 2014; Castro & Spear, 2016). Lack

of early porphyroblastic garnet growth inhibits constraints for Ulsteinvik's early prograde evolution.

Minimum peak conditions in WGC2019J-25B are interpreted to occur at ~2.9 GPa and 760 °C. Though not directly observed in the rock, the presence of omphacite as a peak mineral is interpreted based upon the crystallisation of fine-grained biotite + plagioclase + quartz textures (Fig. 3g), which likely formed via breakdown of omphacite + phengite + rutile. Quartz mosaics within garnet (Fig. 3i) were possibly formed after coesite decompression (e.g. Smyth, 1977; Enami & Qija, 1990; Mosenfelder & Bohlen, 1997). The potential presence of this UHP mineral is further validated by its record in the neighbouring Hareidland eclogite (e.g. Carswell et al., 2003a). The assigned peak *P–T* is a minimum constraint, as it is impossible to constrain how far the sample progressed into the peak coesite-bearing field. Garnet growth primarily occurs during the prograde history and effectively stops after ~1.6 GPa (Fig. 17). Furthermore, the garnet rims are consumed during exhumation and retrogression. As a result, rutile captured inside of garnet can only be used to elucidate the prograde component of Ulsteinvik's history. The absence of an Eu anomaly in Ulsteinvik monazite (Fig. 11A) suggests it grew outside of plagioclase stability until at least 377 Ma (Fig. 9B, D; McLennan, 1989). This adds a time constraint to the Ulsteinvik *P–T* path, as it appears the rock did not traverse through retrograde plagioclase-stable fields until after 377 Ma. Based upon this hypothesis, Ulsteinvik must have experienced either a long-lived prograde path and/or stalled in the mantle before its retrograde evolution and remained at *P–T* conditions above 16 kbar (Fig. 15; Point 3) until at least 377 Ma. Three distinct retrograde mineral reaction textures were identified: (1) fine-grained intergrown biotite + plagioclase + quartz domains (Fig. 3g); (2) fine-grained cordierite + plagioclase + spinel symplectic coronas (Fig. 3a, b); and (3), partial replacement of kyanite by sillimanite (Fig. 3c). As

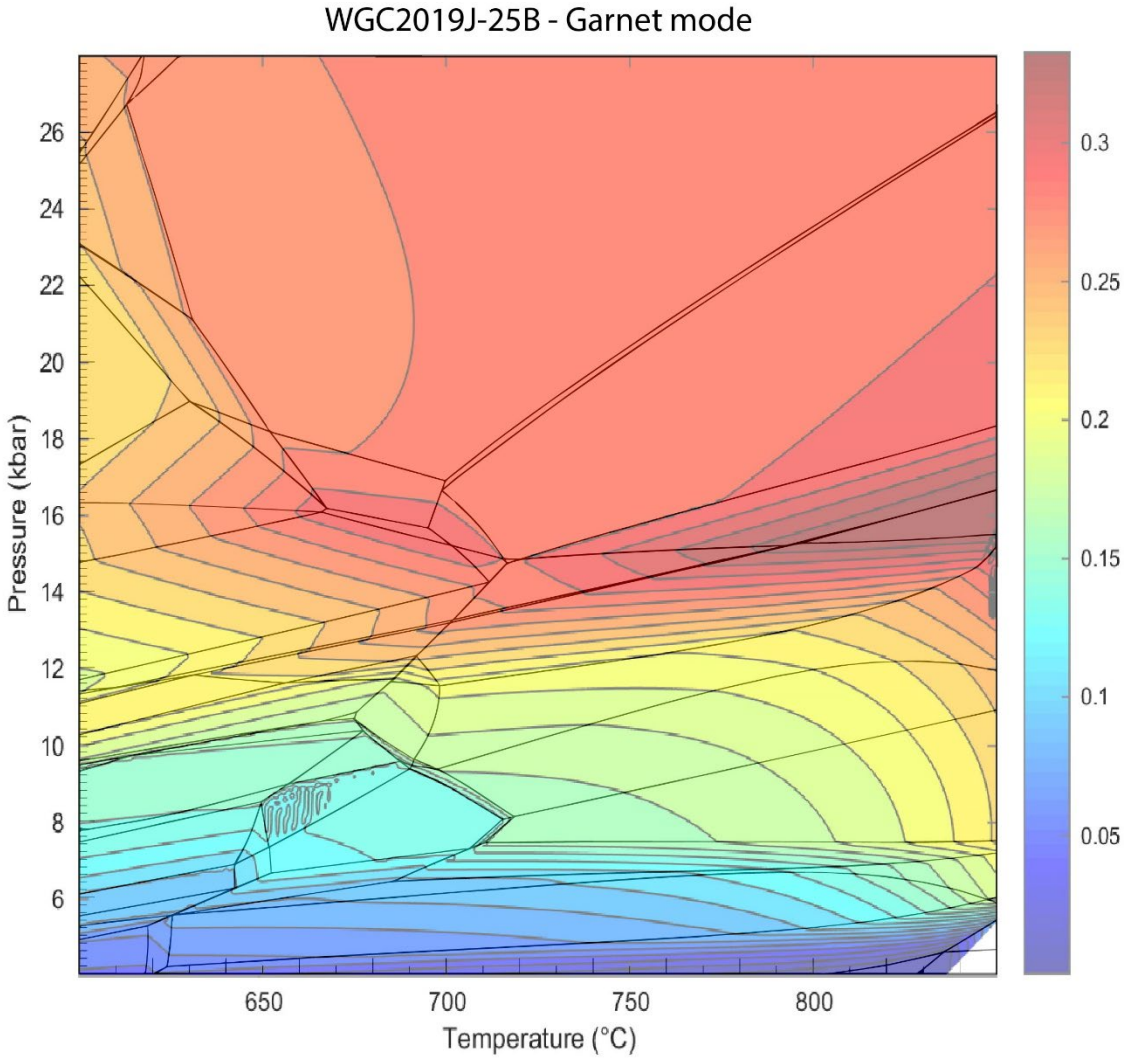


Figure 17: WGC2019J-25B phase diagram coloured by computed garnet mode. Above 16 kbar, garnet mode and thereby garnet growth stalls.

discussed above, biotite-plagioclase-quartz intergrowths are interpreted as the retrograde product of peak omphacite + phengite + rutile breakdown. Cordierite-plagioclase-spinel coronas are interpreted to form at the expense of garnet + kyanite + biotite reactants, some of which still exist in the current assemblage. Calculation of a single *P–T* point was used to constrain retrograde conditions within the Ulsteinvik metapelite at ~7 kbar and ~740 °C (Fig. 15; Point 4), at which point the rock contains both cordierite and sillimanite. This supports the petrographic observation of cordierite-spinel-plagioclase coronas occasionally consuming retrograde sillimanite.

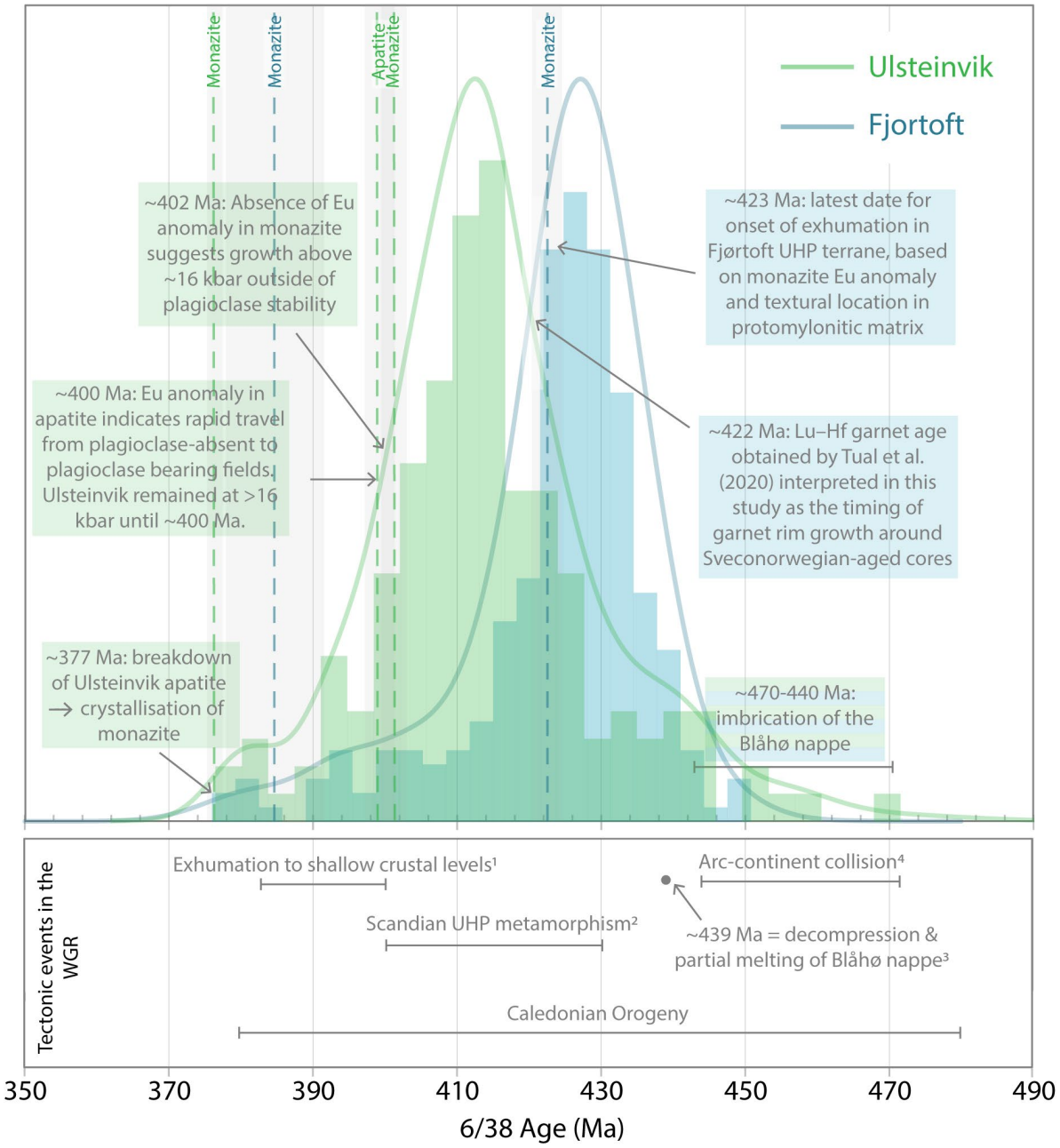
Decompression during exhumation would have caused minor melting within the rock (Fig. 2c). The lack of K-feldspar within cordierite-spinel reaction textures suggests some melt loss, however this is likely to be volumetrically minor due to the preservation of abundant biotite and the lack of migmatitic character observed in the rock.
At Fjørtoft, Sveconorwegian-aged monazite occurs frequently inside of garnet inclusion trails (Fig. 3e, f). This means the age of Fjørtoft garnets is ambiguous and makes the estimation of a prograde Caledonian history difficult. Therefore, it is not discussed in this study. Based on the inferred peak assemblage and Zr-in-rutile temperatures, minimum peak conditions at Fjørtoft are interpreted as ~18 kbar and ~750 °C (Fig. 16; Point 1). Diamond has been reported from the Fjørtoft outcrop, implying pressures >3.6 GPa and suggesting extensive reworking of the sampled metapelite. Retrograde rims of biotite around muscovite suggest the Fjørtoft metapelite traversed through conditions of ~11 kbar and ~710 °C (Fig. 16; Point 2).

Tectonic implications for the Caledonian evolution of the Western Gneiss Region

Ulsteinvik and Fjørtoft record protracted and potentially coupled metamorphic histories. Both samples contain U–Pb zircon and monazite ages that correlate with the Sveconorwegian Orogeny, although Fjørtoft preserves a more extensive record. Similarly, both Fjørtoft and Ulsteinvik record a Late Ordovician-Early Silurian peak in zircon and rutile ages (Fig. 18). Ca. 470–440 Ma ages pre-date the onset of Scandian subduction in the WGR (~430 Ma; e.g. Griffin & Brueckner, 1980; Tucker et al., 2004; T. E. Krogh et al., 2011). In Fjørtoft, these ages record its well-known history as a constituent of the Seve-Blåhø nappe, an allochthonous terrane that was imbricated onto the Baltican margin prior to Scandian subduction (ca. 430 Ma; Robinson, 1995; Terry et

al., 2000a; Carswell et al., 2006). The overlap of Ulsteinvik ages with the Fjørtoft age peak suggests the Ulsteinvik metapelite could have also been a constituent of the Blåhø nappe, and may share its pre-Scandian history with the Fjørtoft metapelite. This hypothesis is supported by observations made by Root et al. (2005) regarding similarities in host-rock lithologies between Ulsteinvik and the Blåhø nappe, as well as by age data similar to Ordovician-Silurian dates from this metapelitic study presented by DesOrmeau et al. (2015) in neighbouring eclogitic rocks from Hareidland, Ulsteinvik. The Ulsteinvik and Fjørtoft metapelites are therefore suggested to have both been partially subducted within the Blåhø nappe at ca. 450 Ma and accreted to the base of the upper plate (Majka et al. 2014). These terranes were then imbricated upon the Baltica continent during Scandian subduction at ca. 430 Ma. The fact that both Ulsteinvik and Fjørtoft record Sveconorwegian histories suggests a Baltic provenance for the allochthonous Blåhø nappe, where the sedimentary protolith for these metapelites must have been deposited either within the Baltica continent or proximally in the Iapetus Ocean (Stephens & Gee, 1985; Gee et al., 2013). At some stage during either pre-Scandian subduction, partial(?) exhumation, or imbrication on the Baltican margin, the Blåhø nappe possibly experienced slab tear, separating the Ulsteinvik and Fjørtoft domains. Monazite geochronology and geochemistry within Ulsteinvik and Fjørtoft record different histories during the Scandian phase of the WGR, possibly indicative of this decoupling (Fig. 9, 18). Figure 18 demonstrates the extent of the out of phase relationship between metapelites at Ulsteinvik and Fjørtoft.

At Fjørtoft, a relatively rapid Scandian subduction and exhumation history is proposed. Monazite occurs in two populations (~423 Ma and ~385 Ma; Figure 9B), which both



¹Andersen et al. (1998), Terry et al. (2000b), Tucket et al. (2004), Hacker (2007), Walsh et al (2007).
²Griffin & Brueckner (1980), Terry et al. (2000), Tucker et al. (2004), Kylander-Clark et al. (2007), Krogh et al. (2011).
³Majka et al. (2014)
⁴Andersen & Andresen (1994), Bruckner & van Roermund (2004), Hacker & Gans (2005), Root et al. (2005), Janák et al. (2013a), Majka et al. (2014), Klonowska et al. (2014), DesOrmeau et al. (2015)

Figure 18: Age distribution for Ulsteinvik (green) and Fjørtoft (blue). Rutile and zircon age data are combined in cumulative age distribution curves, monazite and apatite are indicated by dotted lines and associated error bars. Note that distribution curve heights have been normalised for visual comparison. The plot is annotated based on observations and interpretations made within this study. The bottom panel presents inferred tectonic events that occur within the WGR based on past studies.

have negative Eu anomalies and therefore crystallised in the presence of plagioclase. The growth of these monazites in association with a strongly foliated matrix (Fig. 10a) suggests they crystallised during the retrograde evolution of Fjørtoft. This suggests that

the Fjørtoft metapelite had already experienced UHP metamorphism and begun exhumation by ca. 423 Ma, indicating an early and rapid burial and exhumation relative to the rest of the WGR, where UHP metamorphism is constrained as late as 397 Ma (Kylander-Clark et al., 2007; Kylander-Clark et al., 2009). Contrastingly, Fjørtoft metapelite garnet zoning profiles (Fig. 4f) exhibit compositional diffusion, interpreted as the result of prolonged exposure at (U)HT. This could be attributed to the pre-Scandian component of the Fjørtoft metapelite's history, during the early subduction of the Blåhø nappe. Speculatively, the Blåhø nappe could have experienced slab tear and consequent exhumation, leaving behind the Fjørtoft metapelite and allowing it to reside within the subduction channel for a prolonged period of time.

Based on geochronology, geochemistry and *P–T* modelling, the Ulsteinvik metapelite appears to have experienced a comparatively long-lived prograde history and later exhumation relative to the Fjørtoft metapelite. The preservation of Ulsteinvik garnet zoning profiles (Fig. 4c) indicates that the terrane could not have remained in the mantle for longer than ~10 Myr (Caddick et al., 2010). The absence of an Eu anomaly in ~402 Ma monazite (Fig. 9a) and its strong presence in ~400 Ma apatite is interpreted as rapid travel from plagioclase-absent to plagioclase-bearing fields. This suggests that the Ulsteinvik metapelite remained above ~16 kbar until ~400 Ma (Fig. 15; Point 3).

CONCLUSION

The Western Gneiss Region, Norway offers fascinating insight into the dynamics of continental subduction and emphasises that it is not always a smooth, 'conveyor belt' process. Geochronology, geochemistry and thermometry, along with *P–T* forward modelling from the Ulsteinvik and Fjørtoft metapelites supports the following conclusions:

1. Sveconorwegian-ages of ca. 1064–903 Ma were recorded in Fjørtoft, and 1018–998 Ma in Ulsteinvik. The prevalence of this record across both localities, along with the occurrence Sveconorwegian-aged monazite entrapped within garnet is interpreted as supporting a period of Sveconorwegian-growth within the WGR.
2. The Ulsteinvik metapelite records a Late Ordovician-Early Silurian age peak that pre-dates the onset of Scandian UHP subduction. The similarity of this pre-Scandian age peak to ages recorded within the Blåhø nappe on the island of Fjørtoft supports the conclusion made by Root et al. (2005) regarding Ulsteinvik's affinity for the Seve-Blåhø nappe and shared Ordovician-Early Silurian history with Fjørtoft.
3. Negative Eu anomalies within ~423 Ma monazite from the Fjørtoft metapelite suggest crystallisation in the presence of retrograde plagioclase, constraining the beginning of exhumation within Fjørtoft. This indicates that subduction and exhumation were extremely rapid (potentially <7 Myr) within this part of the WGR.
4. Ulsteinvik experienced a long-lived prograde history and potentially rapid growth of retrograde plagioclase based on the lack of negative Eu anomaly in ~402 Ma monazite, and its presence in ~400 Ma apatite. This suggests that Ulsteinvik was at pressures (~16 kbar) that inhibited plagioclase growth until as late as ~402 Ma before rapid exhumation.

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APPENDIX 1: WHOLE-ROCK GEOCHEMISTRY

Samples were crushed at the University of Adelaide using a tungsten carbide ring mill and then delivered to Bureau Veritas for analysis. Hydrofluoric, nitric, hydrochloric and perchloric acids were used to digest and reflux samples. Zn was determined through Inductively Coupled Plasma Mass Spectrometry (ICP–MS). Cu and Ni were calculated by Inductively Coupled Plasma Optical Emission Spectrometry (ICP–OES). Aliquots of each sample were then fused with lithium metaborate in a PT crucible at high temperature. The resultant fused glass was then digested in nitric acid, causing the complete dissolution of most minerals, with volatile elements being lost at high fusion temperatures. ICP–OES was used to determine Al_2O3, CaO, Cr, Fe_2O3, K_2O, MgO, MnO, Na_2O, P_2O_5, SiO_2, TiO_2, and V. Following digestion in hydrochloric and hydrofluoric acids, ICP-MS was used to determine Ba, Ce, Co, Ga, La, Nb, Rb, Sr, Th, U, Y and Zr.

IDENT	Ag	Al2O3	As	Ba	Be	Bi	CaO	Cd	Co	Cr	Cs	Cu	Fe2O3	Ga
UNITS	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm
SCHEME	MA102	LB101	MA102	MA101	MA102	MA102	LB101	MA102	MA102	LB101	MA102	MA102	LB101	LB102
DETECTION LIMIT	0.2	0.01	1	2	0.5	0.1	0.01	0.5	1	20	0.1	1	0.01	1
WGC 2019J_25B-1	<0.2	15.3	<1	48	1	<0.1	2.77	<0.5	24	420	3.1	66	8.62	14
WGC 2019J_25B-2	<0.2	17.3	<1	136	1.5	<0.1	3.29	<0.5	24	360	3.5	88	9.12	23
WGC 2019J_27	<0.2	18.2	<1	566	<0.5	<0.1	1.76	<0.5	25	460	0.4	32	9.02	24
WGC 2019J_29	<0.2	19.3	<1	640	<0.5	<0.1	1.34	<0.5	25	300	0.7	33	10.1	26
WGC 2019J_30	<0.2	27.2	<1	204	<0.5	<0.1	2.41	<0.5	40	420	0.1	80	18.2	32
WGC 2019J_31A	<0.2	21.5	<1	538	<0.5	<0.1	1.05	<0.5	27	380	0.5	53	11.5	28
WGC 2019J_31B	<0.2	22.1	<1	560	<0.5	<0.1	0.99	<0.5	28	520	0.5	43	11.6	28

APPENDIX 2: EXTENDED EPMA METHODS AND RESULTS

Wavelength Dispersive Spectrometers (WDS) at Adelaide Microscopy were used to analyse major oxides (SiO2, ZrO2, TiO2, Cr2O3, Al2O3, FeO, MnO, MgO, CaO, P2O5, Na2O, K2O, BaO, NiO, F and Cl). Energy Dispersive Spectrometers (EDS) were used to obtain qualitative x-ray compositional maps for major elements in garnet and cordierite-spinel reaction textures (Al, Ca, Fe, K, Mg, Mn, Na, P, Si and Ti).

WGC2019J-25B					
Oxides	**Garnet core**	**Garnet rim**	**Plagioclase**	**Spinel**	**Biotite**
SiO2	38.59	38.61	52.73	0.00	36.15
TiO2	0.03	0.01	0.00	0.03	3.01
Al2O3	22.05	22.18	30.55	60.55	17.22
Cr2O3	0.03	0.03	0.00	0.27	0.09
FeO	24.38	25.21	0.08	28.23	14.99
MnO	0.53	0.75	0.00	0.14	0.03
MgO	7.45	7.91	-0.01	8.79	13.06
ZnO	-	-	0.00	1.78	0.00
CaO	7.23	5.68	12.71	0.17	0.00
Na2O	0.01	0.01	4.40	0.00	0.23
K2O	-	-	0.05	0.00	9.00
Cl	0.00	0.00	0.00	0.00	0.00
F	0.01	0.01	0.00	0.00	0.00
H2O	0.00	0.00	0.00	0.00	3.96
Total	**100.31**	**100.40**	**100.51**	**99.96**	**97.75**

WGC2019J-25B					
Cations	**Garnet core**	**Garnet rim**	**Plagioclase**	**Spinel**	**Biotite**
Si	2.96	2.96	2.37	0.00	2.68
Ti	0.00	0.00	0.00	0.00	0.17
Al	1.99	2.00	1.63	1.95	1.50
Cr	0.00	0.00	0.00	0.01	0.01
Fe3+	0.08	0.07	0.00	0.05	0.45
Fe2+	1.48	1.54	0.00	0.60	0.47
Mn2+	0.03	0.05	0.00	0.00	0.00
Mg	0.85	0.90	0.00	0.36	1.44
Zn	0.00	0.00	0.00	0.04	0.00
Ca	0.59	0.47	0.62	0.01	0.00
Na	0.00	0.00	0.38	0.00	0.03
K	0.00	0.00	0.00	0.00	0.85
Cl	0.00	0.00	0.00	0.00	0.00
F	0.00	0.00	0.00	0.00	0.00
OH-	0.00	0.00	0.00	0.00	2.00

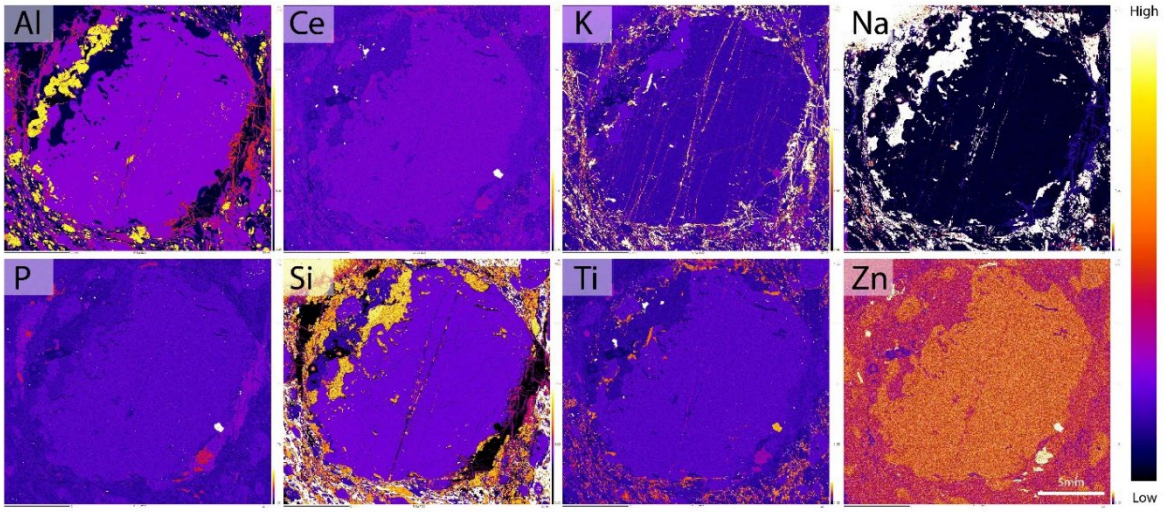
WGC2019J-25B reaction textures						
Oxides	**Garnet**	**Spinel**	**Biotite**	**Plagioclase**	**Cordierite**	**Ilmenite**
SiO2	38.39	0.07	36.41	62.07	49.27	0.09
TiO2	0.00	0.00	3.76	0.00	0.00	46.46
Al2O3	22.15	58.75	17.13	24.37	33.59	0.17
Cr2O3	0.00	0.27	0.14	0.00	0.00	0.09
FeO	28.79	32.36	15.88	0.06	5.42	51.90
MnO	1.35	0.16	0.00	0.00	0.00	0.27
MgO	6.54	5.74	12.67	0.00	9.90	0.47
ZnO	3.69	0.00	0.00	5.51	0.00	0.00
CaO	0.00	0.00	0.16	8.44	0.00	0.00
Na2O	0.00	0.00	9.37	0.12	0.00	0.00
K2O	0.00	0.00	0.00	0.00	0.00	0.00
Cl	0.00	0.00	0.00	0.00	0.00	0.00
F	0.00	0.00	0.00	0.00	0.00	0.00
H2O	0.00	0.00	4.10	0.00	0.00	0.00
Total	**100.89**	**97.35**	**99.62**	**100.56**	**98.18**	**99.44**

WGC2019J-25B reaction textures						
Cations	**Garnet**	**Spinel**	**Biotite**	**Plagioclase**	**Cordierite**	**Ilmenite**
Si	3.01	0.00	2.66	2.98	5.01	0.00
Ti	0.00	0.00	0.21	0.00	0.00	0.88
Al	2.04	1.97	1.47	1.38	4.03	0.00
Cr	0.00	0.01	0.01	0.00	0.00	0.00
Fe3+	0.00	0.02	0.05	0.00	0.00	0.23
Fe2+	1.89	0.75	0.92	0.00	0.46	0.86
Mn2+	0.09	0.00	0.00	0.00	0.00	0.01
Mg	0.76	0.24	1.38	0.00	1.50	0.02
Zn	0.21	0.00	0.00	0.20	0.00	0.00
Ca	0.00	0.00	0.01	0.43	0.00	0.00
Na	0.00	0.00	1.33	0.01	0.00	0.00
K	0.00	0.00	0.00	0.00	0.00	0.00
Cl	0.00	0.00	0.00	0.00	0.00	0.00
F	0.00	0.00	0.00	0.00	0.00	0.00
OH-	0.00	0.00	2.00	0.00	0.00	0.00

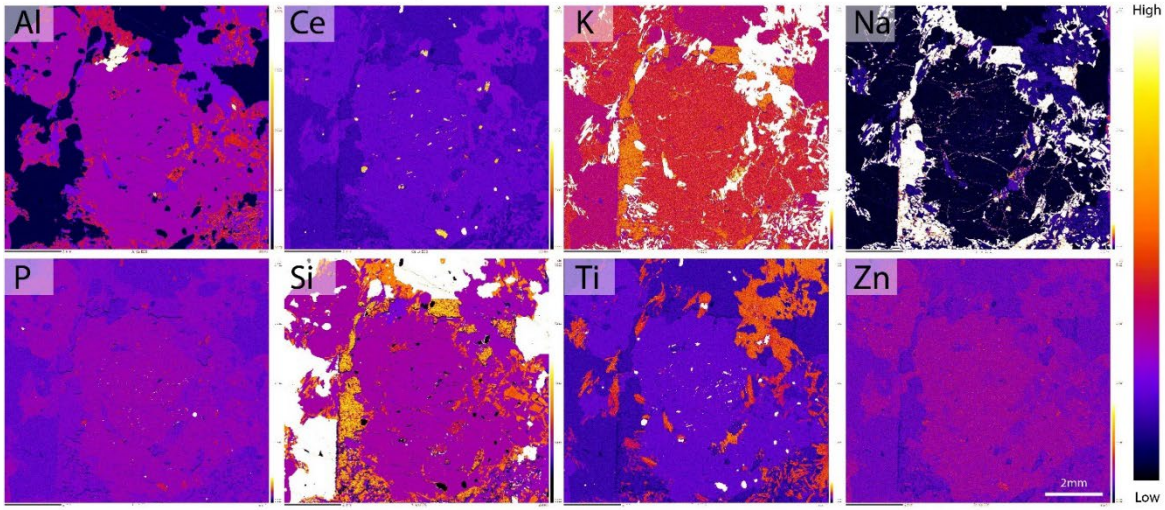
WGC2019J-31A					
Oxides	**Garnet core**	**Garnet rim**	**K-feldspar**	**Plagioclase**	**Biotite**
SiO2	38.19	38.39	64.38	62.16	36.63
TiO2	0.00	0.01	0.00	0.00	4.90
Al2O3	22.02	22.10	18.88	23.97	17.46
Cr2O3	0.00	0.01	0.00	0.00	0.05
FeO	31.02	29.23	0.04	0.04	15.30
MnO	0.68	0.46	0.00	0.00	0.02
MgO	7.47	7.80	-0.02	-0.02	11.74
ZnO	-	-	0.00	0.00	0.00
CaO	1.21	2.66	0.00	5.19	0.00
Na2O	0.02	0.01	1.30	8.60	0.14
K2O	-	-	14.12	0.13	9.61
Cl	0.00	0.00	0.00	0.00	0.00
F	0.01	0.01	0.00	0.00	0.00
H2O	0.00	0.00	0.00	0.00	0.00
Total	100.62	100.68	98.70	100.07	95.85

WGC2019J-31A					
Cations	**Garnet core**	**Garnet rim**	**K-feldspar**	**Plagioclase**	**Biotite**
Si	2.96	2.96	3.00	2.76	2.71
Ti	0.00	0.00	0.00	0.00	0.27
Al	2.01	2.01	1.04	1.25	1.52
Cr	0.00	0.00	0.00	0.00	0.00
Fe3+	0.06	0.07	0.00	0.00	0.05
Fe2+	1.95	1.81	0.00	0.00	0.90
Mn2+	0.04	0.03	0.00	0.00	0.00
Mg	0.86	0.90	0.00	0.00	1.30
Zn	0.00	0.00	0.00	0.00	0.00
Ca	0.10	0.22	0.00	0.25	0.00
Na	0.00	0.00	0.12	0.74	0.02
K	0.00	0.00	0.84	0.01	0.91
Cl	0.00	0.00	0.00	0.00	0.00
F	0.00	0.00	0.00	0.00	0.00
OH-	0.00	0.00	0.00	0.00	2.00

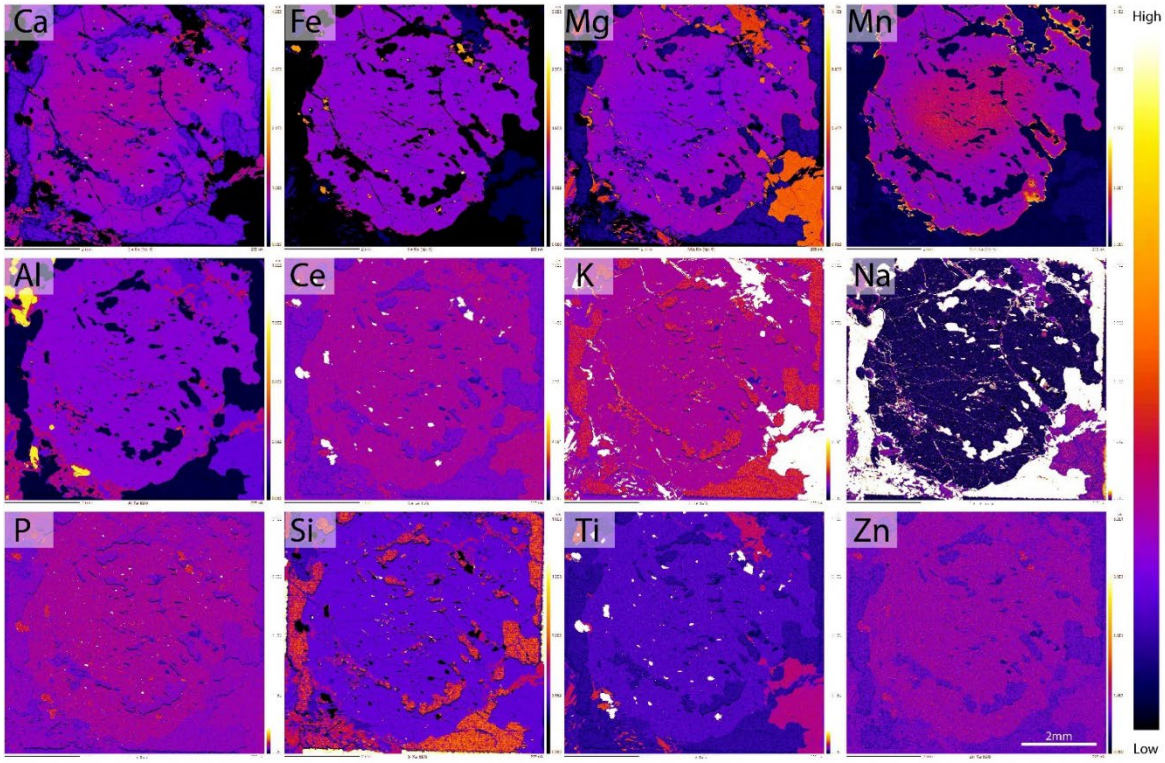
WGC2019J-31A: Additional EPMA garnet maps



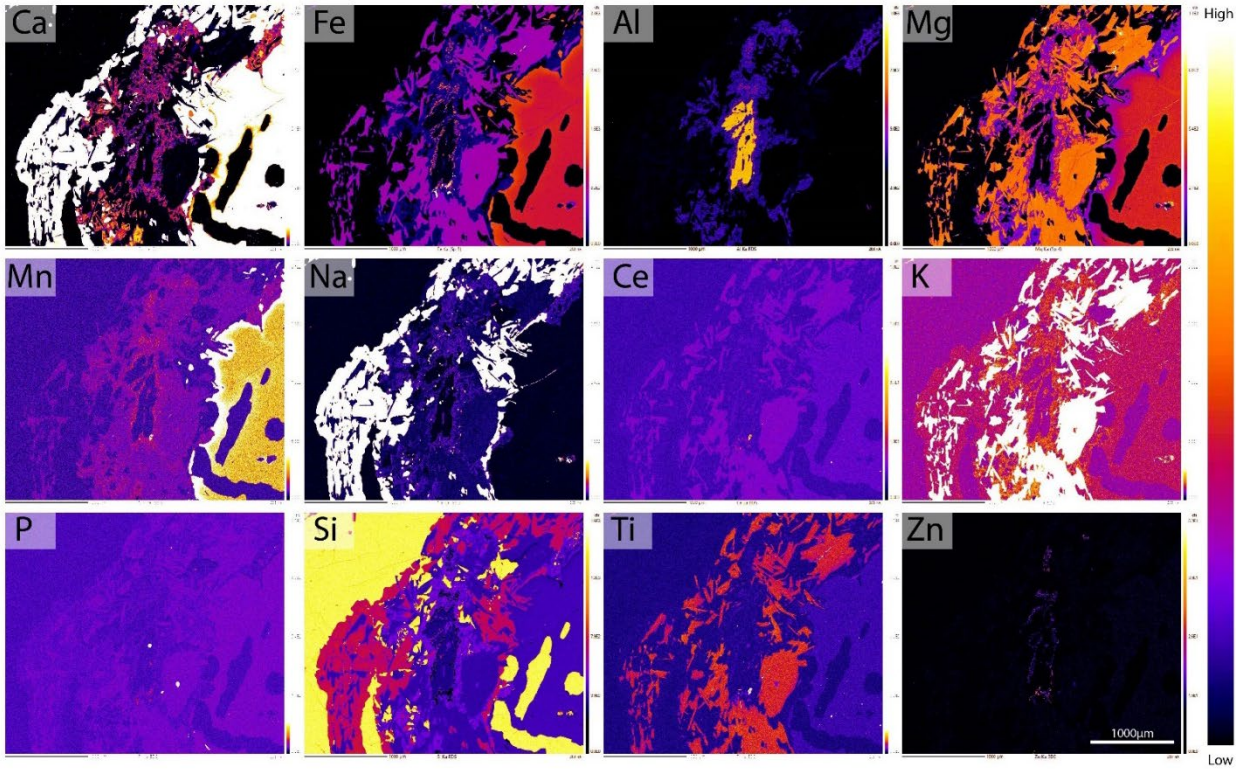
WGC2019J-25B-1: Additional EPMA garnet maps



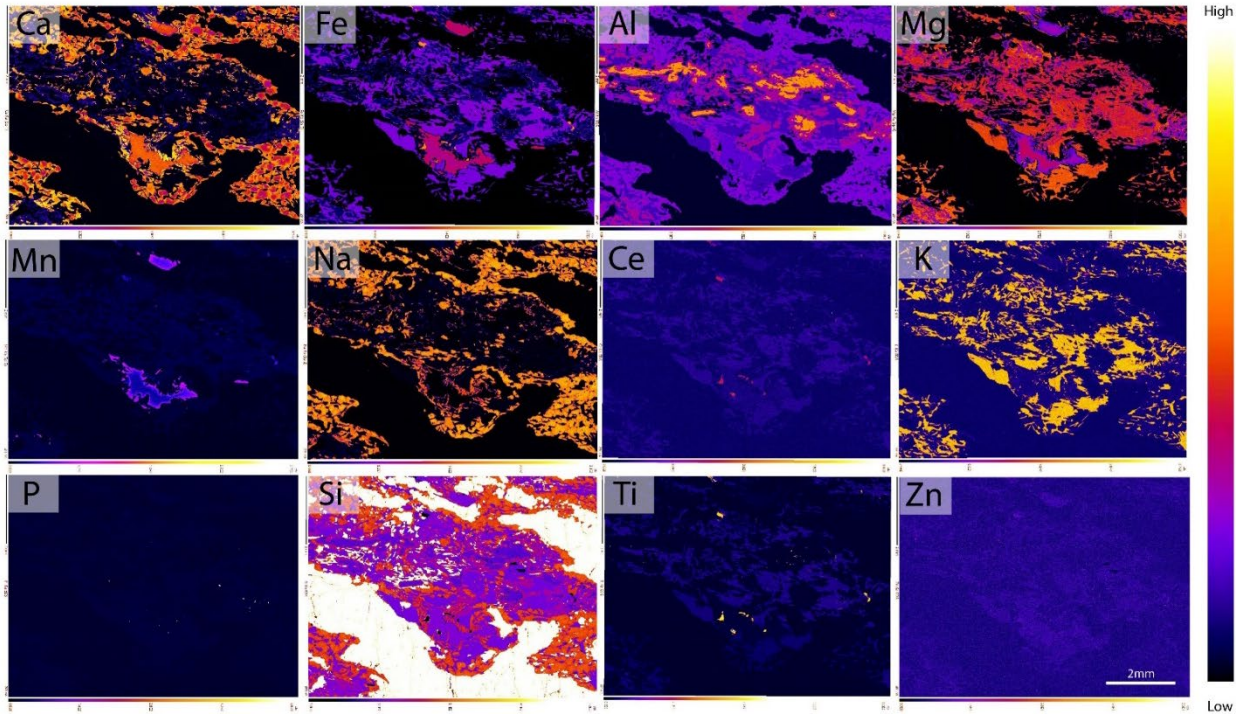
WGC2019J-25B-2: EPMA garnet maps

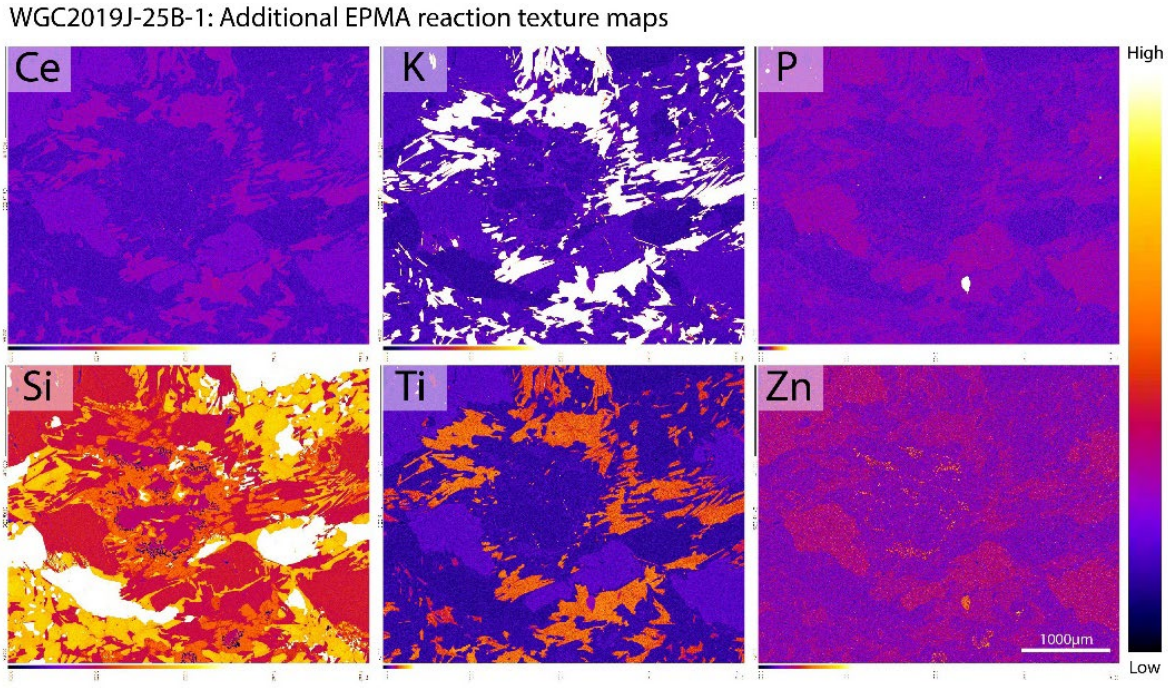


WGC2019J-25B-2: EPMA reaction texture maps



WGC2019J-25B-3: EPMA reaction texture maps





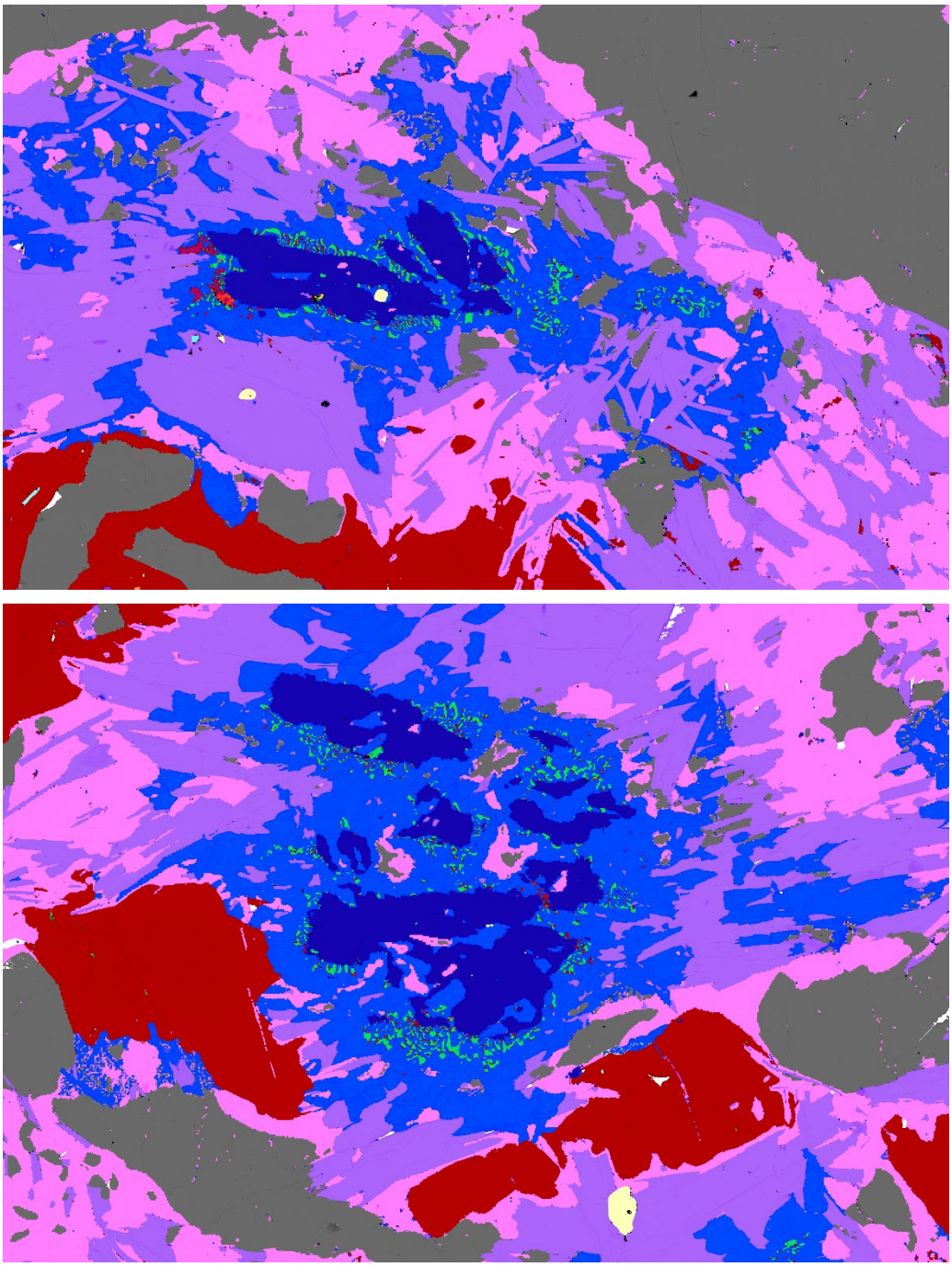
APPENDIX 3A: EXTENDED LA–ICP–MS METHODS

Mineral separate preparation

Zircon grains were separated under standard crushing, sieving and panning procedures. Additionally, sample WGC2019J-31A was subject to heavy liquid separation. Approximately 100 grains were hand-picked and mounted from WGC2019J-25B, and approximately 300 hand-picked from WGC2019J-31A. 2.5 cm-diameter moulds for each sample were then filled with epoxy resin and hardener, allowed to set, and then polished to expose the centre of each grain.

Scanning electron microscope analysis

Prior to LA–ICP–MS analysis, both zircon (mounted) and monazite (in-situ) were imaged with a back-scatter electron (BSE) detector on the FEI Quanta MLA–600 scanning electron microscope (SEM) equipped with a tungsten filament electron source at Adelaide Microscopy. Zircon grains were then imaged using the Gatan cathodoluminescence (CL) analyser, also attached to the FEI Quanta MLA–600 SEM. Zircon grains are dull in BSE images, but tend to exhibit zoning or other characteristic textures under the CL analyser. Comparatively, monazite has a higher atomic mass and is therefore more likely to demonstrate zoning in BSE images.
E-DAX software was used in conjunction with SEM-BSE and -CL images and the Genesis Spectrum program to distinguish between minerals and formulate mineral liberation analysis maps of key reaction textures in WGC2019J-25B.


Unknown
Almandine
Biotite
Quartz
Cordierite
Kyanite
Orthoclase
Low_Counts
Apatite
Zircon
Hematite/Magnetite
Rutile
Chalcopyrite
Marcasite
No_XRay
Plagioclase
Ilmenite
Spinel
Monazite-(La)
Ilmenorutile

LA–ICP–MS analysis

LA–ICP–MS analyses were performed at Adelaide Microscopy using a RESOlution LR 193nm Excimer laser system coupled with an Agilent 7700s ICP–MS under a He-ablation atmosphere. Zircon, monazite and apatite were analysed for U–Pb geochronology and trace elements, whilst rutile was analysed exclusively for U–Pb geochronology and garnet exclusively for trace elements. $^{207}Pb/^{206}Pb$ ratios were calculated in biotite and K-feldspar so that anchoring ages could be used for the concordia plots of common-Pb bearing minerals. A total of 60 s of acquisition time for each zircon and monazite analysis was subdivided into 30 s of background acquisition and 30 s of sample ablation. For rutile, apatite, garnet, biotite and K-feldspar, total acquisition time spanned 70 s, distributed between 30 s of background acquisition and 40 s of sample ablation.

LA–ICP–MS standards

Geochronological analyses were corrected for elemental fractionation and mass bias in zircon, monazite, apatite, rutile, biotite and K-feldspar through various primary standards. Data accuracy was monitored through the use of secondary standards. All trace element analyses were corrected using the external standard NIST610.
Biotite and K-feldspar were standardised against GSD and NIST610 for Pb isotope calculations.

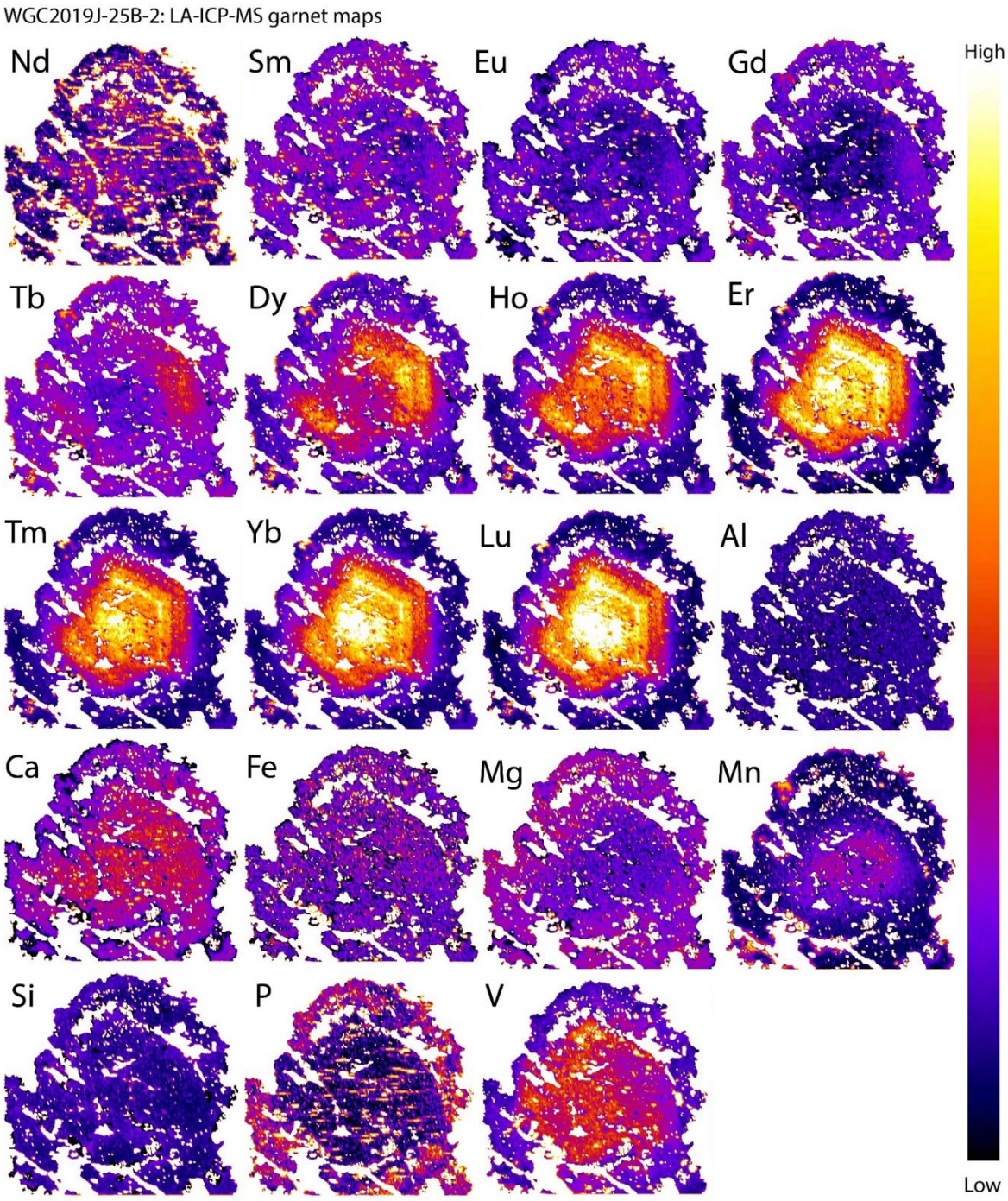
Mineral	Standard	Type	Known age (Ma)	Weighted mean 6/38 age (Ma)	Concordia age (Ma)
25B Zircon	GJ	Primary	608.5 ± 0.4 (Jackson et al., 2004)	601.81 ± 2.46	603.01 ± 2.31
	Pleisovice	Secondary	337.13 ± 0.37 (Sláma et al., 2008)	338.59 ± 1.82	339.22 ± 1.68
	91500	Secondary	1065.4 ± 0.3 (Wiedenbeck et al., 1995)	1054.36 ± 9.38	1058.46 ± 10.76
31A Zircon	GJ	Primary	608.5 ± 0.4 (Jackson et al., 2004)	601.80 ± 1.78	602.48 ± 1.73
	Pleisovice	Secondary	337.13 ± 0.37 (Sláma et al., 2008)	338.48 ± 1.91	338.17 ± 2.04
	91500	Secondary	1065.4 ± 0.3 (Wiedenbeck et al., 1995)	1059.32 ± 5.21	1057.51 ± 5.23
Monazite	MAdel	Primary	518.37 ± 0.99 (updated from Payne et al., 2008 with additional TIMS analysis)	518.06 ± 1.52	515.99 ± 1.47
	Ambat	Secondary	~525 (in-house)	520.24 ± 2.19	518.09 ± 2.21
	222	Secondary	450.2 ± 3.4 (in-house)	449.67 ± 1.46	450.57 ± 1.27
Apatite	MAD	Primary	486.58 ± 0.85 & 474.25 ± 0.41 (Thomson et al., 2012)	473.81 ± 3.22	474.44 ± 3.22
	McClure	Secondary	523.51 ± 1.47 (Schoene & Bowring, 2006)	Discordant.	540.8 ± 21
	401	Secondary	530.3 ± 1.5 (Thompson et al., 2016)	537.21 ± 6.78	541.26 ± 10.11
Rutile	R10	Primary	1090 ± 5 (Luvizotto & Zack, 2009)	1091.67 ± 4.70	1091.28 ± 3.27
	R19	Secondary	489.5 ± 0.9 (Zack et al., 2011)	498.51 ± 10.49	496.17 ± 10.69

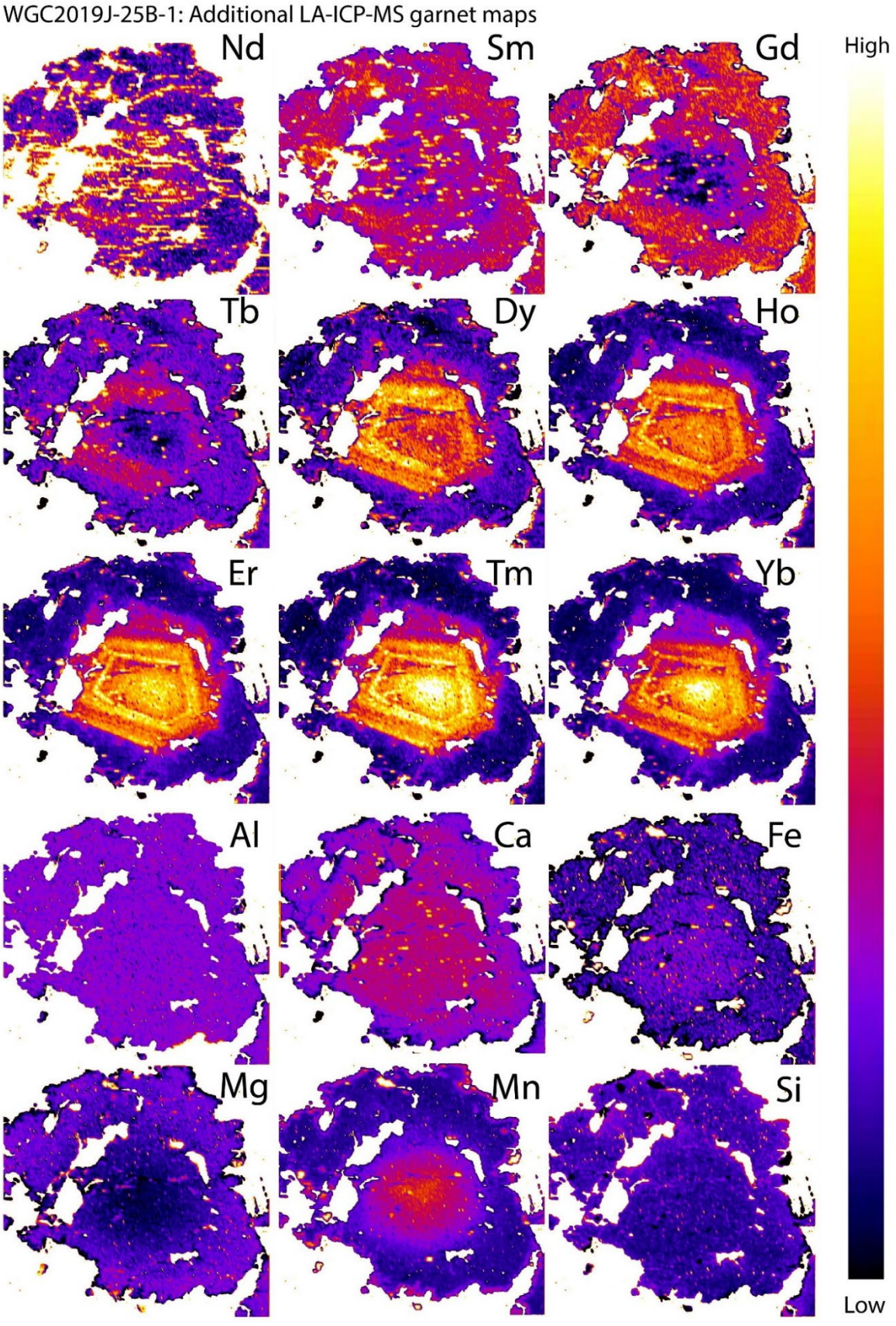
Data processing and reduction

Iolite version 3.6 data processing software (Paton et al., 2011) was used to reduce U-Pb isotopic data. This software uses data from well-constrained standards to correct for down-hole fractionation and instrument drift during data acquisition. Background signal is typically collected by the laser during the first 30 s of data acquisition. This portion of signal should be flat, any spikes that are observed must be removed. Samples and standards are subsequently identified and cropped to remove background. A data reduction scheme (DRS) is then applied. A linear fit typically best represents the data, though it is important to check other schemes as well. The DRS application is used to correct for instrument drift and down-hole fractionation. Next, sample and standard signals are cropped to exclude anomalous data and improve the overall quality of analyses. Good analyses should have relatively steady U and Pb isotope values (i.e. reasonably flat slopes), no major signal spikes (usually indicative of ablating an inclusion), and no major decrease in signal towards the end of the analysis (typically suggestive of firing through the grain). In the case of a bi-modal signal, the earlier section of the signal should be retained as this is more representative of the original target. Both halves of the signal should not be included, as this would constitute a mixed and thereby meaningless age. It is important to not let the bracketing of signals be influenced by personal bias. The previous DRS is once again applied to the data prior to exportation from Iolite 3.6 and the creation of concordia plots.
The final step (where relevant) is to process trace element data. In order to maintain consistency between chemistry and age, it is important that the signals selected for trace elements are cropped identically to U-Pb geochronology analyses. An internal element standard must be assigned in order to process trace element data for minerals in Iolite 3.6. Index elements are selected based on their relative consistency within a mineral. Trace element data was processed using Zr = 43.14% for zircon, Ce = 20% for monazite, Ca = 39.36% for apatite and Si = 18.71% for garnet. Trace element data were reduced using the same method outlined previously for U-Pb geochronology.

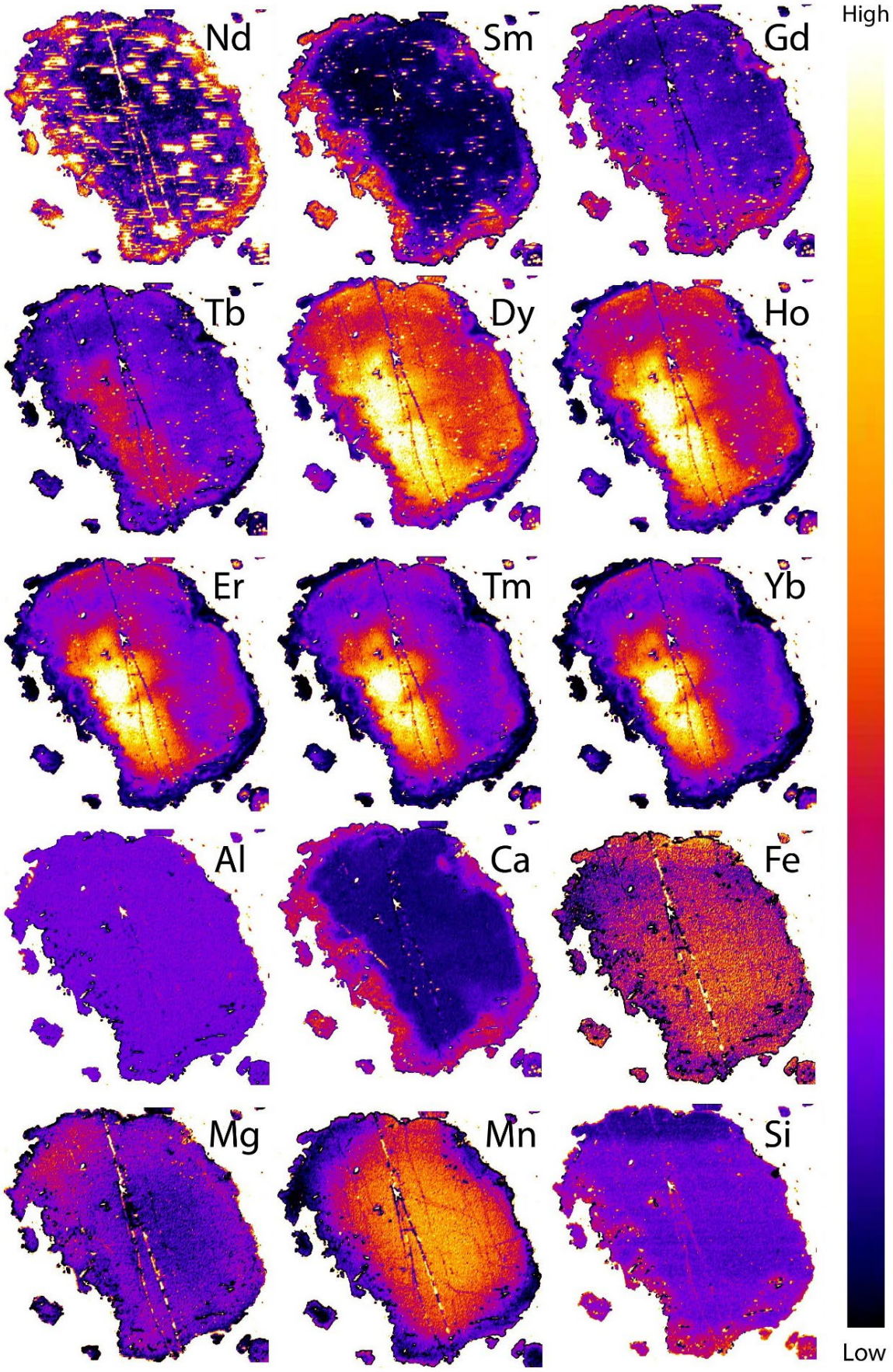
APPENDIX 3B: LA–ICP–MS GARNET RESULTS

Garnet trace element maps




WGC2019J-25B-1: Additional LA-ICP-MS garnet maps
Nd
Sm
Gd
Tb
Dy
Ho
Er
Tm
Yb
Al
Ca
Fe
Mg
Mn
Si
High
Low

WGC2019J-31A: Additional LA-ICP-MS garnet maps



Garnet trace elements

Sample	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Y	Ho	Er	Tm	Yb	Lu	Total HREEs	Eu anomaly	Mg	Ca	Mn	Fe
25B-3b-C9_gnt - 1.d	0.021097	0.011 9086	0.177 8017	1.218 8184	19.72 973	24.95 5595	40.45 2261	47.89 4737	46.74 7967	61.48	38.79 1209	34.43 75	28.70 4453	30.37 2671	27.47 9675	315.9 0821	0.88335 64	433 40	390 00	34 95	173 900
25B-3b-C9_gnt - 2.d	0.018 0591	0.018 7602	0.175 6466	1.673 9606	20.20 2703	26.87 389	46.98 4925	56.53 7396	53.90 2439	68.28	46.79 4872	39.56 25	32.59 1093	33.22 9814	29.43 0894	360.3 2901	0.87226 11	441 80	395 00	28 02	170 000
25B-3b-C9_gnt - 3.d	- 0.083 9662	0.020 3915	0.229 5259	1.183 8074	17.63 5135	24.19 1829	42.66 3317	50.41 5512	51.66 6667	64.28	44.21 2454	44	39.71 6599	39.87 5776	42.64 2276	376.8 0929	0.88196 63	435 00	407 00	27 28	171 100
25B-3b-C9_gnt - 4.d	0.013 7848	0.028 5481	0.221 9828	1.466 0832	16.01 3514	24.45 8259	41.10 5528	50.41 5512	47.47 9675	61.84	43.05 8608	39.87 5	35.14 17	35.65 2174	35.81 3008	349.2 7568	0.95330 55	432 20	416 00	26 93	170 000
25B-3b-C9_gnt - 5.d	- 0.003 4135	0.017 7814	0.212 2845	1.448 5777	17.83 7838	24.24 5115	43.61 809	51.85 5956	53.57 7236	67.4	47.94 8718	48.31 25	47.61 1336	48.75 7764	51.09 7561	416.5 6107	0.86920 02	432 50	438 00	27 33	173 500
25B-3b-C9_gnt - 6.d	0.001 0072	0.021 3703	0.119 6121	1.334 7921	18.31 0811	24.01 421	42.31 1558	51.13 5734	50.48 7805	64.1	43.86 4469	41.37 5	39.83 8057	42.17 3913	39.18 6992	372.1 6197	0.86275 01	425 30	457 00	27 00	170 700
25B-3b-C9_gnt - 7.d	- 0.000 2166	0.011 9086	0.137 931	1.072 2101	14.72 973	21.75 8437	40.85 4271	53.15 7895	57.39 8374	72	54.17 5824	53.87 5	52.95 5466	55.90 0621	58.17 0732	457.6 3391	0.88697 54	403 00	496 00	27 36	168 600
25B-3b-C9_gnt - 8.d	6.464 E-05	0.026 1011	0.161 6379	1.210 0656	16.28 3784	22.78 8632	42.11 0553	52.10 5263	58.65 8537	85.2	59.15 7509	73.93 75	77.36 8421	92.73 2919	94.14 6341	593.3 0649	0.87025 22	400 10	467 00	29 44	170 800
25B-3b-C9_gnt - 9.d	- 1.728 E-05	0.015 3344	0.167 0259	0.936 5427	11.28 3784	17.67 3179	36.48 2412	59.58 4488	78.45 5285	12 2.9	94.50 5495	117.6 875	118.6 6397	126.1 4907	116.6 6667	834.6 1247	0.87105 49	382 70	499 00	31 54	172 000
25B-3b-C9_gnt - 10.d	5.055 E-06	0.055 4649	0.301 7241	1.757 1116	17.70 2703	21.66 9627	42.36 1809	68.42 1053	86.17 8862	13 9.3	99.45 0549	119.8 125	117.0 0405	126.7 0807	114.6 3415	871.5 0923	0.79130 59	383 00	499 00	39 90	185 400
25B-3b-C9_gnt - 11.d	- 1.162 E-06	0.060 3589	0.476 2931	2.407 0022	15.87 8378	20.81 7052	39.44 7236	63.07 4792	84.02 439	13 4.3	93.95 6044	110.8 75	112.9 1498	119.1 9255	110.9 3496	829.2 7271	0.83177 88	359 60	508 00	42 70	182 400
25B-3b-C9_gnt - 12.d	0.012 6582	0.101 1419	0.409 4828	2.085 3392	13.17 5676	16.92 7176	32.36 1809	65.98 338	105.0 4065	17 8.6	134.2 4908	175.5	175.3 0364	185.2 1739	185.3 6585	1205. 26	0.81975 04	345 20	482 00	45 59	177 900
25B-3b-C9_gnt - 13.d	0.012 6582	0.089 7227	0.448 2759	2.188 1838	12.56 7568	15.52 3979	25.17 5879	53.07 4792	79.55 2846	13 9.2	94.32 2344	116.9 375	120.6 0729	130.8 6957	127.1 1382	861.6 7816	0.87274 04	329 00	482 00	48 12	180 900
25B-3b-C9_gnt - 14.d	0.028 692	0.117 4551	0.603 4483	2.472 6477	12.63 5135	14.60 0355	22.56 2814	48.83 6565	80.73 1707	15 2.5	108.2 4176	133.3 125	141.4 17	154.3 4783	152.2 3577	971.6 2313	0.86472 27	314 30	505 00	54 63	182 800
25B-3b-C9_gnt - 15.d	0.057 384	0.145 1876	0.538 7931	1.838 0744	6.621 6216	8.117 2291	16.43 2161	45.78 9474	91.46 3415	18 0.6	123.4 4322	146.5	158.0 5668	165.1 5528	166.6 6667	1077. 6747	0.77817 68	312 20	526 00	60 20	185 800
25B-3b-C9_gnt - 16.d	6.54E-06	0.137 031	0.700 431	2.800 8753	15.74 3243	16.98 0462	23.46 7337	39.83 3795	73.33 3333	15 8.7	107.3 2601	148.2 5	160.7 2874	182.4 8447	194.3 0894	1064. 9653	0.88342 66	308 80	511 00	61 03	185 900
25B-3b-C9_gnt - 17.d	0.032 0675	0.159 8695	0.603 4483	1.816 1926	9.459 4595	10.58 6146	14.22 1106	29.52 9086	68.00 813	17 3.1	119.4 1392	171.8 75	191.4 9798	223.7 2671	246.3 4146	1223. 4923	0.91272 1	306 10	514 00	64 18	185 100
25B-3b-C9_gnt - 18.d	0.022 7848	0.184 3393	0.625	2.625 8206	15.20 2703	16.23 4458	25.07 5377	38.19 9446	69.55 2846	16 3.1	113.0 0366	166.6 25	185.0 2024	226.5 8385	245.1 2195	1207. 207	0.83148 36	304 90	530 00	66 20	185 000

25B-3b-C9_gnt - 19.d	0.130 8017	0.300 1631	0.883 6207	2.997 8118	19.18 9189	22.13 1439	31.25 6281	49.77 8393	82.23 5772	17 4.9	119.5 9707	167.8 125	191.4 9798	228.5 7143	250.4 065	1264. 7996	0.90367 59	304 60	531 00	67 90	183 100
25B-3b-C9_gnt - 20.d	0.043 038	0.156 6069	0.477 3707	2.210 0656	11.08 1081	12.48 6679	20.80 402	46.81 4404	84.02 439	16 4.6	109.8 9011	133.3 75	141.4 5749	152.7 3292	150.5 2846	983.4 2277	0.82239 84	309 50	538 00	69 13	183 000
25B-3b-C9_gnt - 21.d	- 0.005 5781	0.114 1925	0.754 3103	2.188 1838	13.17 5676	14.33 3925	27.08 5427	54.40 4432	90.60 9756	16 6.9	117.3 9927	145.5 625	146.5 587	153.6 646	138.2 1138	1013. 3106	0.75877 12	317 50	509 00	65 14	181 000
25B-3b-C9_gnt - 22.d	0.046 4135	0.088 0914	0.506 4655	2.582 0569	16.62 1622	19.41 3854	32.66 3317	58.55 9557	88.04 878	14 8.2	103.1 1355	113.5	112.5 5061	117.9 5031	101.3 0081	843.2 2362	0.83319 17	328 70	512 00	58 96	180 400
25B-3b-C9_gnt - 23.d	- 0.027 0042	0.187 602	0.851 2931	2.735 2298	16.14 8649	20.26 643	37.63 8191	72.52 0776	109.9 187	17 2.1	128.5 7143	142.3 125	130.3 6437	120.8 6957	108.6 1789	985.2 7523	0.82204 35	328 60	533 00	53 12	179 700
25B-3b-C9_gnt - 24.d	0.093 2489	0.226 7537	1.012 931	3.063 4573	16.68 9189	22.87 7442	40.95 4774	71.16 3435	101.8 2927	15 6.9	115.9 3407	127.1 875	110.9 3117	106.8 323	87.03 252	877.8 1026	0.87505 95	334 90	510 00	47 63	175 700
25B-3b-C9_gnt - 25.d	0.105 9072	0.176 1827	0.515 0862	2.275 7112	14.86 4865	20.40 8526	39.14 5729	63.49 0305	79.43 0894	12 1.9	83.69 9634	87.31 25	76.55 8704	75.52 795	65.20 3252	653.1 2324	0.84603 62	334 60	493 00	42 74	172 700
25B-3b-C9_gnt - 26.d	0.000 8477	0.045 677	0.235 9914	1.426 6958	12.77 027	16.18 1172	40.25 1256	67.11 9114	85.08 1301	12 4.9	85.53 1136	88.43 75	80.28 3401	76.33 5404	61.50 4065	669.1 9192	0.71370 74	367 40	482 00	38 86	183 500
25B-3b-C9_gnt - 27.d	0.012 2363	0.073 4095	0.415 9483	1.494 5295	14.86 4865	21.93 6057	42.76 3819	65.78 9474	79.06 5041	11 4.8	82.60 0733	86.12 5	77.48 9879	73.10 559	58.17 0732	637.1 4645	0.87004 12	368 90	499 00	35 74	176 400
25B-3b-C9_gnt - 28.d	6.764 E-05	0.027 5693	0.266 1638	1.485 7768	16.75 6757	22.80 6394	43.41 7085	53.73 9612	59.14 6341	88. 5	64.83 5165	74.56 25	71.05 2632	68.44 7205	63.25 2033	543.5 3549	0.84553 45	382 90	508 00	30 73	170 700
25B-3b-C9_gnt - 29.d	- 1.938 E-05	0.055 4649	0.357 7586	1.750 547	21.89 1892	31.13 6767	52.01 005	58.89 1967	59.91 8699	83. 7	57.19 7802	57.18 75	51.57 8947	51.30 4348	45	464.7 7926	0.92275 89	390 30	504 00	29 77	169 800
25B-3b-C9_gnt - 30.d	4.236 E-06	0.016 9657	0.240 3017	1.498 9059	18.24 3243	25.27 5311	44.72 3618	53.24 0997	49.39 0244	61. 2	39.74 359	33.12 5	28.86 6397	27.88 8199	24.59 3496	318.0 4792	0.88486 5	394 60	505 00	27 48	167 800
25B-3b-C9_gnt - 31.d	0.009 2827	0.026 9168	0.221 9828	1.750 547	18.58 1081	25.39 9645	45.07 5377	51.57 8947	46.99 187	57. 3	36.73 9927	32.56 25	25.58 7045	23.66 4596	19.06 5041	293.4 8993	0.87765 22	412 20	453 00	27 12	169 400
25B-3b-C9_gnt - 32.d	3.671 E-07	0.033 6052	0.257 5431	1.925 6018	19.39 1892	25.50 6217	42.61 3065	49.77 8393	46.26 0163	56. 8	37.54 5788	31.18 75	25.87 0445	23.72 6708	20.69 1057	291.8 6005	0.88728 79	413 40	465 00	26 52	168 500
25B-3b-C9_gnt - 33.d	- 2.426 E-07	0.022 5122	0.197 1983	1.794 3107	19.25 6757	27.76 1989	45.57 7889	50.77 5623	45.44 7154	55. 65	35.49 4505	30.62 5	25.26 3158	23.97 5155	21.50 4065	288.7 3466	0.93709 13	431 20	452 00	26 50	170 400
25B-3b-C9_gnt - 34.d	5.523 E-07	0.013 8662	0.200 431	1.553 6105	18.98 6486	24.70 6927	42.91 4573	48.39 3352	44.51 2195	54. 11	35.07 326	30.87 5	25.91 0931	22.91 9255	20.28 4553	282.0 7855	0.86555 37	428 40	455 00	26 50	170 200
25B-3b-C9_gnt - 35.d	- 2.034 E-06	0.013 54	0.216 5948	1.450 7659	17.09 4595	24.63 5879	44.82 4121	50.16 6205	46.54 4715	55. 69	35.80 5861	31.43 75	24.93 9271	24.09 9379	20.16 2602	288.8 4553	0.88998 52	398 70	433 00	36 46	173 800
25B-3b-C9_gnt - 36.d	7.553 E-06	0.012 398	0.149 7845	1.352 2976	18.24 3243	25.73 7123	45.32 6633	51.93 9058	47.84 5528	59. 19	38.22 3443	34.37 5	27.81 3765	25.21 7391	22.80 4878	307.4 0906	0.89501 9	424 80	401 00	28 42	171 600
25B-3b-C10_gnt - 1.d	- 3.013 E-05	0.027 8956	0.293 1034	1.367 6149	18.31 0811	22.82 4156	42.66 3317	55.45 7064	59.43 0894	82. 6	62.63 7363	70.81 25	62.95 5466	66.45 9627	65.16 2602	525.5 1552	0.81660 8	440 80	394 00	29 78	173 300
25B-3b-C10_gnt - 2.d	0.009 2827	0.048 2871	0.362 069	1.621 4442	18.58 1081	23.46 3588	44.82 4121	54.59 8338	60.56 9106	85. 6	64.46 8864	67.31 25	63.48 1781	69.75 1553	64.55 2846	530.3 3499	0.81302 34	441 40	412 00	30 05	173 200
25B-3b-C10_gnt - 3.d	- 0.000 3895	0.033 279	0.282 3276	1.641 1379	18.51 3514	25.82 5933	42.76 3819	56.28 8089	68.04 878	10 7.3	85.71 4286	102.5	98.09 7166	105.4 0373	106.0 9756	729.4 4961	0.91785 35	430 90	426 00	30 48	172 900

25B-3b-C10_gnt - 4.d	0.013	0.048	0.463	1.757	17.63	25.43	43.46	55.78	72.68	12	97.43	127.5	121.4	134.3	136.7	866.9	0.91867	430	435	31	176
	5021	4502	3621	1116	5135	5169	7337	9474	2927	0.9	5897	625	5749	4783	8862	6473	88	60	00	63	100
25B-3b-C10_gnt - 5.d	-	0.081	0.417	2.253	18.85	25.68	40.60	55.45	77.76	13	105.8	134	137.3	142.9	143.0	930.9	0.92834	433	434	32	172
	0.005	5661	0259	8293	1351	3837	3015	7064	4228	4.5	6081		6842	1925	8943	592	52	10	00	90	700
	6118																				
25B-3b-C10_gnt - 6.d	0.019	0.083	0.398	2.188	20	23.71	38.39	53.04	84.51	15	118.3	141.8	138.8	147.4	139.9	977.0	0.85573	415	445	34	170
	1983	1974	7069	1838		2256	196	7091	2195	3.1	1502	75	664	5342	187	8782	19	50	00	44	700
25B-3b-C10_gnt - 7.d	-	0.065	0.528	2.603	20.54	26.26	40.75	54.29	80.65	15	110.9	142.3	143.7	158.0	146.7	992.0	0.90796	427	464	37	177
	0.077	0897	0172	9387	0541	9982	3769	3629	0407	5.3	8901	75	247	1242	4797	9313	68	60	00	79	200
	6371																				
25B-3b-C10_gnt - 8.d	0.054	0.143	0.470	2.177	17.97	23.69	34.27	50.94	82.23	17	124.5	165.8	175.8	196.2	190.6	1159.	0.95471	396	463	39	173
	4304	5563	9052	2429	2973	4494	1357	1828	5772	2.8	4212	75	2996	7329	5041	1484	08	40	00	45	700
25B-3b-C10_gnt - 9.d	0.034	0.138	0.765	2.297	15.40	20.12	29.34	44.40	86.74	21	153.8	238.1	257.0	274.5	280.0	1549.	0.94646	394	494	41	170
	1772	6623	0862	593	5405	4334	6734	4432	7967	4.3	4615	25	8502	3416	813	124	61	10	00	52	400
25B-3b-C10_gnt - 10.d	0.035	0.192	0.866	3.763	24.66	26.14	37.88	49.94	83.37	18	132.4	189.4	206.4	230.4	229.6	1309.	0.85531	392	472	41	169
	865	4959	3793	6761	2162	5648	9447	4598	3984	7.7	1758	375	7773	3478	748	461	23	30	00	46	200
25B-3b-C10_gnt - 11.d	0.028	0.150	0.840	3.413	20.67	26.85	38.89	50.16	80.48	18	132.0	200.1	225.9	266.4	270.7	1413.	0.94704	395	493	43	170
	692	0816	5172	5667	5676	6128	4472	6205	7805	8	5128	25	1093	5963	3171	9326	28	30	00	21	400
25B-3b-C10_gnt - 12.d	0.014	0.102	0.625	2.713	18.91	22.61	32.96	44.65	74.43	18	130.4	224.3	275.3	346.5	389.8	1675.	0.90541	391	481	45	169
	346	7732		3479	8919	1012	4824	374	0894	9.5	0293	75	0364	8385	374	0875	25	40	00	08	400
25B-3b-C10_gnt - 13.d	0.021	0.135	0.700	2.997	22.09	26.02	36.88	47.67	76.05	19	136.6	233.0	291.4	372.6	419.1	1772.	0.91151	383	501	45	169
	519	3997	431	8118	4595	1314	4422	313	6911	5.9	3004	625	9798	7081	0569	5971	69	50	00	35	800
25B-3b-C10_gnt - 14.d	1.62E	0.081	0.538	2.100	14.59	17.65	23.31	35.20	71.99	22	153.4	283.8	355.4	434.1	469.1	2023.	0.95708	379	503	47	168
	-06	5661	7931	6565	4595	5417	6583	7756	187	0.2	7985	125	6559	6149	0569	4247	28	00	00	19	400
25B-3b-C10_gnt - 15.d	1.059	0.070	0.391	1.969	16.95	21.82	34.57	45.67	81.34	21	157.1	269.6	315.7	378.8	403.2	1871.	0.90150	390	506	45	170
	E-05	1468	1638	3654	9459	9485	2864	867	1463	9.3	4286	875	8947	8199	5203	074	85	50	00	37	400
25B-3b-C10_gnt - 16.d	-	0.062	0.463	2.194	17.77	22.27	40.90	55.42	90.89	19	142.4	203.7	221.4	252.1	263.4	1424.	0.82614	391	465	42	175
	4.515	969	3621	7484	027	3535	4523	9363	4309	5.4	9084	5	5749	118	1463	9484	53	80	00	14	100
	E-05																				
25B-3b-C10_gnt - 17.d	0.021	0.088	0.424	1.947	18.24	22.84	36.23	52.16	85.40	18	131.8	181.2	192.3	216.5	210.9	1252.	0.88846	395	465	39	175
	9409	0914	569	4836	3243	1918	1156	0665	6504	2.1	6813	5	0769	8385	7561	6525	53	80	00	48	300
25B-3b-C10_gnt - 18.d	-	0.070	0.360	1.706	16.08	20.28	31.80	55.59	107.0	22	171.7	229.1	233.1	256.5	242.6	1519.	0.89686	388	477	38	175
	0.000	9625	9914	7834	1081	4192	9045	5568	7317	3.5	9487	25	9838	2174	8293	4917	02	80	00	67	100
	6329																				
25B-3b-C10_gnt - 19.d	0.002	0.060	0.351	1.369	15.54	18.34	31.70	63.13	135.4	28	226.0	311.0	307.6	336.5	325.2	1989.	0.82655	400	497	36	173
	3165	3589	2931	8031	0541	8135	8543	0194	878	4.8	0733	625	9231	8385	0325	9672	3	20	00	02	700
25B-3b-C10_gnt - 20.d	-	0.053	0.378	2.140	15.67	21.91	37.53	58.78	107.9	20	166.3	217.1	225.1	248.8	246.7	1478.	0.90356	409	473	31	170
	0.009	0179	2328	0438	5676	8295	7688	1163	6748	7.3	0037	25	0121	1988	4797	1431	6	10	00	99	100
	9156																				
25B-3b-C10_gnt - 21.d	0.061	0.127	0.775	3.172	20	24.93	39.74	56.26	87.23	15	125.8	167.0	178.7	206.5	206.5	1187.	0.88446	415	444	30	170
	6034	2431	8621	8665		7833	8744	0388	5772	9	2418	625	0445	8385	0407	1752	78	60	00	60	900

25B-3b-C10_gnt-22.d	0.054	0.210	1.002	3.873	23.10	27.30	42.76	57.89	79.67	13	100.9	122.0	125.7	139.5	133.7	892.6	0.86845	426	441	29	174
	0084	4405	1552	0853	8108	0178	3819	4737	4797	3	1575	625	4899	6522	3984	0183	04	40	00	37	100
25B-3b-C10_gnt-23.d	-	0.130	0.754	3.194	20.67	29.09	46.48	58.11	74.06	11	87.36	102.5	98.29	110.2	112.0	755.4	0.93849	425	431	28	172
	0.000	5057	3103	7484	5676	4139	2412	6343	5041	2.8	2637		9595	4845	3252	2458	36	80	00	84	800
	8776																				
25B-3b-C10_gnt-24.d	0.000	0.053	0.326	2.122	20.54	26.51	47.08	58.61	68.45	95.	75.91	87.5	83.40	86.89	96.50	652.7	0.85271	436	422	28	172
	2464	8336	5086	5383	0541	865	5427	4958	5285	5	5751		081	441	4065	8528	17	60	00	96	500
25B-3b-C10_gnt-25.d	0.143	0.143	0.415	1.759	25.40	23.58	54.42	60.66	64.83	89.	64.65	68.81	63.23	63.04	65.08	540.1	0.63436	468	330	30	180
	4599	5563	9483	2998	5405	7922	2111	482	7398	8	2015	25	8866	3478	1301	3038	46	10	00	16	100
25B-3b-C10_gnt-26.d	0.020	0.040	0.246	1.822	22.16	24.65	51.20	59.11	59.51	83	57.27	58.12	56.07	59.81	57.03	489.9	0.73183	456	367	29	175
	6751	6199	7672	7571	2162	3641	603	3573	2195		1062	5	2874	3665	252	4089	72	00	00	40	600
25B-3b-C10_gnt-27.d	0.000	0.062	0.395	2.516	24.93	29.30	51.80	58.61	59.34	83.	57.96	58.56	55.74	56.70	56.13	486.2	0.81543	445	392	28	172
	1637	8059	4741	4114	2432	7282	9045	4958	9593	2	7033	25	8988	8075	8211	8936	7	50	00	85	800
25B-3b-C10_gnt-28.d	-	0.050	0.337	1.838	18.64	26.02	42.96	51.99	51.30	68.	45.25	42.25	38.70	40.06	35.20	373.5	0.91928	442	419	28	170
	0.000	571	2845	0744	8649	1314	4824	446	0813	8	641		4453	2112	3252	715	26	20	00	44	500
	6582																				
25B-3b-C10_gnt-29.d	0.002	0.036	0.223	1.750	17.02	25.50	45.97	52.10	49.67	64.	41.95	39.06	34.33	31.18	28.61	341.1	0.91157	437	411	27	169
	4051	8679	0603	547	7027	6217	9899	5263	4797	21	9707	25	1984	0124	7886	4226	55	10	00	82	200
25B-3b-C10_gnt-30.d	-	0.027	0.269	1.794	21.35	28.59	49.84	57.89	55.12	70.	45.93	41.31	33.56	33.85	29.26	367.2	0.87654	449	394	28	169
	0.008	5693	3966	3107	1351	6803	9246	4737	1951	3	4066	25	2753	0932	8293	4523	76	00	00	38	500
	0591																				
25B-3b-C10_gnt-31.d	0.032	0.028	0.216	1.312	18.58	23.78	49.54	55.56	51.38	67.	43.90	40.81	36.03	33.22	29.10	357.1	0.78383	450	408	30	175
	1519	385	5948	9103	1081	3304	7739	7867	2114	1	1099	25	2389	9814	5691	3147	52	40	00	66	100
25B-3b-C10_gnt-32.d	-	0.014	0.153	1.026	18.17	16.44	58.94	67.59	61.86	74.	50.01	43.68	37.24	36.77	33.17	404.6	0.50249	398	319	58	195
	0.154	6819	0172	2582	5676	7602	4724	0028	9919	3	8315	75	6964	0186	0732	5364	86	20	00	04	100
	4304																				
31A-3-gnt-1.d	0.006	0.091	1.282	4.573	17.70	9.573	71.55	96.39	73.41	60.	41.53	25.62	16.88	14.40	12.60	341.1	0.26898	392	159	30	209
	8017	354	3276	3042	2703	7123	7789	8892	4634	3	8462	5	2591	9938	1626	7114	75	40	20	77	100
31A-3-gnt-2.d	-	0.051	0.915	4.310	17.5	12.43	81.65	131.0	125.4	12	94.13	69.81	54.25	50.31	46.91	700.8	0.32890	402	164	31	207
	0.001	7129	9483	7221		3393	8291	2493	065	9	9194	25	1012	0559	0569	5527	5	70	80	56	700
	3654																				
31A-3-gnt-3.d	0.000	0.026	0.538	3.501	18.04	12.07	82.96	131.8	129.3	13	83.51	62.68	46.07	46.95	43.08	674.7	0.31219	396	170	34	203
	4017	1011	7931	0941	0541	8153	4824	5596	0894	1.3	6484	75	2874	6522	9431	8771	7	30	20	76	700
31A-3-gnt-4.d	-	0.012	0.237	2.231	11.41	6.571	62.06	127.1	153.5	17	119.0	90.93	73.48	70.93	73.29	882.0	0.24687	408	121	37	208
	0.000	7243	069	9475	8919	9361	0302	4681	3659	3.7	4762	75	1781	1677	2683	7466	32	90	90	56	200
	102																				
31A-3-gnt-5.d	7.426	0.009	0.282	1.903	8.445	3.570	55.12	134.6	168.7	19	130.0	98	73.07	69.31	68.37	936.2	0.16545	416	895	38	207
	E-06	1354	3276	7199	9459	1599	5628	2604	3984	4.1	3663		6923	677	3984	7018	76	20	0	61	700
31A-3-gnt-6.d	7.679	0.008	0.232	1.553	9.054	2.753	56.78	130.7	176.5	20	143.0	102.8	78.74	72.17	68.53	979.8	0.12141	419	842	40	210
	E-05	9723	7586	6105	0541	1083	392	4792	0407	7.3	4029	125	4939	3913	6585	6022	97	00	0	02	400
31A-3-gnt-8.d	0.001	-	0.084	0.844	8.851	2.468	48.04	111.3	158.7	21	144.1	132.5	110.2	107.9	102.1	1082.	0.11972	409	764	41	210
	2152	8.173	0517	6389	3514	9165	0201	5734	3984	5	3919	625	834	5031	5447	1871	9	30	0	92	100
		E-06																			

31A-3-gnt -9.d	- 0.004 7679	0.004 894	0.210 1293	1.216 6302	10.06 7568	2.824 1563	47.83 9196	111.9 1136	154.1 0569	21 5.9	144.6 8864	128.3 125	108.4 6154	104.6 5839	97.11 3821	1065. 1519	0.12868 7	406 40	798 0	42 65	211 500
31A-3-gnt -10.d	0.016 6667	0.005 0571	0.098 0603	1.597 3742	10.33 7838	2.806 3943	46.08 0402	108.0 3324	151.5 0407	20 6.9	140.4 7619	125	105.4 6559	100.3 1056	91.34 1463	1029. 0311	0.12858 07	400 70	770 0	43 17	211 100
31A-3-gnt -11.d	- 0.082 2785	- 1.917 E-05	0.209 0517	1.772 4289	10.47 2973	2.966 2522	49.49 7487	112.4 6537	157.7 2358	21 4.8	147.8 022	130.5	111.9 8381	103.2 2981	101.2 6016	1079. 7649	0.13028 11	411 80	817 0	45 18	219 100
31A-3-gnt -12.d	0.015 2321	- 4.026 E-05	0.052 8017	0.737 4179	8.378 3784	3.410 302	49.19 598	109.4 1828	150.8 5366	20 0.3	136.0 8059	117	92.51 0121	87.26 7081	79.75 6098	973.1 8583	0.16797 63	393 70	771 0	45 18	216 200
31A-3-gnt -13.d	- 0.003 0338	- 4.509 E-05	0.064 6552	0.919 0372	9.189 1892	2.735 3464	47.83 9196	110.2 4931	151.3 4146	20 0.6	128.9 3773	111.6 875	89.67 6113	83.72 6708	75.08 1301	951.3 0012	0.13046 13	396 20	769 0	45 94	217 400
31A-3-gnt -14.d	0.000 8932	- 4.721 E-05	0.064 6552	0.954 0481	9.054 0541	2.309 0586	51.20 603	119.9 446	154.9 187	19 5.2	128.5 7143	105.1 25	82.38 8664	78.94 4099	67.88 6179	932.9 7867	0.10723 9	385 90	751 0	46 64	214 400
31A-3-gnt -15.d	- 0.000 2409	0.001 3051	0.084 0517	0.691 4661	8.716 2162	2.628 7744	50.70 3518	113.8 5042	143.3 3333	18 7.7	117.5 8242	100.9 375	81.74 0891	81.30 4348	75.32 5203	901.7 7411	0.12504 61	373 90	746 0	48 11	215 100
31A-3-gnt -16.d	0.117 2996	0.148 4502	0.385 7759	1.415 7549	11.35 1351	2.326 8206	52.96 4824	118.0 0554	144.1 0569	19 7	119.2 3077	106.6 25	88.98 7854	82.23 6025	80	936.1 9088	0.09489 54	368 20	704 0	48 83	215 500
31A-3-gnt -17.d	- 1.512 E-05	0.002 7732	0.155 1724	1.185 9956	7.635 1351	2.273 5346	49.44 7236	113.0 1939	149.1 8699	20 2.8	121.7 9487	108.3 125	95.30 3644	90.68 323	87.92 6829	969.0 2746	0.11700 98	365 10	688 0	49 29	215 200
31A-3-gnt -18.d	4.506 E-06	0.058 7276	0.528 0172	1.509 8468	7.702 7027	1.829 4849	52.36 1809	122.7 1468	154.3 4959	21 6.8	134.7 9853	120.8 75	101.0 1215	99.19 2547	94.10 5691	1043. 8482	0.09109 61	363 90	707 0	50 05	215 300
31A-3-gnt -19.d	- 1.198 E-06	0.036 2153	0.395 4741	1.728 6652	10.20 2703	2.646 5364	57.78 8945	124.9 3075	161.9 1057	23 3.4	139.7 4359	124	109.6 7611	105.0 3106	101.0 9756	1099. 7896	0.10899 28	373 70	663 0	51 25	218 600
31A-3-gnt -20.d	3.92E -07	0.015 3344	0.186 4224	1.238 512	8.310 8108	2.770 8703	54.07 0352	131.5 7895	170.6 0976	25 2.2	149.2 674	136.0 625	120.2 834	114.1 6149	110.7 3171	1184. 8952	0.13071 18	372 30	712 0	50 80	218 000
31A-3-gnt -21.d	- 2.148 E-07	- 7.201 E-05	- 0.000 7295	0.636 7615	6.756 7568	1.651 865	57.73 8693	134.6 2604	177.5 6098	27 1.2	160.2 5641	145.9 375	127.3 2794	128.0 7453	123.1 7073	1268. 1541	0.08363 19	374 90	688 0	51 22	217 700
31A-3-gnt -22.d	5.688 E-07	0.008 1566	0.171 3362	1.039 3873	8.918 9189	2.166 9627	58.74 3719	140.4 4321	195.9 3496	30 6.5	187.7 2894	178.3 75	155.4 6559	155.9 6273	145.9 3496	1466. 3454	0.09467 05	366 20	752 0	50 46	215 600
31A-3-gnt -23.d	- 2.101 E-06	- 8.189 E-05	0.066 8103	0.923 4136	8.783 7838	1.936 0568	56.83 4171	137.9 5014	200.8 1301	32 5.6	195.7 8755	191.0 625	168.8 2591	168.6 9565	156.5 0407	1545. 2388	0.08665 08	384 00	751 0	51 29	222 300
31A-3-gnt -24.d	7.848 E-06	- 8.369 E-05	- 0.000 778	0.361 0503	7.432 4324	2.166 9627	57.68 8442	146.8 144	218.6 9919	36 8.7	220.5 1282	219.1 25	202.0 2429	200.1 2422	184.9 5935	1760. 9593	0.10465 06	382 30	691 0	49 81	220 700
31A-3-gnt -25.d	- 2.869 E-05	- 8.858 E-05	- 0.000 7823	0.398 2495	7.364 8649	2.042 6288	62.91 4573	162.3 2687	249.5 935	42 7.7	262.6 3736	274.1 875	250.6 0729	257.7 6398	243.9 0244	2128. 7189	0.09489 24	381 70	742 0	48 41	214 500
31A-3-gnt -26.d	0.000 1076	- 9.054 E-05	- 0.000 7716	0.358 8621	7.027 027	2.184 7247	62.71 3568	160.3 8781	250.8 1301	44 3.8	278.7 5458	301.1 875	281.7 8138	288.1 9876	285.7 7236	2290. 6954	0.10407 11	385 80	677 0	47 82	215 500

31A-3-gnt -27.d	- 0.0004105	- 9.657E-05	0.042 0259	0.404 814	6.756 7568	1.989 3428	58.59 2965	160.1 108	245.1 2195	43 4.8	268.1 3187	284.3 75	263.5 6275	272.0 4969	254.0 6504	2182. 2171	0.09998 11	393 70	716 0	47 03	215 600
31A-3-gnt -28.d	0.001 6329	- 0.000102	- 0.000 8233	0.275 7112	5.743 2432	2.202 4867	61.15 5779	159.0 0277	253.6 5854	47 3.6	293.0 4029	320.6 25	313.7 6518	324.2 236	308.1 3008	2446. 0455	0.11752 11	394 60	750 0	46 30	217 000
31A-3-gnt -29.d	- 0.0056962	0.004 2414	- 0.000 8114	0.437 6368	6.891 8919	2.397 8686	69.74 8744	188.3 6565	308.1 3008	56 2.8	359.8 9011	402.1 875	386.2 3482	408.6 9565	397.1 5447	3013. 4583	0.10936 74	398 70	739 0	44 56	214 900
31A-3-gnt -30.d	0.021 8987	- 0.000 1062	- 0.000 8244	0.494 5295	7.297 2973	2.042 6288	67.88 9447	180.8 8643	308.1 3008	57 1.8	365.0 1832	416.2 5	401.6 1943	416.7 7019	402.8 4553	3063. 32	0.09177 14	406 20	725 0	43 84	216 900
31A-3-gnt -31.d	- 0.0995781	- 0.000 1078	0.101 2931	1.262 5821	7.837 8378	2.557 7265	68.29 1457	183.6 5651	301.6 2602	54 8.1	358.7 9121	406.8 75	381.3 7652	391.9 2547	380.0 813	2952. 432	0.11055 36	402 40	729 0	42 23	212 600
31A-3-gnt -32.d	0.013 9578	- 0.000 1308	0.022 6293	1.260 3939	13.85 1351	4.706 9272	73.26 6332	184.4 8753	303.2 5203	55 0.6	355.6 7766	387.5	365.9 919	370.1 8634	345.9 3496	2863. 6304	0.14775 4	410 30	790 0	41 73	216 400
31A-3-gnt -33.d	- 0.0038017	0.039 1517	- 0.000 9084	0.726 477	15.74 3243	9.076 3766	72.21 1055	183.1 0249	282.1 1382	48 3.5	302.9 304	304.3 75	272.8 7449	261.4 9068	232.5 2033	2322. 9072	0.26919 29	406 00	114 10	40 41	217 900
31A-3-gnt -34.d	0.000 9797	0.007 9935	- 0.000 8718	0.555 7987	19.59 4595	10.07 1048	66.33 1658	159.8 338	232.1 1382	38 2.4	218.8 6447	193.2 5	164.3 7247	157.0 8075	122.6 0163	1630. 5169	0.27934 83	398 00	134 50	38 26	211 400
31A-3-gnt -35.d	- 0.0003447	0.014 1925	0.044 181	0.452 954	24.93 2432	13.65 897	73.61 809	152.6 3158	219.1 4634	35 4.7	204.2 1245	183.1 25	151.4 17	141.9 2547	115.6 5041	1522. 8083	0.31881 84	389 60	159 70	36 61	208 700
31A-3-gnt -36.d	0.000 2844	0.022 8385	- 0.000 8696	0.816 1926	29.05 4054	15.55 9503	66.23 1156	130.4 7091	177.3 9837	28 2.5	169.7 8022	157.3 125	133.6 0324	130.1 2422	119.7 9675	1300. 9862	0.3547	385 40	176 60	35 38	207 100
31A-3-gnt -37.d	- 0.0007831	0.008 1566	0.026 9397	1.269 1466	31.08 1081	11.66 9627	55.67 8392	107.7 5623	123.1 7073	15 2.4	79.67 033	60.62 5	42.55 0607	42.85 7143	30.97 561	640.0 0565	0.28052 11	456 00	155 00	34 00	219 400
31A-3-gnt -38.d	0.118 1435	0.154 9755	0.366 3793	2.078 7746	26.68 9189	13.32 1492	54.37 1859	93.35 1801	98.04 878	12 9.3	80.21 978	69.31 25	61.74 0891	62.54 6584	62.60 1626	657.1 2196	0.34970 2	416 00	152 80	30 83	203 300
31A-3-gnt -39.d	0.084 3882	0.053 0179	0.214 4397	2.231 9475	29.45 9459	13.32 1492	65.72 8643	99.72 2992	110.9 7561	14 7.2	98.53 4799	89.12 5	81.33 6032	86.89 441	81.42 2764	795.2 1161	0.30273 54	416 30	177 80	28 13	199 600
31A-3-gnt -40.d	0.053 5865	0.081 5661	0.560 3448	3.938 7309	34.66 2162	13.97 8686	71.65 8291	121.1 9114	131.6 6667	15 2.4	102.3 8095	76.68 75	59.59 5142	56.83 2298	47.84 5528	748.5 9922	0.28048 22	418 50	167 30	27 01	199 500
31A-3-gnt -41.d	- 0.0045992	0.064 2741	0.394 3966	4.157 5492	47.77 027	19.36 0568	66.53 2663	68.42 1053	44.67 4797	40. 31	24.15 7509	15	8.704 4534	6.832 2981	4.959 3496	213.0 5946	0.34341 7	423 40	181 00	27 28	203 200
31A-3-gnt -42.d	0.008 4388	0.035 7259	0.261 8534	3.238 512	56.41 8919	26.99 8224	81.95 9799	52.85 3186	30.56 9106	25. 14	13.99 2674	8.293 75	4.696 3563	4.267 0807	1.910 5691	141.7 2272	0.39702 91	392 10	218 00	27 98	204 000
31A-3-gnt -43.d	0.017 7215	0.066 8842	0.418 1034	5.579 8687	58.51 3514	29.25 3996	79.14 5729	55.78 9474	30.60 9756	26. 22	16.11 7216	9.562 5	5.425 1012	4.534 1615	3.414 6341	151.6 7284	0.42987 62	385 70	231 20	27 93	207 200
31A-3-gnt -44.d	0.027 4262	0.058 7276	0.743 5345	5.623 6324	59.45 9459	22.71 7584	75.92 9648	50.30 4709	26.70 7317	20. 38	13.31 5018	7.468 75	4.615 3846	3.378 882	2.764 2276	128.9 3429	0.33810 06	378 10	197 70	30 07	211 100
31A-3-gnt -45.d	8.11E-05	0.101 1419	1.314 6552	8.468 2713	52.97 2973	14.81 3499	72.21 1055	45.23 5457	22.56 0976	14. 79	8.553 1136	4.356 25	3.076 9231	2.335 4037	1.743 9024	102.6 5203	0.23951 27	393 40	176 20	26 52	207 800

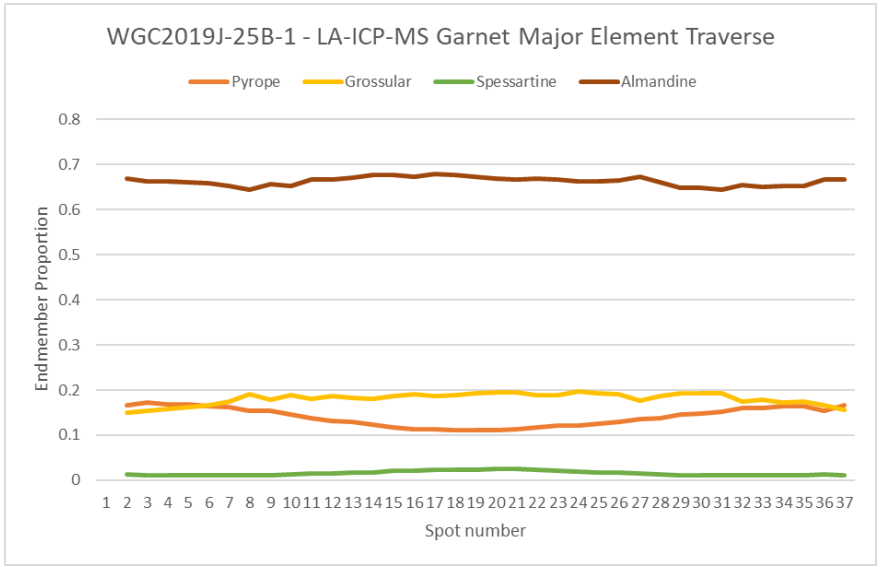
31A-3-gnt -	6.793	0.200	2.058	9.737	45.74	12.53	64.62	38.58	17.47	11.	6.703	3.406	1.967	1.534	1.004	81.93	0.23064	415	159	21	203
46.d	E-05	6525	1897	4179	3243	9964	3116	7258	9675	25	2967	25	6113	1615	065	2317	23	00	80	66	500
31A-3-gnt -	0.032	0.055	0.560	5.185	59.59	24.93	74.17	41.77	17.84	10.	6.959	2.643	1.412	1.031	1.130	83.27	0.37509	415	207	21	200
47.d	9114	9543	3448	9956	4595	7833	0854	2853	5528	48	707	75	9555	0559	0813	5931	27	30	40	17	300
31A-3-gnt -	0.018	0.049	0.387	3.172	61.21	36.05	113.6	83.43	44.22	34.	22.72	13.31	8.259	7.869	5.447	219.7	0.43234	392	234	25	199
48.d	5654	7553	931	8665	6216	6838	1809	4903	7642	45	8938	25	1093	5652	1545	2981	52	00	20	81	900

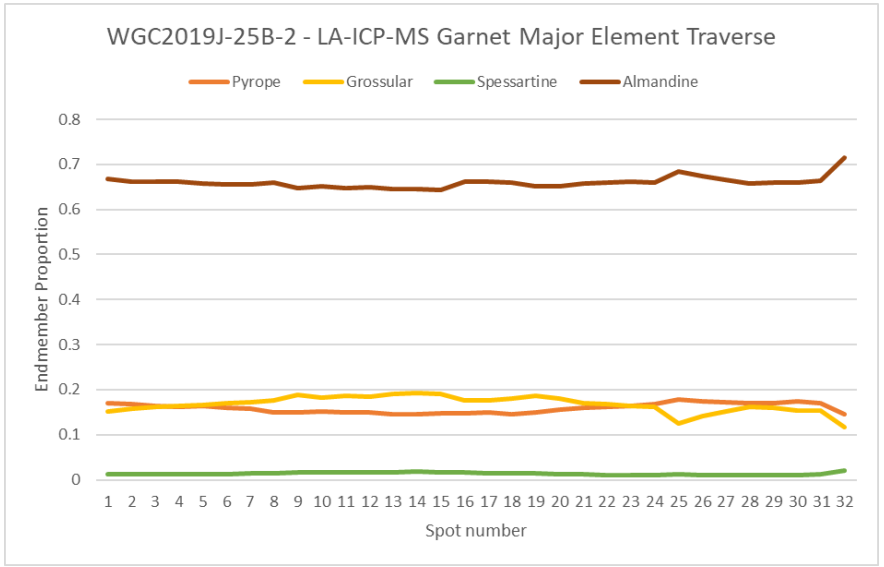
Garnet trace element standards

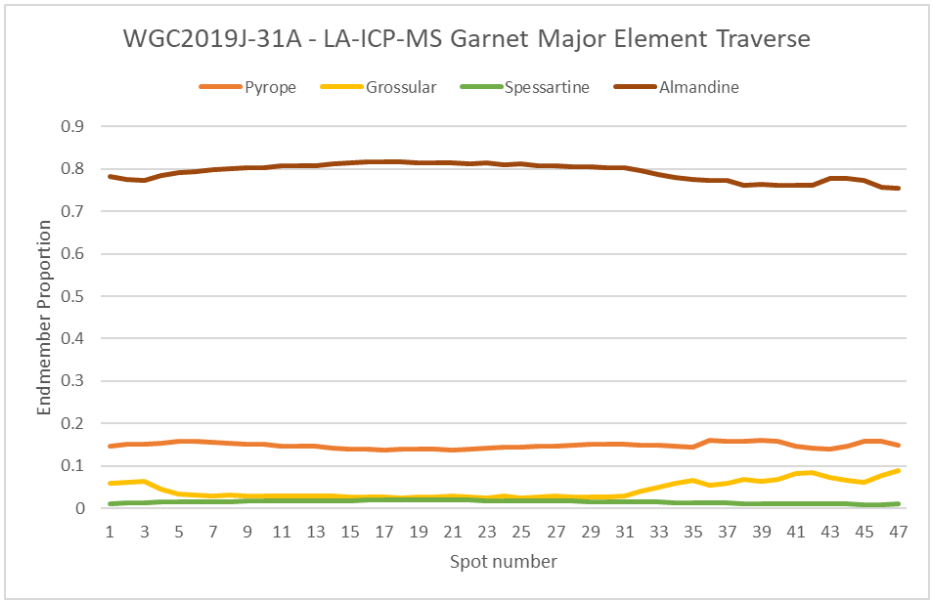
Standard	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
GSD_29 - 1.d	23.37	27.2	29.74	28.65	31.68	26.55	31.98	30.74	32.69	32.11	25.58	31.91	32.25	32.51
GSD_29 - 2.d	24.32	27.31	30.27	29.38	32.96	26.86	33.2	31.15	33.82	33.13	25.91	32.72	33.32	33.04
GSD_29 - 3.d	21.57	27.5	29.4	28.31	30.9	26.02	32.2	30.54	32.75	32.14	26.19	31.72	31.77	32.3
GSD_29 - 4.d	23.78	27.77	30.15	28.92	32.29	26.72	32.61	31.17	32.97	32.91	25.19	32.21	34.03	33.48
GSD_29 - 5.d	18.88	27.82	30.35	29.41	32.23	26.94	32.4	31.36	33.99	32.97	25.78	32.8	32.75	33.99
GSD_29 - 6.d	22.84	27.41	29.3	28.56	31.32	26.94	32.71	30.47	34.28	32.66	25.77	32.79	32.03	33.18
GSD_29 - 7.d	22.21	27.77	29.94	28.73	32.5	26.71	31.8	30.5	33.82	32.38	25.33	32.75	33.77	33.32
GSD_29 - 8.d	26.24	27.74	30.5	29.77	32.8	27.29	31.9	31.32	33.61	32.61	25.43	32.36	33.49	34.28
GSD_29 - 9.d	26.63	28.72	31.43	30.31	32.43	27.86	33.3	31.6	34.46	33.06	26.19	33.78	34.44	34.21
GSD_29 - 10.d	26.42	28.08	30.61	29.67	31.99	26.84	32.82	31.33	33.99	32.74	26.04	32.98	33.06	34.18
GSD_29 - 11.d	26	27.81	29.97	29.25	31.35	26.96	33.3	31.15	33.22	32.58	25.48	32.97	33.15	34.21
GSD_29 - 12.d	25.96	27.57	30.42	29.3	31.8	27.23	32.5	31.25	33.79	32.93	25.81	32.81	32.81	34.17
GSD_29 - 13.d	24.37	27.49	30.6	29.22	31.83	27.1	33.4	31.02	33.91	32.81	25.9	32.75	33.09	34.31
GSD - 1.d	25.4	28.44	31.59	30.3	32.96	27.99	34.12	32.67	35.6	34.31	27.01	34.35	34.78	35.38
GSD - 2.d	26.15	28.77	31.3	30.82	33.56	28.48	34.43	32.89	35.46	34.55	27.09	34.52	35.23	35.72
GSD - 3.d	26.69	28.97	31.71	30.82	33.02	28.25	34.9	33.34	36.36	34.54	27.21	34.75	35.38	35.81
GSD - 4.d	26.84	29.03	31.92	31.33	33.37	28.69	35.19	33.34	36.17	34.69	27.48	34.92	35.42	35.96
GSD - 5.d	25.2	28.94	31.93	31.15	33.95	28.65	34.4	32.92	35.91	34.56	27.45	34.63	34.9	35.59
GSD - 6.d	25.52	28.86	31.5	30.47	33.63	28.3	34.03	32.87	35.66	34.2	27.21	34.39	35.06	35.7
GSD - 7.d	25.46	28.37	30.84	29.88	32.01	27.82	33.48	32.23	35.14	33.72	27.13	33.64	34.32	34.7
GSD - 8.d	25.88	28.89	31.41	30.89	32.47	28.2	33.44	32.59	35.49	33.89	27	34.21	34.37	35.06
GSD - 9.d	24.52	28.75	31.63	30.67	33.33	28.32	34.89	33.11	35.85	34.54	27.28	34.58	35.25	35.69

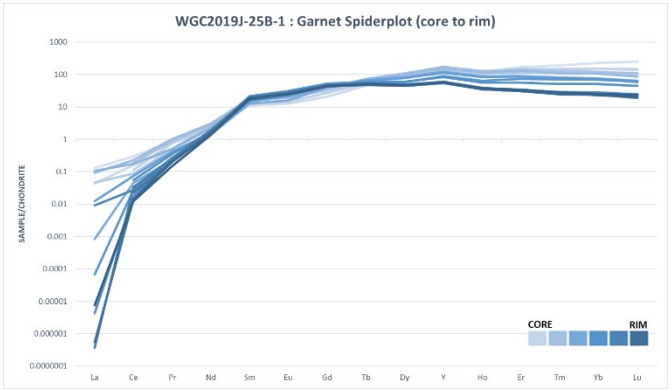
GSD - 10.d	25.27	29.33	32.14	31.39	33.96	28.49	35.53	33.42	36.24	34.9	27.54	35.32	35.76	36.22
GSD - 11.d	25.98	29.03	31.55	31.04	32.88	28	34.43	32.76	35.3	34.46	26.96	34.44	35.33	35.61
GSD - 12.d	26.24	28.74	31.2	30.35	33.52	28.23	34.2	32.65	35.2	34.21	26.66	34.24	34.42	35.41
GSD - 13.d	25.7	29.17	31.88	29.97	33.13	28.29	33.9	32.42	35.37	34.13	26.93	34.3	35.14	35.58
GSD - 14.d	25.95	29.22	31.75	30.52	32.93	27.85	33.95	32.32	35.15	34.15	27.13	34.16	34.65	35.27
GSD - 15.d	26.95	28.96	31.08	30.66	32.88	27.9	34.34	32.33	35.18	33.92	26.92	34.01	34.01	34.89
GSD - 16.d	27.54	29.51	32.07	30.82	33.28	28.5	34.99	32.95	35.57	34.45	27.35	34.7	35.17	36.16
GSD - 17.d	27.58	29.37	32.33	31.87	34.4	28.86	34.93	33.36	36.79	35.19	27.99	35.36	35.98	36.74
GSD - 18.d	28.25	30.25	32.8	32.3	33.97	29.33	35.84	34.21	37.63	35.7	28.32	36.11	36.77	37.41
GSD - 19.d	27.8	29.39	31.96	30.5	33.86	28.84	34.8	33.03	35.95	34.39	27.47	35.01	35.33	36.23
GSD - 20.d	27.58	29.53	32.26	31.49	33.64	28.64	34.56	33.29	35.91	34.61	27.87	35.11	35.6	36.23
GSD - 21.d	26.88	28.85	31.46	30.51	33.16	28.01	33.89	32.38	35.39	34	27.31	34.26	34.93	35.37
GSD - 22.d	26.92	28.51	31.21	30.14	32.32	27.97	33.73	32.01	35.17	33.44	27.06	34.1	34.41	35.2
GSD - 23.d	27.02	28.82	31.62	30.69	33.41	28.07	34.29	32.45	35.87	34.12	27.26	34.31	34.79	35.59
GSD - 24.d	27.1	29.2	31.56	30.74	32.91	28.23	34.75	32.94	35.12	34.34	27.47	34.35	34.69	35.42
GSD - 25.d	26.85	28.87	31.51	30.74	32.84	28.29	34.76	32.69	35.35	33.93	27.16	34.46	35.02	35.73
GSD - 26.d	26.81	28.58	31.44	30.42	32.72	28.4	34.72	32.92	35.79	34.3	27.25	34.78	35.15	36.12
NIST610 - 1.d	249.2	260.9	257.6	246.2	259.9	256	257.2	250.2	250.3	256.2	259.5	248.3	255.6	250.7
NIST610 - 2.d	253.2	259	257.3	246.8	259.4	255.5	255.9	249.6	249.4	256.6	259.5	247.7	257.6	249.6
NIST610 - 3.d	255.7	261.2	258.2	249.1	261.4	259.4	258.5	252.4	252.7	259.5	263.8	252	260.4	254.1
NIST610 - 4.d	256.8	262.8	260.3	250.4	262.8	260.2	262.2	254.3	253.6	260.8	263.9	252.5	261.2	255.4
NIST610 - 5.d	253.1	260.5	258.1	246.9	260	257.1	257.7	251.1	252.8	258.3	262.2	249.6	259.2	252.9
NIST610 - 6.d	254.5	261.1	258.2	247.8	261.8	258	258.5	250.6	251.2	258.7	263.4	250.5	258.7	253.1
NIST610 - 7.d	249.6	257.4	254.8	244	255.5	254.1	255.3	248.7	248.1	255.6	259	247.9	256.3	249.5
NIST610 - 8.d	251.8	258.5	255.4	246.9	258.7	254.7	256.9	249.7	250.5	256.1	261.1	248.8	257.2	252.3
NIST610 - 9.d	250.6	258.6	256.8	246.1	259.4	256.6	258.3	250.3	249.9	257.4	260.7	249.8	258.9	252.8
NIST610 - 10.d	251.8	259.5	257.5	246.9	261.7	257.5	257.8	251.2	250.4	258.7	261.9	250	258.5	252.8
NIST610 - 11.d	248	256.3	253.2	242.3	256.1	253.6	254	247.1	248.1	254.9	258.1	246.3	254	249.2
NIST610 - 12.d	250.7	258.7	256	246.1	258.8	255.8	256	249.7	250.5	257.7	261	248.6	258.1	251.8
NIST610 - 13.d	251.9	260.7	258.1	246.3	261.7	257.3	257.3	251.6	251.4	257.8	261	249.7	258.8	252.6
NIST610 - 14.d	252.4	260.7	258.2	247.1	260.3	258	256.7	251.4	250.4	259.1	261.9	250.5	259.3	252.9

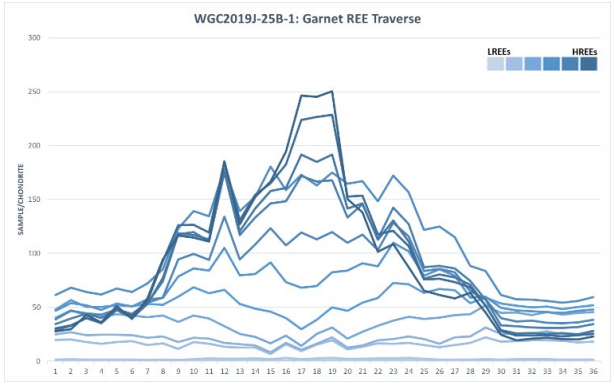
NIST610 - 15.d	251.2	257.8	254.9	246.3	259.2	254.9	256.9	250.7	250.9	257.7	260.1	249.2	258.6	251.2
NIST610 - 16.d	251.9	259	256.3	246.7	258.3	256.8	257.9	251.5	249.2	256.1	260	249.6	257.2	252.4
NIST610 - 17.d	254.8	261	258.1	247.2	261.4	259.7	259	252.4	252.1	258.2	262	252.2	259.5	253.6
NIST610 - 18.d	259.9	267.2	263.4	252.9	265.9	262.2	264.4	255.6	256.5	262.6	266	255.2	264.6	256.3
NIST610 - 19.d	254.2	260.2	258.2	247.3	261.2	258.1	258	250.8	252	257.7	261.9	249.8	258.9	253.1
NIST610 - 20.d	256.6	262.9	261.5	248.9	262.2	260.2	260.9	253.2	254.1	260.9	263.7	252.5	261.2	256
NIST610 - 21.d	254.4	262.1	258.5	248.6	261.1	258.5	258.6	252.2	252.8	259.7	262.8	251.8	259.4	253.7
NIST610 - 22.d	252.4	260.2	256.9	247.2	261.3	257.1	256.8	250.9	250.6	258	261.9	248.9	258.9	251.4
NIST610 - 23.d	252.7	261	257.1	247.6	258.6	256.4	257.7	250.4	250.7	257.5	262	248.6	258	251.5
NIST610 - 24.d	252.3	260.1	257	247.1	259.7	257.4	257.6	251.7	250.2	257.4	262	250.1	258.7	251.7
NIST610 - 25.d	248.7	256.7	254.8	243.7	257.7	253.4	253.7	247.8	247.5	254.7	257.2	246	255	249.5
NIST610 - 26.d	251.2	259.7	256.1	245.4	257.8	255.5	257.9	249	249.4	256.8	260.2	248.3	256.2	250.5

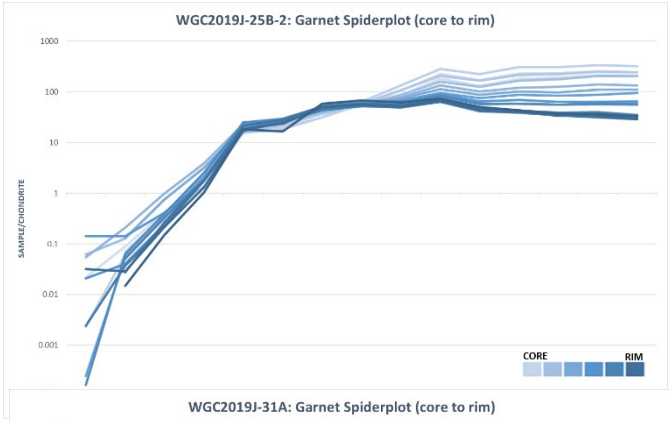

WGC2019J-25B-1 - LA-ICP-MS Garnet Major Element Traverse
Pyrope
Grossular
Spessartine
Almandine
Endmember Proportion
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37
Spot number

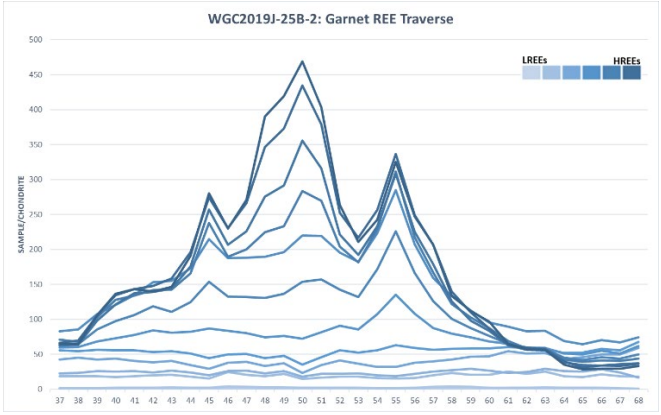

WGC2019J-25B-2 - LA-ICP-MS Garnet Major Element Traverse
Pyrope
Grossular
Spessartine
Almandine
Endmember Proportion
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Spot number

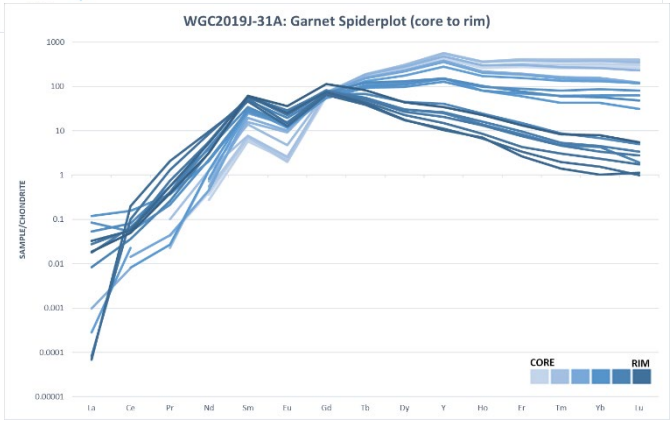

WGC2019J-31A - LA-ICP-MS Garnet Major Element Traverse
Pyrope
Grossular
Spessartine
Almandine
Endmember Proportion
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Spot number

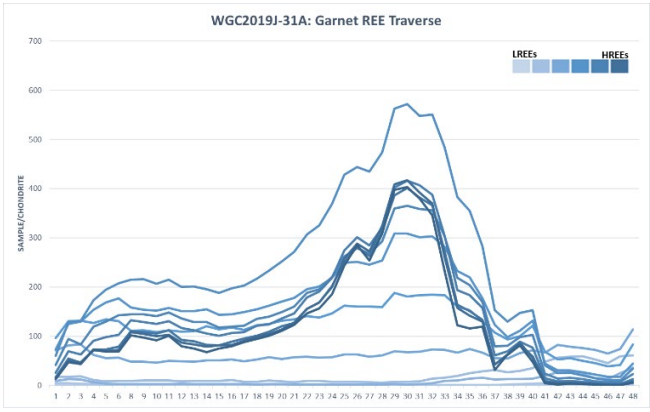

WGC2019J-25B-1 : Garnet Spiderplot (core to rim)
SAMPLE/CHONDRITE
CORE
RIM
La Ce Pr Nd Sm Eu Gd Tb Dy Y Ho Er Tm Yb Lu


WGC2019J-25B-1: Garnet REE Traverse
LREEs
HREEs
SAMPLE/CHONDRITE


WGC2019J-25B-2: Garnet Spiderplot (core to rim)
SAMPLE/CHONDRITE
CORE
RIM

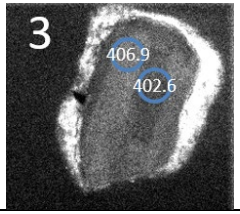
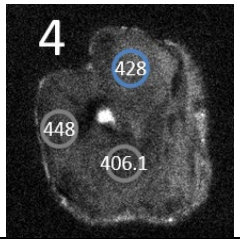
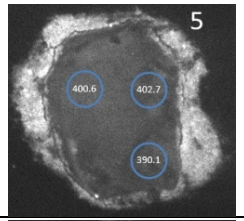
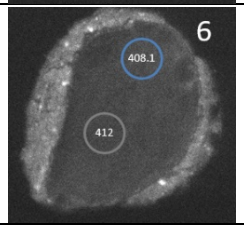

WGC2019J-25B-2: Garnet REE Traverse
LREEs
HREEs
SAMPLE/CHONDRITE

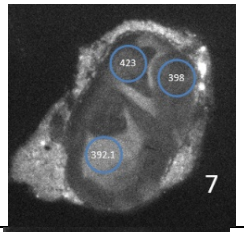
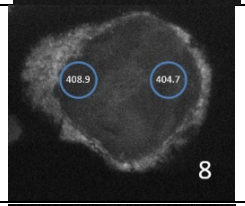
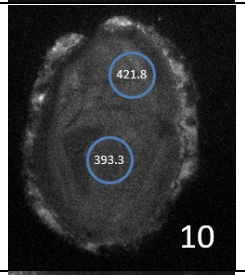
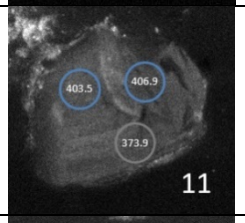
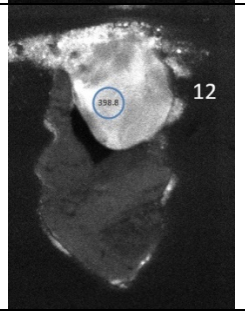

WGC2019J-31A: Garnet Spiderplot (core to rim)
SAMPLE/CHONDRITE
CORE
RIM
La Ce Pr Nd Sm Eu Gd Tb Dy Y Ho Er Tm Yb Lu

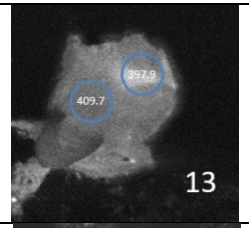
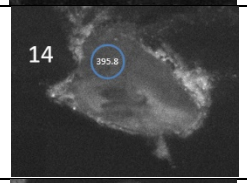
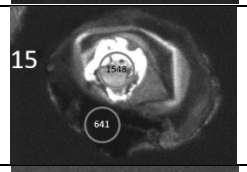
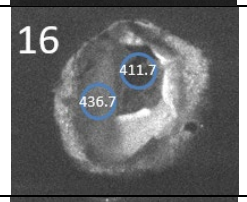
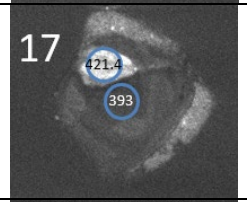
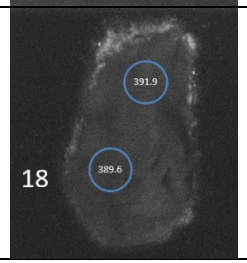

WGC2019J-31A: Garnet REE Traverse
LREEs
HREEs
SAMPLE/CHONDRITE

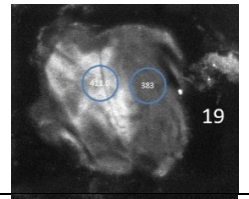
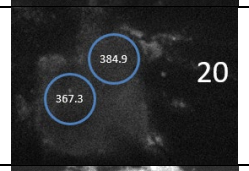
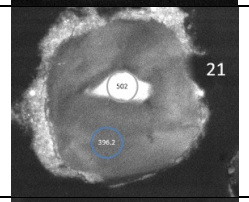
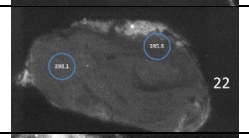
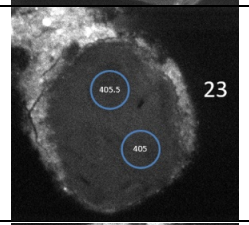
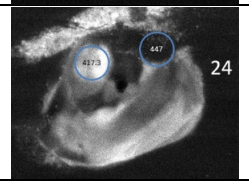
APPENDIX 3C: LA–ICP–MS ZIRCON RESULTS

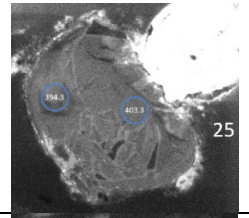
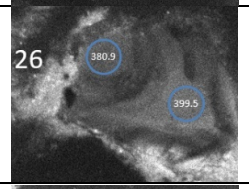
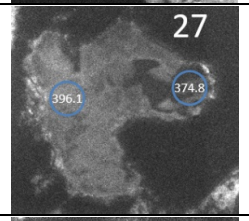
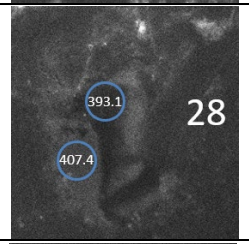
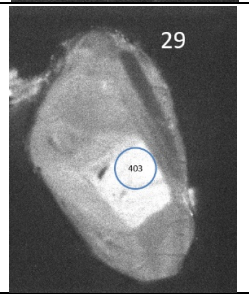
Zircon morphology

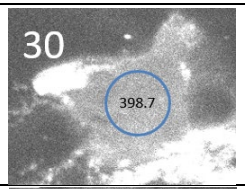
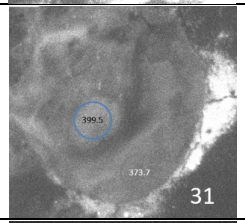
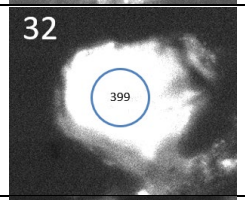
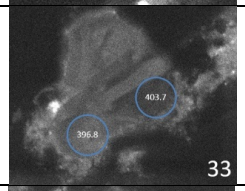
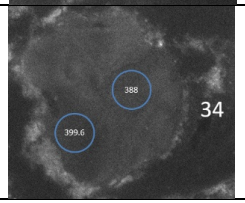
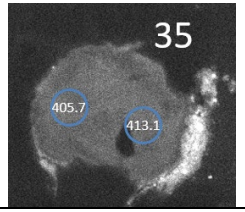
Sample	Textural location	Zoning	Size (long axis)	Crystal habit	Comments	SEM-CL image
WGC-25B-3 - 1.d	core	Y	~200µm	Euhedral, tabular		
WGC-25B-3 - 2.d	rim					
WGC-25B-4 - 1.d	rim	Y	~200µm	Euhedral, equant	Relatively flat zoning throughout grain, tiny detrital core not targeted	
WGC-25B-4 - 2.d	core					
WGC-25B-4 - 3.d	rim					
WGC-25B-5 - 1.d	core	N	~100µm	Euhedral, tabular		
WGC-25B-5 - 2.d	rim					
WGC-25B-5 - 3.d	rim					
WGC-25B-6 - 1.d	core	N	~100µm	Euhedral, tabular		
WGC-25B-6 - 2.d	rim					
WGC-25B-7 - 1.d	rim	Y	~100µm	Euhedral, tabular	Random, smeared looking zoning.	
WGC-25B-7 - 2.d	rim					

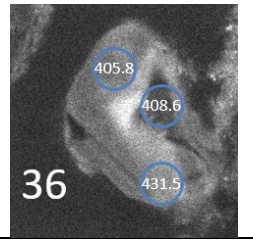
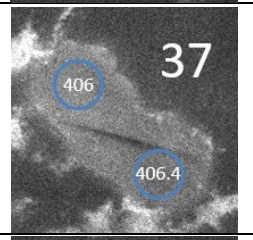
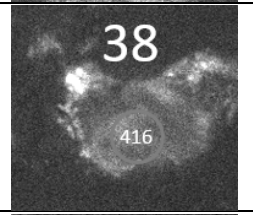
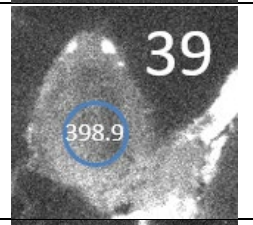
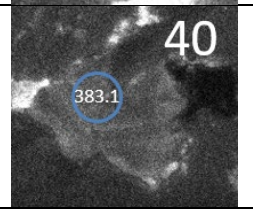
WGC-25B-7 - 3.d	core					
WGC-25B-8 - 1.d	rim	N	~75µm	Euhedral, equant	Slight patchiness? But overall flat zoning	
WGC-25B-8 - 2.d	rim					
WGC-25B-10 - 1.d	core	Y	~100µm	Euhedral, prismatic		
WGC-25B-10 - 2.d	rim					
WGC-25B-11 - 1.d	core	Y	~100µm	Subhedral, equant	Patchy zoning radiating outwards from 11-1	
WGC-25B-11 - 2.d	rim					
WGC-25B-11 - 3.d	rim					
WGC-25B-12 - 1.d	core	Y	~75µm	Euhedral, equant	Patchy	

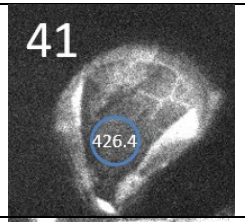
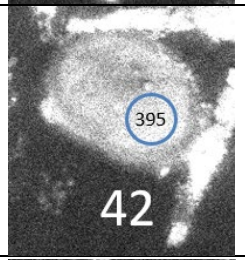
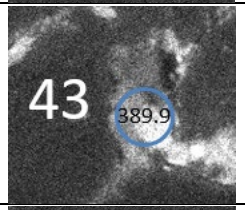
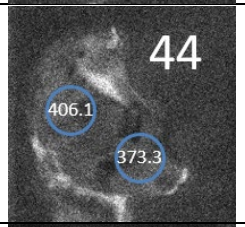
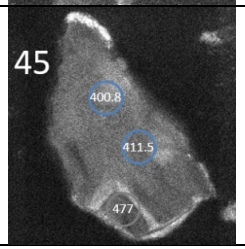
WGC-25B-13 - 1.d	core	N	~75µm	Subhedral, equant	Slight patchiness? But overall flat zoning	
WGC-25B-13 - 2.d	rim					
WGC-25B-14 - 1.d	core	Y	~75µm	Euhedral, tabular	Patchy	
WGC-25B-15 - 1.d	core	Y	~100µm	Euhedral, prismatic	Complex zoning. Dark core, bright mantle, dark, light, dark rim.	
WGC-25B-15 - 2.d	rim					
WGC-25B-16 - 1.d	core	Y	~100µm	Euhedral, prismatic		
WGC-25B-16 - 2.d	rim					
WGC-25B-17 - 1.d	core	Y	~75µm	Euhedral, equant		
WGC-25B-17 - 2.d	rim					
WGC-25B-18 - 1.d	core	N	~100µm	Subhedral, tabular		
WGC-25B-18 - 2.d	core					
WGC-25B-19 - 1.d	core	Y	~100µm			

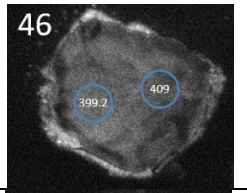
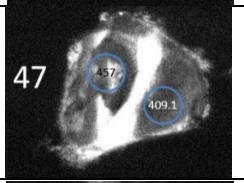
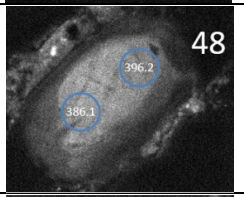
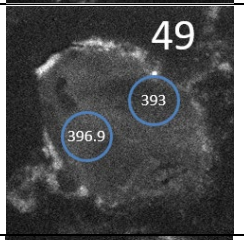
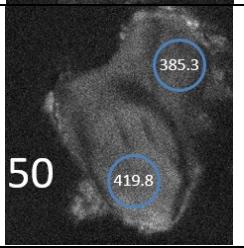
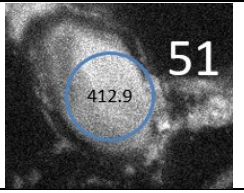
WGC-25B-19 - 2.d	rim			Anhedral, tabular		
WGC-25B-20 - 1.d	core	N	~50µm	Subhedral, equant		
WGC-25B-20 - 2.d	core					
WGC-25B-21 - 1.d	core	Y	~100µm	Euhedral, equant		
WGC-25B-21 - 2.d	rim					
WGC-25B-22 - 1.d	rim	N	~150µm	Euhedral, tabular		
WGC-25B-22 - 2.d	rim					
WGC-25B-23 - 1.d	core	N	~75µm	Euhedral, equant		
WGC-25B-23 - 2.d	rim					
WGC-25B-24 - 1.d	mantle	Y	~75µm	Euhedral, equant	Complex zoning radiating out from 24-2	
WGC-25B-24 - 2.d	core					
WGC-25B-25 - 1.d	rim	Y	~150µm			

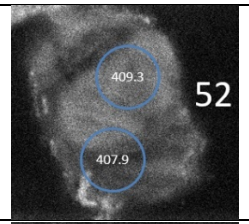
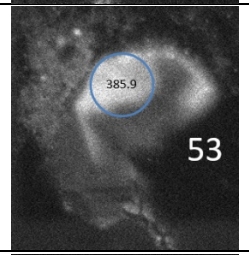
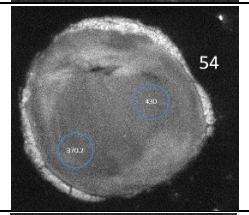
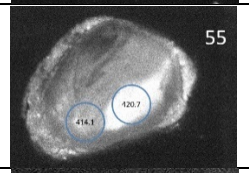
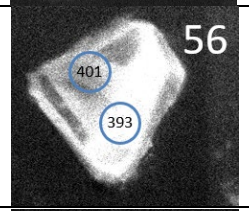
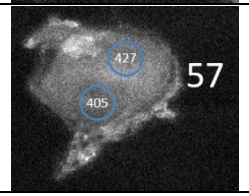
WGC-25B-25 - 2.d	rim			Euhedral, tabular	Weird fractured looking zoning? 25-1 on dark patch	
WGC-25B-26 - 1.d	core					
WGC-25B-26 - 2.d	rim	Y	~100µm	Euhedral, tabular		
WGC-25B-27 - 1.d	rim					
WGC-25B-27 - 2.d	rim	Y	~100µm	Anhedral	27-1 located on darker patch. Asymmetric crystal habit	
WGC-25B-28 - 1.d	rim					
WGC-25B-28 - 2.d	rim	Y	~75µm	Anhedral, tabular	Swirly zoning. 28-2 on darker patch	
WGC-25B-29 - 1.d	core	Y	~150µm	Euhedral, tabular		

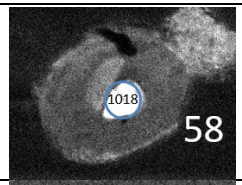
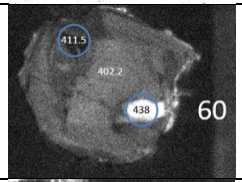
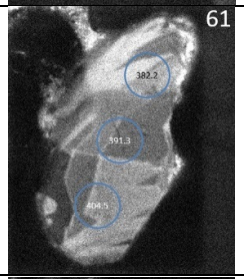
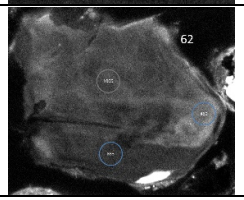
WGC-25B-30 - 1.d	core	N	~50µm	Anhedral		
WGC-25B-31 - 1.d	core	Y	~100µm	Euhedral, equant	Faint, patchy zoning	
WGC-25B-31 - 2.d	rim					
WGC-25B-32 - 1.d	core	Y	~50µm	Euhedral, equant		
WGC-25B-33 - 1.d	core	Y	~75µm	Subhedral, triangular	Faint, patchy zoning	
WGC-25B-33 - 2.d	rim					
WGC-25B-34 - 1.d	core	Y	~75µm	Euhedral, equant	Faint, patchy zoning	
WGC-25B-34 - 2.d	rim					
WGC-25B-35 - 1.d	rim	Y	~100µm	Euhedral, equant	Flat zoning aside from a small, dark core	
WGC-25B-35 - 2.d	core					
WGC-25B-36 - 1.d	rim	Y	~100µm			

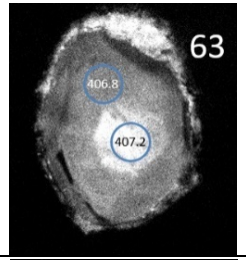
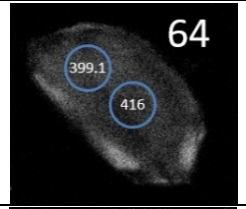
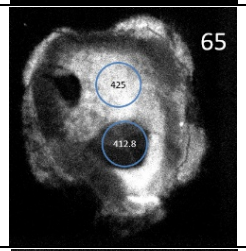
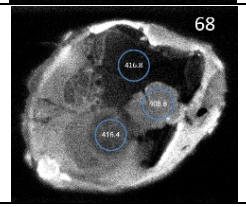
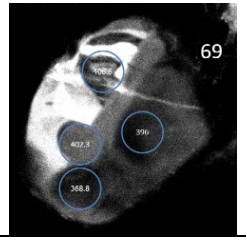
WGC-25B-36 - 2.d	mantle					
WGC-25B-36 - 3.d	core			Euhedral, tabular		
WGC-25B-37 - 1.d	rim					
WGC-25B-37 - 2.d	rim	N	~75µm	Euhedral, tabular		
WGC-25B-38 - 1.d	core	Y	~50µm	Subhedral, tabular		
WGC-25B-39 - 1.d	core	Y	~50µm	Euhedral, tabular		
WGC-25B-40 - 1.d	core	Y	~50µm	Subhedral, tabular	Faint, patchy zoning	

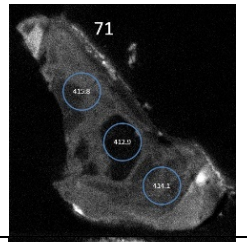
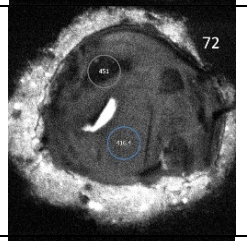
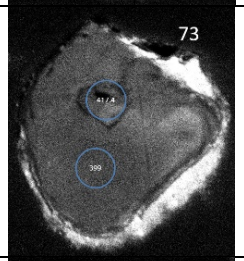
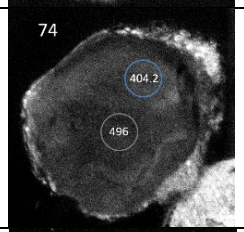
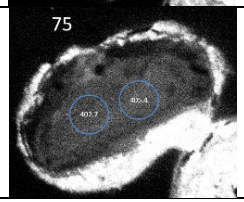
WGC-25B-41 - 1.d	core	Y	~75µm	Euhedral, tabular		
WGC-25B-42 - 1.d	core	N	~50µm	Euhedral, equant		
WGC-25B-43 - 1.d	core	N	~50µm	Subhedral, tabular		
WGC-25B-44 - 1.d **WGC-25B-44 - 2.d**	rim core	Y	~75µm	Anhedral, tabular		
WGC-25B-45 - 1.d **WGC-25B-45 - 2.d** **WGC-25B-45 - 3.d**	core rim rim	Y	~100µm	Anhedral, tabular		
WGC-25B-46 - 1.d	core	Y	~100µm		Faint, patchy zoning	

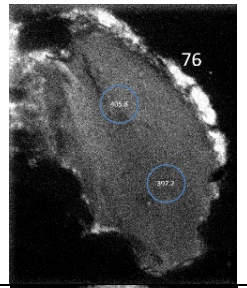
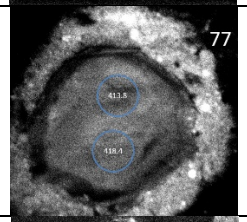
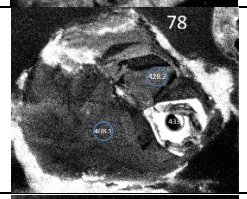
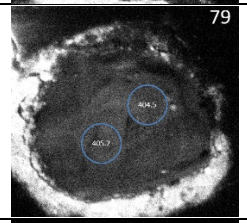
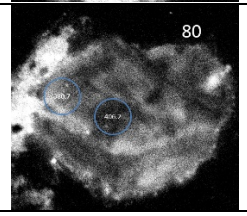
WGC-25B-46 - 2.d	core			Euhedral, equant		
WGC-25B-47 - 1.d	rim					
WGC-25B-47 - 2.d	core	Y	~75µm	Subhedral, equant		
WGC-25B-48 - 1.d	core					
WGC-25B-48 - 2.d	core	Y	~100µm	Euhedral, tabular	Zoned but both targets located in core due to thin rim	
WGC-25B-49 - 1.d	core					
WGC-25B-49 - 2.d	rim	Y	~75µm	Euhedral, tabular	Faint, patchy zoning	
WGC-25B-50 - 1.d	rim					
WGC-25B-50 - 2.d	core	Y	~100µm	Anhedral, tabular	Faint, patchy zoning	
WGC-25B-51 - 1.d	core	Y	~50µm	Euhedral, prismatic		

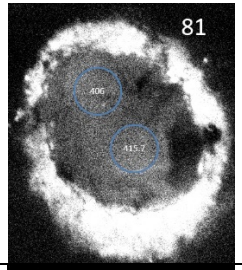
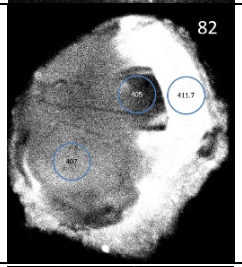
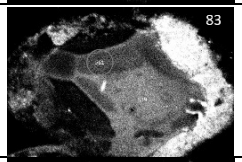
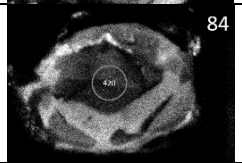
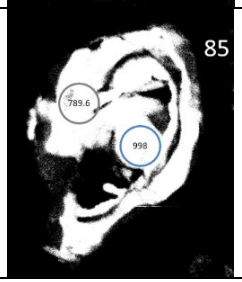
WGC-25B-52 - 1.d	core	Y	~75µm	Euhedral, tabular	Faint, patchy zoning	
WGC-25B-52 - 2.d	rim					
WGC-25B-53 - 1.d	core	Y	~75µm	Anhedral		
WGC-25B-54 - 1.d	core	Y	~100µm	Euhedral, equant		
WGC-25B-54 - 2.d	rim					
WGC-25B-55 - 1.d	core	Y	~75µm	Euhedral, tabular		
WGC-25B-55 - 2.d	rim					
WGC-25B-56 - 1.d	core	Y	~75µm	Anhedral		
WGC-25B-56 - 2.d	core					
WGC-25B-57 - 1.d	core	Y	~75µm	Subhedral, tabular		
WGC-25B-57 - 2.d	rim					

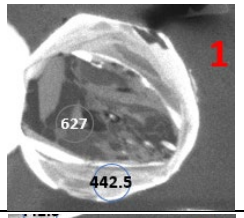
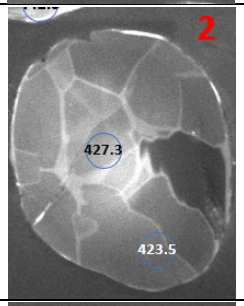
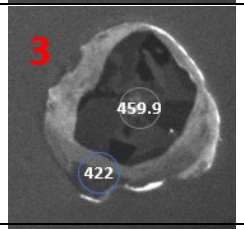
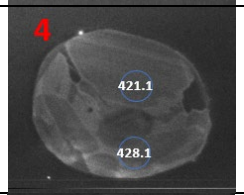
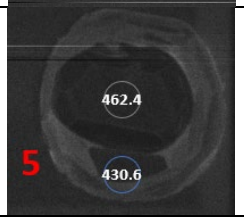
WGC-25B-58 - 1.d	core	Y	~75µm	Euhedral, equant	Bright, detrital core	
WGC-25B-59 - 1.d	core	N	~50µm	Anhedral		
WGC-25B-60 - 1.d **WGC-25B-60 - 2.d** **WGC-25B-60 - 3.d**	core rim rim	Y	~100µm	Subhedral, equant	Small, bright core and faint, irregular zoning surrounding	
WGC-25B-61 - 1.d **WGC-25B-61 - 2.d** **WGC-25B-61 - 3.d**	rim core rim	Y	~100µm	Anhedral, tabular		
WGC-25B-62 - 1.d **WGC-25B-62 - 2.d** **WGC-25B-62 - 3.d**	rim rim core	Y	~200µm	Subhedral, equant	Patchy and irregular. Difficult to differentiate between zoning boundaries	
WGC-25B-63 - 1.d	core	Y	~100µm			

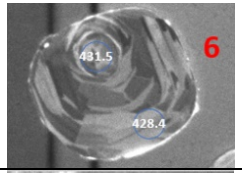
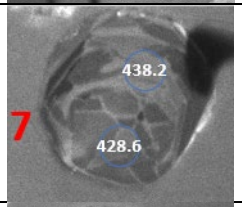
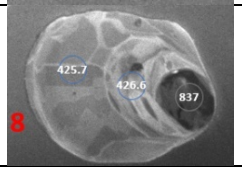
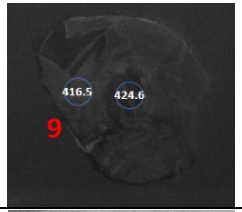
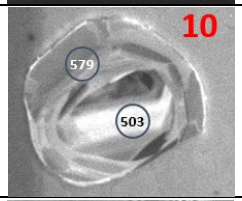
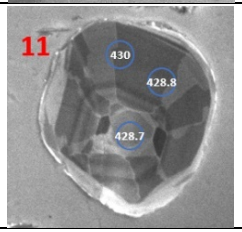
WGC-25B-63 - 2.d	rim			Subhedral, prismatic		
WGC-25B-64 - 1.d	core					
WGC-25B-64 - 2.d	rim	Y	~75µm	Subhedral, prismatic	Relatively flat, slight patchy zoning around edges	
WGC-25B-65 - 1.d	core					
WGC-25B-65 - 2.d	rim	Y	~100µm	Subhedral, equant	Patchy zoning with distinct dark sectors	
WGC-25B-68 - 1.d	core					
WGC-25B-68 - 2.d	core	Y	~125µm	Euhedral, equant		
WGC-25B-68 - 3.d	mantle					
WGC-25B-69 - 1.d	rim					
WGC-25B-69 - 2.d	core					
WGC-25B-69 - 3.d	rim	Y	~100µm	Euhedral, equant	Very complex zoning. Grain looks like it has been halved	
WGC-25B-69 - 4.d	core					
WGC-25B-71 - 1.d	rim	Y	~125µm	Anhedral		
WGC-25B-71 - 2.d	core					

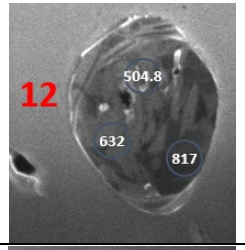
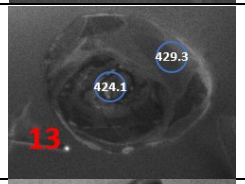
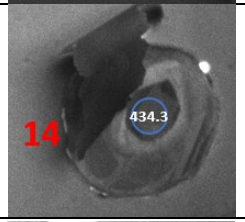
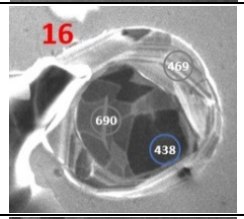
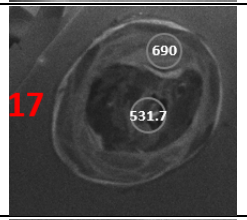
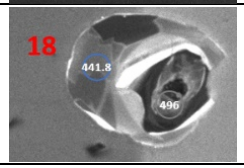
WGC-25B-71 - 3.d	rim					
WGC-25B-72 - 1.d	core					
WGC-25B-72 - 2.d	core	Y	~100µm	Euhedral, equant		
WGC-25B-73 - 1.d	core					
WGC-25B-73 - 2.d	rim	Y	~100µm	Subhedral, equant		
WGC-25B-74 - 1.d	rim					
WGC-25B-74 - 2.d	core	Y	~100µm	Euhedral, equant	Faint, patchy zoning	
WGC-25B-75 - 1.d	core					
WGC-25B-75 - 2.d	core	N	~100µm	Euhedral, tabular	Relatively flat, slight patchy zoning around edges	
WGC-25B-76 - 1.d	core	Y	~150µm		Faint, patchy zoning	

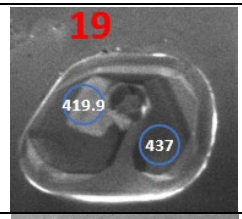
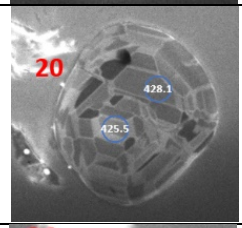
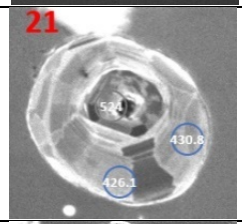
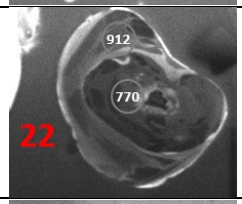
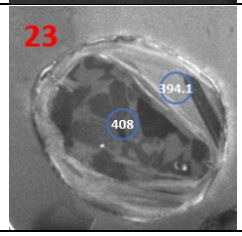
WGC-25B-76 - 2.d	core			Anhedral, tabular		
WGC-25B-77 - 1.d	core					
WGC-25B-77 - 2.d	core	Y	~75µm	Euhedral, equant	Relatively flat, slight patchy zoning around edges	
WGC-25B-78 - 1.d	core					
WGC-25B-78 - 2.d	mantle	Y	~200µm	Subhedral, hexagonal	78-1 is located on top of a complex zoned area around what looks like a detrital core. Slightly prismatic	
WGC-25B-78 - 3.d	rim					
WGC-25B-79 - 1.d	core					
WGC-25B-79 - 2.d	core	Y	~75µm	Euhedral, equant	Relatively flat, slight patchy zoning around edges	
WGC-25B-80 - 1.d	rim					
WGC-25B-80 - 2.d	core	Y	~100µm	Anhedral	Very patchy	
WGC-25B-81 - 1.d	core	N	~75µm			

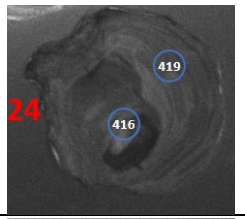
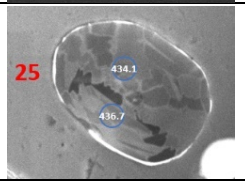
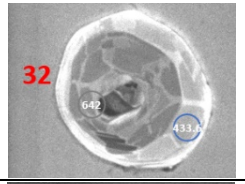
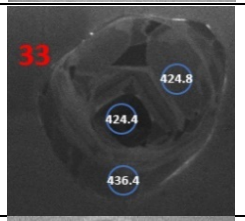
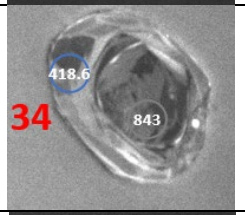
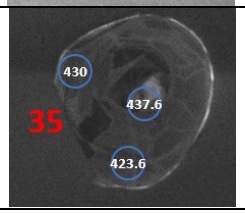
WGC-25B-81 - 2.d	core			Euhedral, equant		
WGC-25B-82 - 1.d	rim					
WGC-25B-82 - 2.d	core					
WGC-25B-82 - 3.d	core	Y	~100µm	Subhedral, prismatic		
WGC-25B-83 - 1.d	rim					
WGC-25B-83 - 2.d	core	Y	~100µm	Subhedral, prismatic	Appears zoned but could just be shadow from different crystal faces	
WGC-25B-84 - 1.d	core	Y	~100µm	Euhedral, prismatic		
WGC-25B-85 - 1.d	rim					
WGC-25B-85 - 2.d	core	Y	~100µm	Subhedral, prismatic		
31A-1 - 1.d	core	Y	~100µm		detrital core?	

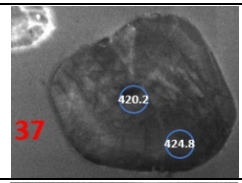
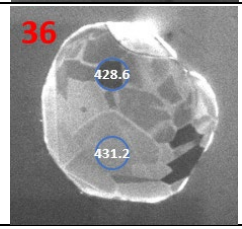
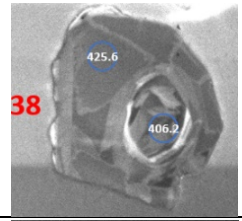
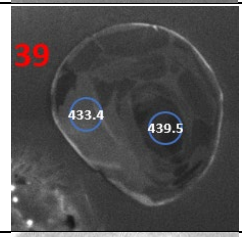
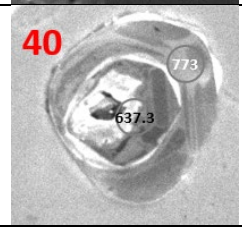
31A-1 - 2.d	rim			Euhedral, equant		
31A-2 - 1.d	core					
31A-2 - 2.d	rim	N	~125µm	Euhedral, tabular	Relatively flat zoning	
31A-3 - 1.d	core					
31A-3 - 2.d	rim	Y	~75µm	Euhedral, equant	detrital core?	
31A-4 - 1.d	core					
31A-4 - 2.d	rim	N	~100µm	Euhedral, tabular	Relatively flat zoning	
31A-5 - 1.d	core					
31A-5 - 2.d	rim	Y	~100µm	Euhedral, equant	Dark, detrital core	
31A-6 - 1.d	core	Y	~75µm		detrital core?	

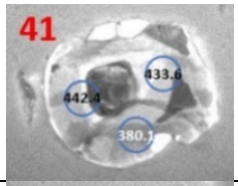
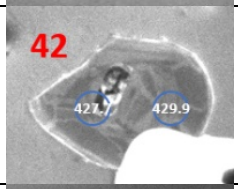
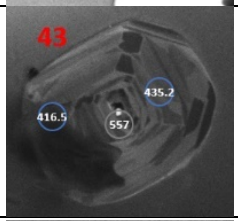
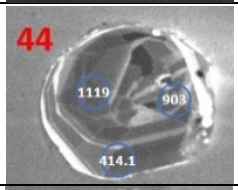
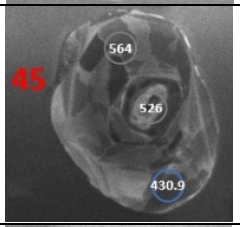
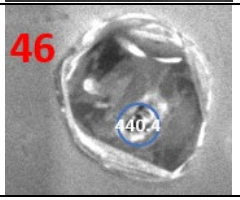
31A-6 - 2.d	rim			Euhedral, equant		
31A-7 - 1.d	core					
31A-7 - 2.d	rim	minor	~50µm	Euhedral, equant		
31A-8 - 1.d	core	Y	~100µm	Euhedral, tabular	detrital core?	
31A-8 - 2.d	mantle				second zoned sector	
31A-8 - 3.d	rim				third zoned sector	
31A-9 - 1.d	core	N	~100µm	Subhedral, equant		
31A-9 - 2.d	rim					
31A-10 - 1.d	core	Y	~75µm	Euhedral, equant	quite a bright core - could just be reflective crystal plane? Dark around	
31A-10 - 2.d	rim					
31A-11 - 1.d	core	Y	~125µm	Euhedral, equant	pale core compared to usual dark core in other zircons	
31A-11 - 2.d	rim					
31A-11 - 3.d	rim					
31A-12 - 1.d	core	Y	~75µm	Euhedral, prismatic	overall messy looking grain in terms of zoning	
31A-12 - 2.d	rim					

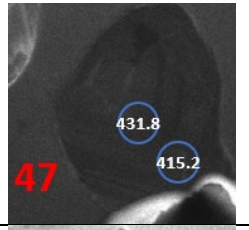
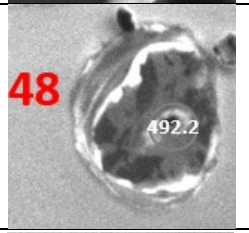
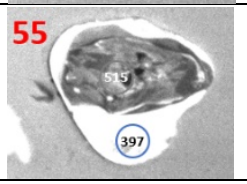
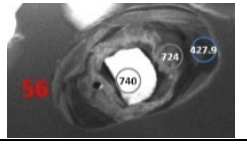
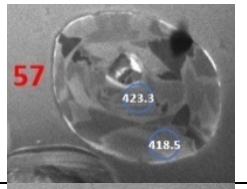
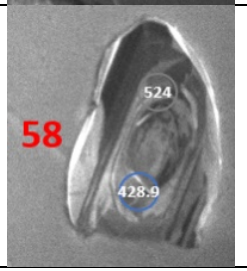
31A-12 - 3.d	rim					
31A-13 - 1.d **31A-13 - 2.d**	core rim	Y	~75µm	Euhedral, equant	dark detrital core?	
31A-14 - 1.d	core	Y	~75µm	Euhedral, equant		
31A-16 - 1.d **31A-16 - 2.d** **31A-16 - 3.d**	mantle rim core	Y	~100µm	Euhedral, equant	second zone of dark, detrital core Dark, detrital core	
31A-17 - 1.d **31A-17 - 2.d**	core rim	Y	~75µm	Euhedral, equant	dark, detrital core	
31A-18 - 1.d **31A-18 - 2.d**	mantle rim	Y	~100µm	Subhedral, equant	Second zone of dark, detrital core	

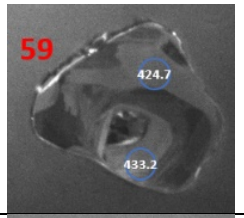
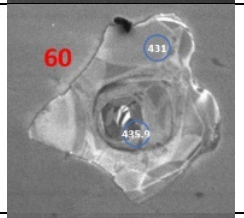
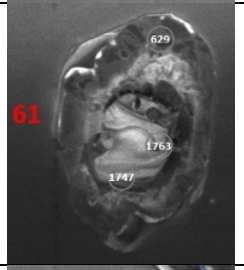
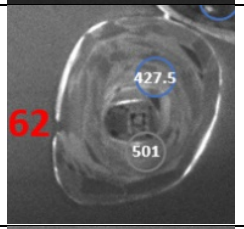
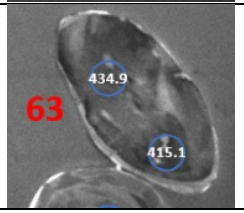
31A-19 - 1.d	mantle	Y	~75µm	Euhedral, tabular		
31A-19 - 2.d	mantle					
31A-20 - 1.d	core	N	~125µm	Euhedral, equant		
31A-20 - 2.d	rim					
31A-21 - 1.d	mantle	Y	~100µm	Euhedral, equant	Second zone of dark, detrital core. Could have potentially overlapped between two zones	
31A-21 - 2.d	rim					
31A-21 - 3.d	rim					
31A-22 - 1.d	mantle	Y	~100µm	Anhedral	second zone of dark, detrital core	
31A-22 - 2.d	rim					
31A-23 - 1.d	core	Y	~125µm	Euhedral, equant		
31A-23 - 2.d	rim					
31A-24 - 1.d	core	Y	~100µm			

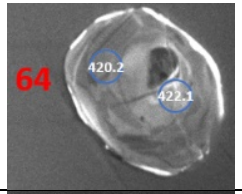
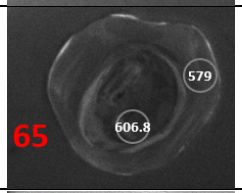
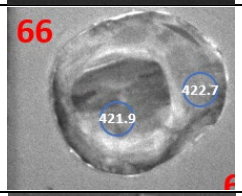
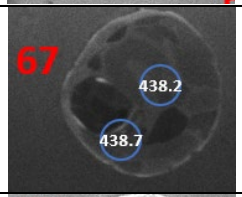
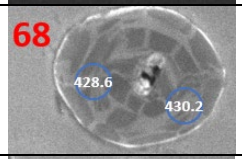
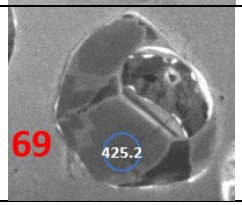
31A-24 - 2.d	rim			Subhedral, equant		
31A-25 - 1.d	core					
31A-25 - 2.d	rim	N	~125µm	Euhedral, tabular		
31A-32 - 1.d	core					
31A-32 - 2.d	rim	Y	~100µm	Euhedral, equant	potentially overlapping mantle and core	
31A-33 - 1.d	core					
31A-33 - 2.d	mantle					
31A-33 - 3.d	rim	Y	~100µm	Euhedral, tabular		
31A-34 - 1.d	core					
31A-34 - 2.d	rim	Y	~75µm	Euhedral, tabular		
31A-35 - 1.d	core					
31A-35 - 2.d	rim					
31A-35 - 3.d	rim	Y	~100µm	Euhedral, equant		

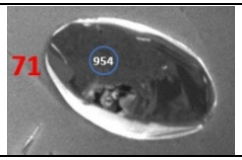
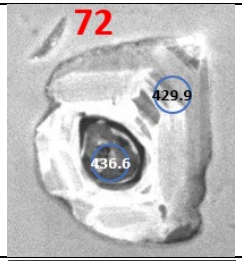
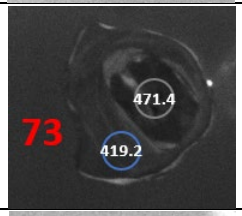
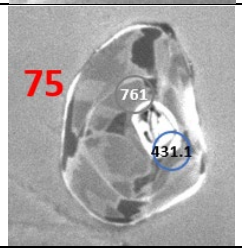
31A-37 - 1.d	core	N	~125µm	Euhedral, equant	Very patchy looking	
31A-37 - 2.d	rim					
31A-36 - 1.d	core	minor	~75µm	Subhedral, equant		
31A-36 - 2.d	rim					
31A-38 - 1.d	core	Y	~100µm	Anhedral		
31A-38 - 2.d	rim					
31A-39 - 1.d	core	minor	~75µm	Euhedral, equant		
31A-39 - 2.d	rim					
31A-40 - 1.d	mantle	Y	~75µm	Euhedral, equant	potentially overlapping mantle and core	
31A-40 - 2.d	rim					
31A-41 - 1.d	core	Y	~75µm	Subhedral, equant	potentially overlapping core and rim	
31A-41 - 2.d	rim					

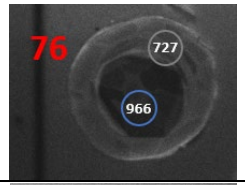
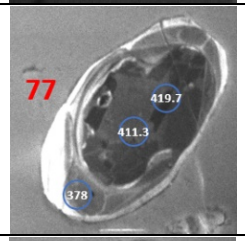
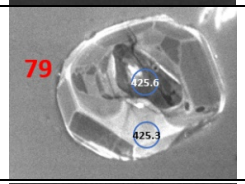
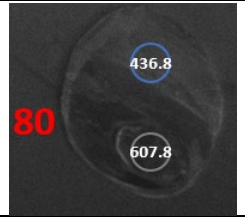
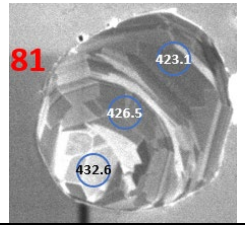
31A-41 - 3.d	rim					
31A-42 - 1.d	core	Y	~75µm	Anhedral		
31A-42 - 2.d	rim					
31A-43 - 1.d	core	Y	~125µm	Euhedral	detrital core but very small. Overlap with mantle	
31A-43 - 2.d	rim					
31A-43 - 3.d	rim					
31A-44 - 1.d	mantle	Y	~75µm	Euhedral, equant	could be straddling zoning boundary between core and rim	
31A-44 - 2.d	core					
31A-44 - 3.d	rim					
31A-45 - 1.d	core	Y	~125µm	Euhedral, tabular	detrital core?	
31A-45 - 2.d	rim					
31A-45 - 3.d	rim					
31A-46 - 1.d	core	Y	~75µm	Subhedral, equant	detrital core?	
31A-47 - 1.d	core	minor	~100µm	Subhedral	detrital core?	

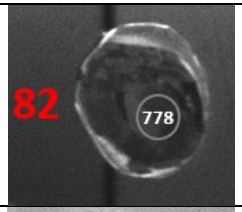
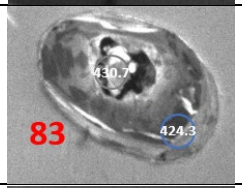
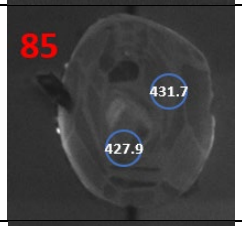
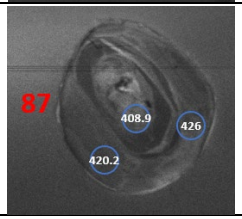
31A-47 - 2.d	rim					
31A-48 - 1.d	core	Y	~75µm	Euhedral, tabular	detrital core?	
31A-55 - 1.d	core	Y	~75µm	Anhedral	quite a messy core in terms of growth zones, could be overlapping multiple Very bright rim compared to previous zircons	
31A-55 - 2.d	rim					
31A-56 - 1.d	core	Y	~125µm	Euhedral, tabular	potentially overlapping core and mantle	
31A-56 - 2.d	mantle					
31A-56 - 3.d	rim					
31A-57 - 1.d	mantle	Y	~100µm	Euhedral, equant		
31A-57 - 2.d	rim					
31A-58 - 1.d	mantle	Y	~100µm	Anhedral, prismatic	could be overlapping mantle and core	
31A-58 - 2.d	mantle					

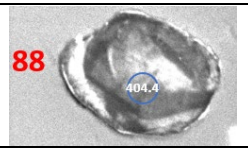
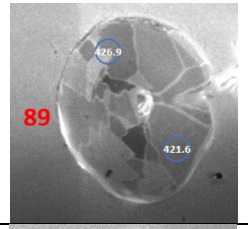
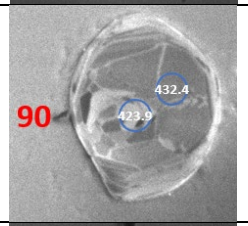
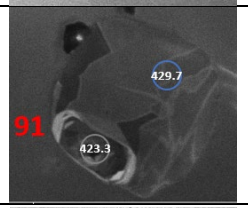
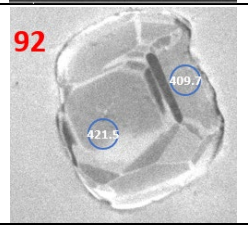
31A-59 - 1.d	mantle	Y	~125µm	Anhedral		
31A-59 - 2.d	rim					
31A-60 - 1.d	mantle	Y	~125µm	Anhedral	potentially overlapping mantle and core	
31A-60 - 2.d	rim					
31A-61 - 1.d	core	Y	~150µm	Subhedral, prismatic	very patchy, cloudy complex zoning	
31A-61 - 2.d	core					
31A-61 - 3.d	rim					
31A-62 - 1.d	core	Y	~100µm	Subhedral, tabular	potentially overlapping core and rim	
31A-62 - 2.d	rim					
31A-63 - 1.d	rim	minor	~100µm	Euhedral, prismatic	patchy zoning	
31A-63 - 2.d	rim					
31A-64 - 1.d	mantle	Y	~100µm			

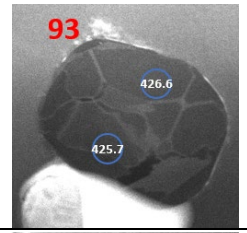
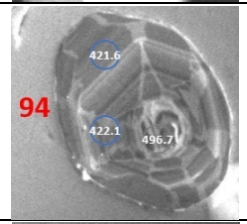
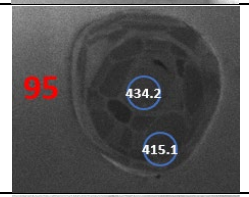
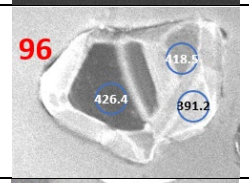
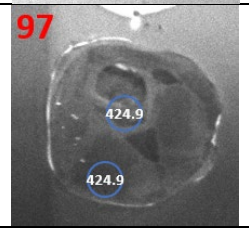
31A-64 - 2.d	rim			Subhedral, tabular		
31A-65 - 1.d	core					
31A-65 - 2.d	rim	Y	~100µm	Subhedral, equant	maybe overlapping core and mantle	
31A-66 - 1.d	core					
31A-66 - 2.d	rim	Y	~100µm	Euhedral, equant	patchy zoning	
31A-67 - 1.d	rim					
31A-67 - 2.d	rim	Y	~75µm	Euhedral, equant		
31A-68 - 1.d	rim					
31A-68 - 2.d	rim	Y - tiny detrital core but flat zoning for majority of grain	~100µm	Euhedral, equant		
31A-69 - 1.d	rim	Y	~100µm	Subhedral		

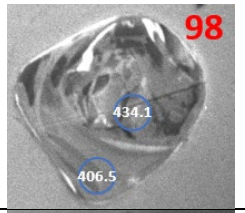
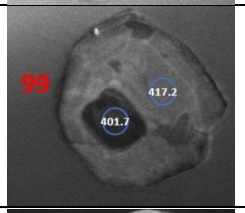
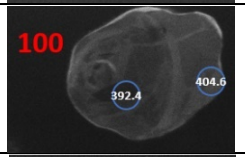
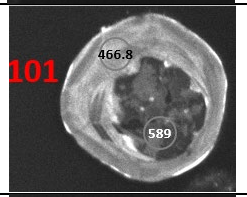
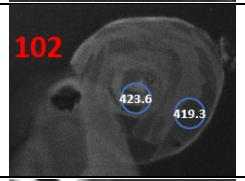
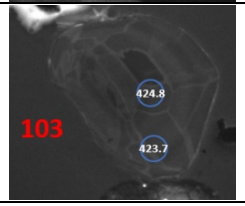
31A-71 - 1.d	core	Y	~125µm	Euhedral, prismatic		
31A-70 - 1.d	?	?	?	?	no CL image	
31A-72 - 1.d	core	Y	~100µm	Anhedral	Fragmented	
31A-72 - 2.d	rim					
31A-73 - 1.d	core	Y	~75µm	Anhedral		
31A-73 - 2.d	rim					
31A-74 - 1.d	core	Y	~75µm	Subhedral, equant		
31A-75 - 1.d	mantle	Y	~75µm	Subhedral, tabular	potentially overlapping core and mantle	
31A-75 - 2.d	rim				potentially overlapping mantle and rim	
31A-76 - 1.d	core	Y	~75µm			

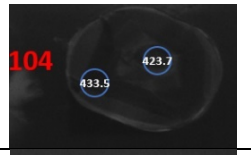
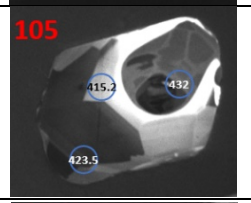
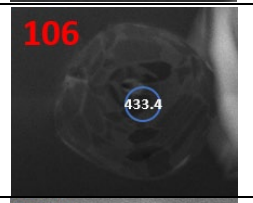
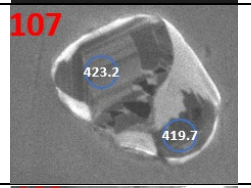
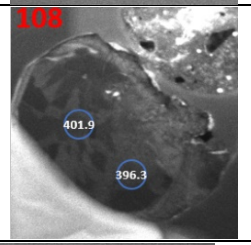
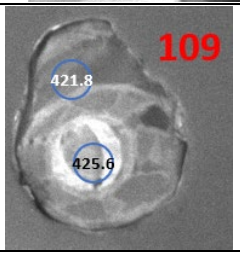
31A-76 - 2.d	rim			Euhedral, equant	potentially overlapping core and rim	
31A-77 - 1.d	core					
31A-77 - 2.d	core					
31A-77 - 3.d	rim	Y	~150µm	Euhedral, prismatic	Very bright rim compared to previous zircons	
31A-78 - 1.d	core					
31A-78 - 2.d	rim	minor	~125µm	Subhedral, equant		
31A-79 - 1.d	core					
31A-79 - 2.d	rim	Y	~125µm	Subhedral, equant		
31A-80 - 1.d	core					
31A-80 - 2.d	rim	Y	~75µm	Euhedral, equant		
31A-81 - 1.d	core					
31A-81 - 2.d	mantle					
31A-81 - 3.d	rim	Y	~125µm	Subhedral, equant		

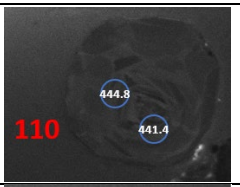
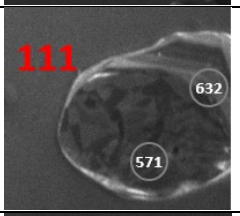
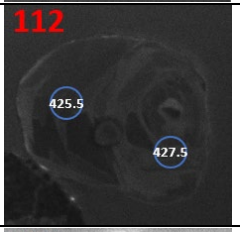
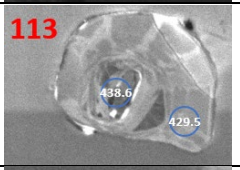
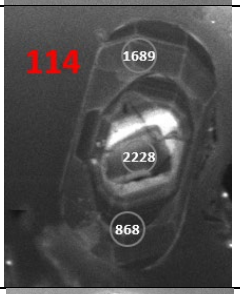
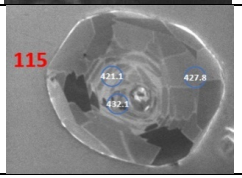
31A-82 - 1.d	core	Y	~50µm	Equant	dark detrital core?	
31A-83 - 1.d **31A-83 - 2.d**	core rim	Y	~100µm	Euhedral, tabular		
31A-84 - 1.d **31A-84 - 2.d**	core core	Y	~100µm	Subhedral, prismatic		
31A-85 - 1.d **31A-85 - 2.d**	core rim	minor	~100µm	Euhedral, tabular		
31A-86 - 1.d **31A-86 - 2.d**	core mantle	Y	~100µm	Anhedral		
31A-87 - 1.d **31A-87 - 2.d** **31A-87 - 3.d**	core rim rim	Y	~125µm	Euhedral, equant		

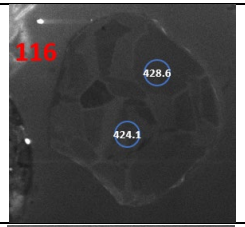
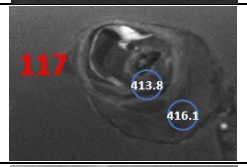
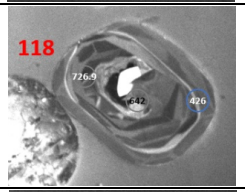
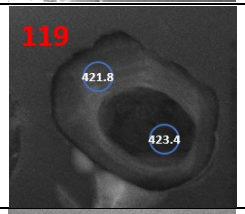
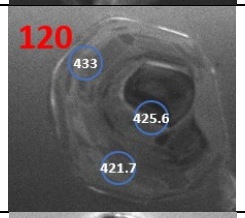
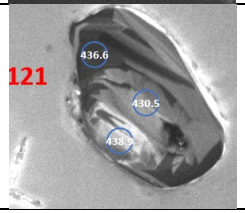
31A-88 - 1.d	core	Y	~75µm	Subhedral	Very patchy	
31A-89 - 1.d	rim	N - tiny detrital core but overall flat	~125µm	Euhedral, equant		
31A-89 - 2.d	rim					
31A-90 - 1.d	core	Y	~100µm	Subhedral		
31A-90 - 2.d	rim					
31A-91 - 1.d	core	Y	~100µm	Euhedral, equant		
31A-91 - 2.d	rim					
31A-92 - 1.d	core	Y	~125µm	Subhedral, tabular		
31A-92 - 2.d	rim					
31A-93 - 1.d	core	N	~125µm			

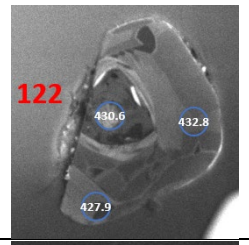
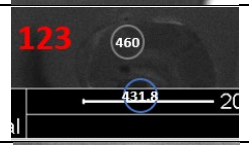
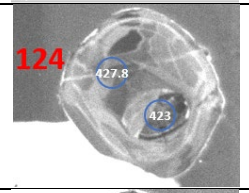
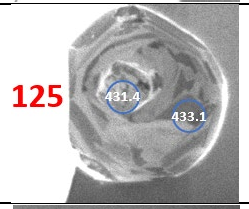
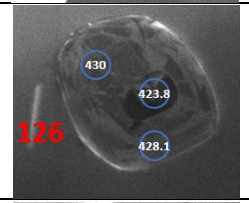
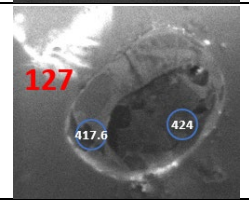
31A-93 - 2.d	rim			Euhedral, tabular		
31A-94 - 1.d	core				Dark, detrital core? Target could have been overlapping core and mantle	
31A-94 - 2.d	mantle	Y	~150µm	Euhedral, prismatic		
31A-94 - 3.d	rim					
31A-95 - 1.d	core					
31A-95 - 2.d	rim	Y	~100µm	Euhedral, equant		
31A-96 - 1.d	core					
31A-96 - 2.d	mantle	Y	~125µm	Anhedral	Pale rim	
31A-96 - 3.d	rim					
31A-97 - 1.d	core					
31A-97 - 2.d	rim	Y	~100µm	Euhedral, equant		
31A-98 - 1.d	core	Y	~100µm			

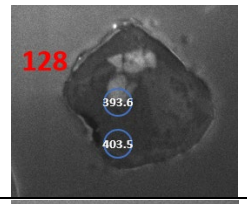
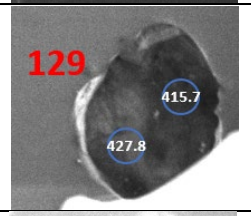
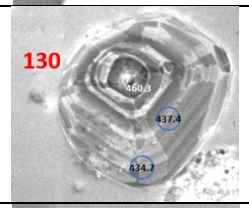
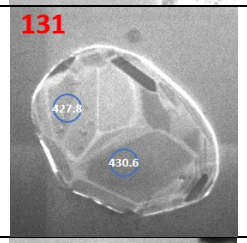
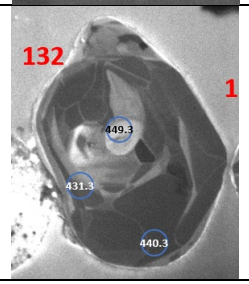
31A-98 - 2.d	rim			Euhedral, tabular	
31A-99 - 1.d	core	Y	~100µm	Subhedral	
31A-99 - 2.d	rim				
31A-100 - 1.d	mantle	Y	~100µm	Subhedral, tabular	
31A-100 - 2.d	rim				
31A-101 - 1.d	core	Y	~100µm	Euhedral, equant	
31A-101 - 2.d	rim				
31A-102 - 1.d	core	Y	~100µm	Subhedral, equant	
31A-102 - 2.d	rim				
31A-103 - 1.d	core	N	~125µm	Subhedral	
31A-103 - 2.d	rim				
31A-104 - 1.d	core	Y	~100µm		

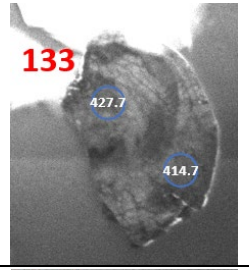
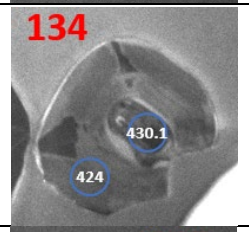
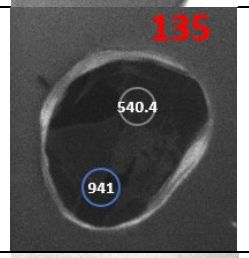
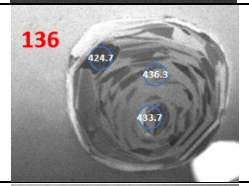
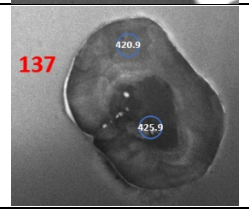
31A-104 - 2.d	rim			Euhedral, tabular		
31A-105 - 1.d **31A-105 - 2.d** **31A-105 - 3.d**	core mantle rim	Y	~125µm	Subhedral, tabular		
31A-106 - 1.d	core	N	~75µm	Euhedral, equant		
31A-107 - 1.d **31A-107 - 2.d**	rim rim	Y	~100µm	Euhedral, tabular	looks like broken grain. Core broken off	
31A-108 - 1.d **31A-108 - 2.d**	core core	N	~125µm	Subhedral, tabular		
31A-109 - 1.d **31A-109 - 2.d**	core rim	Y	~100µm	Subhedral		

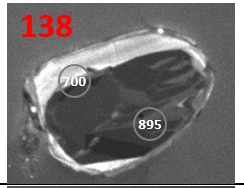
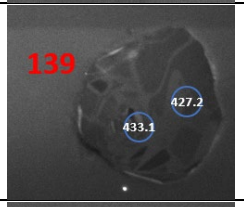
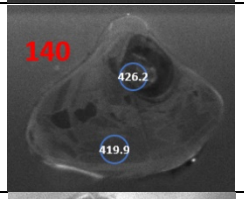
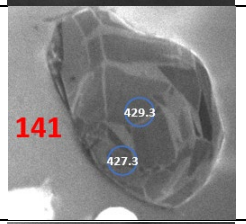
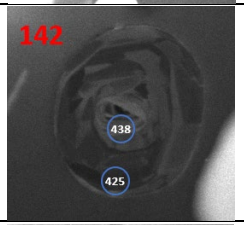
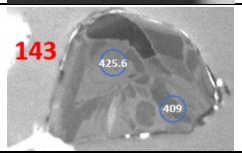
31A-110 - 1.d	core	N	~100µm	Euhedral, equant	
31A-110 - 2.d	core				
31A-111 - 1.d	core	Y	~100µm	Subhedral, prismatic	
31A-111 - 2.d	rim				
31A-112 - 1.d	core	Y	~125µm	Subhedral, tabular	
31A-112 - 2.d	rim				
31A-113 - 1.d	core	Y	~100µm	Subhedral, tabular	
31A-113 - 2.d	rim				
31A-114 - 1.d	core	Y	~150µm	Euhedral, prismatic	
31A-114 - 2.d	rim				
31A-114 - 3.d	rim				
31A-115 - 1.d	core	Y	~150µm	Euhedral, equant	
31A-115 - 2.d	mantle				
31A-115 - 3.d	rim				

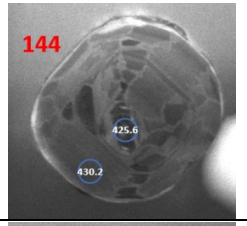
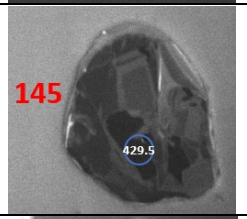
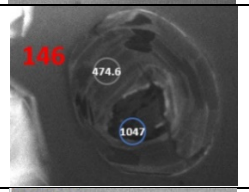
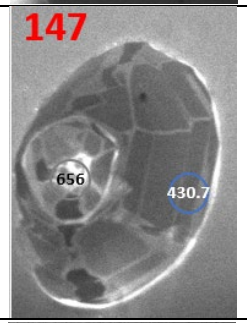
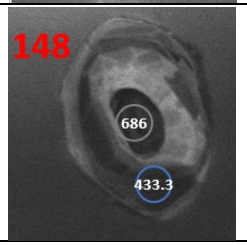
31A-116 - 1.d	core	N	~125µm	Subhedral		
31A-116 - 2.d	rim					
31A-117 - 1.d	core	Y	~75µm	Euhedral		
31A-117 - 2.d	rim					
31A-118 - 1.d	core	Y	~125µm	Euhedral, tabular	likely overlapping core and mantle	
31A-118 - 2.d	mantle					
31A-118 - 3.d	rim					
31A-119 - 1.d	core	Y	~100µm	Euhedral, tabular		
31A-119 - 2.d	rim					
31A-120 - 1.d	core	Y	~100µm	Euhedral, equant	likely overlapping core and rim	
31A-120 - 2.d	rim					
31A-120 - 3.d	rim					
31A-121 - 1.d	core	Y	~125µm	Subhedral, tabular		
31A-121 - 2.d	mantle					
31A-121 - 3.d	rim					
31A-122 - 1.d	core	Y	~125µm		Tabular grain split in half	

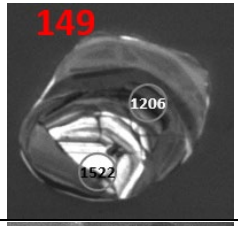
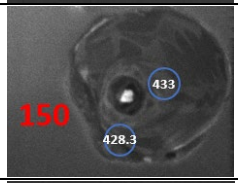
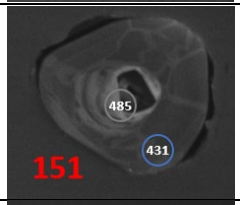
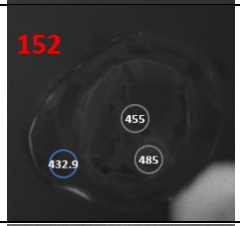
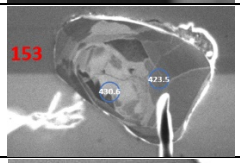
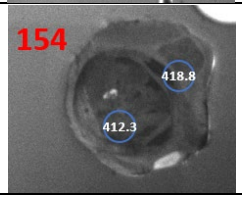
31A-122 - 2.d	mantle				
31A-122 - 3.d	rim			Fragmented subhedral	
31A-123 - 1.d	core				
31A-123 - 2.d	rim	N	~100µm	Euhedral, equant	
31A-124 - 1.d	core				
31A-124 - 2.d	rim	Y	~100µm	Euhedral, equant	
31A-125 - 1.d	core				
31A-125 - 2.d	rim	Y	~100µm	Euhedral, equant	
31A-126 - 1.d	core				
31A-126 - 2.d	rim				
31A-126 - 3.d	rim	Y	~100µm	Euhedral, equant	
31A-127 - 1.d	core				
31A-127 - 2.d	rim	Y	~100µm	Euhedral, tabular	
31A-128 - 1.d	rim	Y	~100µm		

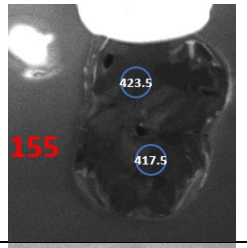
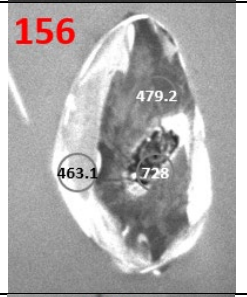
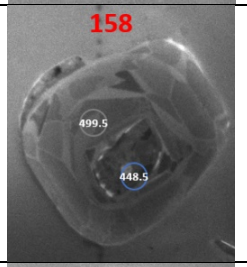
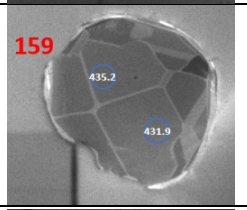
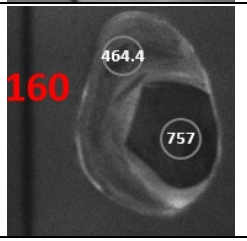
31A-128 - 2.d	rim			Subhedral, equant		
31A-129 - 1.d	core					
31A-129 - 2.d	core	Y	~75µm	Subhedral		
31A-130 - 1.d	core				likely overlapping growth zones	
31A-130 - 2.d	mantle	Y	~125µm	Euhedral, equant		
31A-130 - 3.d	rim					
31A-131 - 1.d	rim					
31A-131 - 2.d	rim	N	~100µm	Euhedral, tabular		
31A-132 - 1.d	core					
31A-132 - 2.d	rim					
31A-132 - 3.d	rim	Y	~150µm	Subhedral		
31A-133 - 1.d	core	Y	~100µm	Anhedral	very patchy zoning	

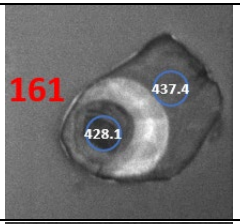
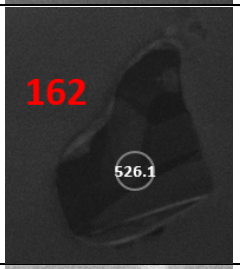
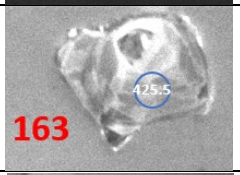
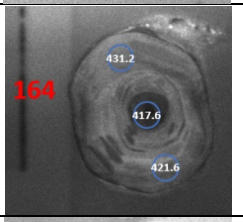
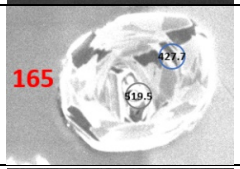
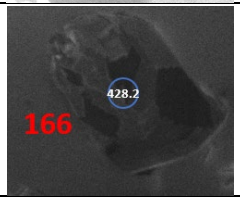
31A-133 - 2.d	rim					
31A-134 - 1.d	core					
31A-134 - 2.d	rim	Y	~75µm	Euhedral, equant, fragmented		
31A-135 - 1.d	core					
31A-135 - 2.d	core	Y	~75µm	Euhedral, equant	very dark core	
31A-136 - 1.d	core					
31A-136 - 2.d	mantle	Y	~125µm	Euhedral, equant		
31A-136 - 3.d	rim					
31A-137 - 1.d	core					
31A-137 - 2.d	rim	Y	~125µm	Euhedral, tabular	very patchy/dusty looking	
31A-138 - 1.d	core	Y	~100µm			

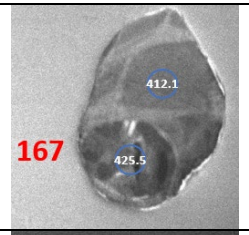
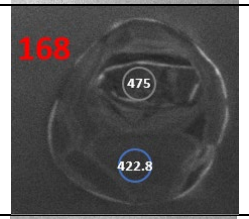
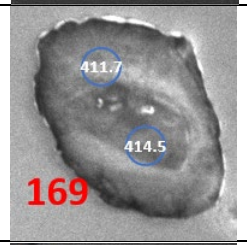
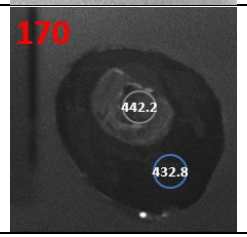
31A-138 - 2.d	rim			Euhedral, tabular	likely overlapping core and rim	
31A-139 - 1.d	core					
31A-139 - 2.d	rim	Y - tiny detrital core but flat zoning for majority of grain	~100µm	Subhedral, equant		
31A-140 - 1.d	core					
31A-140 - 2.d	rim	Y	~125µm	Anhedral		
31A-141 - 1.d	rim					
31A-141 - 2.d	core	N	~125µm	Subhedral, tabular		
31A-142 - 1.d	core					
31A-142 - 2.d	rim	Y	~125µm	Euhedral, equant		
31A-143 - 1.d	core					
31A-143 - 2.d	rim	N	~125µm	Subhedral, fragmented		
31A-144 - 1.d	core	Y	~150µm			

31A-144 - 2.d	rim			Euhedral, equant	
31A-145 - 1.d	core	Y	~100µm	Subhedral, tabular	
31A-146 - 1.d	core	Y	~125µm	Euhedral, equant	
31A-146 - 2.d	rim				
31A-147 - 1.d	core	Y	~125µm	Euhedral, prismatic	
31A-147 - 2.d	rim				
31A-148 - 1.d	core	Y	~100µm	Euhedral, prismatic	
31A-148 - 2.d	rim				
31A-149 - 1.d	core	Y	~100µm		

31A-149 - 2.d	rim			Euhedral, equant	
31A-150 - 1.d	rim				
31A-150 - 2.d	rim	Y	~100µm	Euhedral, equant	
31A-151 - 1.d	core				
31A-151 - 2.d	rim	Y	~100µm	Euhedral	
31A-152 - 1.d	core				
31A-152 - 2.d	mantle				
31A-152 - 3.d	rim	Y	~125µm	Euhedral, equant	
31A-153 - 1.d	core				
31A-153 - 2.d	rim	Y	~150µm	Subhedral, tabular	
31A-154 - 1.d	core				
31A-154 - 2.d	rim	Y	~100µm	Euhedral, equant	
31A-155 - 1.d	core	N	~100µm		

31A-155 - 2.d	core			Subhedral, tabular		
31A-156 - 1.d	core				detrital core?	
31A-156 - 2.d	mantle					
31A-156 - 3.d	rim	Y	~100µm	Subhedral, prismatic		
31A-158 - 1.d	core					
31A-158 - 2.d	rim	Y	~150µm	Euhedral, equant		
31A-159 - 1.d	rim					
31A-159 - 2.d	rim	N	~125µm	Euhedral, equant		
31A-160 - 1.d	core				likely overlap	
31A-160 - 2.d	rim	Y	~100µm	Euhedral, prismatic	likely overlap	

31A-161 - 1.d	core	Y	~100µm	Subhedral, tabular	
31A-161 - 2.d	rim				
31A-162 - 1.d	core	N	~100µm	Anhedral	
31A-163 - 1.d	rim	Y	~75µm	Tabular	
31A-164 - 1.d	core	Y	~125µm	Euhedral, prismatic	
31A-164 - 2.d	rim				
31A-164 - 3.d	rim				
31A-165 - 1.d	core	Y	~100µm	Euhedral, equant	
31A-165 - 2.d	rim				
31A-166 - 1.d	core	N	~125µm	Euhedral, tabular	

31A-167 - 1.d	core				
31A-167 - 2.d	rim	Y	~100µm	Anhedral	
31A-168 - 1.d	core				
31A-168 - 2.d	rim	Y	~100µm	Euhedral, equant	
31A-169 - 1.d	core				
31A-169 - 2.d	rim	Y	~100µm	Subhedral, prismatic	
31A-170 - 1.d	core				
31A-170 - 2.d	rim	Y	~100µm	Euhedral, equant	

Blue = concordant, grey - discordant

WGC2019J-25B zircon geochronology

Sample	207/235	2σ	206/238	2σ	207/206	2σ	ErrCorr 6/38vs7/35	ErrCorr 38/6vs7/6	207/235 age	2σ	206/238 age	2σ	Concordant?	% discordance
WGC-25B-3 - 1.d	0.49	0.016	0.06446	0.0015	0.0542	0.0013	0.41233	0.010737	404.3	11	402.6	9	C - Caledonian	0.42048
WGC-25B-3 - 2.d	0.497	0.018	0.06516	0.0014	0.0541	0.0018	0.073672	0.30248	410	12	406.9	8.7	C - Caledonian	0.756098

WGC-25B-4 - 1.d	0.493	0.033	0.0687	0.0022	0.0541	0.0032	0.5007	0.062073	412	24	428	13	C - Caledonian	-3.8835
~~**WGC-25B-4 - 2.d**~~	~~0.54~~	~~0.029~~	~~0.06503~~	~~0.0015~~	~~0.0612~~	~~0.003~~	~~0.39478~~	~~-0.09824~~	~~438~~	~~19~~	~~406.1~~	~~9.3~~	~~D~~	~~7.283105~~
~~**WGC-25B-4 - 3.d**~~	~~0.712~~	~~0.094~~	~~0.072~~	~~0.0036~~	~~0.0662~~	~~0.0057~~	~~0.76947~~	~~-0.60217~~	~~531~~	~~52~~	~~448~~	~~21~~	~~D~~	~~15.63089~~
WGC-25B-5 - 1.d	0.484	0.021	0.06411	0.0015	0.0536	0.002	0.25552	0.13106	401	15	400.6	9.2	C - Caledonian	0.099751
WGC-25B-5 - 2.d	0.481	0.017	0.06239	0.0014	0.0564	0.0022	-0.19993	0.52532	400	12	390.1	8.5	C - Caledonian	2.475
WGC-25B-5 - 3.d	0.489	0.019	0.06446	0.0015	0.0549	0.0021	-0.04657	0.42395	406	13	402.7	9.3	C - Caledonian	0.812808
~~**WGC-25B-6 - 1.d**~~	~~0.553~~	~~0.037~~	~~0.0661~~	~~0.0024~~	~~0.0591~~	~~0.0031~~	~~0.62936~~	~~-0.04736~~	~~444~~	~~23~~	~~412~~	~~14~~	~~D~~	~~7.207207~~
WGC-25B-6 - 2.d	0.496	0.023	0.0654	0.0016	0.0535	0.0024	-0.11289	0.39624	407	16	408.1	9.5	C - Caledonian	-0.27027
WGC-25B-7 - 1.d	0.533	0.044	0.0678	0.0027	0.0571	0.0044	0.19001	0.1639	427	30	423	16	C - Caledonian	0.936768
WGC-25B-7 - 2.d	0.474	0.04	0.0636	0.0021	0.0551	0.0045	0.17652	0.19802	396	27	398	13	C - Caledonian	-0.50505
WGC-25B-7 - 3.d	0.465	0.029	0.0627	0.0019	0.0529	0.0031	0.22789	0.16206	390	20	392.1	12	C - Caledonian	-0.53846
WGC-25B-8 - 1.d	0.481	0.023	0.0655	0.0015	0.0536	0.0025	0.059581	0.24905	399	16	408.9	9	C - Caledonian	-2.4812
WGC-25B-8 - 2.d	0.474	0.022	0.0648	0.0015	0.0531	0.0024	0.000908	0.29063	392	15	404.7	8.8	C - Caledonian	-3.2398
WGC-25B-10 - 1.d	0.501	0.023	0.0629	0.0015	0.0558	0.0025	-0.06694	0.42409	411	15	393.3	9.3	C - Caledonian	4.306569
WGC-25B-10 - 2.d	0.523	0.043	0.0676	0.0018	0.0541	0.0042	0.14327	0.1252	429	27	421.8	11	C - Caledonian	1.678322
WGC-25B-11 - 1.d	0.494	0.022	0.0646	0.0016	0.0556	0.0026	0.087463	0.3241	408	15	403.5	9.5	C - Caledonian	1.102941
~~**WGC-25B-11 - 2.d**~~	~~0.478~~	~~0.02~~	~~0.0597~~	~~0.0016~~	~~0.0563~~	~~0.0024~~	~~0.098093~~	~~0.37443~~	~~395~~	~~14~~	~~373.9~~	~~9.5~~	~~D~~	~~5.341772~~
WGC-25B-11 - 3.d	0.503	0.02	0.06517	0.0014	0.0552	0.0021	-0.09213	0.39363	416	13	406.9	8.6	C - Caledonian	2.1875
WGC-25B-12 - 1.d	0.489	0.029	0.0638	0.0017	0.0544	0.0032	0.078596	0.23456	404	19	398.8	10	C - Caledonian	1.287129
~~**WGC-25B-13 - 1.d**~~	~~0.475~~	~~0.021~~	~~0.0656~~	~~0.0016~~	~~0.0516~~	~~0.0024~~	~~0.2166~~	~~0.14053~~	~~393~~	~~15~~	~~409.7~~	~~9.9~~	~~RD~~	~~-4.24936~~
WGC-25B-13 - 2.d	0.47	0.018	0.06367	0.0014	0.0527	0.0021	-0.07198	0.37109	390	13	397.9	8.4	C - Caledonian	-2.02564
WGC-25B-14 - 1.d	0.468	0.027	0.0633	0.0018	0.0529	0.0031	0.14043	0.4094	395	18	395.8	11	C - Caledonian	-0.20253
~~**WGC-25B-15 - 1.d**~~	~~4.08~~	~~0.14~~	~~0.2715~~	~~0.0071~~	~~0.1072~~	~~0.0027~~	~~0.55232~~	~~0.10084~~	~~1646~~	~~27~~	~~1548~~	~~36~~	~~D~~	~~5.953827~~
~~**WGC-25B-15 - 2.d**~~	~~1.216~~	~~0.095~~	~~0.1048~~	~~0.0057~~	~~0.0824~~	~~0.0037~~	~~0.8278~~	~~-0.41692~~	~~804~~	~~43~~	~~641~~	~~33~~	~~D~~	~~20.27363~~
WGC-25B-16 - 1.d	0.515	0.019	0.06595	0.0014	0.0562	0.0019	0.091548	0.27538	421	13	411.7	8.7	C - Caledonian	2.209026
WGC-25B-16 - 2.d	0.528	0.027	0.0699	0.0019	0.0536	0.0026	0.020829	0.33945	435	18	436.7	12	C - Caledonian	-0.3908
WGC-25B-17 - 1.d	0.528	0.02	0.06756	0.0015	0.0567	0.0018	0.33783	0.005117	431	14	421.4	9.2	C - Caledonian	2.227378
WGC-25B-17 - 2.d	0.477	0.019	0.06287	0.0014	0.0544	0.0018	0.18398	0.1717	395	13	393	8.7	C - Caledonian	0.506329
WGC-25B-18 - 1.d	0.474	0.018	0.06257	0.0014	0.0541	0.002	-0.15506	0.44595	393	13	391.9	8.1	C - Caledonian	0.279898
WGC-25B-18 - 2.d	0.492	0.02	0.0623	0.0014	0.0568	0.0022	0.11726	0.27806	405	14	389.6	8.4	C - Caledonian	3.802469
WGC-25B-19 - 1.d	0.476	0.034	0.0659	0.0019	0.0522	0.0039	-0.13884	0.39735	394	24	411.6	11	C - Caledonian	-4.46701

WGC-25B-19 - 2.d	0.485	0.029	0.0612	0.0019	0.0567	0.0036	-0.00454	0.35756	399	20	383	12	C - Caledonian	4.010025
WGC-25B-20 - 1.d	0.437	0.021	0.0586	0.0015	0.0541	0.0023	0.26137	0.19683	367	15	367.3	9	C - Caledonian	-0.08174
WGC-25B-20 - 2.d	0.477	0.021	0.06153	0.0015	0.0565	0.0024	-0.13702	0.46086	395	15	384.9	8.9	C - Caledonian	2.556962
~~**WGC-25B-21 - 1.d**~~	~~0.95~~	~~0.12~~	~~0.081~~	~~0.0038~~	~~0.082~~	~~0.0078~~	~~0.79842~~	~~-0.57845~~	~~655~~	~~61~~	~~502~~	~~23~~	~~D~~	~~23.35878~~
WGC-25B-21 - 2.d	0.507	0.021	0.0634	0.0016	0.0566	0.0021	0.21046	0.20165	416	15	396.2	9.6	C - Caledonian	4.759615
WGC-25B-22 - 1.d	0.493	0.02	0.06335	0.0015	0.0566	0.0019	0.16018	0.1862	407	13	395.9	9.1	C - Caledonian	2.727273
WGC-25B-22 - 2.d	0.496	0.017	0.0637	0.0014	0.0563	0.0017	0.12591	0.30255	408.2	11	398.1	8.6	C - Caledonian	2.474277
WGC-25B-23 - 1.d	0.487	0.024	0.06493	0.0015	0.0544	0.0023	0.20395	0.12056	403	16	405.5	9	C - Caledonian	-0.62035
WGC-25B-23 - 2.d	0.481	0.02	0.0649	0.0016	0.0541	0.002	0.28011	0.15565	398	14	405	9.8	C - Caledonian	-1.75879
WGC-25B-24 - 1.d	0.523	0.024	0.06689	0.0016	0.0568	0.0025	0.050977	0.26064	426	16	417.3	9.5	C - Caledonian	2.042254
WGC-25B-24 - 2.d	0.544	0.031	0.0719	0.0023	0.0542	0.0028	0.27956	0.2064	443	20	447	14	C - Caledonian	-0.90293
WGC-25B-25 - 1.d	0.492	0.02	0.06309	0.0015	0.0555	0.002	0.056527	0.29276	405	14	394.3	8.9	C - Caledonian	2.641975
WGC-25B-25 - 2.d	0.489	0.017	0.06457	0.0015	0.0544	0.002	-0.14845	0.52547	403.8	11	403.3	9.2	C - Caledonian	0.123824
WGC-25B-26 - 1.d	0.475	0.023	0.06087	0.0015	0.057	0.0024	0.28966	0.040403	393	16	380.9	8.9	C - Caledonian	3.07888
WGC-25B-26 - 2.d	0.501	0.022	0.0639	0.0018	0.0569	0.0027	0.048552	0.3912	413	15	399.5	11	C - Caledonian	3.268765
WGC-25B-27 - 1.d	0.461	0.017	0.0599	0.0015	0.0547	0.0018	0.3284	0.21154	384	12	374.8	9.1	C - Caledonian	2.395833
WGC-25B-27 - 2.d	0.49	0.022	0.06338	0.0015	0.0565	0.0025	0.010602	0.31424	405	16	396.1	9.1	C - Caledonian	2.197531
WGC-25B-28 - 1.d	0.488	0.032	0.0651	0.0016	0.0529	0.0034	0.14579	0.085775	400	22	407.4	9.8	C - Caledonian	-1.85
WGC-25B-28 - 2.d	0.487	0.03	0.0629	0.0016	0.0558	0.0032	0.074786	0.20464	402	20	393.1	9.5	C - Caledonian	2.21393
WGC-25B-29 - 1.d	0.514	0.033	0.0645	0.0017	0.0573	0.0033	0.14305	0.19383	420	21	403	11	C - Caledonian	4.047619
WGC-25B-30 - 1.d	0.492	0.021	0.0638	0.0016	0.0549	0.0022	0.14409	0.26773	405	14	398.7	9.5	C - Caledonian	1.555556
WGC-25B-31 - 1.d	0.484	0.025	0.0638	0.0016	0.0549	0.0026	0.35583	-0.03298	401	17	399.5	9.6	C - Caledonian	0.374065
~~**WGC-25B-31 - 2.d**~~	~~0.468~~	~~0.017~~	~~0.05968~~	~~0.0015~~	~~0.0566~~	~~0.0015~~	~~0.3453~~	~~0.2101~~	~~389~~	~~12~~	~~373.7~~	~~9~~	~~D~~	~~3.933162~~
WGC-25B-32 - 1.d	0.503	0.024	0.0639	0.0016	0.0562	0.0023	0.2679	0.12143	412	16	399	9.5	C - Caledonian	3.15534
WGC-25B-33 - 1.d	0.488	0.02	0.06463	0.0015	0.0549	0.002	0.16184	0.19177	402	14	403.7	8.9	C - Caledonian	-0.42289
WGC-25B-33 - 2.d	0.487	0.025	0.06349	0.0015	0.0549	0.0028	-0.13561	0.41115	401	17	396.8	9.1	C - Caledonian	1.047382
WGC-25B-34 - 1.d	0.474	0.019	0.06204	0.0015	0.056	0.0023	0.021529	0.33366	395	14	388	9	C - Caledonian	1.772152
WGC-25B-34 - 2.d	0.484	0.022	0.064	0.0016	0.0539	0.0024	0.039257	0.32572	401	15	399.6	9.4	C - Caledonian	0.349127
~~**WGC-25B-35 - 1.d**~~	~~0.482~~	~~0.021~~	~~0.06496~~	~~0.0015~~	~~0.0522~~	~~0.0021~~	~~0.030808~~	~~0.32848~~	~~400~~	~~14~~	~~405.7~~	~~9.2~~	~~RD~~	~~-1.425~~
WGC-25B-35 - 2.d	0.521	0.022	0.06618	0.0015	0.0575	0.0024	-0.12153	0.40949	428	15	413.1	9	C - Caledonian	3.481308
WGC-25B-36 - 1.d	0.49	0.023	0.06485	0.0016	0.0544	0.0024	0.25395	0.094547	405	16	405.8	9.2	C - Caledonian	-0.19753

WGC-25B-36 - 2.d	0.525	0.026	0.0692	0.002	0.0555	0.0027	0.21578	0.24381	426	18	431.5	12	C - Caledonian	-1.29108
WGC-25B-36 - 3.d	0.503	0.02	0.06531	0.0015	0.0556	0.0021	0.069033	0.2668	414	14	408.6	8.9	C - Caledonian	1.304348
WGC-25B-37 - 1.d	0.511	0.019	0.06501	0.0015	0.0567	0.0016	0.40755	0.11916	418	12	406	9.3	C - Caledonian	2.870813
WGC-25B-37 - 2.d	0.502	0.018	0.06508	0.0015	0.0562	0.0018	0.09339	0.32611	412	12	406.4	9	C - Caledonian	1.359223
~~**WGC-25B-38 - 1.d**~~	~~0.597~~	~~0.063~~	~~0.0666~~	~~0.003~~	~~0.0637~~	~~0.0051~~	~~0.63171~~	~~-0.19051~~	~~470~~	~~39~~	~~416~~	~~18~~	~~D~~	~~11.48936~~
WGC-25B-39 - 1.d	0.493	0.018	0.06384	0.0015	0.0561	0.002	0.03629	0.32714	409	12	398.9	8.9	C - Caledonian	2.469438
WGC-25B-40 - 1.d	0.457	0.023	0.06124	0.0014	0.0533	0.0027	0.013619	0.29361	380	16	383.1	8.7	C - Caledonian	-0.81579
~~**WGC-25B-41 - 1.d**~~	~~0.499~~	~~0.021~~	~~0.06838~~	~~0.0016~~	~~0.0524~~	~~0.0021~~	~~-0.11953~~	~~0.42198~~	~~411~~	~~15~~	~~426.4~~	~~9.5~~	~~RD~~	~~-3.74696~~
WGC-25B-42 - 1.d	0.482	0.021	0.0632	0.0016	0.0545	0.0021	0.26875	0.2081	400	15	395	9.9	C - Caledonian	1.25
WGC-25B-43 - 1.d	0.477	0.022	0.06236	0.0015	0.0545	0.0024	0.027783	0.28505	394	15	389.9	9.1	C - Caledonian	1.040609
WGC-25B-44 - 1.d	0.462	0.016	0.05963	0.0015	0.0561	0.0019	0.24586	0.18046	384.9	11	373.3	8.9	C - Caledonian	3.01377
WGC-25B-44 - 2.d	0.488	0.021	0.06503	0.0015	0.0535	0.0021	0.15179	0.17299	402	14	406.1	8.8	C - Caledonian	-1.0199
~~**WGC-25B-45 - 1.d**~~	~~0.85~~	~~0.11~~	~~0.0768~~	~~0.0034~~	~~0.0726~~	~~0.0065~~	~~0.71516~~	~~-0.35304~~	~~598~~	~~54~~	~~477~~	~~20~~	~~D~~	~~20.23411~~
WGC-25B-45 - 2.d	0.523	0.041	0.0659	0.0019	0.0566	0.0043	0.018745	0.44206	426	28	411.5	12	C - Caledonian	3.403756
WGC-25B-45 - 3.d	0.495	0.023	0.06416	0.0015	0.0551	0.0025	0.17478	0.20091	410	15	400.8	8.9	C - Caledonian	2.243902
WGC-25B-46 - 1.d	0.467	0.025	0.0639	0.0017	0.0536	0.0028	0.22513	0.13314	389	17	399.2	11	C - Caledonian	-2.62211
WGC-25B-46 - 2.d	0.469	0.026	0.0655	0.0016	0.0527	0.0027	0.092459	0.17843	391	17	409	9.8	C - Caledonian	-4.60358
WGC-25B-47 - 1.d	0.478	0.032	0.0655	0.0018	0.0529	0.0035	-0.12361	0.37671	393	22	409.1	11	C - Caledonian	-4.09669
WGC-25B-47 - 2.d	0.595	0.033	0.0735	0.0023	0.0589	0.0031	0.28184	0.14567	477	21	457	14	C - Caledonian	4.192872
WGC-25B-48 - 1.d	0.487	0.027	0.0634	0.0017	0.0549	0.003	-0.06996	0.44502	405	18	396.2	10	C - Caledonian	2.17284
WGC-25B-48 - 2.d	0.469	0.024	0.0617	0.0016	0.0555	0.0028	-0.08356	0.41407	391	17	386.1	9.5	C - Caledonian	1.253197
WGC-25B-49 - 1.d	0.477	0.019	0.06287	0.0014	0.0551	0.002	0.023292	0.32158	395	13	393	8.8	C - Caledonian	0.506329
WGC-25B-49 - 2.d	0.495	0.019	0.0635	0.0015	0.0567	0.002	0.1408	0.32049	407	13	396.9	9.4	C - Caledonian	2.481572
WGC-25B-50 - 1.d	0.466	0.018	0.0616	0.0014	0.0541	0.0019	0.13694	0.22561	387	13	385.3	8.4	C - Caledonian	0.439276
WGC-25B-50 - 2.d	0.51	0.022	0.0673	0.0016	0.0543	0.0023	0.19673	0.14252	417	15	419.8	9.9	C - Caledonian	-0.67146
WGC-25B-51 - 1.d	0.497	0.03	0.0662	0.0018	0.0539	0.0034	-0.00352	0.35734	410	19	412.9	11	C - Caledonian	-0.70732
WGC-25B-52 - 1.d	0.487	0.019	0.06556	0.0015	0.0539	0.002	-0.08691	0.40482	403	13	409.3	8.9	C - Caledonian	-1.56328
WGC-25B-52 - 2.d	0.501	0.021	0.0653	0.0016	0.0554	0.0023	-0.06357	0.44787	411	14	407.9	9.6	C - Caledonian	0.754258
WGC-25B-53 - 1.d	0.48	0.017	0.0617	0.0014	0.0556	0.0016	0.17725	0.24476	399	12	385.9	8.3	C - Caledonian	3.283208
WGC-25B-54 - 1.d	0.532	0.026	0.069	0.0018	0.0562	0.0027	0.12991	0.22877	431	17	430	11	C - Caledonian	0.232019
WGC-25B-54 - 2.d	0.462	0.021	0.0591	0.0016	0.0559	0.0021	0.29484	0.16688	384	14	370.2	9.5	C - Caledonian	3.59375

WGC-25B-55 - 1.d	0.486	0.025	0.0675	0.0018	0.052	0.0027	0.12181	0.22534	405	16	420.7	11	C - Caledonian	-3.87654
WGC-25B-55 - 2.d	0.523	0.032	0.0664	0.002	0.0571	0.0035	0.027904	0.31289	424	21	414.1	12	C - Caledonian	2.334906
WGC-25B-56 - 1.d	0.489	0.026	0.0629	0.0017	0.0558	0.0031	0.044635	0.36718	402	18	393	10	C - Caledonian	2.238806
~~**WGC-25B-56 - 2.d**~~	~~0.525~~	~~0.03~~	~~0.0642~~	~~0.0019~~	~~0.0596~~	~~0.0037~~	~~-0.00802~~	~~0.37022~~	~~428~~	~~21~~	~~401~~	~~11~~	~~D~~	~~6.308411~~
WGC-25B-57 - 1.d	0.514	0.031	0.0686	0.0022	0.0543	0.003	0.40977	0.060827	418	20	427	13	C - Caledonian	-2.15311
WGC-25B-57 - 2.d	0.493	0.023	0.0649	0.0016	0.0556	0.0026	-0.0228	0.36356	406	16	405	10	C - Caledonian	0.246305
WGC-25B-58 - 1.d	1.788	0.067	0.171	0.004	0.0755	0.0024	0.34723	0.17154	1040	25	1018	22	C - Sveconorwegian	2.115385
WGC-25B-59 - 1.d	0.515	0.026	0.0668	0.0017	0.0557	0.0028	0.085252	0.21919	422	18	417.9	11	C - Caledonian	0.971564
WGC-25B-60 - 1.d	0.553	0.039	0.0703	0.0021	0.056	0.0039	-0.22738	0.47813	448	26	438	13	C - Caledonian	2.232143
~~**WGC-25B-60 - 2.d**~~	~~0.504~~	~~0.017~~	~~0.06439~~	~~0.0015~~	~~0.0574~~	~~0.0018~~	~~0.21171~~	~~0.24218~~	~~415~~	~~12~~	~~402.2~~	~~9~~	~~D~~	~~3.084337~~
WGC-25B-60 - 3.d	0.495	0.02	0.06591	0.0014	0.0537	0.0018	0.1456	0.16478	409	13	411.5	8.6	C - Caledonian	-0.61125
WGC-25B-61 - 1.d	0.473	0.019	0.06117	0.0014	0.056	0.002	0.24285	0.21967	394	14	382.7	8.5	C - Caledonian	2.86802
WGC-25B-61 - 2.d	0.479	0.02	0.0626	0.0016	0.0546	0.0023	0.12073	0.26628	396	14	391.3	9.7	C - Caledonian	1.186869
WGC-25B-61 - 3.d	0.473	0.021	0.0648	0.0017	0.0539	0.0027	-0.14315	0.49783	395	15	404.5	10	C - Caledonian	-2.40506
~~**WGC-25B-62 - 1.d**~~	~~1.36~~	~~0.096~~	~~0.138~~	~~0.0045~~	~~0.0706~~	~~0.004~~	~~0.34948~~	~~0.063672~~	~~867~~	~~42~~	~~833~~	~~26~~	~~D - ellipse touching concordia~~	~~3.921569~~
WGC-25B-62 - 2.d	0.608	0.052	0.0756	0.0035	0.0578	0.0034	0.66468	-0.13544	483	32	469	21	C - Caledonian	2.898551
~~**WGC-25B-62 - 3.d**~~	~~2.05~~	~~0.13~~	~~0.1799~~	~~0.0059~~	~~0.0839~~	~~0.0062~~	~~0.16162~~	~~0.24322~~	~~1129~~	~~46~~	~~1066~~	~~32~~	~~D~~	~~5.580159~~
WGC-25B-63 - 1.d	0.52	0.029	0.0652	0.0017	0.0571	0.0031	0.049351	0.27929	422	20	407.2	10	C - Caledonian	3.507109
WGC-25B-63 - 2.d	0.493	0.03	0.0651	0.0018	0.0526	0.0033	-0.07294	0.399	406	20	406.8	11	C - Caledonian	-0.19704
WGC-25B-64 - 1.d	0.523	0.03	0.0668	0.0021	0.0574	0.0035	0.024256	0.39997	424	20	416	13	C - Caledonian	1.886792
WGC-25B-64 - 2.d	0.489	0.036	0.0639	0.0016	0.055	0.0038	-0.02241	0.28016	410	24	399.1	9.9	C - Caledonian	2.658537
WGC-25B-65 - 1.d	0.519	0.02	0.06613	0.0016	0.0563	0.002	0.2087	0.18807	425	14	412.8	9.5	C - Caledonian	2.870588
WGC-25B-65 - 2.d	0.501	0.024	0.0682	0.0016	0.0528	0.0023	0.18852	0.16929	410	16	425	9.8	C - Caledonian	-3.65854
WGC-25B-68 - 1.d	0.521	0.029	0.0667	0.0017	0.0561	0.0031	0.058064	0.26959	423	19	416.4	11	C - Caledonian	1.560284
WGC-25B-68 - 2.d	0.51	0.018	0.06548	0.0014	0.0567	0.0017	0.24705	0.14167	421	13	408.8	8.6	C - Caledonian	2.897862
WGC-25B-68 - 3.d	0.518	0.019	0.0668	0.0015	0.0566	0.002	-0.06	0.39927	423	13	416.8	9.1	C - Caledonian	1.465721
WGC-25B-69 - 1.d	0.457	0.024	0.0589	0.0017	0.0552	0.0026	0.29541	0.090591	380	17	368.8	11	C - Caledonian	2.947368
WGC-25B-69 - 2.d	0.51	0.039	0.0644	0.0018	0.057	0.0044	0.001751	0.28339	413	26	402.3	11	C - Caledonian	2.590799
WGC-25B-69 - 3.d	0.475	0.025	0.0651	0.0016	0.053	0.0027	0.16845	0.14728	392	17	406.6	9.5	C - Caledonian	-3.72449
WGC-25B-69 - 4.d	0.473	0.033	0.0634	0.0021	0.0552	0.0038	0.1106	0.21873	393	23	396	13	C - Caledonian	-0.76336

WGC-25B-71 - 1.d	0.51	0.021	0.06635	0.0015	0.0564	0.0021	0.10799	0.23906	420	15	414.1	8.9	C - Caledonian	1.404762
WGC-25B-71 - 2.d	0.513	0.021	0.06615	0.0015	0.0556	0.002	0.091335	0.24677	419	14	412.9	8.8	C - Caledonian	1.455847
WGC-25B-71 - 3.d	0.528	0.021	0.0666	0.0016	0.0573	0.0022	-0.06632	0.49927	429	14	415.8	9.6	C - Caledonian	3.076923
WGC-25B-72 - 1.d	0.507	0.021	0.06673	0.0015	0.0544	0.0021	-0.05803	0.39693	415	14	416.4	8.8	C - Caledonian	-0.33735
~~**WGC-25B-72 - 2.d**~~	~~0.604~~	~~0.035~~	~~0.0725~~	~~0.0022~~	~~0.0601~~	~~0.0029~~	~~0.49237~~	~~-0.05658~~	~~476~~	~~22~~	~~451~~	~~13~~	~~D~~	~~5.252101~~
WGC-25B-73 - 1.d	0.512	0.021	0.0669	0.0016	0.0557	0.002	0.19344	0.15668	420	15	417.4	9.4	C - Caledonian	0.619048
WGC-25B-73 - 2.d	0.484	0.02	0.06372	0.0015	0.0545	0.0021	-0.19389	0.47392	401	13	399	9.5	C - Caledonian	0.498753
WGC-25B-74 - 1.d	0.496	0.021	0.06472	0.0015	0.0558	0.0022	0.17631	0.24309	408	14	404.2	9.4	C - Caledonian	0.931373
~~**WGC-25B-74 - 2.d**~~	~~0.852~~	~~0.087~~	~~0.08~~	~~0.0038~~	~~0.0743~~	~~0.005~~	~~0.85929~~	~~-0.69177~~	~~614~~	~~48~~	~~496~~	~~23~~	~~D~~	~~19.21824~~
WGC-25B-75 - 1.d	0.499	0.023	0.06447	0.0015	0.0563	0.0023	-0.07269	0.35864	411	15	402.7	9.1	C - Caledonian	2.019465
WGC-25B-75 - 2.d	0.515	0.022	0.0649	0.0016	0.0572	0.0022	0.17045	0.20565	420	15	405.4	9.6	C - Caledonian	3.47619
WGC-25B-76 - 1.d	0.501	0.021	0.06498	0.0015	0.0558	0.0023	-0.00129	0.30831	411	14	405.8	8.9	C - Caledonian	1.265207
WGC-25B-76 - 2.d	0.511	0.016	0.06356	0.0014	0.0587	0.0017	-0.00483	0.41132	418.8	11	397.2	8.4	C - Caledonian	5.157593
WGC-25B-77 - 1.d	0.506	0.025	0.0663	0.0016	0.0558	0.0025	0.14273	0.16353	418	16	413.8	9.8	C - Caledonian	1.004785
WGC-25B-77 - 2.d	0.536	0.029	0.0671	0.002	0.0571	0.0029	0.14769	0.25207	436	19	418.4	12	C - Caledonian	4.036697
~~**WGC-25B-78 - 1.d**~~	~~0.676~~	~~0.045~~	~~0.0695~~	~~0.0023~~	~~0.0717~~	~~0.0054~~	~~-0.10994~~	~~0.43234~~	~~522~~	~~26~~	~~433~~	~~14~~	~~D~~	~~17.04981~~
WGC-25B-78 - 2.d	0.509	0.019	0.0687	0.0017	0.0536	0.0016	0.24789	0.15332	417	13	428.2	10	C - Caledonian	-2.68585
WGC-25B-78 - 3.d	0.5	0.022	0.06536	0.0015	0.055	0.0022	0.051748	0.26691	410	15	408.1	8.9	C - Caledonian	0.463415
WGC-25B-79 - 1.d	0.499	0.021	0.06477	0.0014	0.0562	0.002	0.22953	0.089115	413	14	404.5	8.6	C - Caledonian	2.058111
WGC-25B-79 - 2.d	0.5	0.019	0.06487	0.0015	0.056	0.002	0.15757	0.21872	412	13	405.2	8.8	C - Caledonian	1.650485
WGC-25B-80 - 1.d	0.486	0.024	0.0608	0.0015	0.0571	0.0027	0.15113	0.1745	405	16	380.7	9.1	C - Caledonian	6
WGC-25B-80 - 2.d	0.479	0.027	0.0651	0.0019	0.0533	0.0032	0.068326	0.44671	397	20	406.2	12	C - Caledonian	-2.31738
WGC-25B-81 - 1.d	0.515	0.021	0.06501	0.0015	0.0574	0.0021	0.1576	0.21174	421	14	406	9	C - Caledonian	3.562945
WGC-25B-81 - 2.d	0.495	0.022	0.06662	0.0016	0.0542	0.0022	0.083955	0.26683	407	15	415.7	9.6	C - Caledonian	-2.13759
WGC-25B-82 - 1.d	0.51	0.022	0.06595	0.0016	0.0568	0.0023	0.087681	0.33485	417	15	411.7	9.5	C - Caledonian	1.270983
WGC-25B-82 - 2.d	0.52	0.046	0.0649	0.0023	0.0601	0.0057	-0.03013	0.32515	418	31	405	14	C - Caledonian	3.110048
WGC-25B-82 - 3.d	0.475	0.035	0.0652	0.0018	0.054	0.0042	-0.10929	0.42864	401	25	407	11	C - Caledonian	-1.49626
~~**WGC-25B-83 - 1.d**~~	~~0.841~~	~~0.085~~	~~0.0894~~	~~0.0058~~	~~0.0662~~	~~0.0047~~	~~0.75117~~	~~-0.16244~~	~~614~~	~~46~~	~~561~~	~~38~~	~~D~~	~~8.631922~~
~~**WGC-25B-83 - 2.d**~~	~~0.844~~	~~0.099~~	~~0.0874~~	~~0.0064~~	~~0.0677~~	~~0.0032~~	~~0.96146~~	~~-0.63755~~	~~603~~	~~49~~	~~539~~	~~37~~	~~D~~	~~10.6136~~
WGC-25B-84 - 1.d	0.564	0.043	0.0673	0.0021	0.0605	0.0043	0.39001	-0.00775	451	27	420	13	C - Caledonian	6.873614
~~**WGC-25B-85 - 1.d**~~	~~1.284~~	~~0.034~~	~~0.1303~~	~~0.0029~~	~~0.072~~	~~0.0012~~	~~0.40514~~	~~0.30765~~	~~839~~	~~15~~	~~789.6~~	~~17~~	~~D~~	~~5.887962~~

WGC-25B-85 - 2.d	1.658	0.056	0.1676	0.0042	0.0725	0.002	0.23885	0.28713	990	21	998	23	C - Sveconorwegian	-0.80808

~~Crossed out~~ = discordant, C = concordant, NC = near concordant, D = discordant, RD = reversely discordant.

WGC2019J-25B zircon geochronology standards

Standard	Type	207/235	2σ	206/238	2σ	207/206	2σ	ErrCorr 6/38vs7/35	ErrCorr 38/6vs7/6	207/235 age	2σ	206/238 age	2σ	Concordant?
GJ - 1.d	Primary	0.788	0.037	0.0977	0.0023	0.0579	0.0027	-0.04451	0.36194	587	21	601	14	C
GJ - 2.d	Primary	0.814	0.036	0.098	0.0022	0.0598	0.0027	0.023979	0.29155	605	21	602.7	13	C
GJ - 3.d	Primary	0.813	0.03	0.0986	0.0023	0.0599	0.0019	0.12723	0.31547	609	16	606.1	13	C
GJ - 4.d	Primary	0.792	0.029	0.0964	0.0023	0.0598	0.0022	0.092785	0.31467	595	17	593.1	13	C
GJ - 5.d	Primary	0.839	0.033	0.0976	0.0022	0.062	0.0024	-0.19716	0.51644	617	18	600.4	13	C
GJ - 6.d	Primary	0.84	0.032	0.0983	0.0023	0.062	0.0022	0.16401	0.26034	620	18	604.2	14	C
GJ - 7.d	Primary	0.801	0.038	0.0984	0.0023	0.0584	0.0027	-0.01351	0.31492	597	21	604.9	14	C
GJ - 8.d	Primary	0.816	0.032	0.0977	0.0022	0.0594	0.002	-0.06326	0.37228	606	18	601.1	13	C
GJ - 9.d	Primary	0.838	0.033	0.0984	0.0023	0.0616	0.0024	-0.13216	0.46058	618	18	604.7	13	C
GJ - 10.d	Primary	0.809	0.037	0.0976	0.0024	0.0595	0.0028	0.1752	0.21622	602	21	600.2	14	C
GJ - 11.d	Primary	0.802	0.032	0.0967	0.0023	0.0602	0.0021	0.25299	0.12381	598	18	595	14	C
GJ - 12.d	Primary	0.824	0.037	0.0981	0.0022	0.0597	0.0024	0.12398	0.24831	608	21	603.5	13	C
GJ - 13.d	Primary	0.792	0.035	0.0972	0.0023	0.0597	0.0028	-0.20313	0.50618	594	20	597.7	14	C
GJ - 14.d	Primary	0.817	0.037	0.0963	0.0024	0.0608	0.0024	0.12786	0.23342	603	21	592.7	14	C
GJ - 15.d	Primary	0.821	0.034	0.0982	0.0023	0.0613	0.0027	-0.19384	0.51198	606	19	603.7	13	C
GJ - 16.d	Primary	0.837	0.034	0.0993	0.0024	0.0608	0.0023	0.09212	0.26506	618	19	610.2	14	C
GJ - 17.d	Primary	0.826	0.037	0.0971	0.0023	0.0613	0.0027	0.037429	0.29329	608	21	597.2	14	C
GJ - 18.d	Primary	0.821	0.033	0.0993	0.0023	0.0599	0.002	0.34765	0.05318	611	19	610.5	13	C
GJ - 19.d	Primary	0.837	0.034	0.0991	0.0023	0.0608	0.0023	-0.0475	0.41023	615	19	608.9	14	C
GJ - 20.d	Primary	0.807	0.027	0.0994	0.0023	0.0594	0.0017	0.06055	0.31326	602	14	610.8	13	C
GJ - 21.d	Primary	0.818	0.032	0.0982	0.0024	0.0596	0.0025	-0.17964	0.55734	607	18	604	14	C
GJ - 22.d	Primary	0.821	0.038	0.0967	0.0024	0.0616	0.0029	-0.08009	0.43514	608	22	594.8	14	C
GJ - 23.d	Primary	0.801	0.033	0.0959	0.0021	0.0598	0.0024	0.05617	0.30637	600	18	590.4	13	C

GJ - 24.d	Primary	0.786	0.035	0.0986	0.0024	0.0588	0.0026	0.091591	0.28067	594	21	606.1	14	C
Plesovice - 1.d	Secondary	0.384	0.016	0.05412	0.0012	0.0508	0.0022	-0.0962	0.41931	330	11	339.7	7.5	C
~~**Plesovice - 2.d**~~	~~Secondary~~	~~0.383~~	~~0.013~~	~~0.05431~~	~~0.0013~~	~~0.0502~~	~~0.0015~~	~~0.06266~~	~~0.36698~~	~~328.8~~	~~9.6~~	~~340.9~~	~~7.8~~	~~D~~
~~**Plesovice - 3.d**~~	~~Secondary~~	~~0.379~~	~~0.015~~	~~0.05449~~	~~0.0013~~	~~0.0497~~	~~0.0019~~	~~0.20127~~	~~0.23506~~	~~325~~	~~11~~	~~342~~	~~8~~	~~D~~
Plesovice - 4.d	Secondary	0.396	0.016	0.0532	0.0012	0.0531	0.0021	0.11821	0.21873	338	12	334.1	7.3	C
Plesovice - 5.d	Secondary	0.406	0.014	0.05485	0.0012	0.0527	0.0017	0.004865	0.3547	345.5	10	344.2	7.4	C
Plesovice - 6.d	Secondary	0.386	0.015	0.0543	0.0012	0.0513	0.0021	-0.05118	0.3871	331.8	11	340.8	7.4	C
Plesovice - 7.d	Secondary	0.401	0.016	0.05459	0.0013	0.0521	0.0019	0.12279	0.2714	343	12	342.6	7.7	C
Plesovice - 8.d	Secondary	0.4	0.017	0.05432	0.0012	0.0527	0.002	-0.03639	0.34784	342	12	341	7.5	C
Plesovice - 9.d	Secondary	0.407	0.017	0.05477	0.0012	0.0528	0.002	0.11103	0.24681	346	12	343.7	7.5	C
Plesovice - 10.d	Secondary	0.417	0.014	0.05389	0.0012	0.0554	0.0016	-0.0421	0.37943	353.6	10	338.4	7.1	C
~~**Plesovice - 11.d**~~	~~Secondary~~	~~0.397~~	~~0.017~~	~~0.05369~~	~~0.0012~~	~~0.0531~~	~~0.0021~~	~~-0.01193~~	~~0.307~~	~~338~~	~~12~~	~~337.1~~	~~7.1~~	~~D~~
Plesovice - 12.d	Secondary	0.401	0.016	0.05312	0.0012	0.0541	0.002	0.1019	0.26766	342	11	333.7	7.6	C
Plesovice - 13.d	Secondary	0.403	0.015	0.05417	0.0012	0.0539	0.0019	0.091521	0.31248	343	11	340.1	7.5	C
Plesovice - 14.d	Secondary	0.39	0.016	0.05418	0.0012	0.0516	0.0019	0.040166	0.26424	333	12	340.1	7.5	C
Plesovice - 15.d	Secondary	0.394	0.014	0.05439	0.0012	0.0524	0.0018	-0.12974	0.46543	338.2	11	341.4	7.3	C
Plesovice - 16.d	Secondary	0.415	0.016	0.0543	0.0013	0.055	0.0019	0.16405	0.24466	353	12	340.9	7.7	C
~~**Plesovice - 17.d**~~	~~Secondary~~	~~0.416~~	~~0.017~~	~~0.05307~~	~~0.0012~~	~~0.0563~~	~~0.002~~	~~0.11068~~	~~0.22872~~	~~354~~	~~12~~	~~333.3~~	~~7.1~~	~~D~~
Plesovice - 18.d	Secondary	0.412	0.015	0.0536	0.0012	0.0549	0.0019	-0.05199	0.41352	349.6	11	336.6	7.1	C
~~**Plesovice - 19.d**~~	~~Secondary~~	~~0.42~~	~~0.015~~	~~0.05321~~	~~0.0012~~	~~0.0567~~	~~0.002~~	~~-0.00962~~	~~0.38845~~	~~355.5~~	~~11~~	~~334.2~~	~~7.2~~	~~D~~
Plesovice - 20.d	Secondary	0.405	0.017	0.05333	0.0012	0.0549	0.0024	-0.12529	0.38994	345	13	334.9	7.4	C
Plesovice - 21.d	Secondary	0.397	0.018	0.05356	0.0012	0.0536	0.0023	0.062391	0.28693	338	13	336.3	7.6	C
Plesovice - 22.d	Secondary	0.39	0.016	0.05432	0.0013	0.0526	0.0023	-0.16403	0.49866	333	12	340.9	8.2	C
Plesovice - 23.d	Secondary	0.41	0.016	0.05299	0.0012	0.0557	0.0023	-0.06974	0.38759	349	11	332.8	7.3	C
Plesovice - 24.d	Secondary	0.393	0.017	0.05284	0.0012	0.0538	0.002	0.097799	0.22436	335	12	331.9	7.4	C
91500 - 1.d	Secondary	1.79	0.11	0.1777	0.0053	0.0742	0.0045	0.080328	0.27531	1049	41	1054	29	C
~~**91500 - 2.d**~~	~~Secondary~~	~~1.78~~	~~0.1~~	~~0.1792~~	~~0.0051~~	~~0.0696~~	~~0.0035~~	~~0.26868~~	~~0.11935~~	~~1035~~	~~39~~	~~1065~~	~~29~~	~~D~~
91500 - 3.d	Secondary	1.96	0.11	0.1774	0.0047	0.078	0.0043	0.096842	0.28612	1094	38	1055	26	C
91500 - 4.d	Secondary	1.869	0.095	0.1808	0.0059	0.0752	0.0041	0.05796	0.43928	1066	34	1074	33	C
~~**91500 - 5.d**~~	~~Secondary~~	~~1.963~~	~~0.089~~	~~0.1759~~	~~0.0046~~	~~0.0805~~	~~0.0037~~	~~-0.07537~~	~~0.41503~~	~~1101~~	~~30~~	~~1044~~	~~25~~	~~D~~
91500 - 6.d	Secondary	1.885	0.1	0.1787	0.0053	0.0761	0.0043	0.17853	0.24168	1071	37	1059	29	C

91500 - 7.d	Secondary	1.83	0.11	0.1808	0.0048	0.0717	0.0043	-0.01321	0.35618	1053	**40**	1071	26	C
91500 - 8.d	Secondary	1.95	0.092	0.1798	0.005	0.0773	0.0035	0.009377	0.44881	1108	33	1065	27	C
91500 - 9.d	Secondary	1.736	0.099	0.174	0.0047	0.0742	0.0044	0.014138	0.3756	1042	38	1034	26	C
91500 - 10.d	Secondary	1.818	0.1	0.1742	0.0048	0.0773	0.0044	0.13791	0.29145	1051	38	1035	26	C
91500 - 11.d	Secondary	1.837	0.093	0.1772	0.005	0.0775	0.004	0.072065	0.37602	1060	35	1051	27	C
91500 - 12.d	Secondary	1.89	0.12	0.1778	0.0048	0.0778	0.0049	-0.11226	0.41905	1073	40	1054	26	C

~~Crossed out~~ = discordant, C = concordant, NC = near concordant, D = discordant, RD = reversely discordant.

WGC2019J-31A zircon geochronology

Sample	207/235	2σ	206/238	2σ	207/206	2σ	ErrCorr 6/38vs7/35	ErrCorr 38/6vs7/6	207/235 age	2σ	206/238 age	2σ	Concordant?	% discordance
~~**31A-1 - 1.d**~~	~~0.906~~	~~0.05~~	~~0.1022~~	~~0.0035~~	~~0.0644~~	~~0.0031~~	~~0.5617~~	~~0.076329~~	~~652~~	~~26~~	~~627~~	~~20~~	~~D - ellipse touching concordia~~	~~3.834356~~
31A-1 - 2.d	0.567	0.033	0.0711	0.0019	0.0583	0.0033	0.33115	0.10429	456	21	442.5	11	C - Caledonian	2.960526
31A-2 - 1.d	0.5	0.027	0.0685	0.0017	0.0536	0.003	0.085745	0.3712	416	20	427.3	10	C - Caledonian	-2.71635
31A-2 - 2.d	0.507	0.029	0.0679	0.0016	0.0533	0.0031	-0.00225	0.3527	417	20	423.5	9.4	C - Caledonian	-1.55875
~~**31A-3 - 1.d**~~	~~0.558~~	~~0.03~~	~~0.074~~	~~0.0017~~	~~0.0543~~	~~0.0028~~	~~0.20641~~	~~0.11583~~	~~451~~	~~19~~	~~459.9~~	~~10~~	~~D - ellipse touching concordia~~	~~-1.97339~~
31A-3 - 2.d	0.526	0.024	0.06766	0.0015	0.0565	0.0025	0.033139	0.45108	428.2	16	422	9	C - Caledonian	1.447922
31A-4 - 1.d	0.503	0.034	0.0675	0.0016	0.0541	0.0035	0.28395	0.10892	413	22	421.1	9.9	C - Caledonian	-1.96126
31A-4 - 2.d	0.538	0.033	0.0687	0.0018	0.0568	0.0033	0.20493	0.10251	438	23	428.1	11	C - Caledonian	2.260274
~~**31A-5 - 1.d**~~	~~0.593~~	~~0.03~~	~~0.0744~~	~~0.0018~~	~~0.0581~~	~~0.003~~	~~0.15696~~	~~0.32544~~	~~473~~	~~20~~	~~462.4~~	~~11~~	~~D - ellipse touching concordia~~	~~2.241015~~
31A-5 - 2.d	0.503	0.031	0.06908	0.0014	0.0526	0.0031	0.19704	0.10135	411	21	430.6	8.7	C - Caledonian	-4.76886
31A-6 - 1.d	0.534	0.027	0.06922	0.0014	0.0561	0.0028	0.10254	0.23575	433	18	431.5	8.5	C - Caledonian	0.34642
31A-6 - 2.d	0.507	0.027	0.0687	0.0016	0.054	0.0029	0.18287	0.19609	417	19	428.4	9.6	C - Caledonian	-2.73381
31A-7 - 1.d	0.516	0.026	0.06876	0.0015	0.0547	0.0027	-0.08225	0.37086	421	17	428.6	9.1	C - Caledonian	-1.80523
31A-7 - 2.d	0.538	0.027	0.07034	0.0015	0.0551	0.0026	0.13605	0.30689	437	18	438.2	9.3	C - Caledonian	-0.2746
~~**31A-8 - 1.d**~~	~~1.401~~	~~0.069~~	~~0.1387~~	~~0.0041~~	~~0.0735~~	~~0.003~~	~~0.70483~~	~~0.054193~~	~~889~~	~~30~~	~~837~~	~~23~~	~~D~~	~~5.849269~~
31A-8 - 2.d	0.497	0.033	0.0684	0.0018	0.0518	0.0034	0.29382	0.099368	407	23	426.6	11	C - Caledonian	-4.81572

31A-8 - 3.d	0.513	0.028	0.0683	0.0016	0.0552	0.0031	-0.06378	0.39575	423	19	425.7	9.5	C - Caledonian	-0.6383
31A-9 - 1.d	0.496	0.027	0.06809	0.0015	0.0527	0.0028	0.14242	0.2053	407	19	424.6	9.1	C - Caledonian	-4.32432
31A-9 - 2.d	0.511	0.028	0.0668	0.0015	0.0549	0.0029	0.15966	0.22664	417	19	416.5	9.3	C - Caledonian	0.119904
~~**31A-10 - 1.d**~~	~~0.661~~	~~0.091~~	~~0.0812~~	~~0.0067~~	~~0.0588~~	~~0.0034~~	~~0.89248~~	~~-0.38349~~	~~507~~	~~49~~	~~503~~	~~39~~	~~D - ellipse touching concordia~~	~~0.788955~~
~~**31A-10 - 2.d**~~	~~0.841~~	~~0.047~~	~~0.094~~	~~0.0025~~	~~0.0649~~	~~0.003~~	~~0.56964~~	~~-0.00611~~	~~617~~	~~25~~	~~579~~	~~15~~	~~D~~	~~6.158833~~
31A-11 - 1.d	0.537	0.025	0.0688	0.0016	0.0556	0.0027	0.04163	0.39742	436	17	428.7	9.8	C - Caledonian	1.674312
31A-11 - 2.d	0.516	0.027	0.06879	0.0014	0.0543	0.0026	0.26598	0.10804	421	18	428.8	8.6	C - Caledonian	-1.85273
31A-11 - 3.d	0.545	0.026	0.06898	0.0015	0.0583	0.0028	0.20358	0.21106	444	17	430	9	C - Caledonian	3.153153
~~**31A-12 - 1.d**~~	~~0.674~~	~~0.038~~	~~0.0815~~	~~0.0023~~	~~0.0613~~	~~0.0028~~	~~0.35241~~	~~0.14839~~	~~529~~	~~23~~	~~504.8~~	~~14~~	~~D - ellipse touching concordia~~	~~4.574669~~
~~**31A-12 - 2.d**~~	~~0.946~~	~~0.051~~	~~0.1031~~	~~0.0027~~	~~0.0666~~	~~0.0031~~	~~0.49142~~	~~-0.00166~~	~~673~~	~~26~~	~~632~~	~~16~~	~~D~~	~~6.092125~~
~~**31A-12 - 3.d**~~	~~1.348~~	~~0.076~~	~~0.1351~~	~~0.004~~	~~0.0721~~	~~0.0034~~	~~0.33008~~	~~0.1218~~	~~864~~	~~34~~	~~817~~	~~23~~	~~D~~	~~5.439815~~
31A-13 - 1.d	0.509	0.027	0.068	0.0017	0.0548	0.0029	0.065376	0.40072	417	18	424.1	10	C - Caledonian	-1.70264
31A-13 - 2.d	0.529	0.03	0.0689	0.0016	0.0562	0.003	0.037091	0.32429	431	19	429.3	9.8	C - Caledonian	0.394432
31A-14 - 1.d	0.516	0.027	0.0697	0.0015	0.0552	0.0027	0.34949	0.093629	426	18	434.3	9.2	C - Caledonian	-1.94836
~~**31A-16 - 1.d**~~	~~1.039~~	~~0.052~~	~~0.113~~	~~0.0032~~	~~0.0668~~	~~0.003~~	~~0.60968~~	~~-0.01583~~	~~726~~	~~26~~	~~690~~	~~18~~	~~D~~	~~4.958678~~
~~**31A-16 - 2.d**~~	~~0.589~~	~~0.029~~	~~0.0755~~	~~0.0017~~	~~0.0567~~	~~0.0027~~	~~0.41305~~	~~-0.07563~~	~~469~~	~~19~~	~~469~~	~~10~~	~~D - ellipse touching concordia~~	~~0~~
31A-16 - 3.d	0.564	0.028	0.0703	0.0017	0.0582	0.0028	0.15197	0.30636	456	19	438	9.9	C - Caledonian	3.947368
~~**31A-17 - 1.d**~~	~~0.755~~	~~0.038~~	~~0.086~~	~~0.0021~~	~~0.0644~~	~~0.0029~~	~~0.47242~~	~~0.013806~~	~~573~~	~~22~~	~~531.7~~	~~12~~	~~D~~	~~7.207679~~
~~**31A-17 - 2.d**~~	~~1.031~~	~~0.049~~	~~0.113~~	~~0.0028~~	~~0.0672~~	~~0.0029~~	~~0.38156~~	~~0.24542~~	~~722~~	~~24~~	~~690~~	~~16~~	~~D - ellipse touching concordia~~	~~4.432133~~
~~**31A-18 - 1.d**~~	~~0.653~~	~~0.035~~	~~0.0801~~	~~0.0027~~	~~0.0598~~	~~0.0025~~	~~0.76458~~	~~-0.14571~~	~~509~~	~~21~~	~~496~~	~~16~~	~~D - ellipse touching concordia~~	~~2.554028~~
31A-18 - 2.d	0.564	0.029	0.071	0.0016	0.0574	0.0029	0.059247	0.33968	453	19	441.8	9.7	C - Caledonian	2.472406
31A-19 - 1.d	0.483	0.024	0.0673	0.0016	0.0526	0.0025	0.26703	0.16127	399	16	419.9	9.6	C - Caledonian	-5.2381
31A-19 - 2.d	0.505	0.026	0.0701	0.0016	0.053	0.0025	0.34282	0.076884	417	17	437	9.5	C - Caledonian	-4.79616
31A-20 - 1.d	0.484	0.025	0.06824	0.0015	0.0515	0.0025	0.12318	0.28856	401	16	425.5	9.2	C - Caledonian	-6.10973
31A-20 - 2.d	0.514	0.028	0.0687	0.0016	0.0554	0.003	-0.07305	0.35899	422	19	428.1	9.4	C - Caledonian	-1.4455
~~**31A-21 - 1.d**~~	~~0.718~~	~~0.038~~	~~0.0846~~	~~0.0024~~	~~0.0607~~	~~0.0031~~	~~0.16595~~	~~0.34325~~	~~549~~	~~22~~	~~524~~	~~14~~	~~D - ellipse touching concordia~~	~~4.553734~~

31A-21 - 2.d	0.533	0.031	0.0691	0.0018	0.0555	0.0031	0.22168	0.23668	432	21	430.8	11	C - Caledonian	0.277778
31A-21 - 3.d	0.506	0.027	0.0682	0.0017	0.0545	0.003	0.091109	0.32229	414	18	426.1	10	C - Caledonian	-2.92271
~~**31A-22 - 1.d**~~	~~1.238~~	~~0.078~~	~~0.1272~~	~~0.0058~~	~~0.0697~~	~~0.0029~~	~~0.86694~~	~~-0.16779~~	~~814~~	~~36~~	~~770~~	~~33~~	~~D~~	~~5.405405~~
~~**31A-22 - 2.d**~~	~~1.538~~	~~0.069~~	~~0.1516~~	~~0.0037~~	~~0.073~~	~~0.0031~~	~~0.50174~~	~~0.10374~~	~~951~~	~~27~~	~~912~~	~~21~~	~~D~~	~~4.100946~~
31A-23 - 1.d	0.483	0.024	0.0653	0.0016	0.0535	0.0027	0.32943	0.15611	399	16	408	9.5	C - Caledonian	-2.25564
31A-23 - 2.d	0.461	0.023	0.06305	0.0013	0.0539	0.0026	0.055477	0.30824	384	16	394.1	8.1	C - Caledonian	-2.63021
31A-24 - 1.d	0.528	0.029	0.0667	0.0015	0.0568	0.0031	0.082625	0.26998	429	19	416	9.1	C - Caledonian	3.030303
31A-24 - 2.d	0.517	0.03	0.0672	0.0016	0.0555	0.0033	-0.07627	0.38546	421	20	419	9.7	C - Caledonian	0.475059
31A-25 - 1.d	0.538	0.031	0.0701	0.0016	0.0557	0.003	0.02587	0.40137	437	20	436.7	9.8	C - Caledonian	0.06865
31A-25 - 2.d	0.551	0.033	0.0697	0.0017	0.0574	0.0033	0.21256	0.12668	446	21	434.1	10	C - Caledonian	2.668161
~~**31A-32 - 1.d**~~	~~0.955~~	~~0.078~~	~~0.1049~~	~~0.0053~~	~~0.0646~~	~~0.0033~~	~~0.87709~~	~~-0.41018~~	~~674~~	~~40~~	~~642~~	~~31~~	~~D~~	~~4.747774~~
31A-32 - 2.d	0.53	0.029	0.06959	0.0015	0.056	0.003	0.28809	0.012666	432	19	433.6	9.3	C - Caledonian	-0.37037
31A-33 - 1.d	0.526	0.026	0.06805	0.0015	0.0566	0.0027	0.21874	0.098919	430	18	424.4	8.8	C - Caledonian	1.302326
31A-33 - 2.d	0.519	0.026	0.06812	0.0014	0.0551	0.0026	0.28915	0.067784	426	18	424.8	8.6	C - Caledonian	0.28169
31A-33 - 3.d	0.524	0.029	0.07	0.0016	0.0542	0.0031	-0.10601	0.48216	428	20	436.4	9.6	C - Caledonian	-1.96262
~~**31A-34 - 1.d**~~	~~1.39~~	~~0.064~~	~~0.1397~~	~~0.0031~~	~~0.072~~	~~0.003~~	~~0.45515~~	~~0.087248~~	~~884~~	~~28~~	~~843~~	~~18~~	~~D~~	~~4.638009~~
31A-34 - 2.d	0.513	0.027	0.0671	0.0015	0.0557	0.0028	0.025397	0.29026	419	18	418.6	8.8	C - Caledonian	0.095465
31A-35 - 1.d	0.553	0.03	0.0702	0.0016	0.0577	0.0031	0.08375	0.32906	445	20	437.6	9.8	C - Caledonian	1.662921
31A-35 - 2.d	0.538	0.029	0.0679	0.0016	0.0562	0.0029	0.34965	0.034947	436	19	423.6	9.7	C - Caledonian	2.844037
31A-35 - 3.d	0.525	0.031	0.069	0.0016	0.0548	0.003	0.070013	0.27855	428	21	430	9.8	C - Caledonian	-0.46729
31A-37 - 1.d	0.498	0.025	0.06735	0.0015	0.0535	0.0026	0.24847	0.19853	411	17	420.2	8.8	C - Caledonian	-2.23844
31A-37 - 2.d	0.501	0.024	0.06811	0.0014	0.0531	0.0024	0.091134	0.2467	411.6	16	424.8	8.2	C - Caledonian	-3.207
31A-36 - 1.d	0.517	0.028	0.06875	0.0015	0.0548	0.0028	0.19033	0.22044	423	19	428.6	9	C - Caledonian	-1.32388
31A-36 - 2.d	0.537	0.029	0.0692	0.0017	0.0559	0.0029	0.16791	0.25396	437	19	431.2	10	C - Caledonian	1.327231
31A-38 - 1.d	0.479	0.027	0.0651	0.0016	0.0538	0.0028	0.12543	0.36638	396	18	406.2	10	C - Caledonian	-2.57576
31A-38 - 2.d	0.512	0.025	0.06825	0.0015	0.0542	0.0025	0.02812	0.37691	422	18	425.6	9	C - Caledonian	-0.85308
31A-39 - 1.d	0.496	0.025	0.0706	0.0016	0.0521	0.0028	-0.08217	0.42268	408	17	439.5	9.6	C - Caledonian	-7.72059
31A-39 - 2.d	0.505	0.029	0.0695	0.0017	0.053	0.003	0.090772	0.25972	413	19	433.4	10	C - Caledonian	-4.93947
~~**31A-40 - 1.d**~~	~~0.932~~	~~0.05~~	~~0.1039~~	~~0.0023~~	~~0.065~~	~~0.0032~~	~~0.31833~~	~~-0.01007~~	~~672~~	~~25~~	~~637.3~~	~~14~~	~~D - ellipse touching concordia~~	~~5.16369~~

~~**31A-40 - 2.d**~~	~~1.186~~	~~0.062~~	~~0.1275~~	~~0.0043~~	~~0.0681~~	~~0.003~~	~~0.68906~~	~~0.1504~~	~~793~~	~~30~~	~~773~~	~~24~~	~~D - ellipse touching concordia~~	~~2.522068~~
31A-41 - 1.d	0.568	0.029	0.071	0.0017	0.0586	0.0028	0.26899	0.1966	459	18	442.4	10	C - Caledonian	3.616558
31A-41 - 2.d	0.541	0.032	0.0696	0.0017	0.0561	0.0031	0.049728	0.32136	439	21	433.6	10	C - Caledonian	1.230068
31A-41 - 3.d	0.483	0.03	0.0607	0.0015	0.0571	0.0034	0.17902	0.16731	401	20	380.1	9.3	C - caledonian	5.21197
31A-42 - 1.d	0.554	0.029	0.0686	0.0017	0.0589	0.0032	0.04537	0.34388	446	19	427.7	10	C - Caledonian	4.103139
31A-42 - 2.d	0.51	0.028	0.06897	0.0015	0.053	0.0027	0.15788	0.18997	419	19	429.9	9.1	C - Caledonian	-2.60143
~~**31A-43 - 1.d**~~	~~0.764~~	~~0.051~~	~~0.0903~~	~~0.0036~~	~~0.0624~~	~~0.0031~~	~~0.80332~~	~~-0.22425~~	~~574~~	~~29~~	~~557~~	~~21~~	~~D - ellipse touching concordia~~	~~2.961672~~
31A-43 - 2.d	0.528	0.032	0.0699	0.0017	0.0551	0.0033	0.18052	0.2859	430	22	435.2	10	C - Caledonian	-1.2093
31A-43 - 3.d	0.504	0.031	0.0668	0.0015	0.0542	0.0034	0.084757	0.17418	415	20	416.5	9.2	C - Caledonian	-0.36145
31A-44 - 1.d	1.982	0.083	0.1897	0.0039	0.0761	0.0029	0.33451	0.30288	1110	29	1119	21	C - Sveconorwegian	-0.81081
31A-44 - 2.d	1.492	0.067	0.1504	0.0038	0.0719	0.0028	0.60914	0.2308	929	27	903	21	C - Sveconorwegian	2.798708
31A-44 - 3.d	0.505	0.024	0.06635	0.0014	0.0551	0.0026	0.062461	0.3489	414	16	414.1	8.4	C - Caledonian	-0.02415
~~**31A-45 - 1.d**~~	~~0.711~~	~~0.045~~	~~0.0851~~	~~0.0033~~	~~0.0603~~	~~0.003~~	~~0.734~~	~~-0.2671~~	~~550~~	~~27~~	~~526~~	~~19~~	~~D - ellipse touching concordia~~	~~4.363636~~
~~**31A-45 - 2.d**~~	~~0.76~~	~~0.051~~	~~0.0916~~	~~0.0038~~	~~0.0609~~	~~0.003~~	~~0.77067~~	~~-0.19756~~	~~574~~	~~30~~	~~564~~	~~23~~	~~D - ellipse touching concordia~~	~~1.74216~~
31A-45 - 3.d	0.526	0.026	0.0691	0.0016	0.0558	0.0029	0.00131	0.36427	432	18	430.9	9.7	C - Caledonian	0.25463
31A-46 - 1.d	0.553	0.032	0.0707	0.0017	0.0569	0.003	-0.03537	0.2669	449	21	440.4	10	C - Caledonian	1.915367
31A-47 - 1.d	0.53	0.026	0.06929	0.0015	0.0558	0.0027	0.000815	0.3133	432	18	431.8	8.9	C - Caledonian	0.046296
31A-47 - 2.d	0.494	0.026	0.06653	0.0015	0.0539	0.0027	0.17654	0.1816	406	18	415.2	9.1	C - Caledonian	-2.26601
~~**31A-48 - 1.d**~~	~~0.641~~	~~0.031~~	~~0.0794~~	~~0.0019~~	~~0.0585~~	~~0.0026~~	~~0.37493~~	~~0.1993~~	~~502~~	~~19~~	~~492.2~~	~~11~~	~~D - ellipse touching concordia~~	~~1.952191~~
~~**31A-55 - 1.d**~~	~~0.711~~	~~0.039~~	~~0.083~~	~~0.0022~~	~~0.0614~~	~~0.003~~	~~0.39404~~	~~0.15659~~	~~543~~	~~23~~	~~515~~	~~14~~	~~D~~	~~5.156538~~
~~**31A-55 - 2.d**~~	~~0.5~~	~~0.037~~	~~0.0635~~	~~0.0019~~	~~0.0564~~	~~0.0039~~	~~-0.02576~~	~~0.32793~~	~~412~~	~~25~~	~~397~~	~~11~~	~~D~~	~~3.640777~~
~~**31A-56 - 1.d**~~	~~1.32~~	~~0.17~~	~~0.1222~~	~~0.0091~~	~~0.0766~~	~~0.0052~~	~~0.9049~~	~~-0.53576~~	~~849~~	~~72~~	~~740~~	~~52~~	~~D~~	~~12.83863~~
~~**31A-56 - 2.d**~~	~~1.193~~	~~0.065~~	~~0.1189~~	~~0.0032~~	~~0.0712~~	~~0.0036~~	~~0.35086~~	~~0.098198~~	~~798~~	~~29~~	~~724~~	~~19~~	~~D~~	~~9.273183~~
31A-56 - 3.d	0.539	0.026	0.06863	0.0015	0.0569	0.0027	0.017795	0.36894	437	17	427.9	8.9	C - Caledonian	2.08238
31A-57 - 1.d	0.525	0.029	0.0679	0.0016	0.0565	0.003	0.069566	0.30281	429	19	423.3	9.6	C - Caledonian	1.328671
31A-57 - 2.d	0.509	0.027	0.0671	0.0015	0.0546	0.003	0.039815	0.3441	416	18	418.5	9.2	C - Caledonian	-0.60096

31A-58 - 1.d	0.528	0.03	0.0688	0.0016	0.0541	0.0029	0.099759	0.2657	429	20	428.9	9.4	C - Caledonian	0.02331
~~**31A-58 - 2.d**~~	~~0.721~~	~~0.051~~	~~0.0849~~	~~0.004~~	~~0.0611~~	~~0.003~~	~~0.79079~~	~~-0.16417~~	~~546~~	~~30~~	~~524~~	~~24~~	~~D~~	~~4.029304~~
31A-59 - 1.d	0.547	0.031	0.0695	0.0016	0.0558	0.003	0.23227	0.19291	441	21	433.2	9.9	C - Caledonian	1.768707
31A-59 - 2.d	0.539	0.029	0.068	0.0017	0.0585	0.003	0.1982	0.25811	440	18	424.7	9.8	C - Caledonian	3.477273
31A-60 - 1.d	0.534	0.03	0.07	0.0016	0.0561	0.0032	-0.05684	0.37152	433	20	435.9	9.5	C - Caledonian	-0.66975
31A-60 - 2.d	0.535	0.03	0.06915	0.0015	0.0562	0.003	0.10773	0.28714	433	20	431	9.2	C - Caledonian	0.461894
~~**31A-61 - 1.d**~~	~~7.41~~	~~0.34~~	~~0.3115~~	~~0.0088~~	~~0.1716~~	~~0.0065~~	~~0.67931~~	~~0.045277~~	~~2157~~	~~41~~	~~1747~~	~~43~~	~~D~~	~~19.00788~~
~~**31A-61 - 2.d**~~	~~7.35~~	~~0.5~~	~~0.315~~	~~0.013~~	~~0.1657~~	~~0.0069~~	~~0.929~~	~~-0.55712~~	~~2135~~	~~61~~	~~1763~~	~~63~~	~~D~~	~~17.42389~~
~~**31A-61 - 3.d**~~	~~0.947~~	~~0.054~~	~~0.1025~~	~~0.0029~~	~~0.0668~~	~~0.0034~~	~~0.44786~~	~~0.001492~~	~~678~~	~~28~~	~~629~~	~~17~~	~~D~~	~~7.227139~~
~~**31A-62 - 1.d**~~	~~0.647~~	~~0.036~~	~~0.0808~~	~~0.002~~	~~0.0584~~	~~0.003~~	~~0.17359~~	~~0.23987~~	~~505~~	~~22~~	~~501~~	~~12~~	~~D - ellipse touching concordia~~	~~0.792079~~
31A-62 - 2.d	0.555	0.033	0.0686	0.0016	0.0588	0.0035	-0.03223	0.34996	448	21	427.5	9.6	C - Caledonian	4.575893
31A-63 - 1.d	0.52	0.029	0.0665	0.0015	0.0561	0.0029	0.29585	0.080005	427	19	415.1	9.2	C - Caledonian	2.786885
31A-63 - 2.d	0.513	0.026	0.06979	0.0014	0.0531	0.0026	0.11755	0.25844	419	17	434.9	8.7	C - Caledonian	-3.79475
31A-64 - 1.d	0.49	0.029	0.06768	0.0015	0.0515	0.0031	0.085861	0.18888	403	20	422.1	9	C - Caledonian	-4.73945
31A-64 - 2.d	0.508	0.03	0.0674	0.0015	0.0546	0.0032	0.057554	0.28677	417	19	420.2	9.2	C - Caledonian	-0.76739
~~**31A-65 - 1.d**~~	~~0.886~~	~~0.045~~	~~0.0987~~	~~0.0024~~	~~0.0655~~	~~0.0029~~	~~0.55692~~	~~-0.05734~~	~~642~~	~~24~~	~~606.8~~	~~14~~	~~D~~	~~5.482866~~
~~**31A-65 - 2.d**~~	~~0.809~~	~~0.058~~	~~0.094~~	~~0.0039~~	~~0.0614~~	~~0.0031~~	~~0.83141~~	~~-0.38497~~	~~599~~	~~32~~	~~579~~	~~23~~	~~D - ellipse touching concordia~~	~~3.338898~~
31A-66 - 1.d	0.522	0.031	0.0676	0.0015	0.0554	0.0032	0.16704	0.15152	429	21	421.9	9.3	C - Caledonian	1.655012
31A-66 - 2.d	0.517	0.03	0.06777	0.0014	0.0546	0.0032	-0.03846	0.33371	421	20	422.7	8.6	C - Caledonian	-0.4038
31A-67 - 1.d	0.562	0.038	0.0704	0.002	0.0567	0.0032	0.5402	-0.05522	449	24	438.7	12	C - Caledonian	2.293987
31A-67 - 2.d	0.518	0.027	0.0704	0.0016	0.053	0.0026	0.17189	0.21365	423	18	438.2	9.5	C - Caledonian	-3.59338
31A-68 - 1.d	0.53	0.029	0.069	0.0017	0.0557	0.003	0.12905	0.3455	430	19	430.2	10	C - Caledonian	-0.04651
31A-68 - 2.d	0.517	0.03	0.06875	0.0015	0.0543	0.003	0.24321	0.007033	421	20	428.6	9	C - Caledonian	-1.80523
31A-69 - 1.d	0.533	0.026	0.0682	0.0016	0.0565	0.0028	0.19518	0.24834	433	18	425.2	9.8	C - Caledonian	1.801386
31A-71 - 1.d	1.623	0.068	0.1596	0.0037	0.0738	0.0028	0.47133	0.3225	978	25	954	20	C - Sveconorwegian	2.453988
31A-70 - 1.d	0.532	0.029	0.06789	0.0015	0.0568	0.003	0.18229	0.208	432	19	423.4	9	C - Caledonian	1.990741
31A-72 - 1.d	0.532	0.028	0.0701	0.0016	0.0551	0.0028	-0.03013	0.42805	432	18	436.6	9.7	C - Caledonian	-1.06481
31A-72 - 2.d	0.525	0.032	0.069	0.0018	0.056	0.0034	0.035028	0.36397	426	21	429.9	11	C - Caledonian	-0.91549

~~**31A-73 - 1.d**~~	~~0.605~~	~~0.031~~	~~0.0759~~	~~0.0018~~	~~0.0582~~	~~0.0028~~	~~0.21225~~	~~0.16074~~	~~480~~	~~19~~	~~471.4~~	~~10~~	~~D - ellipse touching concordia~~	~~1.791667~~
31A-73 - 2.d	0.497	0.028	0.06719	0.0015	0.0538	0.003	-0.03775	0.373	408	19	419.2	8.9	C - Caledonian	-2.7451
31A-74 - 1.d	0.511	0.03	0.0676	0.0016	0.0533	0.0031	0.293	0.06638	417	20	421.7	9.5	C - Caledonian	-1.1271
31A-75 - 1.d	0.539	0.03	0.0692	0.0017	0.0575	0.0031	0.2229	0.094511	436	20	431.1	10	C - Caledonian	1.123853
~~**31A-75 - 2.d**~~	~~1.317~~	~~0.086~~	~~0.1254~~	~~0.0041~~	~~0.0763~~	~~0.0038~~	~~0.77787~~	~~-0.30284~~	~~849~~	~~37~~	~~761~~	~~24~~	~~D~~	~~10.36514~~
31A-76 - 1.d	1.617	0.073	0.1616	0.0038	0.0734	0.0029	0.60153	0.10859	982	26	966	21	C - Sveconorwegian	1.629328
~~**31A-76 - 2.d**~~	~~1.168~~	~~0.062~~	~~0.1195~~	~~0.0039~~	~~0.0702~~	~~0.003~~	~~0.80718~~	~~-0.293~~	~~782~~	~~30~~	~~727~~	~~22~~	~~D~~	~~7.033248~~
31A-77 - 1.d	0.509	0.025	0.0659	0.0015	0.0555	0.0029	-0.06572	0.43574	417	17	411.3	8.8	C - Caledonian	1.366906
31A-77 - 2.d	0.531	0.026	0.0673	0.0015	0.0574	0.0029	-0.11705	0.46773	432	18	419.7	9.1	C - Caledonian	2.847222
~~**31A-77 - 3.d**~~	~~0.531~~	~~0.55~~	~~0.0604~~	~~0.016~~	~~0.0596~~	~~0.032~~	~~0.44222~~	~~0.027465~~	~~428~~	~~77~~	~~378~~	~~91~~	~~D~~	~~11.68224~~
31A-78 - 1.d	0.523	0.03	0.0703	0.0016	0.054	0.003	-0.00456	0.39547	427	19	438	9.6	C - Caledonian	-2.57611
31A-78 - 2.d	0.517	0.027	0.0705	0.0015	0.0534	0.0026	0.4506	-0.13742	424	19	439.1	8.8	C - Caledonian	-3.56132
31A-79 - 1.d	0.521	0.027	0.0683	0.0016	0.0551	0.0026	0.27259	0.14411	424	18	425.6	9.7	C - Caledonian	-0.37736
31A-79 - 2.d	0.511	0.03	0.0682	0.0018	0.0554	0.0033	0.19041	0.30795	417	20	425.3	11	C - Caledonian	-1.99041
~~**31A-80 - 1.d**~~	~~0.878~~	~~0.041~~	~~0.0989~~	~~0.0021~~	~~0.0638~~	~~0.0029~~	~~0.193~~	~~0.26035~~	~~638~~	~~22~~	~~607.8~~	~~13~~	~~D~~	~~4.733542~~
31A-80 - 2.d	0.532	0.03	0.0701	0.0016	0.0546	0.003	0.067766	0.24761	430	21	436.8	9.4	C - Caledonian	-1.5814
31A-81 - 1.d	0.501	0.03	0.0694	0.0018	0.0522	0.0032	0.14729	0.26791	415	21	432.6	11	C - Caledonian	-4.24096
31A-81 - 2.d	0.504	0.027	0.0684	0.0015	0.0538	0.0026	0.34632	-0.02522	415	18	426.5	9	C - Caledonian	-2.77108
31A-81 - 3.d	0.523	0.028	0.0678	0.0016	0.0558	0.0029	0.1936	0.24526	428	18	423.1	9.5	C - Caledonian	1.14486
~~**31A-82 - 1.d**~~	~~1.215~~	~~0.075~~	~~0.1278~~	~~0.0047~~	~~0.0689~~	~~0.0028~~	~~0.87003~~	~~-0.34648~~	~~801~~	~~36~~	~~778~~	~~26~~	~~D~~	~~2.871411~~
~~**31A-83 - 1.d**~~	~~0.575~~	~~0.03~~	~~0.0691~~	~~0.0015~~	~~0.061~~	~~0.0029~~	~~0.30502~~	~~0.14689~~	~~460~~	~~19~~	~~430.7~~	~~9.2~~	~~D~~	~~6.369565~~
31A-83 - 2.d	0.526	0.029	0.06804	0.0015	0.0559	0.003	0.22636	0.14463	431	19	424.3	9.2	C - Caledonian	1.554524
31A-84 - 1.d	1.982	0.085	0.1941	0.0039	0.0748	0.0029	0.41422	0.18913	1108	29	1143	21	C - Sveconorwegian	-3.15884
31A-84 - 2.d	1.6	0.071	0.1596	0.0034	0.0719	0.0029	0.27257	0.20871	970	28	954	19	C - Sveconorwegian	1.649485
31A-85 - 1.d	0.508	0.027	0.0686	0.0016	0.0546	0.0028	0.13685	0.19924	419	18	427.9	9.8	C - Caledonian	-2.12411
31A-85 - 2.d	0.525	0.03	0.0693	0.0016	0.0543	0.003	0.12132	0.23033	426	20	431.7	9.5	C - Caledonian	-1.33803
~~**31A-86 - 1.d**~~	~~0.767~~	~~0.17~~	~~0.077~~	~~0.0069~~	~~0.0735~~	~~0.007~~	~~0.86075~~	~~-0.37744~~	~~571~~	~~77~~	~~478~~	~~42~~	~~D~~	~~16.28722~~
~~**31A-86 - 2.d**~~	~~0.629~~	~~0.036~~	~~0.0709~~	~~0.0019~~	~~0.0626~~	~~0.0032~~	~~0.15046~~	~~0.24727~~	~~496~~	~~22~~	~~441.4~~	~~11~~	~~D~~	~~11.00806~~
31A-87 - 1.d	0.489	0.028	0.0655	0.0015	0.0536	0.0028	0.11091	0.27074	406	19	408.9	9.2	C - Caledonian	-0.71429

31A-87 - 2.d	0.521	0.026	0.06736	0.0015	0.0558	0.0028	0.055912	0.31605	425	18	420.2	8.9	C - Caledonian	1.129412
31A-87 - 3.d	0.535	0.032	0.0683	0.0015	0.0571	0.0033	0.059005	0.23727	432	21	426	9.2	C - Caledonian	1.388889
31A-88 - 1.d	0.481	0.024	0.06474	0.0014	0.0536	0.0025	0.18965	0.22183	398	17	404.4	8.7	C - Caledonian	-1.60804
31A-89 - 1.d	0.536	0.031	0.06848	0.0014	0.0563	0.0034	-0.08618	0.36443	433	21	426.9	8.7	C - Caledonian	1.408776
31A-89 - 2.d	0.534	0.03	0.0676	0.0016	0.0576	0.0032	0.074836	0.29788	433	20	421.6	9.7	C - Caledonian	2.632794
31A-90 - 1.d	0.523	0.026	0.068	0.0016	0.0552	0.0028	0.0306	0.41312	426	17	423.9	9.8	C - Caledonian	0.492958
31A-90 - 2.d	0.527	0.03	0.0694	0.0016	0.0548	0.0031	-0.08996	0.38739	430	20	432.4	9.5	C - Caledonian	-0.55814
~~**31A-91 - 1.d**~~	~~0.562~~	~~0.028~~	~~0.0679~~	~~0.0016~~	~~0.0588~~	~~0.0027~~	~~0.28617~~	~~0.22395~~	~~453~~	~~18~~	~~423.3~~	~~9.9~~	~~D~~	~~6.556291~~
31A-91 - 2.d	0.514	0.031	0.0689	0.0016	0.0532	0.0032	-0.07601	0.33683	421	22	429.7	9.5	C - Caledonian	-2.06651
31A-92 - 1.d	0.512	0.031	0.0676	0.0017	0.0545	0.0033	-0.03009	0.346	420	20	421.5	10	C - Caledonian	-0.35714
31A-92 - 2.d	0.498	0.025	0.06562	0.0015	0.0552	0.0028	-0.11712	0.49972	409	17	409.7	8.8	C - Caledonian	-0.17115
31A-93 - 1.d	0.516	0.025	0.06827	0.0014	0.0547	0.0026	0.091156	0.25222	423	18	425.7	8.7	C - Caledonian	-0.6383
31A-93 - 2.d	0.505	0.027	0.06843	0.0015	0.0527	0.0029	-0.11348	0.46114	413	18	426.6	9.2	C - Caledonian	-3.29298
~~**31A-94 - 1.d**~~	~~0.663~~	~~0.039~~	~~0.0801~~	~~0.0022~~	~~0.0599~~	~~0.0032~~	~~0.35379~~	~~0.1392~~	~~516~~	~~24~~	~~496.7~~	~~13~~	~~D - ellipse touching concordia~~	~~3.74031~~
31A-94 - 2.d	0.501	0.03	0.0677	0.0016	0.0536	0.0031	0.15292	0.17955	411	20	422.1	9.5	C - Caledonian	-2.70073
31A-94 - 3.d	0.521	0.03	0.0676	0.0015	0.0554	0.0032	-0.11431	0.4032	424	20	421.6	9.1	C - Caledonian	0.566038
31A-95 - 1.d	0.539	0.029	0.0697	0.0016	0.0559	0.0031	-0.15899	0.47096	436	19	434.2	9.7	C - Caledonian	0.412844
31A-95 - 2.d	0.508	0.027	0.0665	0.0016	0.0554	0.0029	0.084261	0.33169	419	18	415.1	10	C - Caledonian	0.930788
31A-96 - 1.d	0.526	0.026	0.06838	0.0015	0.056	0.0026	0.20024	0.25494	431	18	426.4	9.1	C - Caledonian	1.067285
31A-96 - 2.d	0.511	0.029	0.0671	0.0016	0.0548	0.003	0.067925	0.32294	419	20	418.5	9.6	C - Caledonian	0.119332
31A-96 - 3.d	0.455	0.029	0.0626	0.0016	0.0524	0.0033	0.10807	0.25622	382	21	391.2	9.8	C - Caledonian	-2.40838
31A-97 - 1.d	0.53	0.027	0.0681	0.0015	0.0561	0.0029	0.045098	0.32596	431	18	424.9	9.3	C - Caledonian	1.415313
31A-97 - 2.d	0.508	0.025	0.06815	0.0015	0.0546	0.0026	0.16033	0.20539	418	18	424.9	8.8	C - Caledonian	-1.65072
31A-98 - 1.d	0.531	0.027	0.06966	0.0015	0.0552	0.0027	0.042176	0.32705	431	18	434.1	9.2	C - Caledonian	-0.71926
31A-98 - 2.d	0.524	0.029	0.0651	0.0018	0.057	0.0031	0.23128	0.22583	426	20	406.5	11	C - Caledonian	4.577465
31A-99 - 1.d	0.49	0.024	0.0643	0.0015	0.0548	0.0027	0.012337	0.31984	404	17	401.7	8.8	C - Caledonian	0.569307
31A-99 - 2.d	0.5	0.029	0.0669	0.0016	0.0549	0.0033	0.037655	0.23914	414	21	417.2	9.6	C - Caledonian	-0.77295
~~**31A-100 - 1.d**~~	~~0.483~~	~~0.025~~	~~0.06277~~	~~0.0014~~	~~0.0555~~	~~0.0028~~	~~0.1182~~	~~0.31732~~	~~401~~	~~17~~	~~392.4~~	~~8.6~~	~~D~~	~~2.144638~~

31A-100 - 2.d	0.486	0.029	0.0647	0.0015	0.0543	0.0033	-0.24848	0.49036	400	20	404.6	9.1	C - Caledonian	-1.15
~~**31A-101 - 1.d**~~	~~0.833~~	~~0.049~~	~~0.0958~~	~~0.0034~~	~~0.0625~~	~~0.0029~~	~~0.73962~~	~~-0.12964~~	~~617~~	~~27~~	~~589~~	~~20~~	~~D~~	~~4.538088~~
31A-101 - 2.d	0.588	0.031	0.0751	0.0017	0.0573	0.0029	0.22673	0.18362	468	20	466.8	10	D - ellipse touching concordia	0.25641
31A-102 - 1.d	0.519	0.029	0.0679	0.0016	0.0544	0.0029	0.27612	0.17304	423	20	423.6	9.8	C - Caledonian	-0.14184
31A-102 - 2.d	0.51	0.026	0.06722	0.0015	0.0548	0.0028	0.044578	0.342	419	18	419.3	9	C - Caledonian	-0.0716
31A-103 - 1.d	0.52	0.028	0.0681	0.0015	0.0545	0.0029	-0.03301	0.40467	425	18	424.8	9.3	C - Caledonian	0.047059
31A-103 - 2.d	0.496	0.028	0.0679	0.0016	0.0529	0.003	0.14532	0.20243	409	20	423.7	9.7	C - Caledonian	-3.59413
31A-104 - 1.d	0.532	0.027	0.06795	0.0015	0.0564	0.0027	0.093609	0.27273	434	17	423.7	9	C - Caledonian	2.373272
31A-104 - 2.d	0.516	0.028	0.0694	0.0016	0.0541	0.0028	0.17072	0.22472	425	19	433.5	9.6	C - Caledonian	-2
31A-105 - 1.d	0.536	0.028	0.0693	0.0016	0.0558	0.0028	0.15053	0.28923	436	19	432	9.6	C - Caledonian	0.917431
31A-105 - 2.d	0.511	0.039	0.0665	0.0017	0.0558	0.004	0.074644	0.21007	418	27	415.2	10	C - Caledonian	0.669856
31A-105 - 3.d	0.503	0.028	0.0679	0.0016	0.0537	0.003	-0.02768	0.44246	412	19	423.5	9.4	C - Caledonian	-2.79126
31A-106 - 1.d	0.54	0.031	0.0695	0.0017	0.0559	0.0031	0.2585	0.10285	438	20	433.4	10	C - Caledonian	1.050228
31A-107 - 1.d	0.526	0.028	0.0679	0.0016	0.0555	0.0028	-0.01308	0.38254	428	19	423.2	9.6	C - Caledonian	1.121495
31A-107 - 2.d	0.516	0.026	0.06727	0.0014	0.0555	0.0026	0.15526	0.16388	423	17	419.7	8.1	C - Caledonian	0.780142
31A-108 - 1.d	0.484	0.024	0.06433	0.0014	0.0539	0.0025	0.14621	0.22009	400	17	401.9	8.5	C - Caledonian	-0.475
31A-108 - 2.d	0.492	0.025	0.0634	0.0015	0.0574	0.0027	0.29353	0.20557	407	17	396.3	9.2	C - Caledonian	2.628993
31A-109 - 1.d	0.513	0.031	0.0683	0.0019	0.0546	0.0034	-0.08413	0.46399	422	21	425.6	12	C - Caledonian	-0.85308
31A-109 - 2.d	0.543	0.032	0.0676	0.0018	0.0558	0.0032	0.31585	0.17985	440	21	421.8	11	C - Caledonian	4.136364
31A-110 - 1.d	0.553	0.031	0.0709	0.0018	0.0561	0.003	0.4269	0.040801	445	20	441.4	11	C - Caledonian	0.808989
31A-110 - 2.d	0.563	0.03	0.0714	0.002	0.058	0.0027	0.53028	0.030777	452	20	444.8	12	C - Caledonian	1.59292
~~**31A-111 - 1.d**~~	~~0.815~~	~~0.036~~	~~0.0926~~	~~0.0022~~	~~0.0635~~	~~0.0028~~	~~0.17588~~	~~0.46416~~	~~604~~	~~21~~	~~571~~	~~13~~	~~D - ellipse touching concordia~~	~~5.463576~~
~~**31A-111 - 2.d**~~	~~0.922~~	~~0.047~~	~~0.103~~	~~0.0029~~	~~0.0644~~	~~0.003~~	~~0.44526~~	~~0.12185~~	~~665~~	~~26~~	~~632~~	~~17~~	~~D~~	~~4.962406~~
31A-112 - 1.d	0.546	0.029	0.06858	0.0015	0.058	0.0031	0.054938	0.31207	443	20	427.5	9.1	C - Caledonian	3.498871
31A-112 - 2.d	0.546	0.026	0.06824	0.0014	0.0578	0.0029	-0.11463	0.44714	442	17	425.5	8.7	C - Caledonian	3.733032
31A-113 - 1.d	0.514	0.03	0.0704	0.0018	0.054	0.0029	0.2375	0.2019	419	20	438.6	11	C - Caledonian	-4.6778
31A-113 - 2.d	0.522	0.032	0.0689	0.0016	0.055	0.0034	-0.06834	0.36106	428	21	429.5	9.9	C - Caledonian	-0.35047
~~**31A-114 - 1.d**~~	~~10.02~~	~~0.42~~	~~0.4132~~	~~0.01~~	~~0.1756~~	~~0.0068~~	~~0.53087~~	~~0.41346~~	~~2437~~	~~40~~	~~2228~~	~~45~~	~~D~~	~~8.576118~~

~~**31A-114 - 2.d**~~	~~1.46~~	~~0.067~~	~~0.1441~~	~~0.0032~~	~~0.0737~~	~~0.0033~~	~~0.22483~~	~~0.33879~~	~~912~~	~~27~~	~~868~~	~~18~~	~~D~~	~~4.824561~~
~~**31A-114 - 3.d**~~	~~6.06~~	~~0.5~~	~~0.2984~~	~~0.017~~	~~0.145~~	~~0.0074~~	~~0.75558~~	~~-0.24861~~	~~1980~~	~~99~~	~~1689~~	~~90~~	~~D~~	~~14.69697~~
31A-115 - 1.d	0.563	0.037	0.0693	0.0016	0.0584	0.0035	0.17605	0.18949	450	24	432.1	9.9	C - Caledonian	3.977778
31A-115 - 2.d	0.528	0.031	0.0675	0.0016	0.0559	0.0035	0.071264	0.29489	428	21	421.1	9.7	C - Caledonian	1.61215
31A-115 - 3.d	0.532	0.029	0.0686	0.0017	0.0564	0.0032	-0.00402	0.36532	432	20	427.8	10	C - Caledonian	0.972222
31A-116 - 1.d	0.508	0.027	0.06801	0.0015	0.054	0.0028	0.084709	0.32262	417	18	424.1	9	C - Caledonian	-1.70264
31A-116 - 2.d	0.515	0.029	0.0688	0.0016	0.0547	0.0032	-0.04001	0.42234	422	20	428.6	9.5	C - Caledonian	-1.56398
31A-117 - 1.d	0.508	0.028	0.06618	0.0015	0.056	0.003	0.10895	0.22029	419	18	413.8	8.7	C - Caledonian	1.24105
31A-117 - 2.d	0.501	0.026	0.06669	0.0015	0.055	0.0027	0.2561	0.10727	413	18	416.1	9.1	C - Caledonian	-0.75061
~~**31A-118 - 1.d**~~	~~0.986~~	~~0.062~~	~~0.1048~~	~~0.0036~~	~~0.0674~~	~~0.0031~~	~~0.74614~~	~~-0.18392~~	~~701~~	~~31~~	~~642~~	~~21~~	~~D~~	~~8.416548~~
~~**31A-118 - 2.d**~~	~~1.34~~	~~0.058~~	~~0.1194~~	~~0.0026~~	~~0.0808~~	~~0.0032~~	~~0.2613~~	~~0.29534~~	~~863~~	~~25~~	~~726.9~~	~~15~~	~~D~~	~~15.77057~~
31A-118 - 3.d	0.519	0.028	0.06833	0.0015	0.0544	0.0027	0.14891	0.23917	425	19	426	9	C - Caledonian	-0.23529
31A-119 - 1.d	0.52	0.028	0.06789	0.0014	0.0563	0.0029	0.18049	0.081923	428	19	423.4	8.6	C - Caledonian	1.074766
31A-119 - 2.d	0.523	0.026	0.06762	0.0015	0.0558	0.0027	0.045542	0.33388	427	17	421.8	8.8	C - Caledonian	1.217799
31A-120 - 1.d	0.527	0.027	0.06814	0.0015	0.0557	0.0027	0.12425	0.2233	429	18	425.6	9.1	C - Caledonian	0.792541
31A-120 - 2.d	0.549	0.028	0.0676	0.0017	0.058	0.0029	0.020206	0.35265	443	19	421.7	10	C - Caledonian	4.808126
31A-120 - 3.d	0.543	0.027	0.06948	0.0015	0.0576	0.0028	0.16434	0.20567	441	17	433	9.3	C - Caledonian	1.814059
31A-121 - 1.d	0.545	0.032	0.0705	0.0017	0.0568	0.003	0.16126	0.1881	446	21	438.9	10	C - Caledonian	1.591928
31A-121 - 2.d	0.541	0.029	0.0691	0.0015	0.0566	0.0029	0.28215	0.055762	439	19	430.5	9.3	C - Caledonian	1.936219
31A-121 - 3.d	0.542	0.029	0.07008	0.0015	0.0564	0.0029	0.21459	0.15004	439	19	436.6	8.9	C - Caledonian	0.546697
31A-122 - 1.d	0.544	0.028	0.0691	0.0017	0.0565	0.0028	0.16326	0.28666	440	18	430.6	10	C - Caledonian	2.136364
31A-122 - 2.d	0.513	0.032	0.0694	0.0016	0.0532	0.0034	-0.1525	0.42354	418	22	432.8	9.5	C - Caledonian	-3.54067
31A-122 - 3.d	0.516	0.031	0.0686	0.0018	0.0539	0.0031	0.003533	0.36219	423	20	427.9	11	C - Caledonian	-1.15839
31A-123 - 1.d	0.531	0.029	0.0691	0.0017	0.0551	0.0032	-0.02505	0.4017	433	19	431.8	10	C - Caledonian	0.277136
~~**31A-123 - 2.d**~~	~~0.624~~	~~0.046~~	~~0.074~~	~~0.0023~~	~~0.0586~~	~~0.0032~~	~~0.81701~~	~~-0.37324~~	~~487~~	~~28~~	~~460~~	~~14~~	~~D~~	~~5.544148~~
31A-124 - 1.d	0.504	0.028	0.0677	0.0016	0.0538	0.003	0.048551	0.37341	416	18	423	10	C - Caledonian	-1.68269
31A-124 - 2.d	0.531	0.029	0.06863	0.0015	0.0561	0.003	0.1738	0.19202	433	19	427.8	9.2	C - Caledonian	1.200924
31A-125 - 1.d	0.527	0.029	0.06922	0.0015	0.0564	0.0032	-0.09965	0.40009	428	19	431.4	9.1	C - Caledonian	-0.79439
31A-125 - 2.d	0.521	0.03	0.0695	0.0016	0.0545	0.0031	0.1312	0.26524	423	20	433.1	9.9	C - Caledonian	-2.38771
31A-126 - 1.d	0.506	0.024	0.06795	0.0014	0.0544	0.0026	0.032869	0.35324	416	16	423.8	8.7	C - Caledonian	-1.875
31A-126 - 2.d	0.521	0.025	0.069	0.0016	0.054	0.0026	-0.00539	0.39083	425	17	430	9.6	C - Caledonian	-1.17647

31A-126 - 3.d	0.539	0.03	0.0687	0.0016	0.0568	0.0031	-0.00165	0.33243	438	19	428.1	9.6	C - Caledonian	2.260274
31A-127 - 1.d	0.525	0.029	0.068	0.0015	0.0563	0.0031	0.047038	0.31551	427	20	424	9.3	C - Caledonian	0.702576
31A-127 - 2.d	0.507	0.028	0.06693	0.0015	0.0555	0.003	0.16101	0.19896	417	18	417.6	9	C - Caledonian	-0.14388
31A-128 - 1.d	0.484	0.028	0.063	0.0015	0.0556	0.0031	-0.02624	0.35512	401	19	393.6	9.3	C - Caledonian	1.845387
31A-128 - 2.d	0.496	0.028	0.0646	0.0015	0.0561	0.003	0.17019	0.22569	409	19	403.5	9.3	C - Caledonian	1.344743
31A-129 - 1.d	0.537	0.026	0.06852	0.0014	0.0559	0.0026	0.2993	0.047012	437	17	427.8	8.5	C - Caledonian	2.105263
31A-129 - 2.d	0.507	0.025	0.0666	0.0016	0.055	0.0025	0.15033	0.38804	415	17	415.7	9.5	C - Caledonian	-0.16867
~~**31A-130 - 1.d**~~	~~0.609~~	~~0.033~~	~~0.074~~	~~0.0019~~	~~0.0609~~	~~0.0031~~	~~0.24716~~	~~0.18575~~	~~483~~	~~21~~	~~460.3~~	~~11~~	~~D - ellipse touching concordia~~	~~4.699793~~
31A-130 - 2.d	0.558	0.033	0.0702	0.0017	0.0579	0.0035	-0.06896	0.46175	448	21	437.4	11	C - Caledonian	2.366071
31A-130 - 3.d	0.561	0.031	0.0698	0.0016	0.0587	0.0031	0.14061	0.24785	450	20	434.7	9.9	C - Caledonian	3.4
31A-131 - 1.d	0.532	0.029	0.0691	0.0016	0.0563	0.0031	-0.13513	0.46261	433	19	430.6	9.8	C - Caledonian	0.554273
31A-131 - 2.d	0.536	0.031	0.0686	0.0018	0.0557	0.0034	0.082244	0.39184	434	21	427.8	11	C - Caledonian	1.428571
31A-132 - 1.d	0.592	0.03	0.0722	0.0017	0.0585	0.0029	0.1946	0.21906	471	19	449.3	10	C - Caledonian	4.607219
31A-132 - 2.d	0.525	0.027	0.0692	0.0016	0.0542	0.0026	0.21541	0.15547	427	18	431.3	9.4	C - Caledonian	-1.00703
31A-132 - 3.d	0.544	0.025	0.0707	0.0016	0.056	0.0024	0.2429	0.30943	440.2	16	440.3	9.5	C - Caledonian	-0.02272
31A-133 - 1.d	0.529	0.027	0.0686	0.0016	0.0553	0.0029	-0.16303	0.5463	432	18	427.7	9.6	C - Caledonian	0.99537
31A-133 - 2.d	0.491	0.025	0.0665	0.0016	0.0535	0.0026	0.22764	0.22511	404	17	414.7	9.9	C - Caledonian	-2.64851
31A-134 - 1.d	0.521	0.029	0.069	0.0016	0.0537	0.0028	0.19293	0.18074	426	20	430.1	9.5	C - Caledonian	-0.96244
31A-134 - 2.d	0.511	0.03	0.068	0.0016	0.0544	0.0031	0.36401	-0.00187	420	21	424	9.5	C - Caledonian	-0.95238
31A-135 - 1.d	1.587	0.074	0.1573	0.0036	0.0731	0.0029	0.63072	-0.03307	962	29	941	20	C - Sveconorwegian	2.182952
~~**31A-135 - 2.d**~~	~~0.733~~	~~0.039~~	~~0.0875~~	~~0.0021~~	~~0.061~~	~~0.003~~	~~0.18576~~	~~0.23319~~	~~557~~	~~22~~	~~540.4~~	~~12~~	~~D~~	~~2.980251~~
31A-136 - 1.d	0.521	0.029	0.0696	0.0016	0.0538	0.0029	0.11984	0.30507	424	20	433.7	9.7	C - Caledonian	-2.28774
31A-136 - 2.d	0.542	0.028	0.07	0.0016	0.0558	0.0029	-0.05384	0.422	442	19	436.3	9.6	C - Caledonian	1.289593
31A-136 - 3.d	0.527	0.029	0.06796	0.0015	0.0557	0.003	0.047811	0.26315	430	20	424.7	9.1	C - Caledonian	1.232558
31A-137 - 1.d	0.532	0.027	0.0683	0.0015	0.0557	0.0026	0.19934	0.24665	432	18	425.9	9	C - Caledonian	1.412037
31A-137 - 2.d	0.538	0.026	0.0675	0.0016	0.0576	0.0027	0.13141	0.44797	436	17	420.9	9.5	C - Caledonian	3.463303
~~**31A-138 - 1.d**~~	~~1.49~~	~~0.075~~	~~0.1492~~	~~0.0052~~	~~0.0727~~	~~0.0029~~	~~0.7776~~	~~0.18919~~	~~923~~	~~30~~	~~895~~	~~29~~	~~D~~	~~3.033586~~
~~**31A-138 - 2.d**~~	~~1.113~~	~~0.051~~	~~0.1147~~	~~0.0028~~	~~0.0701~~	~~0.0029~~	~~0.5054~~	~~0.32934~~	~~758~~	~~25~~	~~700~~	~~16~~	~~D~~	~~7.651715~~
31A-139 - 1.d	0.525	0.033	0.0695	0.0016	0.0555	0.0033	0.24939	0.048923	431	23	433.1	9.9	C - Caledonian	-0.48724
31A-139 - 2.d	0.518	0.029	0.0685	0.0016	0.0545	0.0032	0.070997	0.26709	426	19	427.2	9.5	C - Caledonian	-0.28169

31A-140 - 1.d	0.524	0.028	0.0684	0.0016	0.0553	0.0031	-0.03028	0.35727	430	17	426.2	9.8	C - Caledonian	0.883721
31A-140 - 2.d	0.53	0.029	0.0673	0.0015	0.0575	0.0034	-0.13178	0.56717	435	21	419.9	9.4	C - Caledonian	3.471264
31A-141 - 1.d	0.535	0.031	0.0689	0.0016	0.056	0.003	0.20026	0.16571	439	19	429.3	9.7	C - Caledonian	2.209567
31A-141 - 2.d	0.516	0.026	0.0685	0.0016	0.055	0.0027	0.044419	0.34219	423	18	427.3	9.7	C - Caledonian	-1.01655
31A-142 - 1.d	0.526	0.033	0.0703	0.0017	0.0536	0.0032	0.1157	0.26191	426	22	438	10	C - Caledonian	-2.8169
31A-142 - 2.d	0.515	0.026	0.0682	0.0016	0.0544	0.0028	-0.00987	0.40645	422	18	425	9.5	C - Caledonian	-0.7109
31A-143 - 1.d	0.516	0.028	0.0683	0.0016	0.0547	0.0031	-0.27351	0.56075	421	19	425.6	9.8	C - Caledonian	-1.09264
31A-143 - 2.d	0.516	0.031	0.0655	0.0016	0.0565	0.0035	-0.14549	0.47326	420	21	409	9.7	C - Caledonian	2.619048
31A-144 - 1.d	0.547	0.03	0.0699	0.0017	0.0569	0.0032	0.072424	0.31626	441	20	435.6	10	C - Caledonian	1.22449
31A-144 - 2.d	0.533	0.03	0.069	0.0016	0.0551	0.0031	0.08948	0.22347	432	20	430.2	9.7	C - Caledonian	0.416667
31A-145 - 1.d	0.525	0.024	0.0689	0.0014	0.0553	0.0025	-0.01361	0.37732	427.8	16	429.5	8.7	C - Caledonian	-0.39738
31A-146 - 1.d	1.86	0.13	0.1769	0.009	0.0765	0.0032	0.88626	-0.04866	1060	45	1047	50	C - Sveconorwegian	1.226415
~~**31A-146 - 2.d**~~	~~0.618~~	~~0.038~~	~~0.0764~~	~~0.0017~~	~~0.0579~~	~~0.0033~~	~~0.2065~~	~~0.10078~~	~~488~~	~~24~~	~~474.6~~	~~10~~	~~D - ellipse touching concordia~~	~~2.745902~~
~~**31A-147 - 1.d**~~	~~0.967~~	~~0.056~~	~~0.1072~~	~~0.0036~~	~~0.0652~~	~~0.0029~~	~~0.79377~~	~~-0.32024~~	~~683~~	~~29~~	~~656~~	~~21~~	~~D~~	~~3.953148~~
31A-147 - 2.d	0.528	0.027	0.0691	0.0015	0.0555	0.0029	0.068693	0.32955	431	18	430.7	9.3	C - Caledonian	0.069606
~~**31A-148 - 1.d**~~	~~1.129~~	~~0.054~~	~~0.1123~~	~~0.0026~~	~~0.0721~~	~~0.003~~	~~0.68541~~	~~-0.17386~~	~~767~~	~~27~~	~~686~~	~~15~~	~~D~~	~~10.56063~~
31A-148 - 2.d	0.563	0.028	0.0695	0.0017	0.0584	0.0028	0.11004	0.34729	452	19	433.3	10	C - Caledonian	4.137168
~~**31A-149 - 1.d**~~	~~5.67~~	~~0.26~~	~~0.2664~~	~~0.0064~~	~~0.1543~~	~~0.0063~~	~~0.53864~~	~~0.23534~~	~~1926~~	~~39~~	~~1522~~	~~33~~	~~D~~	~~20.97612~~
~~**31A-149 - 2.d**~~	~~3.83~~	~~0.18~~	~~0.2052~~	~~0.0055~~	~~0.1344~~	~~0.0051~~	~~0.73345~~	~~0.032505~~	~~1598~~	~~36~~	~~1206~~	~~30~~	~~D~~	~~24.53066~~
31A-150 - 1.d	0.53	0.028	0.0687	0.0016	0.0569	0.0031	0.093396	0.27483	431	19	428.3	9.5	C - Caledonian	0.62645
31A-150 - 2.d	0.525	0.029	0.0695	0.0017	0.055	0.0029	0.1853	0.1998	429	19	433	10	C - Caledonian	-0.9324
~~**31A-151 - 1.d**~~	~~0.651~~	~~0.034~~	~~0.0782~~	~~0.0022~~	~~0.06~~	~~0.0027~~	~~0.54001~~	~~0.069401~~	~~507~~	~~21~~	~~485~~	~~13~~	~~D~~	~~4.33925~~
31A-151 - 2.d	0.535	0.033	0.0692	0.0017	0.0554	0.0034	0.08635	0.23148	433	22	431	10	C - Caledonian	0.461894
~~**31A-152 - 1.d**~~	~~0.684~~	~~0.045~~	~~0.0802~~	~~0.0031~~	~~0.0621~~	~~0.0031~~	~~0.71512~~	~~-0.04855~~	~~525~~	~~27~~	~~497~~	~~19~~	~~D~~	~~5.333333~~
~~**31A-152 - 2.d**~~	~~0.551~~	~~0.032~~	~~0.0731~~	~~0.002~~	~~0.0552~~	~~0.0031~~	~~0.30469~~	~~0.17701~~	~~446~~	~~21~~	~~455~~	~~12~~	~~D - ellipse touching concordia~~	~~-2.01794~~
31A-152 - 3.d	0.529	0.031	0.0695	0.0017	0.0553	0.0032	0.066032	0.3081	431	20	432.9	10	C - Caledonian	-0.44084
31A-153 - 1.d	0.569	0.031	0.0691	0.0016	0.0593	0.0031	0.045928	0.33937	457	20	430.6	9.4	C - Caledonian	5.776805
31A-153 - 2.d	0.535	0.028	0.06791	0.0015	0.0569	0.003	-0.13313	0.47428	434	19	423.5	9.2	C - Caledonian	2.419355
31A-154 - 1.d	0.511	0.026	0.0661	0.0016	0.056	0.003	-0.05267	0.5002	418	17	412.3	9.9	C - Caledonian	1.363636

31A-154 - 2.d	0.502	0.027	0.06713	0.0014	0.0537	0.0026	0.062387	0.29441	413	18	418.8	8.6	C - Caledonian	-1.40436
31A-155 - 1.d	0.526	0.024	0.0669	0.0015	0.0555	0.0025	-0.13873	0.47031	428	16	417.5	9	C - Caledonian	2.453271
31A-155 - 2.d	0.532	0.024	0.06791	0.0015	0.0561	0.0026	-0.12928	0.53285	432.1	16	423.5	9.1	C - Caledonian	1.99028
~~**31A-156 - 1.d**~~	~~1.356~~	~~0.071~~	~~0.1193~~	~~0.0035~~	~~0.0814~~	~~0.0035~~	~~0.74429~~	~~-0.23974~~	~~870~~	~~31~~	~~728~~	~~20~~	~~D~~	~~16.32184~~
~~**31A-156 - 2.d**~~	~~0.64~~	~~0.031~~	~~0.0772~~	~~0.0017~~	~~0.0596~~	~~0.0027~~	~~0.28335~~	~~0.17845~~	~~501~~	~~19~~	~~479.2~~	~~10~~	~~D - ellipse touching concordia~~	~~4.351297~~
~~**31A-156 - 3.d**~~	~~0.611~~	~~0.031~~	~~0.0745~~	~~0.0018~~	~~0.0593~~	~~0.0028~~	~~0.24674~~	~~0.24239~~	~~483~~	~~19~~	~~463.1~~	~~11~~	~~D - ellipse touching concordia~~	~~4.120083~~
31A-158 - 1.d	0.579	0.031	0.0721	0.0017	0.0569	0.0031	-0.0208	0.35262	464	20	448.5	10	C - Caledonian	3.340517
~~**31A-158 - 2.d**~~	~~0.65~~	~~0.038~~	~~0.0806~~	~~0.0018~~	~~0.0572~~	~~0.0031~~	~~0.26089~~	~~0.12353~~	~~505~~	~~24~~	~~499.5~~	~~11~~	~~D - ellipse touching concordia~~	~~1.089109~~
31A-159 - 1.d	0.514	0.026	0.06929	0.0015	0.0547	0.0029	-0.04785	0.39675	420	17	431.9	9.2	C - Caledonian	-2.83333
31A-159 - 2.d	0.515	0.026	0.06985	0.0015	0.0532	0.0028	-0.11712	0.44026	422	17	435.2	8.9	C - Caledonian	-3.12796
~~**31A-160 - 1.d**~~	~~1.185~~	~~0.062~~	~~0.1246~~	~~0.0038~~	~~0.068~~	~~0.0029~~	~~0.65922~~	~~-0.00543~~	~~796~~	~~29~~	~~757~~	~~22~~	~~D~~	~~4.899497~~
~~**31A-160 - 2.d**~~	~~0.583~~	~~0.029~~	~~0.0747~~	~~0.0019~~	~~0.0565~~	~~0.0026~~	~~0.20516~~	~~0.30586~~	~~467~~	~~18~~	~~464.4~~	~~11~~	~~D - ellipse touching concordia~~	~~0.556745~~
31A-161 - 1.d	0.518	0.035	0.0687	0.0019	0.0541	0.0038	-0.054	0.4037	423	24	428.1	11	C - Caledonian	-1.20567
31A-161 - 2.d	0.521	0.036	0.0702	0.0016	0.0554	0.0036	0.050845	0.20603	428	25	437.4	9.8	C - Caledonian	-2.19626
~~**31A-162 - 1.d**~~	~~0.736~~	~~0.035~~	~~0.085~~	~~0.0021~~	~~0.0625~~	~~0.0028~~	~~0.32584~~	~~0.17566~~	~~559~~	~~21~~	~~526.1~~	~~12~~	~~D~~	~~5.88551~~
31A-163 - 1.d	0.531	0.032	0.0681	0.0016	0.056	0.0032	0.20831	0.15006	435	21	425.5	9.8	C - Caledonian	2.183908
31A-164 - 1.d	0.487	0.027	0.0669	0.0016	0.0531	0.0029	0.17892	0.21887	404	19	417.6	9.5	C - Caledonian	-3.36634
31A-164 - 2.d	0.533	0.032	0.0676	0.0016	0.0582	0.0036	0.005276	0.33656	436	22	421.6	9.4	C - Caledonian	3.302752
31A-164 - 3.d	0.551	0.031	0.0692	0.0017	0.0584	0.0034	0.079965	0.30978	444	20	431.2	10	C - Caledonian	2.882883
~~**31A-165 - 1.d**~~	~~0.717~~	~~0.041~~	~~0.0839~~	~~0.002~~	~~0.0622~~	~~0.0034~~	~~0.032583~~	~~0.38431~~	~~546~~	~~24~~	~~519.5~~	~~12~~	~~D~~	~~4.85348~~
31A-165 - 2.d	0.538	0.031	0.0686	0.0016	0.0571	0.0032	-0.08402	0.39134	435	20	427.7	9.8	C - Caledonian	1.678161
31A-166 - 1.d	0.517	0.028	0.0687	0.0016	0.0548	0.0028	0.21198	0.1848	425	18	428.2	9.5	C - Caledonian	-0.75294
31A-167 - 1.d	0.518	0.027	0.0682	0.0015	0.0551	0.0027	0.2765	0.13734	424	18	425.5	9.3	C - Caledonian	-0.35377
31A-167 - 2.d	0.51	0.027	0.066	0.0015	0.0556	0.0029	0.099234	0.25119	419	18	412.1	9.1	C - Caledonian	1.646778
~~**31A-168 - 1.d**~~	~~0.592~~	~~0.04~~	~~0.0766~~	~~0.0028~~	~~0.056~~	~~0.0032~~	~~0.66639~~	~~0.012106~~	~~468~~	~~25~~	~~475~~	~~17~~	~~D - ellipse touching concordia~~	~~-1.49573~~
31A-168 - 2.d	0.522	0.03	0.0678	0.0016	0.0551	0.003	0.29788	0.15292	424	20	422.8	9.9	C - Caledonian	0.283019
31A-169 - 1.d	0.517	0.026	0.06642	0.0015	0.0563	0.0028	0.091633	0.28095	422	18	414.5	8.9	C - Caledonian	1.777251

31A-169 - 2.d	0.518	0.025	0.06584	0.0015	0.0577	0.0028	-0.07507	0.43655	423	17	411.7	8.8	C - Caledonian	2.671395
~~**31A-170 - 1.d**~~	~~0.592~~	~~0.033~~	~~0.071~~	~~0.0019~~	~~0.06~~	~~0.0033~~	~~0.16871~~	~~0.30759~~	~~476~~	~~21~~	~~442.2~~	~~12~~	~~D~~	~~7.10084~~
31A-170 - 2.d	0.548	0.026	0.0695	0.0016	0.0569	0.0024	0.48318	0.15131	445	17	432.8	9.7	C - Caledonian	2.741573

~~Crossed out~~ = discordant, C = concordant, NC = near concordant, D = discordant, RD = reversely discordant.

WGC2019J-31A zircon geochronology standards

Standard	Type	207/235	2σ	206/238	2σ	207/206	2σ	ErrCorr 6/38vs7/35	ErrorCorr 8/6vs7/6	207/235 age	2σ	206/238	2σ	Concordant?
GJ - 1.d	Primary	0.87	0.047	0.0993	0.0024	0.0633	0.0035	-0.10222	0.46702	635	25	609.9	14	C
GJ - 2.d	Primary	0.836	0.044	0.099	0.0022	0.061	0.0031	0.069843	0.32519	615	25	608.3	13	C
GJ - 3.d	Primary	0.844	0.049	0.0978	0.0023	0.062	0.0033	0.21295	0.19355	620	26	601.5	13	C
GJ - 4.d	Primary	0.805	0.043	0.0994	0.0025	0.0578	0.0031	-0.0029025	0.39743	597	24	611	14	C
GJ - 5.d	Primary	0.812	0.047	0.0971	0.0022	0.0597	0.0035	0.20931	0.17202	602	27	597.1	13	C
GJ - 6.d	Primary	0.823	0.047	0.0983	0.0022	0.0601	0.0032	0.1279	0.21928	606	26	604.4	13	C
GJ - 7.d	Primary	0.833	0.045	0.0983	0.0023	0.0619	0.0032	0.24369	0.18632	615	24	604.1	13	C
GJ - 8.d	Primary	0.811	0.046	0.0984	0.0023	0.06	0.0034	0.037796	0.32182	603	25	604.7	14	C
GJ - 9.d	Primary	0.806	0.044	0.0985	0.0024	0.0595	0.003	0.19398	0.18295	602	25	605.6	14	C
GJ - 10.d	Primary	0.785	0.044	0.0975	0.0023	0.0579	0.0034	-0.073251	0.40869	586	25	599.4	14	C
GJ - 11.d	Primary	0.807	0.044	0.0972	0.0024	0.0598	0.0031	0.043577	0.37326	600	25	598	14	C
GJ - 12.d	Primary	0.853	0.048	0.0986	0.0023	0.0619	0.0033	0.17883	0.27398	623	26	606.3	14	C
GJ - 13.d	Primary	0.8	0.044	0.0974	0.0021	0.0588	0.0031	0.19722	0.18578	594	25	599.1	12	C
GJ - 14.d	Primary	0.76	0.045	0.0957	0.0023	0.0584	0.0033	0.11013	0.24448	579	26	589	13	C
GJ - 15.d	Primary	0.824	0.05	0.0972	0.0023	0.0612	0.0038	0.0097138	0.2991	612	27	597.6	13	C
GJ - 16.d	Primary	0.809	0.049	0.0978	0.0024	0.0601	0.0039	-0.17937	0.54839	597	28	601	14	C
GJ - 17.d	Primary	0.803	0.041	0.0971	0.0021	0.0593	0.003	0.11732	0.21835	596	23	597.1	12	C
GJ - 18.d	Primary	0.808	0.045	0.0974	0.0023	0.0604	0.0034	0.17717	0.19817	598	26	599.3	14	C
GJ - 19.d	Primary	0.817	0.044	0.0952	0.0022	0.0606	0.0034	0.009745	0.40589	604	25	586.2	13	C
GJ - 20.d	Primary	0.824	0.045	0.0985	0.0023	0.0606	0.0034	0.042158	0.39978	607	26	605.8	14	C
GJ - 21.d	Primary	0.824	0.046	0.098	0.0024	0.0605	0.0033	0.22052	0.14998	607	26	602	14	C
GJ - 22.d	Primary	0.785	0.045	0.0982	0.0025	0.0581	0.0034	-0.0018249	0.38081	588	26	604	15	C

GJ - 23.d	Primary	0.838	0.046	0.0987	0.0024	0.0618	0.0033	0.12666	0.22477	615	26	606.6	14	C
GJ - 24.d	Primary	0.779	0.043	0.0988	0.0024	0.058	0.0032	0.057941	0.39696	587	24	607.3	14	C
GJ - 25.d	Primary	0.819	0.042	0.0981	0.0024	0.0603	0.0032	-0.15759	0.5604	610	23	603	14	C
GJ - 26.d	Primary	0.802	0.045	0.0996	0.0024	0.0581	0.0033	-0.013642	0.35697	603	25	611.8	14	C
GJ - 27.d	Primary	0.794	0.048	0.0981	0.0024	0.0595	0.0036	0.1105	0.23372	596	27	603.2	14	C
GJ - 28.d	Primary	0.793	0.043	0.0973	0.0023	0.0585	0.0032	0.13285	0.21804	593	24	598.2	14	C
GJ - 29.d	Primary	0.812	0.045	0.0978	0.0025	0.0598	0.0034	0.039788	0.39313	606	27	601	14	C
GJ - 30.d	Primary	0.829	0.046	0.0975	0.0025	0.0612	0.0032	0.21971	0.26223	610	26	601	14	C
GJ - 31.d	Primary	0.825	0.044	0.0966	0.0023	0.063	0.0032	0.20137	0.19239	618	26	594.5	13	C
GJ - 32.d	Primary	0.826	0.049	0.0989	0.0023	0.0612	0.0034	0.067779	0.28007	611	26	608.1	14	C
GJ - 33.d	Primary	0.847	0.046	0.0986	0.0024	0.0617	0.0035	-0.096174	0.45218	622	26	606.1	14	C
GJ - 34.d	Primary	0.821	0.043	0.097	0.0023	0.0603	0.0031	0.083711	0.30996	608	24	596.9	14	C
GJ - 35.d	Primary	0.791	0.043	0.0957	0.0024	0.0593	0.0033	-0.16318	0.52746	589	24	589	14	C
GJ - 36.d	Primary	0.833	0.046	0.0983	0.0025	0.061	0.0033	0.2093	0.25564	612	26	604	15	C
GJ - 37.d	Primary	0.769	0.047	0.0973	0.0023	0.0566	0.0034	0.059232	0.21187	581	26	598.7	13	C
GJ - 38.d	Primary	0.814	0.039	0.0971	0.0025	0.0601	0.0028	0.163	0.32843	603	22	598	14	C
GJ - 39.d	Primary	0.799	0.047	0.0987	0.0022	0.0586	0.0034	-0.12628	0.40199	599	26	606.5	13	C
GJ - 40.d	Primary	0.841	0.047	0.0977	0.0025	0.0625	0.0036	-0.073296	0.48392	622	25	601	15	C
GJ - 41.d	Primary	0.801	0.047	0.0971	0.0023	0.0604	0.0033	0.26165	0.15643	597	27	597.1	14	C
GJ - 42.d	Primary	0.772	0.047	0.0985	0.0024	0.0573	0.0033	0.33101	0.083413	577	26	605	14	C
GJ - 43.d	Primary	0.825	0.045	0.0985	0.0023	0.0603	0.0032	0.24837	0.20201	608	25	605.6	14	C
GJ - 44.d	Primary	0.839	0.048	0.0985	0.0025	0.0612	0.0035	-0.053658	0.44439	615	26	606	15	C
GJ - 45.d	Primary	0.836	0.046	0.096	0.0023	0.0618	0.0034	-0.0483	0.41065	614	25	590.5	13	C
GJ - 46.d	Primary	0.852	0.051	0.0955	0.0024	0.0637	0.0037	0.17274	0.22451	627	29	589	14	C
GJ - 47.d	Primary	0.841	0.048	0.0999	0.0026	0.0619	0.0035	0.12941	0.27408	616	26	613	15	C
GJ - 48.d	Primary	0.815	0.048	0.0972	0.0023	0.06	0.0036	0.02387	0.36966	605	26	597.9	14	C
GJ - 49.d	Primary	0.814	0.043	0.097	0.0024	0.0607	0.0032	0.14431	0.24224	604	24	597	14	C
GJ - 50.d	Primary	0.781	0.045	0.0979	0.0022	0.0574	0.0032	0.16011	0.1724	586	26	601.7	13	C
GJ - 51.d	Primary	0.83	0.042	0.101	0.0023	0.0593	0.0029	-0.0066687	0.40132	618	23	620	14	C
GJ - 52.d	Primary	0.8	0.042	0.0995	0.0024	0.0583	0.003	-0.0078396	0.43912	595	23	611.3	14	C
GJ - 53.d	Primary	0.82	0.045	0.0968	0.0022	0.0618	0.0032	0.084614	0.28788	610	24	595.5	13	C

GJ - 54.d	Primary	0.856	0.047	0.0985	0.0022	0.0627	0.0034	0.16315	0.16281	627	26	605.6	13	C
GJ - 55.d	Primary	0.794	0.042	0.0986	0.0021	0.0582	0.003	0.031216	0.2965	593	23	606.1	12	C
GJ - 56.d	Primary	0.821	0.042	0.0965	0.0023	0.0615	0.0033	-0.0040528	0.36286	609	23	593.8	14	C
Ples - 1.d	Secondary	0.398	0.02	0.05504	0.0011	0.0517	0.0024	0.11346	0.26743	339.7	14	345.4	6.9	C
Ples - 2.d	Secondary	0.402	0.02	0.05447	0.0012	0.0537	0.0025	0.11756	0.33601	342.7	14	341.9	7.3	C
Ples - 3.d	Secondary	0.406	0.02	0.05393	0.0011	0.0544	0.0026	0.1394	0.20111	345.6	14	338.6	7	C
Ples - 4.d	Secondary	0.389	0.019	0.05324	0.0011	0.0534	0.0025	0.023048	0.30945	335.5	14	334.4	6.8	C
Ples - 5.d	Secondary	0.403	0.02	0.05398	0.0012	0.0548	0.0026	0.1161	0.31043	344.5	14	338.9	7.1	C
Ples - 6.d	Secondary	0.394	0.02	0.05333	0.0012	0.0529	0.0027	-0.0037622	0.35608	336.3	15	334.9	7.2	C
Ples - 7.d	Secondary	0.383	0.018	0.05406	0.0012	0.0511	0.0023	0.027716	0.37249	328.5	13	339.4	7.2	C
Ples - 8.d	Secondary	0.394	0.02	0.0538	0.0011	0.0532	0.0026	0.12746	0.27406	336.5	14	337.8	6.9	C
Ples - 9.d	Secondary	0.386	0.018	0.05269	0.0011	0.0524	0.0023	0.19845	0.17577	331.2	13	331	6.7	C
Ples - 10.d	Secondary	0.385	0.019	0.05376	0.0011	0.052	0.0024	0.26382	0.11429	330	14	337.5	7	C
Ples - 11.d	Secondary	0.386	0.02	0.05294	0.0011	0.0519	0.0024	0.24919	0.13767	330.5	14	332.5	7	C
Ples - 12.d	Secondary	0.372	0.021	0.05154	0.001	0.0508	0.0028	0.17819	0.11355	322	15	323.9	6.2	C
Ples - 13.d	Secondary	0.411	0.022	0.05486	0.0012	0.0537	0.0028	0.19137	0.25608	349	16	344.3	7.6	C
Ples - 14.d	Secondary	0.407	0.02	0.05415	0.0012	0.0544	0.0026	0.087338	0.3354	346.2	15	339.9	7.5	C
Ples - 15.d	Secondary	0.42	0.022	0.05526	0.0013	0.0556	0.0029	-0.078666	0.43044	355	15	346.7	8	C
Ples - 16.d	Secondary	0.389	0.019	0.05368	0.0011	0.0527	0.0024	0.1376	0.27502	334.3	14	337	7	C
Ples - 17.d	Secondary	0.399	0.019	0.05437	0.0012	0.0532	0.0025	0.09412	0.30232	341.7	14	341.3	7.4	C
Ples - 18.d	Secondary	0.396	0.019	0.05534	0.0011	0.0516	0.0024	0.19572	0.22728	337.8	14	347.2	7	C
Ples - 19.d	Secondary	0.387	0.019	0.05321	0.0011	0.0525	0.0024	0.13877	0.22121	333.1	13	334.2	6.5	C
Ples - 20.d	Secondary	0.4	0.022	0.05278	0.0013	0.0553	0.003	0.15185	0.32655	342	15	331.5	7.9	C
Ples - 21.d	Secondary	0.412	0.022	0.0537	0.0013	0.0554	0.0028	0.10715	0.32003	351	16	337.2	8	C
Ples - 22.d	Secondary	0.418	0.023	0.05427	0.0012	0.0557	0.0028	0.24799	0.17561	358	17	340.6	7.1	C
Ples - 23.d	Secondary	0.407	0.023	0.05448	0.0013	0.0533	0.003	0.037863	0.34776	345	17	342	7.8	C
Ples - 24.d	Secondary	0.403	0.022	0.05371	0.0013	0.0536	0.0029	-0.068238	0.44255	343	16	337.2	8	C
Ples - 25.d	Secondary	0.407	0.023	0.0546	0.0013	0.054	0.0031	0.020747	0.43593	348	16	342.7	8.1	C
Ples - 26.d	Secondary	0.393	0.022	0.0527	0.0013	0.0543	0.0031	-0.070016	0.41357	335	16	331.1	7.8	C
Ples - 27.d	Secondary	0.386	0.02	0.0533	0.0012	0.0523	0.0026	0.079296	0.34963	331.9	14	334.7	7.5	C
Ples - 28.d	Secondary	0.419	0.023	0.0542	0.0012	0.0545	0.003	0.11647	0.25066	354	17	340.2	7.5	C

Ples - 29.d	Secondary	0.409	0.018	0.05542	0.0012	0.0528	0.0023	0.29395	0.1785	347.7	13	347.7	7.4	C
Ples - 30.d	Secondary	0.583	0.032	0.055	0.0015	0.0761	0.0042	0.27295	0.40387	464	21	345.2	9	D
Ples - 31.d	Secondary	0.464	0.024	0.05519	0.0013	0.0608	0.0033	-0.042566	0.47251	386	17	346.3	7.7	D
Ples - 32.d	Secondary	0.426	0.021	0.05392	0.0011	0.0572	0.0028	0.032263	0.25631	362	15	338.5	6.8	D
Ples - 33.d	Secondary	0.405	0.018	0.05471	0.0012	0.053	0.0024	-0.16998	0.48852	344.8	13	343.3	7	C
Ples - 34.d	Secondary	0.396	0.021	0.05433	0.0012	0.0528	0.0027	-0.039162	0.35761	339	15	341	7.5	C
Ples - 35.d	Secondary	0.394	0.021	0.05495	0.0012	0.052	0.0027	-0.015028	0.41094	338	15	344.8	7.4	C
Ples - 36.d	Secondary	0.437	0.023	0.05472	0.0012	0.0568	0.0031	-0.039771	0.36439	367	16	343.4	7.6	C
Ples - 37.d	Secondary	0.418	0.018	0.05396	0.0011	0.0556	0.0023	0.097999	0.3578	355.2	14	338.7	6.7	C
Ples - 38.d	Secondary	0.408	0.019	0.05433	0.001	0.0541	0.0024	0.18156	0.14224	347.1	14	341	6.4	C
Ples - 39.d	Secondary	0.401	0.021	0.05187	0.0011	0.0564	0.0028	0.3273	0.065303	341	16	326	6.9	C
Ples - 40.d	Secondary	0.409	0.019	0.05435	0.0011	0.0539	0.0024	-0.014265	0.39516	348.8	14	341.1	6.7	C
91500 - 1.d	Secondary	1.859	0.12	0.1789	0.0054	0.076	0.0048	0.12423	0.38296	1066	41	1060	29	C
91500 - 2.d	Secondary	1.796	0.11	0.1762	0.0051	0.0722	0.0048	-0.017937	0.36592	1044	42	1052	29	C
91500 - 3.d	Secondary	1.76	0.12	0.1733	0.0046	0.0744	0.0054	0.00034892	0.34248	1024	47	1030	25	C
91500 - 4.d	Secondary	1.94	0.14	0.1825	0.0059	0.0783	0.0061	0.017782	0.44551	1082	53	1083	31	C
91500 - 5.d	Secondary	1.84	0.13	0.1778	0.0051	0.0747	0.0048	0.31799	0.1207	1057	46	1057	29	C
91500 - 6.d	Secondary	1.77	0.14	0.179	0.0056	0.0724	0.0059	-0.091747	0.49984	1030	51	1060	31	C
91500 - 7.d	Secondary	1.77	0.16	0.1764	0.0062	0.0752	0.0065	0.18727	0.25458	1024	60	1050	33	C
91500 - 8.d	Secondary	1.78	0.15	0.1773	0.006	0.0716	0.0059	0.032504	0.2765	1032	52	1051	33	C
91500 - 9.d	Secondary	1.68	0.15	0.1766	0.0056	0.069	0.0063	0.096621	0.28936	1023	56	1047	30	C
91500 - 10.d	Secondary	1.83	0.13	0.182	0.005	0.0729	0.0052	0.21309	0.2005	1053	48	1077	27	C
91500 - 11.d	Secondary	1.76	0.13	0.1829	0.0053	0.07	0.005	0.18386	0.18088	1037	48	1085	29	C
91500 - 12.d	Secondary	1.71	0.14	0.1734	0.0067	0.0723	0.006	0.04017	0.51848	1034	50	1029	37	C
91500 - 13.d	Secondary	1.85	0.14	0.1796	0.0059	0.0747	0.0063	-0.11178	0.47118	1061	50	1064	32	C
91500 - 14.d	Secondary	1.9	0.13	0.1789	0.0051	0.0774	0.0053	0.08669	0.3882	1075	46	1064	29	C
91500 - 15.d	Secondary	1.77	0.15	0.1763	0.0057	0.0726	0.0059	0.21803	0.15814	1034	50	1046	31	C
91500 - 16.d	Secondary	1.743	0.12	0.177	0.0059	0.0734	0.0053	0.018321	0.39511	1028	44	1049	32	C
91500 - 17.d	Secondary	1.77	0.14	0.1754	0.0053	0.0733	0.006	0.14684	0.24624	1035	52	1041	29	C
91500 - 18.d	Secondary	1.78	0.14	0.1807	0.0055	0.0722	0.006	0.021595	0.34478	1041	51	1073	30	C
91500 - 19.d	Secondary	1.87	0.13	0.1727	0.0054	0.0808	0.006	-0.10781	0.48947	1058	46	1030	30	D

91500 - 20.d	Secondary	1.84	0.14	0.1807	0.0057	0.0745	0.0063	-0.13426	0.50755	1062	50	1070	31	C
91500 - 21.d	Secondary	1.87	0.14	0.1816	0.0055	0.0741	0.0056	0.00057159	0.41764	1067	49	1075	30	C
91500 - 22.d	Secondary	1.844	0.12	0.1745	0.0052	0.0756	0.005	0.029253	0.43994	1056	40	1036	29	C
91500 - 23.d	Secondary	1.83	0.13	0.1797	0.0053	0.074	0.0052	0.080822	0.3795	1048	47	1065	29	C
91500 - 24.d	Secondary	1.68	0.13	0.1772	0.0058	0.0688	0.0053	0.054396	0.33539	997	49	1050	32	C
91500 - 25.d	Secondary	1.89	0.13	0.1766	0.0055	0.0756	0.0051	0.19798	0.26449	1065	48	1048	30	C
91500 - 26.d	Secondary	1.73	0.12	0.1763	0.0055	0.0716	0.005	0.064505	0.24721	1023	49	1046	30	C
91500 - 27.d	Secondary	1.86	0.13	0.1778	0.0053	0.0762	0.0058	-0.045769	0.34947	1059	47	1057	29	C
91500 - 28.d	Secondary	1.695	0.11	0.179	0.0053	0.0665	0.004	0.28503	0.14377	1006	42	1061	29	D
91500 - 29.d	Secondary	1.73	0.13	0.1784	0.0063	0.0708	0.0057	0.017395	0.4033	1027	50	1061	35	C
91500 - 30.d	Secondary	1.81	0.13	0.1833	0.0054	0.0723	0.0054	0.042876	0.38431	1062	49	1084	29	C
91500 - 31.d	Secondary	1.87	0.14	0.1812	0.0051	0.0731	0.0055	0.18279	0.33017	1062	50	1073	28	C
91500 - 32.d	Secondary	1.838	0.12	0.1786	0.0054	0.0742	0.0048	0.17436	0.33415	1058	41	1059	29	C
91500 - 33.d	Secondary	1.96	0.12	0.1768	0.0053	0.0796	0.0049	0.23508	0.25412	1096	43	1052	28	C
91500 - 34.d	Secondary	1.749	0.12	0.1745	0.0055	0.0723	0.0052	0.064847	0.34362	1015	44	1039	30	C
91500 - 35.d	Secondary	1.85	0.13	0.1769	0.0048	0.0742	0.0053	-0.027781	0.35429	1056	45	1050	26	C
91500 - 36.d	Secondary	1.91	0.14	0.1816	0.0057	0.0749	0.0056	0.057211	0.37311	1084	50	1075	31	C
91500 - 37.d	Secondary	1.93	0.13	0.1831	0.0056	0.0762	0.0052	0.11658	0.34719	1086	45	1086	31	C
91500 - 38.d	Secondary	1.8	0.14	0.1851	0.0062	0.0709	0.0055	0.18996	0.25411	1048	51	1093	34	C
91500 - 39.d	Secondary	1.94	0.13	0.1811	0.0051	0.0752	0.0049	0.13029	0.29129	1092	47	1072	28	C
91500 - 40.d	Secondary	1.95	0.13	0.1788	0.0056	0.0785	0.0056	-0.087073	0.49358	1104	46	1060	31	C

~~Crossed out~~ = discordant, C = concordant, NC = near concordant, D = discordant, RD = reversely discordant

WGC2019J-25B zircon trace elements

	Chondrite normalised REEs + Y																
Sample	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Y**	**Ho**	**Er**	**Tm**	**Yb**	**Lu**	**Total HREEs**	**Eu anomaly**
WGC-25B-3 - 1.d	0	5.02447	0	0	3.378378	4.795737	18.19095	22.43767	27.56098	48.7	27.10623	29.1875	29.19028	30.24845	30.4878	244.9189	0.611749
WGC-25B-3 - 2.d	0	5.285481	0	0	0	4.795737	13.31658	22.16066	21.66667	39.6	22.34432	25.1875	25.50607	18.75776	26.01626	201.2393	#DIV/0!
WGC-25B-4 - 1.d	0	0.831974	0	0	0	2.895204	3.366834	4.32133	8.211382	23.6	9.89011	15.5	15.82996	34.16149	45.93496	157.4492	#DIV/0!

WGC-25B-4 - 2.d	0.080169	4.763458	0.991379	2.472648	1.891892	4.795737	8.040201	12.18837	14.02439	32.3	11.35531	15.4375	17.40891	16.89441	21.13821	140.7471	1.229628
WGC-25B-4 - 3.d	0	1.092985	0	0	0.945946	0.568384	4.572864	6.648199	9.186992	32.8	8.058608	10.3125	16.19433	22.98137	36.17886	142.3609	0.273284
WGC-25B-5 - 1.d	0	2.349103	0	0	0	0.79929	8.140704	7.617729	12.47967	24.1	13.91941	12.625	9.757085	11.0559	8.699187	100.254	#DIV/0!
WGC-25B-5 - 2.d	0	1.517129	0	0	0	1.829485	6.934673	11.96676	12.11382	16.2	14.46886	17.875	14.49393	22.73292	34.95935	144.8106	#DIV/0!
WGC-25B-5 - 3.d	0	2.218597	0	0	0	4.174067	9.698492	12.46537	13.53659	25.6	13.91941	11.4375	9.311741	13.6646	10.28455	110.2198	#DIV/0!
WGC-25B-6 - 1.d	0	3.099511	0	0	0.878378	5.683837	10.15075	15.51247	19.7561	36.7	20.51282	24.375	23.07692	27.51553	38.61789	206.0667	1.903494
WGC-25B-6 - 2.d	0	3.017945	0	0	0	0.71048	5.979899	7.423823	13.82114	26.7	11.72161	14.125	16.76113	17.20497	18.69919	126.4569	#DIV/0!
WGC-25B-7 - 1.d	0.902954	7.161501	7.650862	14.44201	29.7973	17.22913	18.24121	12.74238	14.39024	25.6	11.17216	10.6875	11.33603	8.136646	11.66667	105.7316	0.739006
WGC-25B-7 - 2.d	0.582278	5.106036	6.465517	11.33479	19.12162	11.90053	8.743719	8.199446	6.829268	38.4	7.289377	8.1875	8.299595	8.63354	13.41463	99.25336	0.920356
WGC-25B-7 - 3.d	0	2.69168	0	0	0.743243	2.344583	5.628141	6.952909	9.02439	23.8	8.260073	8.0625	4.129555	6.397516	7.195122	73.82206	1.146351
WGC-25B-8 - 1.d	0	4.013051	0	0	0.810811	5.150977	13.41709	13.10249	17.23577	22.7	17.21612	15.8125	15.82996	18.26087	14.10569	134.2634	1.561711
WGC-25B-8 - 2.d	0	3.60522	0	0	1.081081	4.973357	10.90452	15.23546	15.89431	17.3	16.11722	16.875	14.21053	17.70186	15.56911	128.9035	1.448496
WGC-25B-10 - 1.d	0.708861	6.182708	3.340517	4.573304	9.797297	9.946714	12.36181	14.95845	16.66667	17.76	13.91941	12.8125	16.07287	16.08696	14.43089	122.7078	0.903827
WGC-25B-10 - 2.d	0	1.239804	0	0	0	0.959147	4.924623	6.426593	7.235772	32.4	8.424908	6.5	7.449393	27.32919	35.77236	131.5382	#DIV/0!
WGC-25B-11 - 1.d	0	1.500816	0	0	0.540541	0	4.522613	4.875346	8.089431	31.7	7.545788	8.625	6.153846	3.78882	4.918699	75.69693	0
WGC-25B-11 - 2.d	0.637131	5.122349	3.103448	5.317287	8.716216	8.525755	14.77387	18.55956	26.01626	46.6	37.91209	54.375	45.74899	67.08075	85.77236	382.065	0.751314
WGC-25B-11 - 3.d	0	3.915171	0	0	1.148649	4.973357	7.487437	14.12742	12.88618	27.7	11.17216	11.5625	9.878543	11.24224	10.81301	109.3821	1.695858
WGC-25B-12 - 1.d	0	2.23491	0	0	0.540541	4.085258	11.65829	24.65374	28.61789	15.2	30.21978	27.6875	21.05263	27.63975	26.01626	201.0875	1.627376
WGC-25B-13 - 1.d	0	1.615008	0	0	0.243243	3.410302	10.45226	15.23546	21.78862	13.9	18.86447	19.8125	15.87045	19.62733	10.85366	135.9525	2.138786
WGC-25B-13 - 2.d	0	1.288744	0	0	3.243243	4.973357	20.40201	16.6205	13.69919	63.1	11.90476	16.0625	12.79352	13.6646	13.65854	161.5036	0.611397
WGC-25B-14 - 1.d	0	2.006525	0	0	2.22973	3.357016	15.17588	22.16066	25	22.4	29.67033	28.3125	24.69636	25.59006	20.3252	198.1551	0.577099
WGC-25B-15 - 1.d	0	1.712887	0	0.525164	7.635135	0	32.66332	60.66482	115.8537	41.1	209.707	391.25	716.5992	1270.807	1869.919	4675.901	0
WGC-25B-15 - 2.d	0.177215	1.598695	0	0	1.283784	2.326821	13.8191	26.5928	61.38211	227	116.3004	235	392.7126	757.764	1150.407	2967.158	0.55243
WGC-25B-16 - 1.d	0	1.82708	0	0	5.608108	8.703375	25.17588	39.61219	55.28455	50.4	58.79121	59.75	54.65587	53.72671	54.87805	427.0986	0.732465
WGC-25B-16 - 2.d	0	1.729201	0	0	1.081081	1.332149	10.60302	15.23546	20.97561	37.9	23.07692	23.75	18.21862	28.19876	27.64228	194.9976	0.393468
WGC-25B-17 - 1.d	0	1.141925	0	0	0	0	0.552764	3.98892	7.235772	27	10.07326	10.5625	11.09312	10.93168	12.27642	93.16167	#DIV/0!
WGC-25B-17 - 2.d	0	2.773246	0	0	0	1.580817	7.135678	9.695291	12.19512	47.8	10.07326	11.375	9.635628	11.0559	10.69106	122.5213	#DIV/0!
WGC-25B-18 - 1.d	0	2.920065	0	0	1.756757	4.440497	9.346734	9.66759	11.50407	370	11.17216	11.875	11.53846	9.31677	13.65854	448.7326	1.095837
WGC-25B-18 - 2.d	0	3.425775	0	0	3.108108	3.907638	12.51256	21.88366	21.09756	206	23.26007	22.8125	21.86235	22.79503	21.95122	361.6624	0.626604
WGC-25B-19 - 1.d	0	1.810767	0	0	2.027027	3.978686	7.085427	14.95845	24.02439	109.6	24.90842	27.1875	26.31579	24.96894	21.13821	273.1017	1.049849
WGC-25B-19 - 2.d	0	1.843393	0	0	0	3.161634	12.21106	17.72853	23.53659	41	26.37363	27.3125	27.53036	26.70807	32.92683	223.1165	#DIV/0!

WGC-25B-20 - 1.d	0.291139	5.057096	1.142241	2.100656	4.391892	6.039076	9.899497	14.40443	15.52846	19.73	17.39927	22.5	20.24291	27.76398	35.77236	173.3414	0.915879
WGC-25B-20 - 2.d	0	3.556281	0	0	0	1.918295	9.447236	11.08033	14.63415	19.8	12.08791	11.1875	9.271255	11.61491	13.13008	102.8061	#DIV/0!
~~WGC-25B-21 - 1.d~~	~~0~~	~~0.378467~~	~~0~~	~~0~~	~~0~~	~~0.550622~~	~~6.78392~~	~~13.85042~~	~~14.30894~~	~~22.8~~	~~14.28571~~	~~18.4375~~	~~15.54656~~	~~24.16149~~	~~30.0813~~	~~153.4719~~	~~#DIV/0!~~
WGC-25B-21 - 2.d	0	4.355628	0	0	2.972973	3.694494	13.51759	16.89751	19.39024	24.4	16.48352	17.0625	17.40891	15.96273	14.22764	141.833	0.582787
WGC-25B-22 - 1.d	0	4.159869	0	0	7.22973	7.282416	21.30653	26.31579	28.86179	39.7	26.92308	31.6875	29.95951	35.59006	36.58537	255.6231	0.586757
WGC-25B-22 - 2.d	0	5.742251	0	0.175055	3.648649	9.058615	27.78894	35.45706	37.72358	47.9	37.91209	40.375	40.89069	46.89441	42.27642	329.4292	0.899621
WGC-25B-23 - 1.d	0	2.577488	0	0	0	0.817052	6.532663	6.925208	10.56911	46	10.98901	11.5	9.473684	7.57764	9.715447	112.7501	#DIV/0!
WGC-25B-23 - 2.d	0	3.784666	0	0	0	0	5.577889	11.08033	13.37398	33.7	12.82051	11.25	13.19838	12.48447	12.31707	120.2248	#DIV/0!
WGC-25B-24 - 1.d	0	0.668842	0	0	0	3.907638	6.231156	12.18837	20.73171	24.7	19.23077	20.1875	17.69231	15.71429	15.36585	145.8108	#DIV/0!
WGC-25B-24 - 2.d	0	1.761827	0	0	0	2.042629	8.190955	15.23546	26.91057	28.1	26.92308	24.5625	25.10121	23.6646	21.13821	191.6356	#DIV/0!
WGC-25B-25 - 1.d	0	3.670473	0	0	1.148649	3.605684	11.70854	16.89751	18.82114	30.2	20.69597	17.0625	17.40891	20.55901	19.95935	161.6044	0.983202
WGC-25B-25 - 2.d	0	4.323002	0	0	2.5	3.907638	13.46734	14.95845	20.65041	55.9	20.51282	20.25	21.45749	23.04348	25.20325	201.9759	0.673447
WGC-25B-26 - 1.d	0	2.822186	0	0	1.689189	9.413854	18.24121	31.30194	37.39837	71.3	35.53114	36.4375	28.34008	33.91304	26.42276	300.6448	1.695905
WGC-25B-26 - 2.d	0.168776	2.479608	0.12931	0.153173	3.513514	6.571936	15.9799	25.76177	28.17073	21.2	28.57143	28.8125	24.2915	28.57143	31.30081	216.6802	0.877072
WGC-25B-27 - 1.d	0	5.986949	0	0.393873	2.635135	6.216696	16.88442	27.70083	30	23.6	30.03663	25.9375	22.46964	30.18634	34.55285	224.4838	0.931998
WGC-25B-27 - 2.d	0	4.159869	0	0	7.432432	7.815275	23.9196	27.14681	34.55285	42	34.79853	36.625	40.89069	46.08696	39.43089	301.5317	0.586141
WGC-25B-28 - 1.d	0	1.810767	0	0	0	2.85968	11.9598	18.55956	24.5122	51.8	21.97802	24.1875	26.72065	23.47826	21.13821	212.3744	#DIV/0!
WGC-25B-28 - 2.d	0	1.729201	0	0	1.283784	4.049734	7.889447	16.89751	22.64228	34.6	21.97802	22.3125	19.47368	17.57764	19.9187	175.4003	1.272498
WGC-25B-29 - 1.d	0	2.218597	0	0	1.148649	3.250444	14.42211	21.32964	28.73984	35.2	33.15018	32.75	29.1498	31.0559	32.11382	243.4892	0.79861
WGC-25B-30 - 1.d	1.434599	6.672104	2.553879	3.522976	7.635135	6.394316	15.32663	21.88366	20.2439	67.8	17.76557	16.375	13.84615	16.3354	14.63415	188.8838	0.591102
WGC-25B-31 - 1.d	0	3.817292	0	0	0	2.841918	7.788945	15.51247	13.57724	53.5	17.03297	14.8125	13.68421	13.91304	15.36585	157.3983	#DIV/0!
~~WGC-25B-31 - 2.d~~	~~0.329114~~	~~3.947798~~	~~0~~	~~0.4814~~	~~5.878378~~	~~6.039076~~	~~9.798995~~	~~15.42936~~	~~22.96748~~	~~19.15~~	~~20.69597~~	~~21.8125~~	~~25.34413~~	~~26.39752~~	~~25.60976~~	~~177.4067~~	~~0.795703~~
WGC-25B-32 - 1.d	0	0.815661	0	0	0	3.730018	10.65327	11.91136	9.634146	49.8	8.058608	11.0625	7.773279	8.881988	12.68293	119.8048	#DIV/0!
WGC-25B-33 - 1.d	0	2.202284	0	0	1.418919	6.927176	22.36181	32.13296	36.99187	66.8	32.60073	36.125	28.34008	26.70807	30.4878	290.1865	1.22977
WGC-25B-33 - 2.d	0	1.859706	0	0	2.22973	5.506217	19.84925	24.93075	31.78862	42.6	23.26007	26.125	23.07692	21.92547	20.73171	214.4385	0.827666
WGC-25B-34 - 1.d	0	3.066884	0	0	2.702703	5.506217	13.01508	17.17452	18.04878	42.1	19.23077	20.375	16.43725	19.68944	19.87805	172.9338	0.928391
WGC-25B-34 - 2.d	0	2.659054	0	0	1.486486	6.394316	10.25126	16.89751	19.8374	57.2	14.28571	18.8125	15.30364	20.99379	17.88618	181.2167	1.638042
~~WGC-25B-35 - 1.d~~	~~0~~	~~3.686786~~	~~0~~	~~0~~	~~0.743243~~	~~4.262877~~	~~12.31156~~	~~14.90305~~	~~15.65041~~	~~36.5~~	~~12.45421~~	~~13.375~~	~~14.12955~~	~~11.86335~~	~~10.97561~~	~~129.8512~~	~~1.409227~~
WGC-25B-35 - 2.d	0	3.278956	0	0	0.810811	3.357016	7.638191	11.82825	13.25203	26.7	12.82051	13.5625	8.54251	14.16149	10.36585	111.2332	1.348958
WGC-25B-36 - 1.d	0	1.761827	0	0.328228	0.945946	4.973357	10.20101	15.78947	23.25203	37.1	24.35897	27.875	21.86235	24.53416	18.69919	193.4712	1.601014
WGC-25B-36 - 2.d	0	0.489396	0	0	0.810811	1.793961	6.683417	7.479224	5.121951	21.2	5.769231	5.0625	3.036437	5.52795	7.642276	60.83957	0.770644

WGC-25B-36 - 3.d	0	0.50571	0	0	3.310811	11.36767	33.66834	25.76177	13.33333	60.1	9.52381	5	7.287449	9.31677	13.08943	143.4126	1.076697
WGC-25B-37 - 1.d	0.219409	3.066884	1.454741	1.378556	0	3.552398	7.085427	13.57341	17.92683	51	18.68132	20.6875	19.83806	26.77019	28.45528	196.9326	#DIV/0!
WGC-25B-37 - 2.d	0	1.060359	0	0	0	0	5.879397	5.844875	9.146341	38.1	12.27106	16.75	23.88664	39.06832	50.81301	195.8802	#DIV/0!
~~WGC-25B-38 - 1.d~~	~~0~~	~~0.766721~~	~~0~~	~~0~~	~~0~~	~~1.669627~~	~~3.61809~~	~~9.141274~~	~~15.52846~~	~~20.2~~	~~17.58242~~	~~24~~	~~27.12551~~	~~34.16149~~	~~40.65041~~	~~188.3896~~	~~#DIV/0!~~
WGC-25B-39 - 1.d	0	2.903752	0	0	2.702703	4.795737	13.36683	15.78947	20.20325	34.5	18.86447	21.3125	15.38462	17.76398	17.07317	160.8915	0.797888
WGC-25B-40 - 1.d	0	2.251223	0	0	3.716216	6.749556	22.21106	29.08587	31.70732	25.8	32.23443	37	33.19838	33.04348	34.55285	256.6223	0.742917
~~WGC-25B-41 - 1.d~~	~~0~~	~~1.32137~~	~~0~~	~~0~~	~~0~~	~~2.50444~~	~~9.19598~~	~~16.06648~~	~~26.05691~~	~~24.8~~	~~25.64103~~	~~25.8125~~	~~23.88664~~	~~22.48447~~	~~16.66667~~	~~181.4147~~	~~#DIV/0!~~
WGC-25B-42 - 1.d	0	3.14845	0	0	1.959459	3.74778	10.35176	17.72853	17.47967	45.7	19.96337	25.8125	29.95951	33.54037	44.30894	234.4929	0.832145
WGC-25B-43 - 1.d	0	1.957586	0	0	1.689189	5.861456	14.52261	29.9169	39.02439	13.3	51.64835	67.5	69.23077	114.2857	126.0163	510.9224	1.183434
WGC-25B-44 - 1.d	0	3.60522	0.086207	1.969365	9.256757	15.09769	23.66834	34.90305	50	17	72.71062	94.375	97.97571	122.3602	147.1545	636.4791	1.019993
WGC-25B-44 - 2.d	0	3.556281	0	0	1.351351	3.516874	9.045226	18.28255	16.70732	37.3	16.66667	12.625	9.149798	13.22981	12.03252	135.9937	1.005919
~~WGC-25B-45 - 1.d~~	~~0.687764~~	~~8.711256~~	~~3.87931~~	~~8.512035~~	~~59.45946~~	~~29.66252~~	~~192.9648~~	~~313.0194~~	~~495.935~~	~~23~~	~~732.6007~~	~~1075~~	~~1178.138~~	~~1515.528~~	~~1894.309~~	~~7227.53~~	~~0.276923~~
WGC-25B-45 - 2.d	0	1.468189	0	0	0	1.492007	5.728643	5.789474	9.512195	26.6	7.362637	10.1875	9.109312	14.40994	16.66667	99.63772	#DIV/0!
WGC-25B-45 - 3.d	0	3.311582	0	0.135667	0	1.030195	8.743719	11.24654	12.43902	32.7	15.38462	15.4375	19.83806	17.20497	23.17073	147.4214	#DIV/0!
WGC-25B-46 - 1.d	0	2.104405	0	0	1.756757	5.328597	14.82412	22.43767	31.78862	35.3	32.96703	32.25	33.60324	30.31056	28.45528	247.1124	1.044173
WGC-25B-46 - 2.d	0	2.969005	0	0	3.378378	4.795737	15.32663	19.11357	29.47154	59.5	31.68498	26	26.31579	28.19876	25.20325	245.4879	0.666466
WGC-25B-47 - 1.d	0	5.579119	0.204741	0.612691	4.72973	4.262877	16.73367	23.54571	30.44715	50.6	34.06593	30.25	28.34008	29.37888	29.26829	255.8961	0.479169
WGC-25B-47 - 2.d	0.202532	8.319739	0.409483	0.437637	5.608108	2.042629	17.33668	34.07202	57.72358	36.9	112.2711	234.375	412.9555	838.5093	1504.065	3230.871	0.207156
WGC-25B-48 - 1.d	0	1.924959	0	0	0	4.618117	13.06533	21.32964	30.3252	80	28.38828	30.9375	26.72065	27.26708	25.60976	270.5781	#DIV/0!
WGC-25B-48 - 2.d	0	2.071778	0	0	1.351351	5.150977	12.36181	24.65374	29.87805	120.5	28.38828	27.4375	25.50607	29.50311	23.17073	309.0375	1.260272
WGC-25B-49 - 1.d	0	2.446982	0	0	0	2.664298	7.286432	11.63435	11.95122	26.3	15.20147	13.0625	13.96761	17.8882	17.07317	127.0785	#DIV/0!
WGC-25B-49 - 2.d	0	3.800979	0	0	3.513514	4.262877	15.17588	19.66759	21.58537	1150	20.14652	20.75	15.62753	19.75155	13.33333	1280.862	0.583788
WGC-25B-50 - 1.d	0	3.278956	0	0	1.554054	10.83481	30.15075	42.10526	55.28455	21.5	54.7619	48.875	42.91498	49.13043	45.52846	360.1006	1.582848
WGC-25B-50 - 2.d	0	1.810767	0	0	1.013514	6.749556	17.53769	23.2687	38.61789	24.8	39.56044	37	34.0081	35.2795	30.0813	262.6159	1.600937
WGC-25B-51 - 1.d	0	1.288744	0	0	0.540541	2.806394	7.18593	12.18837	18.90244	53.2	17.21612	20	14.65587	18.9441	18.57724	173.6841	1.423945
WGC-25B-52 - 1.d	0	3.278956	0	0	1.418919	2.539964	10	13.2964	13.00813	52.1	15.20147	15.1875	19.02834	15.03106	15.85366	158.7065	0.674293
WGC-25B-52 - 2.d	0.080169	3.915171	0	0	1.283784	3.889876	10.1005	13.85042	16.05691	59.8	15.01832	15.9375	11.21457	16.08696	15.56911	163.5338	1.080235
WGC-25B-53 - 1.d	0	4.045677	0	0.218818	10.47297	15.80817	41.70854	58.72576	59.7561	202	57.32601	61.8125	61.94332	66.14907	67.88618	635.5989	0.75637
WGC-25B-54 - 1.d	0	1.729201	0	0	0	5.506217	12.91457	20.77562	23.57724	55.7	22.52747	28.4375	33.60324	55.2795	78.04878	317.9494	#DIV/0!
WGC-25B-54 - 2.d	0	2.430669	0	0.076586	7.972973	7.282416	22.66332	33.79501	37.80488	52.1	42.30769	37.3125	36.43725	41.18012	34.95935	315.8968	0.541756
WGC-25B-55 - 1.d	0	1.435563	0	0	0.472973	3.57016	8.190955	17.17452	25.2439	23.6	28.02198	23.0625	22.55061	24.47205	22.35772	186.4833	1.813854

WGC-25B-55 - 2.d	0	1.82708	0	0	0	2.166963	7.58794	16.06648	20.60976	38.2	20.14652	23.375	24.2915	19.62733	21.54472	183.8613	#DIV/0!
WGC-25B-56 - 1.d	0	2.169657	0	0	1.283784	1.705151	14.1206	24.65374	33.21138	92	32.78388	37.375	32.79352	33.91304	34.14634	320.8769	0.400489
~~**WGC-25B-56 - 2.d**~~	~~0~~	~~1.810767~~	~~0~~	~~0~~	~~0.945946~~	~~3.889876~~	~~14.22111~~	~~25.76177~~	~~32.68293~~	~~64.8~~	~~37.54579~~	~~38.25~~	~~29.1498~~	~~35.2795~~	~~35.77236~~	~~299.2421~~	~~1.060562~~
WGC-25B-57 - 1.d	0	1.941272	0	0	0.472973	3.019538	6.030151	17.17452	20.12195	39.6	20.32967	19.875	16.19433	20.74534	16.09756	170.1384	1.787962
WGC-25B-57 - 2.d	0	1.272431	0	0	0	1.669627	7.98995	14.68144	22.88618	29	25.64103	30.0625	21.21457	26.14907	24.39024	194.025	#DIV/0!
WGC-25B-58 - 1.d	0	51.63132	0.657328	3.063457	24.45946	16.69627	81.90955	145.4294	261.3821	1036	427.6557	678.125	938.8664	1397.516	1865.854	6750.828	0.373017
WGC-25B-59 - 1.d	0.101266	1.533442	1.045259	2.14442	2.162162	3.357016	6.331658	4.32133	6.910569	26.7	6.190476	8.0625	8.380567	11.98758	18.69919	91.25221	0.907299
WGC-25B-60 - 1.d	0	0.360522	0	0	0	0.35524	7.537688	10.19391	12.15447	100.1	12.08791	12.0625	8.137652	14.59627	15.85366	185.1864	#DIV/0!
~~**WGC-25B-60 - 2.d**~~	~~0~~	~~1.207178~~	~~0~~	~~0~~	~~0~~	~~0.17762~~	~~3.366834~~	~~4.709141~~	~~5.894309~~	~~40.7~~	~~7.637363~~	~~9.25~~	~~9.149798~~	~~7.142857~~	~~7.845528~~	~~92.329~~	~~#DIV/0!~~
WGC-25B-60 - 3.d	0	3.24633	0	0	0.743243	2.85968	7.487437	8.836565	10.77236	41.6	10.25641	10.875	8.461538	10.55901	8.861789	110.2227	1.212231
WGC-25B-61 - 1.d	0	3.132137	0	0	3.581081	7.104796	27.33668	37.67313	38.69919	67.8	39.01099	36.8125	32.38866	30.24845	34.14634	316.7793	0.718078
WGC-25B-61 - 2.d	0	2.430669	0	0.371991	0.743243	6.039076	21.25628	35.18006	39.8374	47.7	41.94139	35.9375	33.60324	34.09938	30.4878	298.7868	1.519362
WGC-25B-61 - 3.d	0	1.843393	0	0	2.432432	5.150977	12.31156	18.83657	23.17073	42.6	21.61172	25.1875	17.00405	18.01242	15.44715	181.8701	0.941267
~~**WGC-25B-62 - 1.d**~~	~~0~~	~~8.319739~~	~~0~~	~~0.109409~~	~~2.094595~~	~~0.26643~~	~~26.13065~~	~~59.55679~~	~~104.065~~	~~12.5~~	~~177.2894~~	~~298.75~~	~~432.7935~~	~~663.354~~	~~878.4553~~	~~2626.764~~	~~0.036013~~
WGC-25B-62 - 2.d	0	2.365416	0	0	0	0	13.9196	23.54571	46.34146	66.1	61.53846	105.625	142.915	224.8447	296.748	967.6583	#DIV/0!
~~**WGC-25B-62 - 3.d**~~	~~0~~	~~9.070147~~	~~0~~	~~0~~	~~4.256757~~	~~1.065719~~	~~30.65327~~	~~65.09695~~	~~130.0813~~	~~43.6~~	~~223.0769~~	~~400~~	~~542.1053~~	~~827.3292~~	~~1154.472~~	~~3385.761~~	~~0.093296~~
WGC-25B-63 - 1.d	0	2.69168	0	0	0.290541	5.150977	16.88442	26.31579	41.54472	62.2	36.44689	37.8125	36.43725	42.91925	31.70732	315.3837	2.325643
WGC-25B-63 - 2.d	0	1.908646	0	0	0.878378	4.049734	12.96482	18.83657	24.6748	37.4	27.65568	22.625	24.69636	23.22981	23.98374	203.1019	1.200058
WGC-25B-64 - 1.d	0	1.615008	0	0	0	5.506217	8.994975	15.78947	26.50407	47.9	22.89377	25	25.91093	24.03727	27.64228	215.6778	#DIV/0!
WGC-25B-64 - 2.d	0	1.712887	0	0	0.540541	4.440497	10.75377	20.22161	27.68293	705	24.54212	27.0625	21.45749	24.84472	29.26829	880.0797	1.841777
WGC-25B-65 - 1.d	0.206751	2.430669	0	0	1.351351	8.170515	25.27638	42.10526	60.56911	15.5	60.62271	63.875	65.58704	68.19876	65.04065	441.4985	1.398002
WGC-25B-65 - 2.d	0	6.003263	0.80819	2.603939	11.28378	6.394316	11.00503	19.39058	19.30894	23.7	25.82418	32.625	38.8664	46.02484	58.13008	263.87	0.573814
WGC-25B-68 - 1.d	0	1.239804	0	0	0	3.801066	12.46231	12.29917	22.35772	16.18	17.94872	18.4375	12.06478	16.45963	13.98374	129.7313	#DIV/0!
WGC-25B-68 - 2.d	0	1.566069	0	0	0.675676	3.339254	16.23116	20.49861	34.95935	21.3	39.92674	37	34.81781	35.90062	32.92683	257.33	1.008337
WGC-25B-68 - 3.d	0	0.91354	0	0	2.364865	5.506217	17.43719	31.57895	50	70.4	42.67399	44.875	34.41296	40.74534	30.89431	345.5805	0.857456
WGC-25B-69 - 1.d	0	1.924959	0	0	0	6.927176	15.07538	24.37673	26.91057	67.6	38.27839	36.5	39.27126	53.97516	61.78862	348.7007	#DIV/0!
WGC-25B-69 - 2.d	0	1.87602	0	0	2.027027	2.611012	9.698492	16.6205	26.86992	45.5	23.44322	22.4375	24.12955	22.6087	18.69919	200.3086	0.58888
WGC-25B-69 - 3.d	0	1.141925	0	0	0	3.9254	10.20101	16.89751	24.43089	312.8	30.21978	30.875	29.55466	40.93168	63.00813	548.7176	#DIV/0!
WGC-25B-69 - 4.d	0	1.549755	0	0	0.608108	5.506217	9.798995	20.22161	27.19512	124	24.72527	30.1875	27.53036	25.34161	30.4878	309.6893	2.255652
WGC-25B-71 - 1.d	0	3.556281	0	0	1.891892	2.930728	13.01508	16.6205	15.93496	394.6	14.28571	14.0625	12.18623	15.59006	11.95122	495.2312	0.590614
WGC-25B-71 - 2.d	0	3.14845	0	0	1.148649	6.394316	12.61307	17.17452	17.47967	70.8	14.65201	17.125	13.88664	15.21739	14.79675	181.132	1.679926

WGC-25B-71 - 3.d	0	2.512235	0	0	0.25	5.150977	9.949749	15.51247	15.0813	46.8	13.36996	13.75	7.165992	11.18012	14.5935	137.4533	3.26598
WGC-25B-72 - 1.d	0	3.115824	0	0	1.013514	2.646536	10.25126	14.18283	13.61789	46.4	15.56777	15.6875	16.68016	15.34161	18.29268	155.7704	0.821059
~~**WGC-25B-72 - 2.d**~~	~~0~~	~~0.619902~~	~~0~~	~~0~~	~~0~~	~~4.973357~~	~~14.07035~~	~~15.78947~~	~~11.78862~~	~~24~~	~~10.43956~~	~~13.8125~~	~~15.78947~~	~~24.2236~~	~~47.15447~~	~~162.9977~~	~~#DIV/0!~~
WGC-25B-73 - 1.d	0	2.69168	0	0	1.351351	3.623446	13.86935	17.45152	14.39024	51.5	13.18681	13.375	11.7004	12.48447	13.90244	147.9909	0.836969
WGC-25B-73 - 2.d	0	3.898858	0	0	1.824324	3.83659	10	16.34349	14.8374	123.4	20.69597	17	12.83401	16.89441	13.94309	235.9484	0.898244
WGC-25B-74 - 1.d	0	1.272431	0	0	0	1.722913	3.065327	4.127424	3.902439	49.9	7.582418	9.5	10.80972	11.24224	10.89431	107.9585	#DIV/0!
~~**WGC-25B-74 - 2.d**~~	~~0~~	~~3.099511~~	~~0.366379~~	~~0~~	~~0~~	~~1.136767~~	~~8.190955~~	~~12.74238~~	~~21.54472~~	~~19.21~~	~~41.75824~~	~~93.125~~	~~153.8462~~	~~223.6025~~	~~422.7642~~	~~988.5932~~	~~#DIV/0!~~
WGC-25B-75 - 1.d	0	3.376835	0	0	1.216216	6.039076	12.01005	16.06648	19.9187	36.2	23.26007	20.8125	20.64777	29.62733	26.82927	193.3621	1.58013
WGC-25B-75 - 2.d	0	2.707993	0	0	0	3.21492	9.447236	16.89751	19.79675	79.8	16.30037	19.25	20.89069	19.75155	15.85366	208.5405	#DIV/0!
WGC-25B-76 - 1.d	0	3.034258	0	0	0.540541	4.440497	11.60804	16.89751	16.70732	89.9	17.03297	18.0625	14.2915	15.2795	17.72358	205.8949	1.772711
WGC-25B-76 - 2.d	0	2.267537	0	0	0	1.847247	6.180905	12.74238	17.92683	62.3	18.13187	18.25	17.81377	24.53416	18.29268	189.9917	#DIV/0!
WGC-25B-77 - 1.d	0	2.022838	0	0	0.472973	4.440497	11.20603	21.88366	24.10569	45.6	26.00733	25.25	23.48178	34.78261	39.8374	240.9485	1.928802
WGC-25B-77 - 2.d	0	1.82708	0	0	0	1.687389	9.346734	17.72853	21.91057	49.1	23.62637	27.875	23.48178	27.51553	29.26829	220.5061	#DIV/0!
~~**WGC-25B-78 - 1.d**~~	~~25.7384~~	~~46.00326~~	~~66.81034~~	~~79.64989~~	~~108.7838~~	~~61.98934~~	~~66.83417~~	~~67.59003~~	~~86.58537~~	~~29~~	~~127.4725~~	~~305.625~~	~~599.1903~~	~~1279.503~~	~~2800.813~~	~~5295.779~~	~~0.727002~~
WGC-25B-78 - 2.d	0	0.619902	0	0	0	1.705151	9.849246	13.85042	13.61789	47.9	10.98901	12.625	10.32389	9.378882	17.11382	135.7989	#DIV/0!
WGC-25B-78 - 3.d	0	3.164763	0	0	1.081081	2.522202	5.628141	7.839335	8.943089	27.1	8.058608	11.0625	8.663968	7.267081	5.203252	84.13783	1.022512
WGC-25B-79 - 1.d	0	2.952692	0	0	0	2.362345	6.834171	13.2964	10.97561	31.2	9.89011	8.8125	9.554656	11.36646	8.292683	103.3884	#DIV/0!
WGC-25B-79 - 2.d	0	1.859706	0	0	0	3.39254	4.623116	12.18837	10.28455	25.7	11.53846	10.375	6.518219	11.92547	9.146341	97.67641	#DIV/0!
WGC-25B-80 - 1.d	0	1.892333	0	0	1.081081	4.031972	10.15075	15.51247	22.64228	28.9	24.35897	24.375	25.91093	20.93168	23.17073	185.8021	1.217136
WGC-25B-80 - 2.d	0	1.82708	0	0	1.959459	2.060391	9.698492	14.40443	21.82927	19.1	25.27473	26.5	20.24291	23.35404	25.20325	175.9086	0.472639
WGC-25B-81 - 1.d	0	3.556281	0	0	0	4.262877	7.738693	13.3518	11.99187	27	11.35531	11.75	9.838057	11.36646	11.30081	107.9543	#DIV/0!
WGC-25B-81 - 2.d	0	3.60522	0	0	1.689189	1.865009	3.869347	8.614958	11.78862	32.1	7.326007	8.375	7.165992	7.080745	6.99187	89.44319	0.729496
WGC-25B-82 - 1.d	0	0.799347	0	0	0	3.694494	12.36181	17.72853	15.2439	15.3	14.65201	19.875	22.67206	29.19255	38.21138	172.8754	#DIV/0!
WGC-25B-82 - 2.d	0	1.533442	0	0	0.878378	0.408526	8.844221	13.01939	20.77236	90	21.79487	20.9375	19.83806	19.25466	19.9187	225.5355	0.146571
WGC-25B-82 - 3.d	0	2.137031	0	0	1.351351	3.143872	11.65829	18.55956	31.34146	41.3	29.12088	28.0625	31.98381	27.95031	25.60976	233.9283	0.792069
~~**WGC-25B-83 - 1.d**~~	~~0~~	~~5.350734~~	~~2.155172~~	~~9.628009~~	~~25~~	~~10.83481~~	~~83.41709~~	~~161.7729~~	~~261.3821~~	~~38.1~~	~~386.4469~~	~~575~~	~~740.8907~~	~~968.9441~~	~~1182.927~~	~~4315.463~~	~~0.23726~~
~~**WGC-25B-83 - 2.d**~~	~~0~~	~~5.399674~~	~~1.163793~~	~~5.273523~~	~~21.62162~~	~~8.703375~~	~~78.89447~~	~~138.5042~~	~~215.4472~~	~~51.8~~	~~346.1538~~	~~525~~	~~595.1417~~	~~788.8199~~	~~1048.78~~	~~3709.647~~	~~0.210727~~
WGC-25B-84 - 1.d	0	0	0	0	0	0	0.954774	2.354571	3.130081	616	4.322344	7.5625	9.311741	20.31056	24.39024	687.382	#DIV/0!
~~**WGC-25B-85 - 1.d**~~	~~17.72152~~	~~53.83361~~	~~11.2069~~	~~12.25383~~	~~21.48649~~	~~7.104796~~	~~95.47739~~	~~189.1967~~	~~373.1707~~	~~530~~	~~624.5421~~	~~1056.25~~	~~1437.247~~	~~2126.708~~	~~2650.407~~	~~8987.521~~	~~0.156862~~
WGC-25B-85 - 2.d	0	22.69168	0	0.59081	8.445946	1.083481	38.19095	78.11634	153.6585	472	276.5568	498.125	692.3077	1118.012	1512.195	4800.972	0.060328

~~Crossed out~~ = discordant

WGC2019J-25B zircon trace element standards

Standard_spot size	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
NIST610-51 - 1.d	427600	437200	435200	418500	439600	437000	436300	425100	423600	437200	441000	426100	440400	426100
NIST610-51 - 2.d	427800	441100	436100	421300	443600	435700	437200	428900	426800	440000	444800	428500	439900	431400
NIST610-51 - 3.d	423100	435300	429500	411100	433400	429000	432700	419900	419800	430700	436900	417300	433000	423400
NIST610-51 - 4.d	423900	434500	430000	415800	436200	431500	433200	420700	425800	433300	439700	420600	433200	425000
NIST610-51 - 5.d	427500	439400	434600	418900	440400	430900	434900	423900	422900	434900	441400	421800	434900	425900
NIST610-51 - 6.d	426500	438300	431500	415100	438400	429400	434400	420700	419400	434500	438700	418800	433700	424300
NIST610-51 - 7.d	428200	440500	435600	421500	438800	434600	435400	423900	418200	433800	437500	422500	435300	422900
NIST610-51 - 8.d	421900	436300	428900	411600	432400	428600	431200	420200	420600	432600	436000	417300	430300	419500
NIST610-51 - 9.d	422200	439200	432500	411800	434900	430500	429400	422100	421200	431700	440400	416300	433200	421200
NIST610-51 - 10.d	414400	427400	424800	404700	429700	422600	427000	413400	414400	424300	430100	411000	427500	416600
NIST610-51 - 11.d	417000	429400	424800	408800	431300	425500	426400	414100	414400	427000	434000	411400	428400	415300
NIST610-51 - 12.d	421100	435500	428800	408800	436500	426300	428700	416300	415200	428700	439000	415900	432500	421600
NIST610-51 - 13.d	426300	439600	432700	413900	434900	431900	429400	422100	420400	436700	439800	417800	437100	423600
NIST610-51 - 14.d	421300	434800	428200	411100	432800	428400	427400	417800	416700	430000	437300	417100	431200	419700
NIST610-51 - 15.d	422100	433800	428400	411900	434800	428100	428300	419800	420800	429600	435300	415300	429800	420200
NIST610-51 - 16.d	420400	435500	428300	410400	437600	427100	431500	420000	420100	430400	436000	416400	430400	420400
NIST610-51 - 17.d	422900	433500	433000	413800	435700	427200	433500	420300	420600	431600	437200	418300	433700	424300
NIST610-51 - 18.d	422100	433600	427700	412900	429200	428200	431800	418400	415400	428900	432500	413900	425300	417000
NIST610-51 - 19.d	424900	437900	432800	414800	434700	431600	431000	419900	423300	430500	437600	420200	432900	422900
NIST610-51 - 20.d	429000	440500	432900	416400	441300	433200	440000	421800	424700	435600	438700	420200	438700	424700
NIST610-51 - 21.d	421100	435400	432000	416700	434200	433500	429700	420900	418800	432100	440200	418700	437000	423400
NIST610-51 - 22.d	428600	439500	434200	414200	440500	433400	435400	424900	422600	432500	441900	424900	439200	424400
NIST610-51 - 23.d	426200	436000	434500	417500	438600	431100	435600	423300	425300	438800	444300	423800	437300	427200
NIST610-51 - 24.d	426000	440000	432600	419100	440000	434300	436900	424500	422800	436700	441000	423800	437200	426700
NIST610-19 - 1.d	425000	441000	436000	421000	439000	428000	428000	419000	418000	430000	441000	410000	432000	420000
NIST610-19 - 2.d	418000	440000	433000	410000	433000	426000	425000	416000	424000	433000	435000	415000	427000	424000
NIST610-19 - 3.d	401000	406000	405000	383000	400000	404000	393000	391000	386000	399000	408000	385000	396000	390000
NIST610-19 - 4.d	408000	414000	413000	386000	418000	407000	396000	398000	391000	408000	416000	395000	406000	397000

NIST610-19 - 5.d	412000	429000	413000	403000	422000	409000	406000	404000	404000	416000	419000	401000	419000	405000
NIST610-19 - 6.d	409000	416000	414000	398000	422000	412000	417000	403000	398000	414000	420000	396000	416000	401000
NIST610-19 - 7.d	425000	438000	429000	414000	424000	423000	423000	416000	408000	425000	437000	409000	422000	418000
NIST610-19 - 8.d	425000	436000	431000	411000	430000	425000	433000	409000	416000	424000	438000	410000	428000	410000
NIST610-19 - 9.d	426000	442000	433000	413000	440000	432000	426000	424000	420000	431000	432000	421000	433000	419000
NIST610-19 - 10.d	418000	437000	424000	408000	432000	419000	425000	412000	407000	419000	432000	406000	419000	413000
NIST610-19 - 11.d	426000	444000	429000	416000	431000	435000	444000	422000	427000	432000	444000	424000	441000	429000
NIST610-19 - 12.d	427000	442000	434000	426000	436000	435000	441000	418000	414000	433000	437000	419000	439000	429000

WGC2019J-31A zircon trace elements

Chondrite normalised REEs + Y																
Sample	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Y**	**Ho**	**Er**	**Tm**	**Yb**	**Lu**	**Total HREEs**	**Eu anomaly**
~~**31A-1 - 1.d**~~	~~0~~	~~0.391517~~	~~0~~	~~0~~	~~6.486486~~	~~0.674956~~	~~59.29648~~	~~145.7064~~	~~230.4878~~	~~408~~	~~243.2234~~	~~243.75~~	~~319.8381~~	~~472.0497~~	~~658.5366~~	~~2721.592~~	~~0.034416~~
31A-1 - 2.d	0	1.223491	0	0.743982	10.74324	11.36767	74.87477	66.20499	62.60163	90.9	51.46525	51.25	58.29965	98.13665	146.3415	625.1995	0.400809
31A-2 - 1.d	0	1.32137	0	2.560175	15.60811	18.29485	54.27136	55.12465	51.21951	69.3	38.64469	41.375	35.62753	36.45963	41.46341	369.2144	0.628591
31A-2 - 2.d	0	1.207178	0	0.503282	15.27027	21.49201	52.76382	51.80055	47.96748	72.6	38.64469	43.9375	35.22267	45.96273	39.43089	375.5665	0.757156
~~**31A-3 - 1.d**~~	~~0.177215~~	~~1.305057~~	~~0~~	~~0.875274~~	~~10.7432~~	~~2.717584~~	~~74.37186~~	~~160.3878~~	~~186.5854~~	~~302.5~~	~~158.6081~~	~~188.125~~	~~207.2874~~	~~281.9876~~	~~430.8943~~	~~1916.376~~	~~0.096142~~
31A-3 - 2.d	0.637131	3.833605	4.418103	9.059081	32.63514	30.19538	90.95477	135.4571	154.065	216.9	123.4432	106.25	106.8826	110.559	113.0081	1066.565	0.554224
31A-4 - 1.d	0	2.512235	0.711207	4.223195	45.94595	10.47957	120.603	76.45429	47.56098	54	29.30403	27.1875	19.4332	24.09938	22.76423	300.8036	0.14078
31A-4 - 2.d	0	1.990212	0	0.919037	18.17568	4.262877	39.69849	29.36288	16.58537	21.2	10.07326	9.4375	5.587045	8.695652	6.910569	107.8523	0.158698
~~**31A-5 - 1.d**~~	~~0~~	~~0.127243~~	~~0~~	~~0~~	~~10.4054~~	~~1.278863~~	~~67.8392~~	~~159.2798~~	~~245.122~~	~~426~~	~~231.8681~~	~~206.25~~	~~172.0648~~	~~164.5963~~	~~184.9593~~	~~1790.14~~	~~0.048134~~
31A-5 - 2.d	0	2.642741	0	3.763676	39.18919	10.30195	115.0754	84.76454	59.34959	74.3	45.9707	37.875	29.55466	29.37888	26.82927	388.0226	0.153407
31A-6 - 1.d	0	2.120718	0	2.844639	20.2027	27.7087	64.32161	56.7867	42.68293	62.7	36.26374	36.625	32.38866	40.12422	48.37398	355.9452	0.768658
31A-6 - 2.d	0	1.402936	0	1.706783	12.56757	16.69627	47.73869	41.82825	32.92683	49.7	28.20513	27.25	23.88664	29.44099	35.36585	268.6037	0.681646

31A-7 - 1.d	0	2.251223	0	2.231947	22.63514	6.394316	55.77889	55.67867	39.43089	42.2	21.79487	17.8125	10.08097	11.80124	14.43089	213.23	0.179957
31A-7 - 2.d	0	1.924959	0	2.035011	27.16216	12.25577	97.48744	72.02216	60.56911	62.1	37.36264	32.25	29.1498	34.16149	37.80488	365.4201	0.238168
~~**31A-8 - 1.d**~~	~~0.037975~~	~~0.652529~~	~~0.172414~~	~~1.356674~~	~~10.60811~~	~~2.309059~~	~~75.8794~~	~~146.8144~~	~~148.374~~	~~188~~	~~105.8608~~	~~89.375~~	~~73.68421~~	~~80.12422~~	~~101.2195~~	~~933.4521~~	~~0.081387~~
31A-8 - 2.d	0	2.544861	0.366379	4.135667	30.27027	14.74245	63.31658	55.40166	47.56098	52.5	25.27473	23.3125	19.02834	17.57764	15.85366	256.5095	0.336746
31A-8 - 3.d	0	2.871126	0.075431	2.450766	27.97297	23.97869	64.82412	55.67867	46.34146	66	37.91209	29.9375	25.50607	28.69565	18.29268	308.3641	0.563103
31A-9 - 1.d	1.308017	5.889077	3.879311	7.396061	60.81081	291.6519	145.2261	142.9363	115.4472	161	85.34799	100.625	106.0729	147.8261	182.9268	1042.182	3.103502
31A-9 - 2.d	0.135021	4.600326	2.715517	9.212254	45.27027	140.4973	100.5025	94.45983	73.98374	86.9	45.23814	38.9375	26.72065	32.67081	34.14634	433.057	2.082922
~~**31A-10 - 1.d**~~	~~0~~	~~0.326264~~	~~0~~	~~1.137856~~	~~5.135135~~	~~4.618117~~	~~79.8995~~	~~136.2881~~	~~158.9431~~	~~325~~	~~184.9817~~	~~237.5~~	~~287.4494~~	~~347.8261~~	~~520.3252~~	~~2198.314~~	~~0.227991~~
~~**31A-10 - 2.d**~~	~~0~~	~~0.636215~~	~~0~~	~~0.076586~~	~~10.74324~~	~~4.795737~~	~~52.76382~~	~~115.5125~~	~~144.3089~~	~~242~~	~~132.6007~~	~~140~~	~~125.9109~~	~~159.6273~~	~~193.9024~~	~~1253.863~~	~~0.201428~~
31A-11 - 1.d	0	0.766721	0	0.4814	23.51351	6.039076	96.48241	120.7756	130.8943	220.7	131.6854	130.625	120.2429	135.4037	132.1138	1122.44	0.126791
31A-11 - 2.d	0	1.125612	0.075431	0.765864	21.89189	5.861456	79.39698	117.1745	122.7642	181.3	106.4103	111.25	98.38057	98.13665	91.86992	927.2861	0.140592
31A-11 - 3.d	0	1.158238	0.064655	0.415755	10.74324	5.683837	67.8392	83.65651	82.52033	137.5	77.65568	82.875	75.7085	78.26087	65.85366	684.0305	0.210539
~~**31A-12 - 1.d**~~	~~0~~	~~0.489396~~	~~0~~	~~0.102845~~	~~11.82432~~	~~9.236234~~	~~89.94975~~	~~169.2521~~	~~195.935~~	~~268.9~~	~~145.0549~~	~~128.75~~	~~119.0283~~	~~111.1801~~	~~121.5447~~	~~1259.645~~	~~0.283209~~
~~**31A-12 - 2.d**~~	~~0~~	~~0.159869~~	~~0~~	~~0~~	~~5.270274~~	~~4.795737~~	~~53.26633~~	~~121.8837~~	~~138.6179~~	~~204.6~~	~~123.2601~~	~~105.625~~	~~78.94737~~	~~91.92547~~	~~100.8134~~	~~965.6725~~	~~0.286228~~
~~**31A-12 - 3.d**~~	~~0.464135~~	~~0.522023~~	~~0~~	~~1.050328~~	~~17.36486~~	~~6.039076~~	~~93.46734~~	~~216.0665~~	~~258.1301~~	~~358.3~~	~~201.0989~~	~~167.5~~	~~148.5833~~	~~154.6584~~	~~165.0407~~	~~1669.377~~	~~0.149901~~
31A-13 - 1.d	0.206751	1.011419	0	2.166302	15.67568	12.96625	58.29146	96.6759	171.5447	414	231.5018	408.125	618.6235	1043.478	1516.26	4500.209	0.428942
31A-13 - 2.d	0	1.663948	0.431034	5.864333	36.48649	30.90586	106.5327	83.3795	57.31707	65.5	35.16484	28.375	17.81371	26.58385	25.20325	339.3373	0.495717
31A-14 - 1.d	0.295359	2.789564	0.366379	4.923414	50.67568	73.53464	81.40704	82.54848	60.97561	73.9	45.42125	35	17.40891	31.67702	47.56098	394.4922	1.144883
~~**31A-16 - 1.d**~~	~~0~~	~~0.262643~~	~~0~~	~~0~~	~~3.986486~~	~~0~~	~~67.33668~~	~~181.1634~~	~~223.1707~~	~~328.8~~	~~176.7399~~	~~128.75~~	~~100~~	~~88.19876~~	~~72.76423~~	~~1299.587~~	~~0~~
~~**31A-16 - 2.d**~~	~~0~~	~~0.424144~~	~~0~~	~~0.2407~~	~~8.783784~~	~~2.113677~~	~~95.9799~~	~~193.3518~~	~~268.2927~~	~~407.3~~	~~215.3846~~	~~205.625~~	~~168.0162~~	~~175.7764~~	~~163.8211~~	~~1797.568~~	~~0.072796~~
31A-16 - 3.d	0	0.783034	0.290948	0.875274	9.121622	3.374775	79.8995	191.6898	236.5854	354.2	199.2674	147.5	119.0283	101.8634	86.99187	1437.126	0.125008
~~**31A-17 - 1.d**~~	~~0~~	~~1.37031~~	~~0.075431~~	~~1.203504~~	~~7.635135~~	~~1.740675~~	~~41.2060~~	~~117.1745~~	~~232.9268~~	~~674~~	~~360.0733~~	~~615.625~~	~~955.4656~~	~~1515.528~~	~~2247.967~~	~~6718.761~~	~~0.098136~~
~~**31A-17 - 2.d**~~	~~0~~	~~0.083197~~	~~0~~	~~0~~	~~2.027027~~	~~0~~	~~40.2010~~	~~126.3158~~	~~194.3089~~	~~447~~	~~244.5055~~	~~350~~	~~479.3522~~	~~663.3541~~	~~1028.455~~	~~3533.292~~	~~0~~
~~**31A-18 - 1.d**~~	~~0.033755~~	~~0.668842~~	~~0.549569~~	~~0.196937~~	~~4.256757~~	~~3.730018~~	~~25.4773~~	~~73.6842~~	~~120.7317~~	~~267~~	~~137.1795~~	~~186.25~~	~~230.7692~~	~~329.1925~~	~~414.6341~~	~~1759.441~~	~~0.358174~~
31A-18 - 2.d	0.320675	4.159869	1.691809	3.807438	12.09459	7.815275	31.15578	32.68698	31.05691	43.1	25.27473	20.6875	15.74899	15.09317	15.36585	199.0141	0.402605

31A-19 - 1.d	0	0.231648	0	0	7.027027	2.060391	55.77889	140.9972	208.5366	435	241.7582	255.625	251.0121	238.5093	265.4472	2036.886	0.104071
31A-19 - 2.d	0	0.309951	0	0.350109	9.054054	5.861456	94.97487	185.0416	279.2683	529	283.8828	317.5	295.5466	296.8944	329.2683	2516.402	0.199885
31A-20 - 1.d	0	3.115824	1.153017	6.19256	62.16216	12.07815	152.2613	108.5873	64.63415	60.7	32.96703	21.6875	12.38866	14.34783	11.50407	326.8165	0.124149
31A-20 - 2.d	0	3.181077	0	4.091904	49.32432	8.170515	100	78.11634	45.12195	40.6	22.52747	14.6875	8.582996	9.875776	3.617886	223.1299	0.116337
~~**31A-21 - 1.d**~~	~~0~~	~~0.538336~~	~~0~~	~~0.153173~~	~~9.662162~~	~~7.282416~~	~~81.40704~~	~~156.7867~~	~~175.6098~~	~~236.3~~	~~128.7546~~	~~105.625~~	~~72.06478~~	~~77.63975~~	~~82.92683~~	~~1035.707~~	~~0.259661~~
31A-21 - 2.d	0	1.745514	0	2.056893	28.37838	32.50444	85.92965	87.53463	62.19512	81.4	49.45055	48.375	37.24696	44.09938	45.12195	455.4236	0.65823
31A-21 - 3.d	0	2.577488	1.206897	4.354486	43.91892	44.93783	123.6181	115.2355	80.0813	122.7	70.51282	68.125	55.87045	72.67081	69.9187	655.1145	0.609881
~~**31A-22 - 1.d**~~	~~0~~	~~0.158238~~	~~0~~	~~0~~	~~6.283784~~	~~0.213144~~	~~59.29648~~	~~136.0111~~	~~183.7398~~	~~338~~	~~183.6996~~	~~191.875~~	~~222.6721~~	~~268.9441~~	~~373.9837~~	~~1898.925~~	~~0.011042~~
~~**31A-22 - 2.d**~~	~~0~~	~~0.213703~~	~~0~~	~~0.100656~~	~~5~~	~~2.664298~~	~~48.74372~~	~~152.0776~~	~~219.1057~~	~~416~~	~~246.5201~~	~~285~~	~~357.085~~	~~482.6087~~	~~613.8211~~	~~2772.218~~	~~0.170663~~
31A-23 - 1.d	0.590717	6.786297	3.232759	6.78337	31.75676	19.00533	77.88945	186.7036	215.4472	303.7	179.1209	131.25	113.7652	115.528	120.3252	1365.84	0.382136
31A-23 - 2.d	0	2.300163	0.161638	1.991247	9.932432	4.262877	97.98995	224.9307	269.1057	357	209.3407	166.875	116.1943	144.7205	152.0325	1640.199	0.136642
31A-24 - 1.d	0	1.092985	0	0.743982	14.93243	22.02487	68.34171	99.16898	117.4797	202	108.4249	120	131.1741	179.5031	226.0163	1183.767	0.689454
31A-24 - 2.d	0	1.615008	0	1.356674	15.87838	16.51865	54.27136	55.95568	32.52033	37.2	25.09158	16.1875	14.37247	9.130435	10.69106	201.149	0.562712
31A-25 - 1.d	0	0.946166	0	3.063457	21.48649	29.12966	98.99497	114.1274	102.439	136.6	69.59707	82.5	67.20648	70.18634	83.73984	726.3962	0.631606
31A-25 - 2.d	0	1.239804	0	0.722101	12.22973	8.703375	58.29146	55.12465	63.00813	85.3	48.35165	48.25	50.20243	45.96273	48.37398	444.5736	0.325969
~~**31A-32 - 1.d**~~	~~0~~	~~0.083197~~	~~0~~	~~0~~	~~5.608108~~	~~0.888099~~	~~53.26633~~	~~121.6066~~	~~208.5366~~	~~389~~	~~208.7912~~	~~259.375~~	~~294.7368~~	~~409.9379~~	~~593.4959~~	~~2485.48~~	~~0.051384~~
31A-32 - 2.d	0	1.32137	0	0.787746	10.47297	15.09769	45.22613	44.87535	28.90244	44.5	24.35897	23.4375	19.4332	22.48447	15.85366	223.8456	0.693715
31A-33 - 1.d	0	0.473083	0	0	9.797297	11.36767	115.5779	372.0222	671.5447	1457	842.4908	983.125	902.4291	1024.224	1096.748	7349.583	0.337817
31A-33 - 2.d	0	0.603589	0.247845	0.700219	23.17568	10.12433	122.1106	170.9141	177.6423	294	166.4835	175.625	176.1134	185.7143	193.9024	1540.395	0.190315
31A-33 - 3.d	0	1.076672	0.398707	1.006565	21.35135	20.42629	71.35678	72.29917	76.01626	125.5	70.14652	85	88.66397	119.2547	132.5203	769.4009	0.52331
~~**31A-34 - 1.d**~~	~~0~~	~~0.055465~~	~~0~~	~~0~~	~~4.121622~~	~~0~~	~~39.69849~~	~~103.0471~~	~~136.9919~~	~~244.2~~	~~140.8425~~	~~141.25~~	~~131.1741~~	~~173.2919~~	~~201.626~~	~~1272.423~~	~~0~~
31A-34 - 2.d	0	0.734095	0	1.66302	11.82432	2.291297	63.31658	137.3961	166.6667	252.2	149.6337	133.125	132.7935	164.5963	215.4472	1351.858	0.08374
31A-35 - 1.d	0	1.794454	0	1.094092	16.95946	5.150977	59.29648	76.7313	59.34959	67.8	40.65934	34.375	30.36437	31.67702	26.42276	367.3794	0.162431
31A-35 - 2.d	0	1.353997	0.18319	1.90372	23.51351	22.91297	83.9196	98.33795	71.13821	82.8	45.6044	27.0625	25.10121	21.18012	20.73171	391.9561	0.515811
31A-35 - 3.d	0	2.071778	0.678879	2.603939	26.35135	19.53819	110.0503	115.2355	82.52033	84.7	47.25275	35.6875	25.50607	27.26708	20.3252	438.4944	0.362817

31A-37-1.d	0.78059	5.28548	3.67456	10.5251	85.8108	128.952	140.703	140.997	110.162	130.6	75.4578	59.3125	57.0850	60.8695	68.6991	703.184	1.173559
31A-37-2.d	0.56540	5.07340	3.08189	11.0940	92.5675	127.353	183.417	177.008	139.430	182.7	109.523	96.25	93.9271	101.242	123.170	1023.253	0.977375
31A-36-1.d	0	1.79445	0.50646	3.08533	37.1621	42.9840	151.758	141.551	113.008	133.2	70.3296	62.3125	52.2267	52.7950	53.2520	678.6753	0.572374
31A-36-2.d	0	1.46818	0	2.34135	25	24.1563	74.8743	77.2853	60.9756	68.4	38.4615	30.5625	30.7692	24.7205	23.1707	354.3454	0.558334
31A-38-1.d	0.71308	2.78956	0.57112	5.20787	49.3243	76.0213	118.593	139.058	141.869	193	119.597	122.5	124.291	153.416	191.869	1185.603	0.993975
31A-38-2.d	0.36286	2.31647	0.85129	3.32603	35.8108	40.8525	97.4874	100.277	97.9674	123.9	73.8095	72.5	65.1821	70.8074	87.3983	691.842	0.691414
31A-39-1.d	0	1.43556	0.48491	2.21006	26.4864	5.15097	85.4271	71.7451	52.4390	60.6	34.0659	29.9375	23.8866	18.8198	22.3577	313.8518	0.108288
31A-39-2.d	0	1.51712	0	2.23194	20.2027	21.4920	64.3216	56.5097	44.3089	52.4	32.9670	21.75	15.7894	18.0124	18.2926	260.0303	0.596202
~~**31A-40-1.d**~~	~~0~~	~~0.76672~~	~~0.16163~~	~~1.31291~~	~~3.51351~~	~~0.47957~~	~~73.3668~~	~~162.049~~	~~248.780~~	~~433.2~~	~~208.241~~	~~220~~	~~190.688~~	~~178.882~~	~~165.040~~	~~1806.883~~	~~0.02987~~
~~**31A-40-2.d**~~	~~0.04219~~	~~0.32626~~	~~0~~	~~0.56892~~	~~5.06756~~	~~0~~	~~41.7085~~	~~127.700~~	~~232.520~~	~~510.9~~	~~283.882~~	~~368.75~~	~~359.919~~	~~405.590~~	~~454.471~~	~~2743.735~~	~~0~~
31A-41-1.d	0	0.53833	0	0	2.09459	8.34813	37.6884	94.4598	173.577	466	260.622	408.75	627.530	993.788	1439.02	4463.753	0.939583
31A-41-2.d	0	2.16965	0.94827	2.40700	16.6891	21.4920	61.8090	48.4764	34.1463	40.9	20.3296	17.0625	12.7125	17.2049	16.0569	206.8894	0.669165
31A-41-3.d	1.68776	6.49265	3.77155	11.5973	60.1351	149.378	130.150	136.565	85.3658	98.4	59.5238	43.125	31.9838	34.7826	45.9349	535.6811	1.688496
31A-42-1.d	0	2.08809	0.56034	2.53829	28.7837	12.7886	83.9196	76.1772	58.5365	63.5	31.8681	36.875	39.2712	72.6708	111.788	490.6877	0.260207
31A-42-2.d	0	1.76182	0.33405	3.15098	28.0405	22.0248	90.4522	82.2714	60.1626	68.9	39.9267	32.3125	24.2915	21.8633	18.6991	348.4273	0.437331
~~**31A-43-1.d**~~	~~0~~	~~0.50571~~	~~0~~	~~0.39387~~	~~11.0135~~	~~3.37477~~	~~58.2914~~	~~126.315~~	~~166.260~~	~~288.9~~	~~163.553~~	~~218.125~~	~~336.437~~	~~513.043~~	~~756.097~~	~~2568.732~~	~~0.133193~~
31A-43-2.d	0	1.45187	0.23706	2.58205	31.7567	4.44049	121.608	104.432	56.0975	56.4	30.0366	20.625	17.6518	12.4223	9.51219	307.1777	0.071455
31A-43-3.d	0	1.25611	0.77586	1.68490	31.7567	6.21669	143.718	131.301	98.3739	72.7	41.7582	25.25	16.6396	5.40372	6.09756	397.5251	0.092021
31A-44-1.d	0	0.01305	0	0	4.12162	0.71048	53.7688	187.257	297.967	534	301.465	305	272.874	303.726	314.634	2516.926	0.047726
31A-44-2.d	0	0.10277	0	0	8.44594	0	72.8643	201.385	265.447	416	250.915	217.5	188.259	180.124	194.308	1913.94	0
31A-44-3.d	0	0.53833	0	0.13129	12.6351	22.2024	113.567	237.673	280.894	407.1	240.293	220.625	198.785	217.391	271.138	2073.9	0.586117
~~**31A-45-1.d**~~	~~0~~	~~0.63621~~	~~0~~	~~1.26914~~	~~18.8513~~	~~3.55239~~	~~73.3668~~	~~116.066~~	~~142.276~~	~~280~~	~~151.465~~	~~200~~	~~223.481~~	~~261.490~~	~~310.162~~	~~1684.943~~	~~0.095521~~
~~**31A-45-2.d**~~	~~0~~	~~0.8646~~	~~0.08620~~	~~1.11597~~	~~15.7432~~	~~6.21669~~	~~87.4371~~	~~127.700~~	~~139.430~~	~~228~~	~~123.260~~	~~135.625~~	~~152.226~~	~~172.049~~	~~193.495~~	~~1271.789~~	~~0.167558~~
31A-45-3.d	0	2.47960	0.33405	1.61925	28.7162	4.97335	93.4673	91.4127	64.6341	79.4	46.7033	35.5	24.6963	32.1118	33.7398	408.1982	0.095997
31A-46-1.d	0	1.28874	0	1.79431	6.41891	5.86145	68.8442	141.828	217.073	361	207.326	183.75	218.623	271.428	337.398	1938.428	0.278831

31A-47 - 1.d	0	2.838499	0.603448	4.814004	41.89189	41.74067	130.1508	124.0997	98.78049	133.7	75.64103	65.375	55.06073	67.08075	63.41463	683.1523	0.56529
31A-47 - 2.d	0	2.724307	0.269397	4.989059	47.2973	53.64121	141.7085	132.964	103.252	137.8	79.67033	76.875	51.82186	57.76398	64.22764	704.3748	0.655213
~~**31A-48 - 1.d**~~	~~0.063291~~	~~0.619902~~	~~0~~	~~0.100656~~	~~8.378378~~	~~10.83481~~	~~64.82412~~	~~134.903~~	~~184.5528~~	~~324~~	~~185.348~~	~~191.875~~	~~218.2186~~	~~256.5217~~	~~319.1057~~	~~1814.525~~	~~0.464915~~
~~**31A-55 - 1.d**~~	~~0.375527~~	~~1.076672~~	~~1.713362~~	~~1.487965~~	~~6.824324~~	~~3.730018~~	~~50.25126~~	~~129.9169~~	~~184.9593~~	~~308~~	~~182.6007~~	~~187.5~~	~~181.3765~~	~~222.3602~~	~~254.065~~	~~1650.779~~	~~0.201422~~
~~**31A-55 - 2.d**~~	~~0~~	~~3.556281~~	~~1.282328~~	~~5.251641~~	~~20.94595~~	~~17.40675~~	~~65.32663~~	~~57.61773~~	~~40.65041~~	~~46.9~~	~~26.00733~~	~~26.625~~	~~16.59919~~	~~25.46584~~	~~25.20325~~	~~265.0687~~	~~0.470568~~
~~**31A-56 - 1.d**~~	~~0~~	~~3.833605~~	~~0~~	~~0.656455~~	~~5.27027~~	~~6.749556~~	~~51.25628~~	~~124.9307~~	~~250.813~~	~~763~~	~~423.0769~~	~~653.75~~	~~910.1215~~	~~1310.559~~	~~1682.927~~	~~6119.178~~	~~0.410663~~
~~**31A-56 - 2.d**~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~39.19598~~	~~129.3629~~	~~214.6341~~	~~506~~	~~235.348~~	~~248.125~~	~~235.6275~~	~~257.1429~~	~~243.9024~~	~~2070.143~~	~~#DIV/0!~~
31A-56 - 3.d	0	0.668842	0	0.393873	2.972973	6.394316	32.66332	78.39335	117.8862	201.8	111.5385	94.375	66.80162	75.15528	74.39024	820.3401	0.648886
31A-57 - 1.d	0	1.337684	0	3.107221	34.72973	30.72824	122.1106	144.0443	136.1789	218.8	125.4579	136.25	139.2713	159.0062	191.0569	1250.065	0.471857
31A-57 - 2.d	0	1.451876	0	2.450766	22.97297	35.7016	94.97487	119.1136	97.15447	133.1	70.87912	74.375	63.15789	67.08075	74.79675	699.6576	0.764319
31A-58 - 1.d	0	0.570962	0	0.196937	5.945946	5.328597	58.79397	154.5706	221.9512	402	245.4212	268.125	266.3968	288.8199	361.7886	2209.073	0.284994
~~**31A-58 - 2.d**~~	~~0~~	~~0.203915~~	~~0~~	~~0~~	~~4.189189~~	~~4.618117~~	~~58.79397~~	~~137.9501~~	~~171.1382~~	~~330~~	~~183.1502~~	~~217.5~~	~~263.1579~~	~~285.7143~~	~~365.8537~~	~~1954.464~~	~~0.294262~~
31A-59 - 1.d	0	0.326264	0	0.131291	7.635135	9.591474	45.22613	78.11634	97.96748	107.7	58.97436	28.5	21.45749	20.80745	17.47967	431.0028	0.516158
31A-59 - 2.d	0	2.78956	0.334052	1.859956	26.08108	19.71581	70.35176	55.12465	39.02439	31.9	16.66667	11.375	6.194332	4.347826	1.097561	165.7304	0.460272
31A-60 - 1.d	0	2.69168	0.657328	4.310722	30.40541	21.31439	90.95477	111.0803	117.0732	180.2	98.9011	109.375	97.57085	103.7267	132.9268	950.854	0.405308
31A-60 - 2.d	0	3.099511	0.948276	5.207877	33.78378	36.5897	105.5276	93.62881	69.9187	90	49.6337	42.875	31.98381	39.31677	40.65041	458.0072	0.612804
~~**31A-61 - 1.d**~~	~~0~~	~~33.27896~~	~~0~~	~~0.503282~~	~~6.486486~~	~~1.492007~~	~~31.15578~~	~~64.26593~~	~~128.8618~~	~~389~~	~~221.2454~~	~~401.875~~	~~549.3927~~	~~850.3106~~	~~1142.276~~	~~3747.228~~	~~0.104953~~
~~**31A-61 - 2.d**~~	~~0~~	~~27.73246~~	~~0~~	~~1.531729~~	~~3.716216~~	~~3.197158~~	~~48.24121~~	~~74.79224~~	~~143.9024~~	~~432~~	~~256.2271~~	~~434.375~~	~~596.3563~~	~~854.6584~~	~~1227.642~~	~~4019.954~~	~~0.238784~~
~~**31A-61 - 3.d**~~	~~0~~	~~0.013051~~	~~0~~	~~0~~	~~1.148649~~	~~3.0373~~	~~24.62312~~	~~74.79224~~	~~171.9512~~	~~594~~	~~331.3187~~	~~684.375~~	~~1210.526~~	~~2234.161~~	~~3369.919~~	~~8671.044~~	~~0.571114~~
~~**31A-62 - 1.d**~~	~~0~~	~~0.734095~~	~~0~~	~~1.028446~~	~~7.027027~~	~~11.90053~~	~~57.78894~~	~~79.77839~~	~~126.0163~~	~~271~~	~~155.8608~~	~~229.375~~	~~284.6154~~	~~438.5093~~	~~587.8049~~	~~2172.96~~	~~0.590552~~
31A-62 - 2.d	0	0.685155	0	0.218818	17.83784	12.78863	82.91457	112.7424	113.4146	147	93.22344	71.25	68.82591	57.76398	64.63415	728.8545	0.332535
31A-63 - 1.d	0.324895	4.535073	1.734914	6.805252	43.91892	19.36057	124.6231	152.3546	133.3333	179	115.7509	110	122.2672	191.3043	267.0732	1271.084	0.261694
31A-63 - 2.d	0.270042	7.846656	5.926724	20.13129	95.94595	24.15631	196.4824	217.7285	204.878	311.1	173.0769	177.5	174.8988	221.7391	294.3089	1775.23	0.175936
31A-64 - 1.d	0	2.202284	0	2.450766	35.13514	27.35346	88.44221	85.59557	64.63415	62.4	36.46689	25.4375	18.21862	15.59006	12.11382	320.4366	0.490695

31A-64 - 2.d	0	1.81076 7	0.25862 1	3.41356 7	37.1621 6	38.1882 8	123.618 1	97.7839 3	73.1707 3	80.6	45.2381	34.125	28.3400 8	16.8944 1	19.1056 9	395.2579	0.563428
~~**31A-65 - 1.d**~~	~~0~~	~~0.21696 6~~	~~0~~	~~0.07002 2~~	~~8.44594 6~~	~~2.27353 5~~	~~74.3718 6~~	~~162.603 9~~	~~213.821 1~~	~~307. 1~~	~~163.736 3~~	~~168.75~~	~~173.279 4~~	~~197.515 5~~	~~252.439~~	~~1639.245~~	0.090714
~~**31A-65 - 2.d**~~	~~0~~	~~0.53833 6~~	~~0~~	~~0.30634 6~~	~~11.4864 9~~	~~6.57193 6~~	~~58.7939 7~~	~~112.465 4~~	~~125.203 3~~	~~196~~	~~115.567 8~~	~~108.125~~	~~104.858 3~~	~~115.528~~	~~128.455 3~~	~~1006.203~~	0.252891
31A-66 - 1.d	0.38396 6	8.53181 1	7.54310 3	21.6630 2	82.4324 3	87.0337 5	94.4723 6	79.7783 9	74.7967 5	117	67.3992 7	75.0625	67.6113 4	59.0062 1	82.5203 3	623.1748	0.986248
31A-66 - 2.d	0.11814 3	8.05872 8	4.20258 6	16.6302	71.6216 2	68.3836 6	115.075 4	77.8393 4	48.3739 8	44.6	27.4725 3	14.75	9.71659 9	6.52173 9	6.95122	236.2254	0.75325
31A-67 - 1.d	0	1.54975 5	0.38793 1	1.92560 2	17.4324 3	25.2220 2	70.3517 6	88.3656 5	78.8617 9	126	71.0622 7	71.875	70.8502	73.9130 4	80.4878	661.4158	0.720217
31A-67 - 2.d	0	1.71288 7	0.56034 5	2.97593	35.1351 4	39.0763 8	100.502 5	91.6897 5	78.0487 8	82.7	54.5787 5	40	27.9352 2	33.4782 6	33.3333 3	441.7641	0.65759
31A-68 - 1.d	0	1.54975 5	0	1.85995 6	22.0945 9	22.0248 7	81.9095 5	72.0221 6	61.3821 1	62.7	34.6153 8	29.4375	27.9352 2	29.3167 7	39.4308 9	356.84	0.51773
31A-68 - 2.d	0	1.46818 9	0	1.20350 1	16.6216 2	10.1243 3	55.2763 8	52.6315 8	38.2113 8	47.8	27.2893 8	24.875	18.2186 2	22.7950 3	28.8617 9	260.6828	0.33401
31A-69 - 1.d	0	2.07177 8	1.70258 6	6.93654 3	52.7027	55.4174 1	144.221 1	113.019 4	85.3658 5	96.7	62.0879 1	41.125	35.6275 3	35.8385 1	37.3983 7	507.1626	0.635646
31A-71 - 1.d	0	0.34257 7	0	0	4.12162 2	0	61.3065 3	138.781 2	152.032 5	230. 7	129.487 2	150.625	184.210 5	263.975 2	406.504 1	1656.316	0
31A-70 - 1.d	0	4.17618 3	1.74569	5.99562 4	27.1621 6	20.0710 5	48.7437 2	30.4709 1	15.3658 5	18.4	8.60805 9	6.25	5.58704 5	6.52173 9	4.67479 7	95.87841	0.551605
31A-72 - 1.d	0	1.40293 6	0	1.22538 3	17.7027	6.39431 6	56.7839 2	72.2991 7	98.7804 9	208. 3	112.087 9	163.125	222.672 1	339.130 4	495.935	1712.33	0.201679
31A-72 - 2.d	0	2.13703 1	0.75431	4.13566 7	30.9459 5	11.3676 7	88.4422 1	59.5567 9	42.2764 2	47	26.9230 8	20.375	19.8380 6	18.3229 8	15.0813	249.3736	0.21729
~~**31A-73 - 1.d**~~	~~0~~	~~0.63621 5~~	~~0~~	~~0~~	~~15.2027~~	~~21.3143 9~~	~~90.4522 6~~	~~184.764 5~~	~~221.544 7~~	~~329. 7~~	~~184.981 7~~	~~191.875~~	~~192.307 7~~	~~229.192 5~~	~~276.016 3~~	~~1810.382~~	0.574781
31A-73 - 2.d	0	2.62642 7	0.68965 5	4.59518 6	38.5135 1	95.3818 8	106.532 7	86.4265 9	60.1626	68.7	41.3919 4	36.4375	27.1255 1	29.5652 2	33.7398 4	383.5492	1.48908
31A-74 - 1.d	0	1.12561 2	0	2.14442	28.3783 8	6.21669 6	145.728 6	187.811 6	142.276 4	127. 8	84.7985 3	41.875	9.71659 9	8.69565 2	4.34959 3	607.3234	0.09667
31A-75 - 1.d	0	1.06035 9	0	2.18818 4	21.2162 2	22.7353 5	76.3819 1	93.9058 2	95.9349 6	177	102.381	143.125	206.477 7	354.658 4	517.479 7	1690.963	0.564771
~~**31A-75 - 2.d**~~	~~0~~	~~1.25611 7~~	~~0~~	~~0~~	~~2.90540 5~~	~~4.79573 7~~	~~32.1608~~	~~89.4736 8~~	~~196.748~~	~~629~~	~~352.014 7~~	~~659.375~~	~~1098.78 5~~	~~1883.23~~	~~2752.03 3~~	~~7660.659~~	0.496122
31A-76 - 1.d	0	0.26753 7	0	0	8.17567 6	0.74600 4	80.9045 2	252.908 6	404.065	715	395.604 4	418.75	336.437 2	377.018 6	397.154 5	3296.938	0.029006
~~**31A-76 - 2.d**~~	~~0~~	~~0.27079 9~~	~~0~~	~~0.17505 5~~	~~11.8243 2~~	~~1.61634 1~~	~~71.3567 8~~	~~231.301 9~~	~~344.715 4~~	~~618~~	~~352.014 7~~	~~351.25~~	~~306.072 9~~	~~320.496 9~~	~~302.032 5~~	~~2825.884~~	0.055645
31A-77 - 1.d	0	3.42577 5	2.29525 9	5.77680 5	20.0675 7	26.9982 2	122.613 1	191.966 8	226.016 3	293. 7	160.439 6	150	131.174 1	145.962 7	173.983 7	1473.243	0.544276
31A-77 - 2.d	0	4.04567 7	1.93965 5	7.22100 7	32.4324 3	31.6163 4	109.045 2	214.127 4	223.983 7	306	195.421 2	157.5	142.915	152.173 9	194.308 9	1586.43	0.531641
~~**31A-77 - 3.d**~~	~~0~~	~~3.86623 2~~	~~1.07758 6~~	~~1.96936 5~~	~~14.8648 6~~	~~21.4920 1~~	~~56.7839 2~~	~~60.9418 3~~	~~44.7154 5~~	~~60.7~~	~~41.2087 9~~	~~21.875~~	~~17.4089 1~~	~~22.3602 5~~	~~15.8536 6~~	~~285.0639~~	0.739748

31A-78 - 1.d	0	0.50571	0	0.70021 9	12.7027	5.68383 7	104.020 1	149.584 5	118.292 7	147. 3	80.2197 8	65.8125	44.9392 7	35.2795	33.7398 4	675.1681	0.156363
31A-78 - 2.d	0	0.63621 5	0	1.90372	21.8243 2	8.88099 5	113.065 3	134.903	100.406 5	133. 1	70.3296 7	56.0625	44.9392 7	53.1677	39.4308 9	632.3396	0.178783
31A-79 - 1.d	4.68354 4	5.90538 3	5.81896 6	7.30853 4	25.6756 8	25.3996 4	81.9095 5	128.254 8	121.951 2	172. 4	101.098 9	90.625	86.6396 8	108.074 5	131.300 8	940.345	0.553859
31A-79 - 2.d	0	1.06035 9	0	1.90372	30.4054 1	45.8259 3	94.4723 6	111.634 3	86.9918 7	93.6	55.6776 6	43.9375	27.1255 1	25.1552 8	24.7967 5	468.9189	0.855034
~~**31A-80 - 1.d**~~	~~0~~	~~0.16476 3~~	~~0~~	~~0.37199 1~~	~~3.78378 4~~	~~0~~	~~74.8743 7~~	~~201.662~~	~~258.130 1~~	~~413. 1~~	~~217.216 1~~	~~180.625~~	~~144.129 6~~	~~131.677~~	~~170.731 7~~	~~1717.272~~	0
31A-80 - 2.d	0	1.32137	0	0	25.6756 8	9.94671 4	104.020 1	94.7368 4	89.0243 9	87.2	57.6923 1	31.875	18.2186 2	13.3540 4	10.9756 1	403.0768	0.192469
31A-81 - 1.d	0	0.66884 2	0	0	16.1486 5	3.19715 8	111.557 8	120.498 6	97.1544 7	104. 7	66.4835 2	61.5	58.7044 5	84.4720 5	105.691 1	699.2042	0.075326
31A-81 - 2.d	0	1.33768 4	0.25862 1	2.34135 7	41.8918 9	8.88099 5	204.522 6	210.803 3	130.081 3	137. 8	84.7985 3	79.375	76.9230 8	90.0621 1	106.097 6	915.9409	0.095946
31A-81 - 3.d	0	1.85970 6	0.17241 4	3.06345 7	38.5135 1	7.46003 6	144.723 6	136.842 1	86.1788 6	104. 1	59.7069 6	68.375	70.4453 4	95.0310 6	113.821 1	734.5005	0.099923
~~**31A-82 - 1.d**~~	~~0~~	~~0.03099 5~~	~~0~~	~~0~~	~~8.98648 6~~	~~0.51509 8~~	~~71.3567 8~~	~~178.670 4~~	~~243.495 9~~	~~356~~	~~199.633 7~~	~~189.375~~	~~178.137 7~~	~~167.080 7~~	~~207.317 1~~	~~1719.71~~	0.020341
~~**31A-83 - 1.d**~~	~~27.8481~~	~~49.4290 4~~	~~68.9655 2~~	~~81.4004 4~~	~~88.5135 1~~	~~117.229 1~~	~~114.070 4~~	~~180.055 4~~	~~285.772 4~~	~~805~~	~~487.179 5~~	~~824.375~~	~~1364.37 2~~	~~2249.06 8~~	~~3304.87 8~~	~~9500.701~~	1.16666
31A-83 - 2.d	0	1.64763 5	0.39870 7	2.56017 5	10.9459 5	26.2877 4	63.3165 8	102.493 1	110.569 1	173	100	93.125	108.097 2	122.981 4	143.089 4	953.3551	0.998546
31A-84 - 1.d	0	0	0	0	4.72973	0	49.7487 4	116.620 5	150.813	196. 6	106.227 1	84.375	76.9230 8	79.5031 1	76.0162 6	887.0781	0
31A-84 - 2.d	0	0.15660 7	0	0	5.67567 6	0.21314 4	85.4271 4	225.207 8	276.016 3	354	192.857 1	150.625	96.7611 3	94.4099 4	108.130 1	1498.007	0.00968
31A-85 - 1.d	0	1.84339 3	0.52801 7	1.26914 7	23.9864 9	24.6891 7	77.3869 3	63.9889 2	42.6829 3	49.7	31.3186 8	22.9375	17.0850 2	22.1739 1	23.5772 4	273.4642	0.573046
31A-85 - 2.d	0	1.56606 9	0	1.85995 6	23.4459 5	21.6696 3	65.8291 5	58.4487 5	48.3739 8	48	29.4871 8	21.25	19.4332	22.6708 1	25.6097 6	273.2737	0.55158
~~**31A-86 - 1.d**~~	~~0~~	~~9.44535 1~~	~~1.65948 3~~	~~2.66958 4~~	~~20.2702 7~~	~~11.9005 3~~	~~54.7738 7~~	~~90.8587 3~~	~~163.008 1~~	~~489~~	~~256.959 7~~	~~498.75~~	~~797.570 9~~	~~1329.19 3~~	~~1882.11 4~~	~~5507.454~~	0.357149
~~**31A-86 - 2.d**~~	~~12.6582 3~~	~~45.8401 3~~	~~8.62069~~	~~13.1291~~	~~42.5675 7~~	~~25.5772 6~~	~~93.9698 5~~	~~141.551 2~~	~~206.910 6~~	~~589~~	~~336.996 3~~	~~559.375~~	~~789.473 7~~	~~1173.91 3~~	~~1695.12 2~~	~~5492.342~~	0.404409
31A-87 - 1.d	0	2.96900 5	2.89870 7	5.01094 1	21.4864 9	24.8667 9	47.7386 9	100.554	126.829 3	191. 7	104.212 5	80.625	59.1093 1	63.9751 6	60.5691 1	787.5743	0.776429
31A-87 - 2.d	0.37130 8	3.55628 1	1.22844 8	4.68271 3	39.8648 6	36.9449 4	104.522 6	87.2576 2	64.2276 4	71.9	39.0109 9	30	36.0323 9	30.4968 9	27.2357 7	386.1613	0.572341
31A-87 - 3.d	0	4.64926 6	3.125	7.87746 2	37.1621 6	45.6483 1	98.9949 7	76.4542 9	65.0406 5	66	37.3626 4	31.25	22.6720 6	30.4347 8	17.4796 7	346.6941	0.752606
31A-88 - 1.d	0.96624 5	5.64437 2	2.42456 9	6.82713 3	50	107.637 7	94.4723 6	110.526 3	125.609 8	212. 6	114.468 9	112.5	107.692 3	136.646	145.528 5	1065.572	1.566127
31A-89 - 1.d	0	1.54975 5	0.26939 7	2.10065 6	33.7837 8	31.4387 2	107.035 2	89.1966 8	67.4796 7	78	42.8571 4	33.75	24.2915	35.6521 7	47.9674 8	419.1946	0.522814
31A-89 - 2.d	0	1.37031	0	0.70021 9	12.7027	13.4991 1	50.2512 6	56.7867	30.6910 6	37.8	18.1318 7	14.75	13.0364 4	12.1739 1	16.3821 1	199.7521	0.534298
31A-90 - 1.d	0	3.11582 4	0.625	3.30415 8	30.8108 1	35.3463 6	104.020 1	89.1966 8	66.2601 6	66.2	39.9267 4	31.25	16.2753	20.6211 2	23.9837 4	353.7137	0.624359

31A-90 - 2.d	0	2.36541 6	1.76724 1	4.39824 9	41.2162 2	40.8525 8	136.683 4	111.634 3	76.4227 6	80.8	47.2527 5	37.375	26.3157 9	27.0186 3	26.0162 6	432.8355	0.544286
~~**31A-91 - 1.d**~~	~~0~~	~~0.71778 1~~	~~0.26939 7~~	~~0.70021 9~~	~~10.7432 4~~	~~8.70337 5~~	~~57.7889 4~~	~~86.9806 1~~	~~97.1544 7~~	~~137. 4~~	~~76.3736 3~~	~~76.875~~	~~65.5870 4~~	~~84.4720 5~~	~~100.813~~	~~725.6558~~	0.349299
31A-91 - 2.d	0	4.32300 2	1.09913 8	9.40919	41.8918 9	17.0515 1	65.8291 5	37.9501 4	20.6910 6	22	12.0879 1	9	6.27530 4	10.9316 8	12.5609 8	131.4971	0.324705
31A-92 - 1.d	0	2.03915 2	0.84051 7	2.53829 3	29.7973	28.9520 4	91.4572 9	93.0747 9	75.6097 6	108	62.6373 6	63.125	62.7530 4	74.5341 6	86.1788 6	625.913	0.554602
31A-92 - 2.d	0	4.82871 1	2.38146 6	9.89059 1	50.6756 8	41.5630 6	127.638 2	99.1689 8	89.4308 9	127. 1	78.7545 8	80.25	72.4696 4	88.1987 6	95.1219 5	730.4948	0.516794
31A-93 - 1.d	0	1.41925	0.86206 9	4.20131 3	43.9189 2	41.0302	136.683 4	146.260 4	118.292 7	175. 7	107.692 3	98.125	96.3562 8	105.590 1	110.569 1	958.5858	0.529566
31A-93 - 2.d	0	1.45187 6	0	1.55361 1	15.2027	20.9591 5	57.2864 3	62.0498 6	51.6260 2	77.8	44.1391 9	35.75	37.6518 2	47.2049 7	44.3089 4	400.5308	0.710211
~~**31A-94 - 1.d**~~	~~0~~	~~0.20554 6~~	~~0~~	~~0~~	~~9.18918 9~~	~~3.73001 8~~	~~41.7085 4~~	~~108.033 2~~	~~146.748~~	~~286~~	~~163.736 3~~	~~191.25~~	~~174.493 9~~	~~224.844 7~~	~~247.967 5~~	~~1543.074~~	0.190528
31A-94 - 2.d	0	1.20717 8	0.39870 7	1.85995 6	33.1081 1	11.9005 3	128.140 7	117.728 5	76.8292 7	59.2	36.0805 9	22.75	12.7935 2	8.19875 8	8.13008 1	341.7107	0.182707
31A-94 - 3.d	0	1.69657 4	0	1.64113 8	15.4054 1	10.8348 1	51.2562 8	41.2742 4	24.3495 9	28	15.0183 2	9	6.84210 5	6.95652 2	8.33333 3	139.7741	0.385577
31A-95 - 1.d	0	2.08809 1	0	4.31072 2	35.8108 1	27.5310 8	98.9949 7	86.7036	64.6341 5	82.5	43.2234 4	39.5625	40.0809 7	31.4906 8	36.9918 7	425.1872	0.462391
31A-95 - 2.d	0	2.18597 1	0	2.16630 2	13.9864 9	10.4795 7	34.1708 5	32.1329 6	27.1544 7	34.6	15.5677 7	19.6875	10.6882 6	20.1242 2	10.9756 1	170.9308	0.47936
31A-96 - 1.d	0	5.25285 5	0.35560 3	6.17067 8	40.2702 7	28.0639 4	75.3768 8	55.6786 7	31.3821 1	29.4	15.9340 7	12.5	8.17813 8	9.44099 4	8.13008 1	170.6441	0.509375
31A-96 - 2.d	0	2.82218 6	0.09698 3	1.55361 1	14.9324 3	8.34813 5	19.4974 9	16.6205	9.47154 5	10.3 3	2.58241 8	3.625	3.03643 7	2.04968 9	3.08943 1	50.80502	0.489255
31A-96 - 3.d	0.24050 6	3.37683 5	0.95905 2	1.99124 7	8.37837 8	11.1900 5	29.1457 3	11.3573 4	10.8130 1	10.3	5.12820 5	2.25	1.37651 8	1.42857 1	1.42276 4	44.07641	0.716085
31A-97 - 1.d	0	2.56117 5	1.89655 2	2.93216 6	18.7162 2	20.9591 5	69.3467 3	126.592 8	175.203 3	348. 8	189.560 4	215	221.457 5	285.093 2	332.520 3	1894.227	0.58177
31A-97 - 2.d	0	2.65905 4	1.08836 2	3.98249 5	46.6216 2	53.4635 9	124.120 6	143.490 3	119.105 7	171	105.311 4	91.25	85.8299 6	98.1366 5	83.3333 3	897.4573	0.702817
31A-98 - 1.d	0	0.55464 9	0	0	9.59459 5	3.28596 8	35.6783 9	46.2603 9	38.6178 9	54	30.5860 8	28.125	19.4332	29.1925 5	37.3983 7	283.6135	0.177602
31A-98 - 2.d	0	2.23491 6	0.63577 9	2.01312 4	12.8378 9	22.2024 3	57.2864 3	57.6177 3	46.3414 6	51.1	29.1208 8	26.25	19.8380 6	26.0869 6	26.8292 7	283.1844	0.818709
31A-99 - 1.d	0.35443 5	7.03099 4	2.04741 8	6.52078 5	26.3513 5	16.5186 2	60.8040 6	91.9667 2	121.138 6	204. 8	113.186 120	114.574 9	129.813 7	160.975 6	1056.256	0.412674	
31A-99 - 2.d	0	7.34094 6	3.57758 6	7.13347 9	37.6351 4	20.6039 1	100.502 5	91.1357 3	51.6260 2	67	40.4761 9	34.25	21.0526 3	33.9751 6	26.0162 6	365.532	0.335015
~~**31A-100 - 1.d**~~	~~0~~	~~2.85481 2~~	~~0.07543 1~~	~~3.76367 6~~	~~37.7027~~	~~9.23623 4~~	~~111.557 8~~	~~106.648 2~~	~~97.9674 8~~	~~141~~	~~78.3882 8~~	~~82.5~~	~~72.8744 9~~	~~73.9130 4~~	~~76.0162 6~~	~~729.3078~~	0.142416
31A-100 - 2.d	0	2.52854 8	1.92887 9	3.69803 1	24.3918 9	23.8010 7	64.3216 1	62.6038 8	41.4634 1	55.9	32.9670 3	28.875	25.5060 7	32.4223 6	32.9268 3	312.6646	0.60089
~~**31A-101 - 1.d**~~	~~0~~	~~0.07993 5~~	~~0~~	~~0.08752 7~~	~~6.35135 1~~	~~2.14920 1~~	~~54.2713 6~~	~~129.916 9~~	~~206.504 1~~	~~396~~	~~225.274 7~~	~~300.625~~	~~392.712 6~~	~~602.484 5~~	~~865.853 7~~	~~3119.371~~	0.11576

31A-101 - 2.d	0	0.53833 6	0	0.21881 8	8.10810 8	4.61811 7	75.3768 8	129.639 9	168.292 7	295	167.582 4	191.25	220.242 9	281.987 6	406.504 1	1860.5	0.186804
31A-102 - 1.d	0	2.00652 5	0.08620 7	3.30415 8	32.5	23.0905 9	80.4020 1	74.2382 3	57.7235 8	60.7	31.8681 3	29	20.2429 1	21.2422 4	14.6341 5	309.6492	0.45171
31A-102 - 2.d	0	2.80587 3	1.27155 2	5.97374 2	53.3783 8	54.3516 9	135.678 4	139.058 2	97.5609 8	112. 6	67.2161 2	54.4375	46.9635 6	52.8571 4	42.6829 3	613.3764	0.638668
31A-103 - 1.d	0	1.43556 3	0	0.78774 6	17.0270 3	17.0515 1	67.8392	71.7451 5	80.4878	168. 6	100.366 3	133.125	156.680 2	204.347 8	238.211 4	1153.564	0.50171
31A-103 - 2.d	0	1.33768 4	0	1.55361 1	13.4459 5	16.3410 3	45.7286 4	47.3684 2	52.4390 2	90	49.2674	58.75	61.5384 6	96.2732 9	104.065	559.7016	0.659006
31A-104 - 1.d	0	0.81566 1	0	1.42231 9	18.1756 8	5.15097 7	100.502 5	110.803 3	75.2032 5	65.9	37.9120 9	21.8125	7.93522 3	6.52173 9	8.65853 7	334.7467	0.120519
31A-104 - 2.d	0	1.19086 5	0.07543 1	3.01969 4	48.6486 5	17.0515 1	246.231 2	265.097	202.845 5	166. 3	105.311 4	54.1875	29.5546 6	18.8819 9	14.1869 9	856.365	0.155796
31A-105 - 1.d	0	2.31647 6	0	2.82275 7	14.1216 2	8.52575 5	37.1859 3	20.4986 1	10.7723 6	12.4	6.77655 7	4.1875	1.57894 7	2.36024 8	3.08943 1	61.66366	0.37205
31A-105 - 2.d	0	16.6557 9	1.04525 9	6.23632 4	52.0270 3	383.659	145.728 6	173.407 2	156.910 6	233. 9	147.619	170.625	217.813 8	298.757 8	376.829 3	1775.863	4.406141
31A-105 - 3.d	0	28.8743 9	3.06034 5	11.2691 5	91.2162 2	587.921 8	257.286 4	274.792 2	223.170 7	319. 9	191.758 2	220	251.417	305.590 1	373.983 7	2160.612	3.837736
31A-106 - 1.d	0	2.34910 3	0.25862 1	2.10065 6	43.2432 4	8.34813 5	116.080 4	88.6426 6	56.9105 7	62.1	34.0659 3	26.25	23.4817 8	22.5465 8	15.8536 6	329.8512	0.117829
31A-107 - 1.d	0	2.78956	1.64870 7	5.92997 8	41.8918 9	41.7406 7	122.613 1	115.512 5	68.2926 8	64.4	37.1794 9	23.3125	17.8137 7	15.9627 3	9.87804 9	352.3517	0.582406
31A-107 - 2.d	0	2.90375 2	0	1.64113 8	39.8648 6	38.1882 8	93.9698 5	85.3185 6	54.0650 4	50.8	26.7399 3	18.9375	16.5991 9	10	6.34146 3	268.8017	0.623937
31A-108 - 1.d	0	3.36052 2	0.64655 2	3.80744	21.1486 5	19.3605 7	86.9346 7	180.886 4	214.227 6	283. 7	157.875 5	126.75	104.453 4	100.621 1	113.008 1	1281.522	0.451523
31A-108 - 2.d	0.35021 1	3.89885 8	3.34051 7	4.81400 4	24.9324 3	30.5506 2	111.557 8	160.941 8	190.243 9	260. 1	154.029 3	123.75	121.052 6	149.068 3	183.739 8	1342.926	0.579279
31A-109 - 1.d	0	2.59380 1	0.75431	2.82275 7	35.1351 4	8.17051 5	84.4221 1	74.5152 4	40.2439	39.9	23.4432 2	15.375	9.67611 3	15.7764	12.4390 2	231.3689	0.15002
31A-109 - 2.d	0	2.61011 4	0.56034 5	2.25382 9	21.9594 6	11.7229 1	76.8844 2	63.1578 9	38.2113 8	36.4	18.6813 2	13.875	8.94736 8	9.31677	12.2357 7	200.8255	0.285302
31A-110 - 1.d	0	2.18597 1	0	1.26914 7	19.1891 9	6.92717 6	44.2211 1	42.6592 8	45.9349 6	89	42.3076 9	65	76.9230 8	124.844 7	174.796 7	661.4665	0.237801
31A-110 - 2.d	0	1.77814	0	2.40700 2	24.5270 3	4.44049 7	73.3668 3	73.4072	79.2682 9	130	69.5970 7	85	78.9473 7	105.590 1	132.113 8	753.9238	0.104679
~~**31A-111 - 1.d**~~	~~0~~	~~0.26101 1~~	~~0~~	~~0~~	~~7.63513 5~~	~~3.01953 8~~	~~67.3366 8~~	~~168.975 1~~	~~180.894 3~~	~~249. 1~~	~~150.183 2~~	~~116.25~~	~~117.004~~	~~112.422 4~~	~~136.991 9~~	~~1231.821~~	0.13317
~~**31A-111 - 2.d**~~	~~0~~	~~0.14355 6~~	~~0~~	~~0.17505 5~~	~~11.3513 5~~	~~2.04262 9~~	~~76.3819 1~~	~~165.097~~	~~197.154 5~~	~~260. 2~~	~~154.578 8~~	~~130~~	~~114.574 9~~	~~119.254 7~~	~~152.845 5~~	~~1293.705~~	0.06937
31A-112 - 1.d	0	1.30505 7	0	1.53172 9	17.5	16.6962 7	70.8542 7	80.0554	70.3252	107. 1	63.9194 1	63.6875	69.6356 3	92.5465 8	108.943 1	656.2128	0.474152
31A-112 - 2.d	0	1.72920 1	0	2.25382 9	31.6891 9	36.0568 4	104.020 1	127.146 8	121.544 7	199. 3	117.582 4	146.25	171.255 1	195.652 2	223.577 2	1302.308	0.62802
31A-113 - 1.d	0	1.64763 5	0.08620 7	1.94748 4	22.0270 3	19.0053 3	59.7989 9	70.6371 2	61.7886 2	123	61.7216 1	89.375	114.17	165.217 4	256.097 6	942.0073	0.523661
31A-113 - 2.d	0	1.99021 2	0.21551 7	2.45076 6	31.3513 5	36.7673 2	103.015 1	91.6897 5	69.5122	85.8	57.5091 6	46.8125	34.4129 6	39.3167 7	36.5853 7	461.6387	0.646969

~~**31A-114 - 1.d**~~	~~0.518987~~	~~69.16803~~	~~1.012931~~	~~1.378556~~	~~25.60811~~	~~5.150977~~	~~108.5427~~	~~200.554~~	~~375.6098~~	~~1058~~	~~626.3736~~	~~1018.125~~	~~1299.595~~	~~1821.118~~	~~2292.683~~	~~8692.058~~	0.097701
~~**31A-114 - 2.d**~~	~~0~~	~~0.029364~~	~~0~~	~~0~~	~~8.851351~~	~~3.055062~~	~~54.77387~~	~~199.723~~	~~373.5772~~	~~828~~	~~458.7912~~	~~541.25~~	~~565.9919~~	~~632.2981~~	~~663.8211~~	~~4263.453~~	0.138749
~~**31A-114 - 3.d**~~	~~1.518987~~	~~52.52855~~	~~1.303879~~	~~1.531729~~	~~14.25676~~	~~3.552398~~	~~68.34171~~	~~156.2327~~	~~282.1138~~	~~747~~	~~426.7399~~	~~625~~	~~732.7935~~	~~1021.739~~	~~1280.488~~	~~5272.107~~	0.113807
31A-115 - 1.d	0	1.174551	0.150862	0.700219	16.01351	20.42629	70.85427	80.33241	77.23577	125	69.96337	61.875	68.82591	82.6087	95.12195	660.9631	0.606405
31A-115 - 2.d	0	1.435563	0	1.094092	12.90541	21.66963	49.74874	52.63158	44.71545	56.2	31.86813	29.375	26.31579	27.70186	26.82927	295.6371	0.855214
31A-115 - 3.d	0	1.158238	0	0.306346	20.06757	17.58437	49.74874	59.27978	48.37398	69.3	39.56044	41.8125	39.67611	36.64596	42.68293	377.3317	0.55653
31A-116 - 1.d	0	1.353997	0	3.741794	25.13514	23.26821	92.46231	85.31856	77.23577	119	68.31502	78.125	67.20648	81.98758	90.2439	667.4323	0.482658
31A-116 - 2.d	0	1.77814	0	1.444201	17.43243	16.34103	52.76382	56.7867	47.56098	77.1	39.37729	46.25	38.05668	57.76398	60.97561	423.8712	0.538806
31A-117 - 1.d	0.14346	3.800979	2.025862	5.251641	23.51351	19.18295	89.44724	112.1884	117.0732	164	89.37729	86.25	82.99595	87.57764	108.1301	847.5925	0.418286
31A-117 - 2.d	0.080169	4.535073	2.823276	10.61269	47.97297	38.18828	96.48241	88.08864	59.34959	50	30.76923	18.5625	9.473684	8.447205	4.390244	269.0811	0.561316
~~**31A-118 - 1.d**~~	~~0~~	~~0.734095~~	~~0~~	~~0~~	~~1.689189~~	~~0.639432~~	~~40.70352~~	~~118.8366~~	~~226.0163~~	~~659~~	~~320.8791~~	~~483.125~~	~~659.919~~	~~1024.845~~	~~1361.789~~	~~4854.409~~	0.077115
~~**31A-118 - 2.d**~~	~~0~~	~~3.7031~~	~~0.086207~~	~~0.350109~~	~~8.783784~~	~~3.232682~~	~~38.69347~~	~~95.56787~~	~~173.1707~~	~~517.6~~	~~281.3187~~	~~555~~	~~889.4737~~	~~1518.634~~	~~2252.033~~	~~6282.797~~	0.175349
31A-118 - 3.d	0	0.30832	0	0	3.445946	14.74245	42.21106	118.8366	165.0407	290.7	147.619	124.375	136.8421	137.8882	145.935	1267.237	1.222369
31A-119 - 1.d	0	3.800979	2.047414	4.704595	20.60811	10.30195	67.8392	103.0471	111.7886	174.4	103.1136	75.75	64.77733	76.39752	75.60976	784.8839	0.275524
31A-119 - 2.d	0	3.866232	2.403017	5.317287	14.18919	9.946714	56.28141	102.2161	122.3577	185.1	109.1575	83.75	78.13765	90.68323	103.252	874.6542	0.35198
31A-120 - 1.d	0	1.207178	0	1.422319	18.24324	9.236234	75.37688	92.79778	106.0976	201	116.1172	140	136.8421	159.6273	175.2033	1127.685	0.249072
31A-120 - 2.d	0	1.027732	0	1.31291	21.28378	22.91297	71.35678	85.59557	82.92683	149.2	84.06593	96.875	113.7652	141.6149	156.0976	910.141	0.587948
31A-120 - 3.d	0	1.353997	0.086207	0.437637	22.7027	12.07815	68.84422	91.68975	100	199	121.2454	149.375	144.5344	170.1863	179.2683	1155.299	0.305512
31A-121 - 1.d	0	0.314845	0	0	7.364865	3.019538	52.76382	121.8837	206.0976	500	274.7253	368.75	376.5182	465.8385	540.6504	2854.464	0.153176
31A-121 - 2.d	0	0.668842	0	0.196937	8.243243	0.550622	51.25628	67.59003	65.04065	118.1	67.21612	74.3125	86.63968	101.2422	101.626	681.7672	0.026787
31A-121 - 3.d	0	0.619902	0	0	9.054054	2.042629	51.25628	72.85319	82.52033	159.1	93.77289	114.375	119.8381	140.3727	146.3415	929.1736	0.094819
31A-122 - 1.d	0	0.734095	0.064655	0.59081	5.337838	6.394316	57.78894	128.8089	186.5854	327	181.8681	209.375	218.2186	282.6087	370.7317	1905.196	0.364073
31A-122 - 2.d	0	1.517129	0	2.669584	22.56757	37.65542	72.36181	85.59557	63.00813	97.2	58.05861	54.875	51.01215	51.5528	43.90244	505.2047	0.931816
31A-122 - 3.d	0	1.207178	0	0.393873	19.7973	30.373	63.31658	62.88089	57.31707	79.8	42.67399	40.4375	34.41296	39.81366	34.55285	391.8889	0.857879
31A-123 - 1.d	0	0.880914	0	0	12.02703	9.236234	38.19095	50.1385	72.76423	150.7	83.69963	94.375	112.1457	132.2981	170.7317	866.853	0.430959

~~**31A-123 - 2.d**~~	~~0~~	~~0.443719~~	~~0~~	~~0.393873~~	~~6.283784~~	~~6.394316~~	~~33.66834~~	~~69.25208~~	~~106.5041~~	~~235~~	~~130.5861~~	~~150.625~~	~~202.4291~~	~~267.0807~~	~~378.0488~~	~~1539.526~~	0.439615
31A-124 - 1.d	0	1.973899	0.193966	1.684902	13.31081	31.08348	55.27638	93.90582	110.9756	200.5	106.9597	145	172.4696	270.8075	414.6341	1515.252	1.145929
31A-124 - 2.d	0	2.561175	0.635776	2.582057	24.05405	15.63055	53.26633	40.1662	27.64228	31.3	17.94872	14.3125	8.582996	11.86335	12.60163	164.4177	0.43667
31A-125 - 1.d	0	1.615008	0	2.582057	16.95946	6.394316	84.92462	71.46814	50.4065	66.1	39.37729	30.75	22.26721	27.51553	28.45528	336.34	0.168489
31A-125 - 2.d	0	1.288744	0.398707	2.100656	27.7027	16.34103	93.96985	82.27147	58.94309	73	36.99634	31.375	31.57895	29.50311	29.6748	373.3427	0.320276
31A-126 - 1.d	0	0.995106	0	1.291028	23.78378	17.22913	111.5578	272.5762	465.4472	1051	635.5311	783.125	805.668	904.9689	963.4146	5881.731	0.334482
31A-126 - 2.d	0	1.615008	0	2.603939	34.45946	28.5968	118.593	131.856	142.6829	233	125.4579	143.75	129.9595	165.2174	161.3821	1233.306	0.447336
31A-126 - 3.d	0	1.305057	0	2.538293	32.97297	25.9325	97.98995	122.7147	93.08943	143.9	88.09524	86.875	82.59109	102.4845	114.2276	833.9776	0.45622
31A-127 - 1.d	0	3.230016	1.422414	4.354486	58.10811	24.15631	167.3367	140.1662	100.4065	113.7	62.82051	57.6875	44.53441	40.37267	33.73984	593.4276	0.244972
31A-127 - 2.d	0	4.225122	1.012931	8.140044	80.40541	41.91829	183.9196	161.7729	108.5366	120	68.86447	54.375	39.27126	42.67081	42.68293	638.1739	0.344705
31A-128 - 1.d	0.080169	3.474715	1.982759	6.017505	40.54054	47.24689	137.1859	104.1551	83.73984	99	60.07326	51.1875	38.05668	46.70807	58.13008	541.0506	0.633539
31A-128 - 2.d	0.147679	4.404568	2.015086	6.214442	42.56757	49.02309	91.9598	84.48753	61.78862	76.5	45.42125	38.8125	38.05668	34.09938	34.14634	413.3123	0.783542
31A-129 - 1.d	1.054852	10.81566	6.573276	22.31947	117.5676	75.48845	162.8141	114.6814	91.86992	171.9	108.0586	151.25	240.8907	422.9814	638.2114	1939.843	0.545621
31A-129 - 2.d	3.797468	14.68189	16.05603	26.47702	101.3514	97.69094	190.4523	122.7147	113.4146	244	142.4908	185	293.1174	500	670.7317	2271.469	0.703148
~~**31A-130 - 1.d**~~	~~0~~	~~1.190865~~	~~0~~	~~1.115974~~	~~18.04054~~	~~2.824156~~	~~68.84422~~	~~84.48753~~	~~55.69106~~	~~75.9~~	~~42.12454~~	~~36.1875~~	~~29.1498~~	~~30.99379~~	~~31.70732~~	~~386.2415~~	0.080136
31A-130 - 2.d	0	1.337684	0	1.094092	12.09459	1.296625	61.80905	57.06371	47.15447	54.2	29.67033	21.25	15.87045	22.36025	16.66667	264.2359	0.047423
31A-130 - 3.d	0	1.125612	0	1.159737	15.87838	3.730018	49.24623	50.96953	41.42276	48.9	28.38828	22.25	15.06073	13.47826	15.81301	236.2826	0.133389
31A-131 - 1.d	0	0.946166	0	0.415755	24.52703	20.24867	55.27638	57.61773	46.34146	55	29.67033	27.8125	21.05263	19.31677	22.35772	279.1691	0.549926
31A-131 - 2.d	0	1.076672	0	1.006565	13.58108	21.49201	51.25628	49.03047	47.96748	55.3	28.20513	26.0625	20.64777	21.18012	19.5122	267.9057	0.814585
31A-132 - 1.d	0	1.027732	0.269397	2.73523	16.08108	7.992895	77.88945	119.9446	150.4065	266	153.8462	173.75	179.7571	217.3913	263.4146	1524.51	0.225843
31A-132 - 2.d	0	0.978793	0	0.787746	19.72973	3.197158	90.95477	99.44598	59.34959	49.6	26.92308	12.4375	5.587045	0.931677	4.674797	258.9497	0.075473
31A-132 - 3.d	0	1.239804	0	0.612691	17.5	2.877442	75.37688	75.34626	41.05691	31.8	18.49817	7.375	2.186235	1.552795	0.203252	178.0186	0.079226
31A-133 - 1.d	1.940928	12.31648	14.76293	30.19694	141.2162	158.9698	198.995	126.8698	72.76423	78.7	48.71795	32.375	19.83806	23.22981	21.54472	424.0396	0.948312
31A-133 - 2.d	1.772152	9.526917	8.297414	24.07002	114.8649	179.3961	200	153.1856	85.77236	87.6	52.9304	38	20.64777	24.40994	23.17073	485.7168	1.183598
31A-134 - 1.d	0.350211	1.82708	1.637931	2.100656	14.25676	29.12966	50.25126	99.44598	134.1463	261	143.4066	170	170.0405	200.6211	228.8618	1407.522	1.088307

31A-134 - 2.d	0	3.7031	1.400862	3.676149	29.59459	130.1954	145.7286	173.9612	143.0894	178.8	102.381	95	74.89879	80.74534	65.85366	914.7294	1.982517
31A-135 - 1.d	0	0	0	0	14.45946	0.479574	80.40201	177.5623	163.4146	179.5	106.9597	74.3125	59.51417	73.91304	84.55285	919.7292	0.014065
~~**31A-135 - 2.d**~~	~~0.160338~~	~~0.40783~~	~~0~~	~~0~~	~~7.972973~~	~~2.309059~~	~~58.29146~~	~~113.0194~~	~~108.1301~~	~~130.5~~	~~73.80952~~	~~62.5~~	~~52.22672~~	~~63.35404~~	~~86.58537~~	~~690.1251~~	0.107108
31A-136 - 1.d	0	1.190865	0	0.218818	10	11.19005	36.68342	49.30748	55.69106	97	52.5641	53.125	47.77328	45.96273	54.06504	455.4887	0.584248
31A-136 - 2.d	0	1.696574	0.086207	1.378556	21.75676	22.38011	51.75879	50.1385	38.37398	45.7	25.09158	21.875	15.54656	19.06832	18.29268	234.0866	0.666919
31A-136 - 3.d	0	2.169657	0.711207	3.21663	30.94595	27.17584	81.90955	70.91413	50.4065	57.1	32.96703	23.8125	23.88664	16.95652	23.57724	299.6206	0.539776
31A-137 - 1.d	0.291139	7.226754	4.310345	12.36324	58.78378	80.99467	121.1055	127.1468	125.2033	187.9	114.652	108.75	119.4332	155.2795	196.3415	1134.706	0.959944
31A-137 - 2.d	0	6.247961	4.202586	12.69147	49.32432	98.75666	108.0402	110.2493	124.7967	197.2	105.8608	146.25	189.0688	272.6708	411.3821	1557.479	1.35283
~~**31A-138 - 1.d**~~	~~0~~	~~0.619902~~	~~0.452586~~	~~0.853392~~	~~10.33784~~	~~3.428064~~	~~83.9196~~	~~176.1773~~	~~198.7805~~	~~280.6~~	~~161.5385~~	~~145.625~~	~~126.3158~~	~~134.1615~~	~~154.065~~	~~1377.264~~	0.116386
~~**31A-138 - 2.d**~~	~~0~~	~~0.350734~~	~~0~~	~~0.085339~~	~~7.635135~~	~~2.753108~~	~~93.96985~~	~~195.5679~~	~~204.878~~	~~280.8~~	~~170.1465~~	~~148.75~~	~~118.2186~~	~~136.0248~~	~~143.4959~~	~~1397.882~~	0.102783
31A-139 - 1.d	0	1.566069	0	2.428884	23.98649	20.24867	71.8593	59.27978	40.2439	45.4	24.90842	21.0625	21.86235	19.00621	19.9187	251.6819	0.487721
31A-139 - 2.d	0	1.957586	0.538793	2.97593	28.37838	23.62345	66.33166	52.63158	48.78049	47.4	30.76923	21.875	15.82996	20.18634	18.69919	256.1718	0.544489
31A-140 - 1.d	0	2.316476	0.172414	3.676149	45.27027	25.57726	100	80.33241	52.84553	53.9	31.31868	21.1875	16.59919	12.36025	9.186992	277.7306	0.380143
31A-140 - 2.d	0	2.169657	0	1.969365	15.47297	16.16341	49.74874	40.1662	28.04878	31.5	13.00366	12.875	9.433198	4.84472	3.577236	143.4488	0.582579
31A-141 - 1.d	0	1.810767	0.172414	3.719912	39.18919	30.01776	105.0251	104.4321	109.7561	182.5	106.4103	123.75	131.1741	166.4596	170.7317	1095.214	0.467895
31A-141 - 2.d	0	1.451876	0	3.45733	22.22973	27.7087	64.32161	85.87258	70.3252	122.1	72.16117	77.5	79.75709	104.9689	116.2602	728.9451	0.732775
31A-142 - 1.d	0	1.631321	0	1.859956	27.7027	5.861456	92.46231	78.67036	46.34146	44.1	21.42857	13	10.32389	8.26087	8.943089	231.0682	0.115814
31A-142 - 2.d	0	3.19739	1.088362	5.579869	57.43243	11.19005	150.2513	118.5596	95.93496	130	77.10623	64.1875	70.44534	67.70186	58.53659	682.472	0.12046
31A-143 - 1.d	0	2.463295	1.702586	3.916849	36.68919	23.80107	102.0101	79.77839	58.53659	68.5	39.19414	32.125	22.67206	25.21739	24.79675	350.8203	0.38905
31A-143 - 2.d	0	2.153344	0	2.297593	12.16216	11.90053	36.68342	30.19391	29.26829	28.7	17.58242	12	8.097166	16.89441	20.3252	163.0614	0.563412
31A-144 - 1.d	0	1.207178	0	0.4814	13.58108	6.039076	42.71357	76.17729	126.8293	255.4	147.2527	194.375	254.251	393.7888	544.7154	1992.79	0.250738
31A-144 - 2.d	0	1.647635	0.592672	4.726477	47.2973	49.02309	128.1407	118.2825	89.02439	93.6	51.8315	47	36.84211	37.01863	34.55285	508.152	0.629708
31A-145 - 1.d	0	0.522023	0	0.940919	15.47297	6.571936	100.5025	227.1468	294.7154	363	212.6374	171.25	124.6964	122.3602	137.8049	1653.611	0.166655
31A-146 - 1.d	0	0.252855	0.18319	0	10	1.278863	67.8392	157.0637	176.0163	250.5	145.0549	128.125	129.5547	144.0994	202.8455	1333.259	0.0491
~~**31A-146 - 2.d**~~	~~0~~	~~0.783034~~	~~0~~	~~0.612691~~	~~27.63514~~	~~11.36767~~	~~98.99497~~	~~118.8366~~	~~108.5366~~	~~147.5~~	~~82.78388~~	~~86.25~~	~~101.6194~~	~~134.1615~~	~~190.2439~~	~~969.9319~~	0.217337

31A-147-1.d	0.367089	1.30505	0.17241	1.13785	11.4864	4.61811	70.8542	136.842	173.170	254	141.758	127.5	116.194	138.509	142.682	1230.658	0.161878
31A-147-2.d	0	2.87112	0	2.01312	19.9324	8.88099	69.3467	54.5706	52.8455	70.1	37.7289	33	38.0566	37.2670	41.4634	365.0323	0.238874
31A-148-1.d	0	0.391517	0	0	1.75675	0	39.1959	111.911	200	549	304.029	543.75	846.153	1546.58	2357.72	6459.152	0
31A-148-2.d	0	4.22512	0.18319	1.77242	16.1486	5.50621	16.0301	17.7285	7.92682	16.88	7.32600	9.9375	10	9.68944	11.0975	90.58587	0.342229
31A-149-1.d	1.518987	23.1647	2.69396	5.18599	27.7027	16.5186	93.9698	152.631	271.544	721	415.750	687.5	927.125	1354.03	1825.20	6354.793	0.323757
31A-149-2.d	1.223629	7.34094	1.77801	2.42888	5.20270	6.21669	34.6733	67.0360	104.878	324.9	169.230	305.625	486.639	814.285	1235.772	3508.368	0.462857
31A-150-1.d	0	1.85970	0.32327	2.27571	32.0270	7.46003	97.9899	90.0277	50.8130	50.6	28.5714	18.3125	12.2267	7.70186	9.02439	267.2776	0.133166
31A-150-2.d	0	1.54975	0	0.67833	11.2162	3.25044	43.7185	42.6592	19.9593	23.3	8.79120	7	3.60323	2.91925	3.53658	111.7689	0.146787
31A-151-1.d	0	1.50081	0	1.15973	11.6891	1.97158	38.6934	40.7202	30.6910	32.5	16.3003	13.375	11.5789	11.8012	10.4878	167.4546	0.092705
31A-151-2.d	0	3.42577	0	1.83807	10.2702	9.41385	18.6934	10.8033	6.26016	7.68	4.74359	2.6875	0.97166	2.91925	1.62601	37.69151	0.679409
31A-152-1.d	0	0.290375	0	0.28446	9.66216	1.97158	50.2512	94.4598	132.113	278	159.707	226.25	272.469	398.757	536.585	2098.343	0.089475
31A-152-2.d	0	2.39804	0.87284	5.47046	29.7297	15.2753	95.4773	77.8393	56.5040	71.8	35.7142	43.75	48.1781	75.7764	111.788	521.3508	0.286711
31A-152-3.d	0	2.62642	0.78663	2.23194	19.2567	11.9005	56.2814	45.1523	29.9187	30.8	15.7509	11.8125	9.31174	8.81987	6.09756	157.6636	0.361487
31A-153-1.d	0.413502	2.23491	1.28232	2.82275	12.8378	14.5648	60.3015	78.9473	87.8048	145	83.6996	95	74.4939	93.1677	104.065	762.1785	0.523474
31A-153-2.d	0	1.30505	0.18319	3.96061	39.1891	33.0373	128.643	139.335	104.878	122.9	72.8937	54.4375	42.9149	42.4223	43.9024	623.6843	0.465295
31A-154-1.d	0.57384	4.04567	2.27370	5.12035	20.6081	18.6500	77.3869	120.775	143.495	213.5	120.512	115.625	133.603	152.795	181.300	1181.608	0.467012
31A-154-2.d	0.06751	3.81729	1.46551	7.08971	26.6891	25.9325	85.9296	131.301	132.113	184.1	106.593	89.375	72.8744	95.6521	114.227	926.2385	0.541508
31A-155-1.d	0	1.50081	0	1.77242	47.9729	19.5381	110.050	208.310	211.382	271	164.835	135	140.890	146.583	197.154	1475.157	0.2689
31A-155-2.d	0	1.33768	0.15086	4.09190	19.3918	10.3019	97.4874	165.097	164.227	235.9	140.659	114.375	88.6639	101.863	123.577	1134.363	0.236938
31A-156-1.d	1814.346	1288.74	991.379	722.100	472.973	168.738	266.331	263.157	346.341	732	415.934	600.625	858.299	1389.44	1922.764	6528.563	0.475429
31A-156-2.d	0	0.290375	0	0	5.33783	2.27353	58.7939	154.847	228.861	423.6	220.696	246.875	279.757	384.472	528.455	2467.565	0.128337
31A-156-3.d	0	0.538336	0	0	7.70270	5.32859	58.7939	139.058	254.878	481.8	264.468	278.75	308.097	391.304	519.918	2638.275	0.250395
31A-158-1.d	0	0.38988	0	0.65645	11.5540	3.55239	65.8291	153.185	181.300	270.9	149.084	163.125	165.587	234.161	334.552	1651.897	0.128809
31A-158-2.d	0	0.619902	0	0.67833	11.8243	6.03907	58.7939	98.0609	115.853	209.5	120.512	146.25	206.477	281.987	426.829	1605.472	0.229042
31A-159-1.d	0	1.48450	0	1.92560	10.6081	15.4529	55.7788	41.5512	36.9918	42.4	26.5567	17	15.0607	11.9254	15.2845	206.7706	0.635268

31A-159 - 2.d	0	1.61500 8	0	1.00656 5	14.5945 9	12.6110 1	53.7688 4	47.6454 3	40.6504 1	44.5	26.0073 3	17.1875	17.4089 1	16.2111 8	23.5772 4	233.188	0.450182
~~**31A-160 - 1.d**~~	~~0~~	~~0.34257 7~~	~~0~~	~~0.10722 1~~	~~4.45945 9~~	~~0.19538 2~~	~~49.2462 3~~	~~98.0609 4~~	~~89.0243 9~~	~~100. 5~~	~~57.1428 6~~	~~44.375~~	~~37.2469 6~~	~~34.2857 1~~	~~37.8048 8~~	~~498.4407~~	0.013184
~~**31A-160 - 2.d**~~	~~0~~	~~0.32137~~	~~0~~	~~0.26258 2~~	~~11.9594 6~~	~~0.19538 2~~	~~58.2914 6~~	~~108.310 2~~	~~112.195 1~~	~~120. 5~~	~~70.6959 7~~	~~45.875~~	~~38.4615 4~~	~~43.4782 6~~	~~46.7479 7~~	~~586.2641~~	0.0074
31A-161 - 1.d	0.33333 3	5.48124	4.52586 2	12.0350 1	42.5675 7	24.5115 5	43.2160 8	30.1939 1	23.0894 3	32.1	23.4432 2	19.625	13.3603 2	16.5217 4	18.6991 9	177.0328	0.57149
31A-161 - 2.d	0.08016 9	5.07340 9	3.52370 7	8.68709	50	31.0834 8	56.2814 1	35.1800 6	22.6016 3	21.7	13.9194 1	9.75	6.47773 3	6.64596 3	7.07317 1	123.348	0.585952
~~**31A-162 - 1.d**~~	~~0~~	~~0.19739~~	~~0~~	~~0.26258 2~~	~~6.28378 4~~	~~0.44405~~	~~65.8291 5~~	~~152.908 6~~	~~147.967 5~~	~~186. 6~~	~~105.677 7~~	~~83.125~~	~~61.9433 2~~	~~65.2173 9~~	~~76.0162 6~~	~~879.4557~~	0.021833
31A-163 - 1.d	0	1.54975 5	0.51724 1	2.38512	33.0405 4	34.2806 4	105.025 1	111.911 4	91.8699 2	118. 8	60.9890 1	60.25	46.9635 6	53.4161 5	53.6585 4	597.8585	0.581941
31A-164 - 1.d	0	3.50734 1	1.48706 9	5.40481 4	11.5540 5	9.41385 4	75.8794	125.484 8	141.056 9	224. 4	130.219 8	132.5	117.004	184.472	225.609 8	1280.747	0.317935
31A-164 - 2.d	0	4.61663 9	2.09051 7	4.83588 6	33.7837 8	19.1829 5	52.7638 2	39.3351 8	21.9512 2	27.7	14.6520 1	14.5625	9.55465 6	11.1180 1	8.78048 8	147.6541	0.454353
31A-164 - 3.d	0	2.88743 9	0.44181	2.45076 6	20.7432 4	13.1438 7	90.4522 6	83.9335 2	63.8211 4	66.8	39.5604 4	30.875	33.1983 8	39.7515 5	43.0894 3	401.0295	0.303442
~~**31A-165 - 1.d**~~	~~0~~	~~0.44045 7~~	~~0~~	~~0~~	~~5.20270 3~~	~~2.78863 2~~	~~52.2613 1~~	~~127.977 8~~	~~184.552 8~~	~~367. 2~~	~~202.930 4~~	~~261.25~~	~~310.526 3~~	~~358.385 1~~	~~454.065~~	~~2266.888~~	0.169117
31A-165 - 2.d	0	1.85970 6	0.35560 3	5.64551 4	51.3513 5	26.2877 4	140.703 5	119.113 6	75.2032 5	73.2	43.4065 9	24.3125	9.95951 4	11.5528	9.91869 9	366.6669	0.309261
31A-166 - 1.d	0	1.84339 3	0.08620 7	2.77899 3	34.4594 6	43.1616 3	157.286 4	160.110 8	121.138 2	137. 4	87.5457 9	56.25	30.7692 3	23.2298 1	26.4227 6	642.8666	0.58627
31A-167 - 1.d	0	11.0766 7	4.41810 3	16.8490 2	152.702 7	225.399 6	206.030 2	177.008 3	162.195 1	210. 2	130.219 8	125	128.340 1	192.546 6	313.008 1	1438.518	1.270763
31A-167 - 2.d	0.76793 2	5.70962 5	2.44612 1	11.3785 6	33.2432 4	59.5026 6	85.4271 4	63.4349	42.6829 3	43.2	23.9926 7	20.625	10.9716 6	10.7453 4	13.4146 3	229.0671	1.116572
~~**31A-168 - 1.d**~~	~~0~~	~~1.64763 5~~	~~0~~	~~1.96936 5~~	~~21.0810 8~~	~~4.97335 7~~	~~68.8442 2~~	~~74.2382 3~~	~~86.1788 6~~	~~208~~	~~114.468 9~~	~~157.5~~	~~222.672 1~~	~~287.577 6~~	~~402.439~~	~~1553.075~~	0.130548
31A-168 - 2.d	0	1.89233 3	1.48706 9	4.79212 3	48.6486 5	37.1225 6	129.145 7	111.357 3	94.7154 5	121. 5	71.7948 7	58.125	52.6315 8	40.4968 9	41.0569 1	591.678	0.468341
31A-169 - 1.d	0.75527 4	8.18923 3	5.38793 1	17.0678 3	60.1351 4	98.4014 2	89.4472 4	134.626	160.569 1	279	164.652	176.875	198.785 4	268.323	325.203 3	1708.034	1.341695
31A-169 - 2.d	1.43459 9	10.5872 8	7.00431	16.4113 8	66.8918 9	110.302	126.130 7	170.083 1	208.536 6	412	243.772 9	329.375	469.635 6	732.919 3	1077.23 6	3643.558	1.200843
~~**31A-170 - 1.d**~~	~~0~~	~~1.32137~~	~~0~~	~~1.75054 7~~	~~29.7297 3~~	~~2.73534 6~~	~~82.4120 6~~	~~91.4127 4~~	~~93.0894 3~~	~~143. 8~~	~~81.5018 3~~	~~80~~	~~97.5708 5~~	~~127.950 3~~	~~174.390 2~~	~~889.7154~~	0.055261
31A-170 - 2.d	0	1.10929 9	0.20474 1	2.07877 5	20.5405 4	28.0639 4	84.9246 2	78.3933 5	67.0731 7	81.3	44.5054 9	39	33.6032 4	37.3291 9	29.6748	410.8792	0.671933

~~Crossed out~~ = discordant

WGC2019J-31A zircon trace elements standards

Standard	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
NIST610_51 - 1.d	421100	434100	427900	413400	434000	428200	427500	418600	423800	428400	433100	419200	432300	420400
NIST610_51 - 2.d	425500	436500	432400	411400	437500	432100	436900	422900	420000	434700	444600	421900	435900	427000
NIST610_51 - 3.d	421900	435200	433500	414300	435000	432200	428700	422700	419200	432400	436200	419800	434300	422000
NIST610_51 - 4.d	422400	434700	430500	411300	432900	425600	426700	417400	417200	426800	435500	415000	430000	419800
NIST610_51 - 5.d	422800	434900	427900	414100	433000	428500	430900	418400	421400	430000	436600	416300	430900	419600
NIST610_51 - 6.d	425100	436700	428900	414600	438100	432100	432300	420100	420800	432500	439600	418600	432300	421800
NIST610_51 - 7.d	425100	438500	433300	412700	436600	431100	437300	421600	422100	434800	435800	420600	432700	423000
NIST610_51 - 8.d	419900	431500	426800	412700	432100	425500	424500	413900	415200	425600	431300	415100	429700	416200
NIST610_51 - 9.d	420700	431400	431500	413100	434400	428000	428800	417200	417500	428200	437700	418500	430600	421600
NIST610_51 - 10.d	422600	436700	431800	413200	433800	430600	432800	421700	420000	431800	434900	417500	432700	422000
NIST610_51 - 11.d	421300	436300	431000	411800	437200	429600	429800	419300	417000	431800	433600	415000	433900	419300
NIST610_51 - 12.d	425500	439000	433200	418500	435400	433100	436700	423500	423000	431500	438000	418300	434800	425300
NIST610_51 - 13.d	421300	432000	429300	409200	433900	427500	431200	420100	419100	430900	438200	416900	433800	425100
NIST610_51 - 14.d	420800	430600	427400	411300	437900	425500	433400	419000	420500	431600	440100	416200	427200	419800
NIST610_51 - 15.d	426800	441200	432700	417200	439300	433100	436000	423200	426300	433400	440900	419100	435400	425000
NIST610_51 - 16.d	424900	439600	433200	414900	437500	433100	439500	419400	422500	435000	440600	421700	434100	425500
NIST610_51 - 17.d	425400	437300	436600	416800	437900	436600	438600	423900	421200	435300	441700	421100	438600	425900
NIST610_51 - 18.d	429100	439900	434600	418500	440400	435900	431900	423600	424100	439500	440600	424200	435200	423800
NIST610_51 - 19.d	428000	441700	434500	416900	437000	435800	435200	427900	426700	436900	442600	421500	435500	426100
NIST610_51 - 21.d	425600	441800	434500	414300	445100	436900	437200	426400	425100	437600	441000	422500	435000	423100
NIST610_51 - 22.d	429700	440300	436200	419500	442900	434000	434800	425700	425000	439200	442100	423600	439300	426400
NIST610_51 - 23.d	424600	440800	432400	419000	439000	429100	431000	423100	420800	434400	437600	421200	434200	422600
NIST610_51 - 24.d	429400	439800	436000	414700	436400	433000	437200	423900	421700	435200	442400	422300	431500	426300
NIST610_51 - 25.d	425800	439600	434400	416300	437000	433900	431700	422100	423300	431400	442400	422200	431800	424500
NIST610_51 - 26.d	422600	434400	432000	414500	433400	427700	430500	417200	420000	433100	435000	417300	431100	424200
NIST610_51 - 27.d	424400	436400	432700	412800	437700	430200	432000	419000	419700	431000	438800	414800	431300	419900
NIST610_51 - 28.d	419400	432300	427000	409900	430300	425300	429000	415800	417500	429400	433500	412800	431500	418800
NIST610_51 - 29.d	419300	432000	423800	410200	428500	425100	425200	416900	415800	428600	434300	412800	431400	417500

NIST610_51 - 30.d	425400	437300	437200	417600	439800	431300	436000	425200	422900	436800	441300	422300	439900	427700
NIST610_51 - 31.d	419900	435300	427100	412000	436300	429000	430500	418800	418200	432700	436200	416800	429800	421100
NIST610_51 - 32.d	423500	436400	429700	415600	437700	430500	436500	420800	418700	431900	442900	421000	433500	424000
NIST610_51 - 33.d	424600	436900	431700	415000	436700	430000	431800	422100	418300	432100	436500	416800	435400	421600
NIST610_51 - 34.d	426800	439700	435200	418300	434300	433900	433800	422200	421600	434500	440500	420700	440800	424800
NIST610_51 - 35.d	424200	435200	433200	413800	436300	432100	434600	419300	420700	432900	438300	422000	435800	423800
NIST610_51 - 36.d	423300	438800	431100	412100	435400	430800	437900	421800	421800	434300	436400	422500	434200	424800
NIST610_51 - 37.d	426600	439200	433100	418300	442700	433600	434600	425600	427800	437000	443000	423600	437900	428500
NIST610_51 - 38.d	421500	434500	429400	412700	437400	431200	432900	423700	423700	435200	438200	419200	435900	425600
NIST610_51 - 39.d	430700	442100	437400	421800	442400	436800	437400	427500	427400	437300	446400	424600	439600	426600
NIST610_51 - 40.d	420200	435000	428400	411900	430600	428000	431900	419800	418600	430500	437800	419300	435600	420000
NIST610_51 - 41.d	426100	438300	434400	415300	441100	435400	435000	423300	425000	432100	441400	422700	436900	424400
NIST610_51 - 42.d	424500	438300	433800	419900	438900	432400	435800	422800	426300	436300	440500	424900	436700	426600
NIST610_51 - 43.d	423700	433800	427600	409600	432300	428100	427900	417600	415400	429600	435600	415200	430900	416700
NIST610_51 - 44.d	419900	430600	428300	412600	431900	426700	423800	414900	415400	423200	431100	411600	425300	415200
NIST610_51 - 45.d	427400	438200	435000	417800	437500	433200	434400	425600	421100	433900	440900	421000	435000	424700
NIST610_51 - 46.d	421500	432200	427500	411400	433100	427700	426400	418900	420700	430400	436400	416700	431400	420500
NIST610_51 - 47.d	421400	434500	428200	409700	433900	424900	429900	418900	416400	427700	432300	415300	428400	419100
NIST610_51 - 48.d	423600	435400	429800	412600	432200	430200	430000	420300	421600	430900	437500	418800	432400	422400
NIST610_51 - 49.d	422300	434300	430100	411900	433500	428200	431000	419600	421500	431600	438600	414900	430800	421600
NIST610_51 - 50.d	424000	438400	431000	415800	438000	433900	432500	420100	421200	436300	439100	422700	435900	422400
NIST610_51 - 51.d	423000	436600	429400	410900	438800	428600	429700	417800	420300	431400	435300	415800	431600	419100
NIST610_51 - 52.d	419500	430400	428800	408600	427800	425900	424500	414700	417800	430600	433700	414000	427300	416000
NIST610_51 - 53.d	423700	438800	433300	414000	438700	428300	435900	419700	417800	430900	437000	417800	430300	422800
NIST610_51 - 54.d	422000	435100	431100	411200	435500	428800	432600	418900	420700	430100	438700	416200	433200	425500
NIST610_51 - 55.d	423500	435500	430100	415400	435800	430700	434900	419600	419000	432500	436800	418200	431100	422900
NIST610_51 - 56.d	425800	434000	433500	415500	439700	432800	437100	423100	421600	433100	439400	421200	438400	425400
NIST610_19 - 1.d	425000	443000	434000	420000	426000	421000	430000	413000	419000	428000	433000	409000	416000	416000
NIST610_19 - 2.d	433000	447000	436000	417000	439000	434000	432000	421000	422000	429000	442000	419000	439000	422000
NIST610_19 - 3.d	425000	438000	435000	414000	439000	433000	434000	421000	422000	432000	437000	419000	428000	420000
NIST610_19 - 4.d	422000	432000	420000	399000	416000	424000	424000	411000	412000	421000	425000	401000	428000	403000

NIST610_19 - 5.d	418000	433000	421000	406000	421000	423000	418000	406000	401000	420000	431000	400000	412000	407000
NIST610_19 - 6.d	416000	431000	416000	406000	431000	425000	419000	412000	416000	422000	430000	405000	417000	416000
NIST610_19 - 7.d	411000	428000	418000	417000	422000	417000	411000	414000	408000	422000	423000	412000	410000	405000
NIST610_19 - 8.d	417000	430000	426000	413000	426000	424000	423000	411000	412000	418000	417000	407000	417000	407000
NIST610_19 - 9.d	419000	434000	433000	417000	434000	430000	425000	414000	415000	423000	438000	407000	428000	412000
NIST610_19 - 10.d	429000	435000	431000	416000	438000	429000	420000	417000	420000	426000	434000	412000	428000	422000
NIST610_19 - 11.d	420000	435000	427000	412000	428000	426000	419000	408000	409000	422000	425000	409000	422000	415000
NIST610_19 - 12.d	425000	443000	434000	410000	425000	437000	431000	420000	418000	432000	440000	418000	429000	420000
NIST610_19 - 13.d	422000	431000	431000	406000	440000	425000	436000	409000	406000	425000	432000	412000	421000	410000
NIST610_19 - 14.d	417000	436000	431000	410000	440000	424000	429000	409000	422000	427000	433000	419000	436000	418000
NIST610_19 - 15.d	414000	429000	428000	406000	429000	417000	424000	410000	411000	419000	422000	403000	415000	411000
NIST610_19 - 16.d	423000	443000	433000	417000	442000	426000	434000	419000	423000	432000	441000	417000	432000	414000
NIST610_19 - 17.d	435000	441000	437000	416000	425000	432000	442000	424000	415000	435000	442000	418000	436000	421000
NIST610_19 - 18.d	441000	461000	442000	419000	452000	437000	443000	426000	434000	444000	454000	429000	451000	427000
NIST610_19 - 19.d	419000	435000	423000	411000	434000	424000	431000	412000	407000	424000	424000	402000	424000	413000
NIST610_19 - 20.d	422000	436000	430000	412000	429000	422000	420000	416000	415000	424000	424000	409000	427000	418000
NIST610_19 - 21.d	422000	441000	431000	427000	436000	429000	435000	420000	430000	428000	436000	425000	424000	422000
NIST610_19 - 22.d	427000	426000	430000	411000	446000	435000	428000	417000	421000	428000	440000	414000	429000	413000
NIST610_19 - 23.d	430000	443000	432000	431000	438000	432000	435000	420000	418000	423000	441000	412000	431000	414000
NIST610_19 - 24.d	423000	434000	425000	395000	425000	424000	415000	410000	415000	418000	419000	411000	425000	408000
NIST610_19 - 25.d	424000	431000	437000	423000	434000	434000	425000	411000	419000	423000	434000	414000	423000	412000
NIST610_19 - 26.d	423000	445000	433000	414000	445000	430000	426000	412000	409000	421000	425000	409000	430000	413000
NIST610_19 - 27.d	438000	456000	446000	422000	443000	445000	450000	431000	436000	446000	444000	425000	445000	428000
NIST610_19 - 28.d	424000	441000	431000	414000	444000	423000	434000	416000	425000	433000	436000	416000	433000	418000

Ti-in-zircon thermometry

Sample	No.	Ti (ppm)	±	T (Ferry & Watson, 2007)	±	Comments
WGC-25B-3 - 1.d	**2**	3	2.2	644.1018729	66.2875412	
WGC-25B-3 - 2.d	**3**	5.5	2.5	692.6709392	56.37272502	
WGC-25B-4 - 1.d	**4**	-0.000296	0.000013	#NUM!	#NUM!	<1 ppm Ti
WGC-25B-5 - 1.d	**7**	2.7	1.8	636.153545	65.50323946	
WGC-25B-5 - 2.d	**8**	-0.000332	0.00002	#NUM!	#NUM!	<1 ppm Ti
WGC-25B-5 - 3.d	**9**	1.2	1.2	579.3001555	100.9316229	
WGC-25B-6 - 2.d	**11**	3.7	1.9	660.3440167	59.08201147	
WGC-25B-7 - 1.d	**12**	4.3	2.3	672.3412466	59.18665898	
WGC-25B-7 - 2.d	**13**	2	1.5	614.2507604	71.92217594	
WGC-25B-7 - 3.d	**14**	3.9	2.2	664.51183	60.33546818	
WGC-25B-8 - 1.d	**15**	7	2.7	713.4563732	54.18140317	
WGC-25B-8 - 2.d	**16**	7.5	3.1	719.5684053	55.27340561	
WGC-25B-10 - 1.d	**17**	6	2.8	700.068554	56.78569314	
WGC-25B-10 - 2.d	**18**	3.2	2.4	649.0396247	66.28197714	
WGC-25B-11 - 1.d	**19**	2	1.6	614.2507604	73.07636112	
WGC-25B-11 - 3.d	**21**	3.7	2	660.3440167	59.86831794	
WGC-25B-12 - 1.d	**22**	2.4	1.6	627.429602	66.87698731	
WGC-25B-13 - 2.d	**24**	2.9	1.7	641.52924	62.71785767	
WGC-25B-14 - 1.d	**25**	0.9	1	560.8027106	#NUM!	<1 ppm Ti
WGC-25B-16 - 1.d	**28**	8.6	3.3	731.9195946	54.53436029	
WGC-25B-16 - 2.d	**29**	3.4	2.1	653.7266072	62.45393703	
WGC-25B-17 - 1.d	**30**	0.52	0.72	527.6676692	#NUM!	<1 ppm Ti
WGC-25B-17 - 2.d	**31**	3.7	2.1	660.3440167	60.64336389	
WGC-25B-18 - 1.d	**32**	1.4	1.2	589.5535378	86.31334198	
WGC-25B-18 - 2.d	**33**	1.1	1.1	573.6194806	113.7548977	
WGC-25B-19 - 1.d	**34**	5.2	2.6	687.9616042	57.84606729	
WGC-25B-19 - 2.d	**35**	4.7	2.4	679.5884537	58.27848302	
WGC-25B-20 - 1.d	**36**	3.7	2.5	660.3440167	63.6377924	

WGC-25B-20 - 2.d	**37**	6.9	2.9	712.1911588	55.37051228	
WGC-25B-21 - 2.d	**39**	8	3	725.3547918	54.03511511	
WGC-25B-22 - 1.d	**40**	2.4	1.7	627.429602	67.91181224	
WGC-25B-22 - 2.d	**41**	4.2	2.3	670.4424511	59.62387935	
WGC-25B-23 - 1.d	**42**	4.7	2.4	679.5884537	58.27848302	
WGC-25B-23 - 2.d	**43**	3.2	2.2	649.0396247	64.6740707	
WGC-25B-24 - 1.d	**44**	-0.000463	0.000025	#NUM!	#NUM!	<1 ppm Ti
WGC-25B-24 - 2.d	**45**	7.4	3	718.3733418	54.96729128	
WGC-25B-25 - 1.d	**46**	3.5	1.9	655.9845582	60.20772223	
WGC-25B-25 - 2.d	**47**	6.5	2.8	706.9744981	55.65428182	
WGC-25B-26 - 1.d	**48**	4.7	2.5	679.5884537	58.92666766	
WGC-25B-26 - 2.d	**49**	2.8	1.8	638.8814791	64.53686082	
WGC-25B-27 - 1.d	**50**	6.1	2.6	701.4866869	55.45050014	
WGC-25B-27 - 2.d	**51**	7.6	3	720.7504673	54.63988188	
WGC-25B-28 - 1.d	**52**	1.3	1.3	584.5936072	93.86872609	
WGC-25B-28 - 2.d	**53**	3.4	1.9	653.7266072	60.82156466	
WGC-25B-29 - 1.d	**54**	5	2.5	684.6957848	57.87421248	
WGC-25B-30 - 1.d	**55**	5.4	2.5	691.1252528	56.65090481	
WGC-25B-31 - 1.d	**56**	0.27	0.55	491.3754861	#NUM!	<1 ppm Ti
WGC-25B-32 - 1.d	**58**	0.27	0.54	491.3754861	#NUM!	<1 ppm Ti
WGC-25B-33 - 1.d	**59**	4.1	2.2	668.5057866	59.36787366	
WGC-25B-33 - 2.d	**60**	2.4	1.7	627.429602	67.91181224	
WGC-25B-34 - 1.d	**61**	3.8	2.2	662.4507046	60.85740141	
WGC-25B-34 - 2.d	**62**	4	2	666.529529	58.36287656	
WGC-25B-35 - 2.d	**64**	4.9	2.4	683.0221981	57.5772024	
WGC-25B-36 - 1.d	**65**	8	3	725.3547918	54.03511511	
WGC-25B-36 - 2.d	**66**	0.9	1.1	560.8027106	#NUM!	<1 ppm Ti
WGC-25B-36 - 3.d	**67**	6.1	2.5	701.4866869	54.89570453	
WGC-25B-37 - 1.d	**68**	3.3	2	651.4126887	62.30894618	
WGC-25B-37 - 2.d	**69**	3.8	2.1	662.4507046	60.10382871	
WGC-25B-39 - 1.d	**71**	4.1	2.2	668.5057866	59.36787366	

WGC-25B-40 - 1.d	**72**	3.8	2	662.4507046	59.33968835	
WGC-25B-42 - 1.d	**74**	7.8	3	723.0768275	54.32955696	
WGC-25B-43 - 1.d	**75**	4.7	2.4	679.5884537	58.27848302	
WGC-25B-44 - 1.d	**76**	5.6	2.6	694.1936044	56.68687889	
WGC-25B-44 - 2.d	**77**	4.8	2.3	681.3201228	57.27241125	
WGC-25B-45 - 2.d	**79**	3.6	1.9	658.1894637	59.62884231	
WGC-25B-45 - 3.d	**80**	4.4	2.2	674.2037839	58.08133334	
WGC-25B-46 - 1.d	**81**	1.6	1.3	598.6369314	79.41506975	
WGC-25B-46 - 2.d	**82**	6.3	2.8	704.266451	56.08540446	
WGC-25B-47 - 1.d	**83**	7.1	2.9	714.7068257	55.00235759	
WGC-25B-47 - 2.d	**84**	11.9	5.1	762.4974929	57.47694865	
WGC-25B-48 - 1.d	**85**	2.4	1.6	627.429602	66.87698731	
WGC-25B-48 - 2.d	**86**	1.8	1.4	606.8093388	75.00471897	
WGC-25B-49 - 1.d	**87**	-0.000562	0.000034	#NUM!	#NUM!	<1 ppm Ti
WGC-25B-49 - 2.d	**88**	1.9	1.3	610.6123488	71.48684748	
WGC-25B-50 - 1.d	**89**	2.7	1.7	636.153545	64.54593694	
WGC-25B-50 - 2.d	**90**	6.2	2.6	702.8857988	55.2272152	
WGC-25B-51 - 1.d	**91**	6.5	2.5	706.9744981	54.06429043	
WGC-25B-52 - 1.d	**92**	7.5	2.8	719.5684053	53.84624496	
WGC-25B-52 - 2.d	**93**	4.6	2.4	677.8260182	58.65177678	
WGC-25B-53 - 1.d	**94**	2.9	1.7	641.52924	62.71785767	
WGC-25B-54 - 1.d	**95**	2.3	1.7	624.3183366	69.2508733	
WGC-25B-54 - 2.d	**96**	3.9	2.3	664.51183	61.0688566	
WGC-25B-55 - 1.d	**97**	5.9	2.4	698.6308117	54.78342366	
WGC-25B-55 - 2.d	**98**	4.1	2.2	668.5057866	59.36787366	
WGC-25B-56 - 1.d	**99**	5.8	2.8	697.1728431	57.2923301	
WGC-25B-57 - 1.d	**101**	1.9	1.5	610.6123488	73.93988096	
WGC-25B-57 - 2.d	**102**	7.4	2.7	718.3733418	53.51755256	
WGC-25B-59 - 1.d	**104**	6.7	2.9	709.6148418	55.76075824	
WGC-25B-60 - 1.d	**105**	0.51	0.72	526.5429514	#NUM!	<1 ppm Ti
WGC-25B-60 - 3.d	**107**	5	2.5	684.6957848	57.87421248	

WGC-25B-61 - 1.d	**108**	2.8	1.7	638.8814791	63.59696743	
WGC-25B-61 - 2.d	**109**	2.1	1.4	617.7395314	68.98387345	
WGC-25B-61 - 3.d	**110**	1.9	1.5	610.6123488	73.93988096	
WGC-25B-62 - 2.d	**112**	3.5	2	655.9845582	61.01768856	
WGC-25B-63 - 1.d	**114**	6.8	2.7	710.910786	54.54342613	
WGC-25B-63 - 2.d	**115**	6.6	2.8	708.3028957	55.44852305	
WGC-25B-64 - 1.d	**116**	1.2	1.2	579.3001555	100.9316229	
WGC-25B-64 - 2.d	**117**	3.5	1.9	655.9845582	60.20772223	
WGC-25B-65 - 1.d	**118**	4.6	2.5	677.8260182	59.30747815	
WGC-25B-65 - 2.d	**119**	7	3	713.4563732	55.67881407	
WGC-25B-68 - 1.d	**120**	-0.000692	0.000041	#NUM!	#NUM!	<1 ppm Ti
WGC-25B-68 - 2.d	**121**	0.76	0.86	550.3012916	#NUM!	<1 ppm Ti
WGC-25B-68 - 3.d	**122**	3.7	2.1	660.3440167	60.64336389	
WGC-25B-69 - 1.d	**123**	-0.000692	0.000027	#NUM!	#NUM!	<1 ppm Ti
WGC-25B-69 - 2.d	**124**	5.8	2.6	697.1728431	56.16676843	
WGC-25B-69 - 3.d	**125**	4.5	2.5	676.0315702	59.70488775	
WGC-25B-69 - 4.d	**126**	1.7	1.4	602.8243343	77.64501988	
WGC-25B-71 - 1.d	**127**	3.8	2.1	662.4507046	60.10382871	
WGC-25B-71 - 2.d	**128**	8.3	2.9	728.685773	53.17281133	
WGC-25B-71 - 3.d	**129**	8.3	2.8	728.685773	52.72149265	
WGC-25B-72 - 1.d	**130**	4	2.2	666.529529	59.839592	
WGC-25B-73 - 1.d	**132**	2.5	1.8	630.4341806	67.68581495	
WGC-25B-73 - 2.d	**133**	1.9	1.5	610.6123488	73.93988096	
WGC-25B-74 - 1.d	**134**	2.8	1.8	638.8814791	64.53686082	
WGC-25B-75 - 1.d	**136**	5.4	2.6	691.1252528	57.2452501	
WGC-25B-75 - 2.d	**137**	2.4	1.6	627.429602	66.87698731	
WGC-25B-76 - 1.d	**138**	3.7	2.1	660.3440167	60.64336389	
WGC-25B-76 - 2.d	**139**	7.7	2.9	721.9198409	54.01422837	
WGC-25B-77 - 1.d	**140**	1.5	1.3	594.2229705	83.13822035	
WGC-25B-77 - 2.d	**141**	3	1.8	644.1018729	62.80805901	
WGC-25B-78 - 2.d	**143**	22.5	9.2	828.2161027	60.79418996	

WGC-25B-78 - 3.d	**144**	6.4	2.6	705.62918	54.80178416	
WGC-25B-79 - 1.d	**145**	0.85	0.97	557.222726	#NUM!	<1 ppm Ti
WGC-25B-79 - 2.d	**146**	7	2.8	713.4563732	54.68467307	
WGC-25B-80 - 1.d	**147**	2.7	1.8	636.153545	65.50323946	
WGC-25B-80 - 2.d	**148**	3	2.1	644.1018729	65.43892407	
WGC-25B-81 - 1.d	**149**	6.7	2.8	709.6148418	55.24893197	
WGC-25B-81 - 2.d	**150**	3.5	2.1	655.9845582	61.81562866	
WGC-25B-82 - 1.d	**151**	2.4	1.9	627.429602	69.92034633	
WGC-25B-82 - 2.d	**152**	3.8	2.1	662.4507046	60.10382871	
WGC-25B-82 - 3.d	**153**	5.7	2.5	695.6940007	39.12333737	
				Weighted mean = 676.35	**± 7.14***	

Sample	**No.**	**Ti (ppm)**	**±**	**T (Ferry & Watson, 2007)**	**±**	**Comments**
31A-1 - 1.d	1	6.6	3.6	708.3029	59.459607	
31A-1 - 2.d	2	2.6	2.2	633.33985	70.276751	
31A-2 - 1.d	3	9.6	4	742.07196	56.101275	
31A-2 - 2.d	4	0.46	0.92	520.61902	#NUM!	~~<1 ppm Ti~~
31A-3 - 1.d	5	3.1	2.3	646.60395	66.276888	
31A-3 - 2.d	6	9	4.2	736.09075	57.674287	
31A-4 - 1.d	7	3.8	2.8	662.4507	65.173953	
31A-4 - 2.d	8	5.4	3.2	691.12525	60.689171	
31A-5 - 1.d	9	5.3	3.4	689.55575	62.133129	
31A-5 - 2.d	10	4.2	2.9	670.44245	63.67809	
31A-6 - 1.d	11	3.2	2.5	649.03962	67.068284	
31A-6 - 2.d	12	3.9	2.6	664.51183	63.212256	
31A-7 - 1.d	13	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-7 - 2.d	14	3.7	2.7	660.34402	65.075913	

31A-8 - 1.d	15	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-8 - 2.d	16	1	1.4	567.48328	#NUM!	
31A-8 - 3.d	17	0	1	#NUM!	#NUM!	~~<1 ppm Ti~~
31A-9 - 1.d	18	22.8	7.2	829.6713	56.681336	
31A-9 - 2.d	19	12.9	4.9	770.3852	55.976708	
31A-10 - 1.d	20	3.7	3.6	660.34402	71.124446	
31A-10 - 2.d	21	4.7	3	679.58845	62.061269	
31A-11 - 1.d	22	3.4	2.5	653.72661	65.57737	
31A-11 - 2.d	23	1.3	1.5	584.59361	96.76771	
31A-11 - 3.d	24	0	1	#NUM!	#NUM!	~~<1 ppm Ti~~
31A-12 - 1.d	25	1.5	1.7	594.22297	88.453505	
31A-12 - 2.d	26	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-12 - 3.d	27	7.6	4.6	720.75047	61.740975	
31A-13 - 1.d	28	17	6.1	798.29679	56.655426	
31A-13 - 2.d	29	7.1	3.8	714.70683	59.285593	
31A-14 - 1.d	30	12.4	9.1	766.50592	68.553523	
31A-16 - 1.d	31	3.9	2.6	664.51183	63.212256	
31A-16 - 2.d	32	0.4	0.81	512.73369	#NUM!	<1 ppm Ti
31A-16 - 3.d	33	3.7	2.7	660.34402	65.075913	
31A-17 - 1.d	34	2.7	2.1	636.15354	68.273417	
31A-17 - 2.d	35	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-18 - 1.d	36	4.9	2.9	683.0222	60.677791	
31A-18 - 2.d	37	3.3	2.4	651.41269	65.525565	
31A-19 - 1.d	38	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-19 - 2.d	39	2.2	1.9	621.09162	72.819596	
31A-20 - 1.d	40	9.5	4.3	741.09671	57.374149	
31A-20 - 2.d	41	1.8	1.8	606.80934	79.79381	
31A-21 - 1.d	42	5.2	3.5	687.9616	63.039651	

31A-21 - 2.d	43	4.5	3	676.03157	62.910099	
31A-21 - 3.d	44	8.8	4.6	734.02456	59.54275	
31A-22 - 1.d	45	2.8	2.4	638.88148	69.846627	
31A-22 - 2.d	46	3.1	2.7	646.60395	69.446147	
31A-23 - 1.d	47	27	11	848.59065	62.237361	
31A-23 - 2.d	48	13.5	4.5	774.8825	54.310326	
31A-24 - 1.d	49	4.1	2.8	668.50579	63.522622	
31A-24 - 2.d	50	8	3.8	725.35479	57.582409	
31A-25 - 1.d	51	12.7	5.1	768.84838	56.758428	
31A-25 - 2.d	52	1.3	1.4	584.59361	95.340589	
31A-32 - 1.d	53	3.1	2.5	646.60395	67.884794	
31A-32 - 2.d	54	2.4	2.4	627.4296	74.623275	
31A-33 - 1.d	55	2.5	2.2	630.43418	71.481635	
31A-33 - 2.d	56	1.6	1.8	598.63693	85.798096	
31A-33 - 3.d	57	4.3	2.7	672.34125	61.888731	
31A-34 - 1.d	58	2.9	2.3	641.52924	68.027624	
31A-34 - 2.d	59	3.3	2.6	651.41269	67.064751	
31A-35 - 1.d	60	0	1	#NUM!	#NUM!	~~<1 ppm Ti~~
31A-35 - 2.d	61	3.9	2.8	664.51183	64.596532	
31A-35 - 3.d	62	1	1.3	567.48328	#NUM!	<1 ppm Ti
31A-37 - 1.d	63	12.4	4.9	766.50592	56.386542	
31A-37 - 2.d	64	16.8	5.2	797.06932	54.450824	
31A-36 - 1.d	65	14	5	778.50813	55.476543	
31A-36 - 2.d	66	0.9	1.3	560.80271	#NUM!	~~<1 ppm Ti~~
31A-38 - 1.d	67	31.2	7.1	865.29167	54.588811	
31A-38 - 2.d	68	13.1	5	771.9028	56.127872	
31A-39 - 1.d	69	2	2.2	614.25076	79.49175	
31A-39 - 2.d	70	1.5	1.7	594.22297	88.453505	

31A-40 - 1.d	71	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-40 - 2.d	72	2.9	2.3	641.52924	68.027624	
31A-41 - 1.d	73	2.6	2.3	633.33985	71.168404	
31A-41 - 2.d	74	12.9	4.7	770.3852	55.354929	
31A-41 - 3.d	75	33	10	871.90542	58.928861	
31A-42 - 1.d	76	3.6	2.6	658.18946	64.982563	
31A-42 - 2.d	77	6.5	3.3	706.9745	58.213832	
31A-43 - 1.d	78	2.7	2.3	636.15354	70.041844	
31A-43 - 2.d	79	4.9	3.2	683.0222	62.460968	
31A-43 - 3.d	80	0	1	#NUM!	#NUM!	~~<1 ppm Ti~~
31A-44 - 1.d	81	0.41	0.82	514.11543	#NUM!	<1 ppm Ti
31A-44 - 2.d	82	3.9	2.6	664.51183	63.212256	
31A-44 - 3.d	83	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-45 - 1.d	84	6.1	3.5	701.48669	60.223033	
31A-45 - 2.d	85	9.8	4.5	743.99786	57.734183	
31A-45 - 3.d	86	5.4	3.2	691.12525	60.689171	
31A-46 - 1.d	87	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-47 - 1.d	88	10.5	4.5	750.49547	56.898359	
31A-47 - 2.d	89	10.4	4.8	749.58928	58.073492	
31A-48 - 1.d	90	5	3.2	684.69578	62.07992	
31A-55 - 1.d	91	5.7	3.4	695.694	60.842135	
31A-55 - 2.d	92	8	6.9	725.35479	69.71653	
31A-56 - 1.d	93	1.9	1.8	610.61235	77.403841	
31A-56 - 2.d	94	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-56 - 3.d	95	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-57 - 1.d	96	7.1	3.9	714.70683	59.743585	
31A-57 - 2.d	97	4.2	3.3	670.44245	66.2276	

31A-58 - 1.d	98	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-58 - 2.d	99	1.4	1.6	589.55354	91.94371	
31A-59 - 1.d	100	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-59 - 2.d	101	15	5.4	785.4557	55.968539	
31A-60 - 1.d	102	12	4.7	763.30998	56.09124	
31A-60 - 2.d	103	13.6	4.9	775.61623	55.455443	
31A-61 - 1.d	104	1.7	1.6	602.82433	80.161596	
31A-61 - 2.d	105	12	6.3	763.30998	61.113553	
31A-61 - 3.d	106	1.4	1.6	589.55354	91.94371	
31A-62 - 1.d	107	4	2.9	666.52953	64.718084	
31A-62 - 2.d	108	4.2	2.9	670.44245	63.67809	
31A-63 - 1.d	109	6.7	4.3	709.61484	62.506904	
31A-63 - 2.d	110	15.1	5.6	786.12965	56.457038	
31A-64 - 1.d	111	5	3.4	684.69578	63.227561	
31A-64 - 2.d	112	10.4	4.8	749.58928	58.073492	
31A-65 - 1.d	113	3.5	2.8	655.98456	67.095152	
31A-65 - 2.d	114	0.46	0.92	520.61902	#NUM!	<1 ppm Ti
31A-66 - 1.d	115	11.1	4.8	755.7896	57.289866	
31A-66 - 2.d	116	12.3	4.7	765.71488	55.83339	
31A-67 - 1.d	117	1.9	1.9	610.61235	78.506757	
31A-67 - 2.d	118	14.7	5.9	783.4118	57.550538	
31A-68 - 1.d	119	8.7	4.1	732.97702	57.717252	
31A-68 - 2.d	120	1.7	1.6	602.82433	80.161596	
31A-69 - 1.d	121	14.4	5.5	781.33389	56.644253	
31A-71 - 1.d	122	9.8	5.7	743.99786	62.020405	
31A-70 - 1.d	123	4.1	2.6	668.50579	62.171807	
31A-72 - 1.d	124	0.9	1.3	560.80271	#NUM!	<1 ppm Ti
31A-72 - 2.d	125	2.5	2.2	630.43418	71.481635	
31A-73 - 1.d	126	6.3	3.8	704.26645	61.18538	
31A-73 - 2.d	127	9.7	4.4	743.03897	57.491046	

31A-74 - 1.d	128	10.8	8.3	753.17248	68.697897	
31A-75 - 1.d	129	2.3	2	624.31834	72.294232	
31A-75 - 2.d	130	2.2	2.1	621.09162	74.82813	
31A-76 - 1.d	131	1.5	1.7	594.22297	88.453505	
31A-76 - 2.d	132	0.9	1.3	560.80271	#NUM!	<1 ppm Ti
31A-77 - 1.d	133	8.9	4.2	735.0624	57.819481	
31A-77 - 2.d	134	12	5.9	763.30998	59.892057	
31A-77 - 3.d	135	5.5	7.5	692.67094	80.409519	
31A-78 - 1.d	136	1.4	1.6	589.55354	91.94371	
31A-78 - 2.d	137	1.4	1.6	589.55354	91.94371	
31A-79 - 1.d	138	3	2.4	644.10187	67.945229	
31A-79 - 2.d	139	13.2	5.1	772.65457	56.354264	
31A-80 - 1.d	140	2.9	2.3	641.52924	68.027624	
31A-80 - 2.d	141	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-81 - 1.d	142	5.2	3.1	687.9616	60.788294	
31A-81 - 2.d	143	0.38	0.76	509.87891	#NUM!	<1 ppm Ti
31A-81 - 3.d	144	6.4	3.6	705.62918	59.945467	
31A-82 - 1.d	145	2.1	2	617.73953	75.539295	
31A-83 - 1.d	146	39.5	8.9	893.63344	56.31171	
31A-83 - 2.d	147	16.8	5.7	797.06932	55.745343	
31A-84 - 1.d	148	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-84 - 2.d	149	0.8	1.1	553.45909	#NUM!	
31A-85 - 1.d	150	3.6	2.6	658.18946	64.982563	
31A-85 - 2.d	151	4.1	2.8	668.50579	63.522622	
31A-86 - 1.d	152	6	4.3	700.06855	64.474856	
31A-86 - 2.d	153	21.9	9.2	825.25847	61.071182	
31A-87 - 1.d	154	2.5	2.2	630.43418	71.481635	
31A-87 - 2.d	155	2.5	2.2	630.43418	71.481635	
31A-87 - 3.d	156	4	5.6	666.52953	80.39295	
31A-88 - 1.d	157	31.5	8.1	866.41463	56.202449	

31A-89 - 1.d	158	7.9	3.8	724.22172	57.753157	
31A-89 - 2.d	159	1.9	1.8	610.61235	77.403841	
31A-90 - 1.d	160	10.2	4.3	747.7554	56.516799	
31A-90 - 2.d	161	11.4	4.8	758.34978	56.983236	
31A-91 - 1.d	162	1	1.4	567.48328	#NUM!	<1 ppm Ti
31A-91 - 2.d	163	7.5	4	719.56841	59.366719	
31A-92 - 1.d	164	14.5	5.9	782.03039	57.694107	
31A-92 - 2.d	165	8.9	4.2	735.0624	57.819481	
31A-93 - 1.d	166	12.3	5.3	765.71488	57.733379	
31A-93 - 2.d	167	9.4	4.1	740.11303	56.73827	
31A-94 - 1.d	168	2	2	614.25076	77.442772	
31A-94 - 2.d	169	1.2	1.4	579.30016	104.0229	
31A-94 - 3.d	170	3.5	2.6	655.98456	65.638021	
31A-95 - 1.d	171	8.1	3.9	726.47632	57.842442	
31A-95 - 2.d	172	5.1	3	686.34193	60.553899	
31A-96 - 1.d	173	13	4.9	771.14637	55.898648	
31A-96 - 2.d	174	2.5	2.2	630.43418	71.481635	
31A-96 - 3.d	175	0.9	1.8	560.80271	#NUM!	<1 ppm Ti
31A-97 - 1.d	176	3.8	2.7	662.4507	64.477516	
31A-97 - 2.d	177	5.7	3.1	695.694	59.223258	
31A-98 - 1.d	178	3.6	2.8	658.18946	66.420683	
31A-98 - 2.d	179	11	6.9	754.92369	64.193927	
31A-99 - 1.d	180	14.5	5.4	782.03039	56.292921	
31A-99 - 2.d	181	15.2	5.1	786.80001	55.014294	
31A-100 - 1.d	182	15.7	5.7	790.0993	56.35698	
31A-100 - 2.d	183	2.1	2.1	617.73953	76.553448	
31A-101 - 1.d	184	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-101 - 2.d	185	1.5	1.8	594.22297	89.695455	
31A-102 - 1.d	186	7.9	4.1	724.22172	59.041978	
31A-102 - 2.d	187	19.7	7	813.82515	57.459995	

31A-103 - 1.d	188	3	2.3	644.10187	67.122823	
31A-103 - 2.d	189	4	3	666.52953	65.3815	
31A-104 - 1.d	190	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-104 - 2.d	191	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-105 - 1.d	192	2.2	1.9	621.09162	72.819596	
31A-105 - 2.d	193	10.7	4.6	752.28695	57.029918	
31A-105 - 3.d	194	18.8	6.5	808.85052	56.726848	
31A-106 - 1.d	195	1.6	1.8	598.63693	85.798096	
31A-107 - 1.d	196	6.6	3.3	708.3029	57.986467	
31A-107 - 2.d	197	2.8	2.4	638.88148	69.846627	
31A-108 - 1.d	198	19.6	6.1	813.28155	55.456161	
31A-108 - 2.d	199	23.3	7.8	832.06292	57.717716	
31A-109 - 1.d	200	4.6	2.9	677.82602	61.856988	
31A-109 - 2.d	201	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-110 - 1.d	202	5.7	3.2	695.694	59.767813	
31A-110 - 2.d	203	1.9	1.9	610.61235	78.506757	
31A-111 - 1.d	204	41	15	898.2413	64.140683	
31A-111 - 2.d	205	7.7	4.5	721.91984	61.115322	
31A-112 - 1.d	206	8.4	4.2	729.77419	58.595622	
31A-112 - 2.d	207	6	3.6	700.06855	61.008604	
31A-113 - 1.d	208	1.5	1.7	594.22297	88.453505	
31A-113 - 2.d	209	6.6	3.6	708.3029	59.459607	
31A-114 - 1.d	210	1	1.3	567.48328	#NUM!	<1 ppm Ti
31A-114 - 2.d	211	2.7	2.4	636.15354	70.904282	
31A-114 - 3.d	212	10.1	5.8	746.82744	61.919583	
31A-115 - 1.d	213	8.8	4.1	734.02456	57.568057	
31A-115 - 2.d	214	2.1	2.1	617.73953	76.553448	
31A-115 - 3.d	215	2.9	2.6	641.52924	70.495278	
31A-116 - 1.d	216	9.1	4.3	737.10981	57.922325	
31A-116 - 2.d	217	2.5	2.2	630.43418	71.481635	

31A-117 - 1.d	218	16.3	6.4	793.94825	57.818246	
31A-117 - 2.d	219	8.3	4.1	728.68577	58.348886	
31A-118 - 1.d	220	1.4	1.6	589.55354	91.94371	
31A-118 - 2.d	221	3.4	2.5	653.72661	65.57737	
31A-118 - 3.d	222	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-119 - 1.d	223	3.8	2.8	662.4507	65.173953	
31A-119 - 2.d	224	10.5	4.6	750.49547	57.252534	
31A-120 - 1.d	225	5.2	3.3	687.9616	61.924775	
31A-120 - 2.d	226	10.8	4.5	753.17248	56.573096	
31A-120 - 3.d	227	9	4	736.09075	56.882034	
31A-121 - 1.d	228	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-121 - 2.d	229	1.1	1.5	573.61948	120.16056	
31A-121 - 3.d	230	0.46	0.91	520.61902	#NUM!	<1 ppm Ti
31A-122 - 1.d	231	2	2	614.25076	77.442772	
31A-122 - 2.d	232	3.6	2.6	658.18946	64.982563	
31A-122 - 3.d	233	10.2	4.5	747.7554	57.242692	
31A-123 - 1.d	234	4	2.9	666.52953	64.718084	
31A-123 - 2.d	235	1.5	1.7	594.22297	88.453505	
31A-124 - 1.d	236	5.5	3.4	692.67094	61.465617	
31A-124 - 2.d	237	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-125 - 1.d	238	0.43	0.87	516.79434	#NUM!	<1 ppm Ti
31A-125 - 2.d	239	5.1	3.3	686.34193	62.283948	
31A-126 - 1.d	240	3.7	2.9	660.34402	66.477629	
31A-126 - 2.d	241	5.8	3.4	697.17284	60.545589	
31A-126 - 3.d	242	11	4.3	754.92369	55.670784	
31A-127 - 1.d	243	6.5	3.7	706.9745	60.186083	
31A-127 - 2.d	244	0.5	1.1	525.39921	#NUM!	<1 ppm Ti
31A-128 - 1.d	245	21	6.7	820.69785	56.264164	
31A-128 - 2.d	246	16.2	5.6	793.31479	55.805208	
31A-129 - 1.d	247	13.9	5.1	777.7915	55.838874	

31A-129 - 2.d	248	15.3	6.1	787.46681	57.679084	
31A-130 - 1.d	249	0.42	0.84	515.46855	#NUM!	
31A-130 - 2.d	250	4.9	3.1	683.0222	61.872658	
31A-130 - 3.d	251	5	3.2	684.69578	62.07992	
31A-131 - 1.d	252	10.5	5	750.49547	58.65062	
31A-131 - 2.d	253	1	1.4	567.48328	#NUM!	<1 ppm Ti
31A-132 - 1.d	254	0.6	1.1	536.05484	#NUM!	<1 ppm Ti
31A-132 - 2.d	255	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-132 - 3.d	256	2.6	2.3	633.33985	71.168404	
31A-133 - 1.d	257	14.4	5.2	781.33389	55.78997	
31A-133 - 2.d	258	34.6	9.5	877.54831	57.861107	
31A-134 - 1.d	259	3.8	2.8	662.4507	65.173953	
31A-134 - 2.d	260	15.8	5.7	790.74894	56.297597	
31A-135 - 1.d	261	2	1.9	614.25076	76.386312	
31A-135 - 2.d	262	2.4	2.7	627.4296	77.25414	
31A-136 - 1.d	263	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-136 - 2.d	264	5.6	3.3	694.1936	60.609053	
31A-136 - 3.d	265	6.1	3.6	701.48669	60.73054	
31A-137 - 1.d	266	13.3	5.1	773.40173	56.277182	
31A-137 - 2.d	267	6.6	3.7	708.3029	59.94283	
31A-138 - 1.d	268	4.1	2.8	668.50579	63.522622	
31A-138 - 2.d	269	1.5	1.7	594.22297	88.453505	
31A-139 - 1.d	270	2.5	2.1	630.43418	70.558459	
31A-139 - 2.d	271	7.3	4	717.16495	59.771716	
31A-140 - 1.d	272	4.3	2.9	672.34125	63.192617	
31A-140 - 2.d	273	3.9	2.8	664.51183	64.596532	
31A-141 - 1.d	274	12.8	5.1	769.61923	56.675007	
31A-141 - 2.d	275	8	4.1	725.35479	58.86249	
31A-142 - 1.d	276	6.3	3.6	704.26645	60.199328	
31A-142 - 2.d	277	5	3.2	684.69578	62.07992	

31A-143 - 1.d	278	9.3	4	739.12077	56.47912	
31A-143 - 2.d	279	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-144 - 1.d	280	2.1	2.1	617.73953	76.553448	
31A-144 - 2.d	281	15	5.6	785.4557	56.521333	
31A-145 - 1.d	282	2.1	2	617.73953	75.539295	
31A-146 - 1.d	283	2.5	2.2	630.43418	71.481635	
31A-146 - 2.d	284	4.8	3	681.32012	61.662043	
31A-147 - 1.d	285	1.9	1.9	610.61235	78.506757	
31A-147 - 2.d	286	3.5	2.8	655.98456	67.095152	
31A-148 - 1.d	287	8.2	4.2	727.58656	58.93154	
31A-148 - 2.d	288	5	3.2	684.69578	62.07992	
31A-149 - 1.d	289	10.2	5.5	747.7554	60.757194	
31A-149 - 2.d	290	6.3	3.6	704.26645	60.199328	
31A-150 - 1.d	291	2.1	2	617.73953	75.539295	
31A-150 - 2.d	292	3.5	2.8	655.98456	67.095152	
31A-151 - 1.d	293	2.6	2.3	633.33985	71.168404	
31A-151 - 2.d	294	7	3.8	713.45637	59.500635	
31A-152 - 1.d	295	3.1	2.7	646.60395	69.446147	
31A-152 - 2.d	296	3.9	2.9	664.51183	65.276009	
31A-152 - 3.d	297	2.4	2.1	627.4296	71.853097	
31A-153 - 1.d	298	3.8	2.8	662.4507	65.173953	
31A-153 - 2.d	299	11.1	4.9	755.7896	57.627867	
31A-154 - 1.d	300	12.3	4.8	765.71488	56.153754	
31A-154 - 2.d	301	8.2	4	727.58656	58.097879	
31A-155 - 1.d	302	40	15	895.18449	64.359089	
31A-155 - 2.d	303	18.4	5.8	806.5779	55.240253	
31A-156 - 1.d	304	10.7	4.5	752.28695	56.679488	
31A-156 - 2.d	305	31	10	864.53826	59.382018	
31A-156 - 3.d	306	0.8	1.1	553.45909	#NUM!	<1 ppm Ti
31A-158 - 1.d	307	3	2.4	644.10187	67.945229	

31A-158 - 2.d	308	0	1	#NUM!	#NUM!	
31A-159 - 1.d	309	4.4	3	674.20378	63.361867	
31A-159 - 2.d	310	5.2	3.3	687.9616	61.924775	
31A-160 - 1.d	311	2.4	2.1	627.4296	71.853097	
31A-160 - 2.d	312	5.8	3.4	697.17284	60.545589	
31A-161 - 1.d	313	11.2	4.7	756.64918	56.847833	
31A-161 - 2.d	314	7.6	3.9	720.75047	58.733195	
31A-162 - 1.d	315	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-163 - 1.d	316	9.6	4.3	742.07196	57.244099	
31A-164 - 1.d	317	9.2	4.3	738.11975	57.78092	
31A-164 - 2.d	318	5.8	3.7	697.17284	62.107832	
31A-164 - 3.d	319	2.5	2.2	630.43418	71.481635	
31A-165 - 1.d	320	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-165 - 2.d	321	5.8	3.4	697.17284	60.545589	
31A-166 - 1.d	322	6.5	3.9	706.9745	61.148734	
31A-167 - 1.d	323	21.6	7.5	823.75523	57.739318	
31A-167 - 2.d	324	10.7	5.4	752.28695	59.768936	
31A-168 - 1.d	325	0	1	#NUM!	#NUM!	<1 ppm Ti
31A-168 - 2.d	326	10.4	5	749.58928	58.772513	
31A-169 - 1.d	327	10	4.7	745.89195	58.209496	
31A-169 - 2.d	328	16.9	6.2	797.68452	56.961346	
31A-170 - 1.d	329	1	1.4	567.48328	#NUM!	<1 ppm Ti
31A-170 - 2.d	330	1.7	1.9	602.82433	83.708736	

APPENDIX 3C: LA–ICP–MS MONAZITE RESULTS

Monazite morphology

Sample	Textural location	Location	Zoning	Size (long axis)	Crystal habit	Comments
WGC2019J-25B-C5_mon_G1 - 1.d	Matrix	rim	Y	~150µm (broken off fragment = ~75µm)	Asymmetric	Broken off fragment of Grain 1. Fragment has paler zoning than the relatively homogenous dark zoning in the main fraction of the grain.
WGC2019J-25B-C5_mon_G1 - 2.d	Matrix	rim				Second broken off fragment of Grain 1. Very minor and patchy zoning present.
WGC2019J-25B-C5_mon_G1 - 3.d	Matrix	rim	N			
WGC2019J-25B-C5_mon_G1 - 4.d	Matrix	rim				Potentially landed on very small region of patchy, pale zoning
WGC2019J-25B-C5_mon_G1 - 5.d	Matrix	core				
WGC2019J-25B-C5_mon_G1 - 6.d	Matrix	rim				
WGC2019J-25B-C5_mon_G1 - 7.d	Matrix	rim				
WGC2019J-25B-C5_mon_G1 - 8.d	Matrix	rim				
WGC2019J-25B-C6_mon_G2 - 1.d	Matrix	core	N	~75µm	Asymmetric	Small amount of patchy zoning but very minor
WGC2019J-25B-C6_mon_G2 - 2.d	Matrix	core				Small amount of patchy zoning but very minor
WGC2019J-25B-C7_mon_G3 - 1.d	Matrix	rim	N	~600µm	Oval	
WGC2019J-25B-C7_mon_G3 - 2.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 3.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 4.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 5.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 6.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 7.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 8.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 9.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 10.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 11.d	Matrix	mid				
WGC2019J-25B-C7_mon_G3 - 12.d	Matrix	mid				
WGC2019J-25B-C7_mon_G3 - 13.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 14.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 15.d	Matrix	mid				

WGC2019J-25B-C7_mon_G3 - 16.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 17.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 18.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 19.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 20.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 21.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 22.d	Matrix	mid				
WGC2019J-25B-C7_mon_G3 - 23.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 24.d	Matrix	mid				
WGC2019J-25B-C7_mon_G3 - 25.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 26.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 27.d	Matrix	mid				
WGC2019J-25B-C7_mon_G3 - 28.d	Matrix	mid				
WGC2019J-25B-C7_mon_G3 - 29.d	Matrix	mid				
WGC2019J-25B-C7_mon_G3 - 30.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 31.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 32.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 33.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 34.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 35.d	Matrix	mid				
WGC2019J-25B-C7_mon_G3 - 36.d	Matrix	rim				
WGC2019J-25B-C7_mon_G3 - 37.d	Matrix	mid				
WGC2019J-25B-C7_mon_G3 - 38.d	Matrix	core				
WGC2019J-25B-C7_mon_G3 - 39.d	Matrix	mid				
WGC2019J-25B-C7_mon_G3 - 40.d	Matrix	core				
WGC2019J-25B-C15_mon_G4 - 1.d	Matrix	rim	N	~1000µm	Asymmetric	
WGC2019J-25B-C15_mon_G4 - 2.d	Matrix	rim				
WGC2019J-25B-C15_mon_G4 - 3.d	Matrix	rim				
WGC2019J-25B-C15_mon_G4 - 4.d	Matrix	mid				
WGC2019J-25B-C15_mon_G4 - 5.d	Matrix	rim				
WGC2019J-25B-C15_mon_G4 - 6.d	Matrix	rim				Near eaten away region of monazite

WGC2019J-25B-C15_mon_G4 - 7.d	Matrix	mid	
WGC2019J-25B-C15_mon_G4 - 8.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 9.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 10.d	Matrix	mid	
WGC2019J-25B-C15_mon_G4 - 11.d	Matrix	mid	
WGC2019J-25B-C15_mon_G4 - 12.d	Matrix	mid	
WGC2019J-25B-C15_mon_G4 - 13.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 14.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 15.d	Matrix	mid	
WGC2019J-25B-C15_mon_G4 - 16.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 17.d	Matrix	rim	Near eaten away region of monazite
WGC2019J-25B-C15_mon_G4 - 18.d	Matrix	mid	
WGC2019J-25B-C15_mon_G4 - 19.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 20.d	Matrix	core	
WGC2019J-25B-C15_mon_G4 - 21.d	Matrix	core	
WGC2019J-25B-C15_mon_G4 - 22.d	Matrix	mid	
WGC2019J-25B-C15_mon_G4 - 23.d	Matrix	mid	
WGC2019J-25B-C15_mon_G4 - 24.d	Matrix	core	
WGC2019J-25B-C15_mon_G4 - 25.d	Matrix	mid	Near eaten away region of monazite
WGC2019J-25B-C15_mon_G4 - 26.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 27.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 28.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 29.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 30.d	Matrix	core	
WGC2019J-25B-C15_mon_G4 - 31.d	Matrix	core	
WGC2019J-25B-C15_mon_G4 - 32.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 33.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 34.d	Matrix	rim	Near second eaten away region of monazite
WGC2019J-25B-C15_mon_G4 - 35.d	Matrix	mid	Near second eaten away region of monazite
WGC2019J-25B-C15_mon_G4 - 36.d	Matrix	rim	
WGC2019J-25B-C15_mon_G4 - 37.d	Matrix	rim	

WGC2019J-25B-C15_mon_G4 - 38.d	Matrix	mid				
WGC2019J-25B-C15_mon_G4 - 39.d	Matrix	mid				
WGC2019J-25B-C15_mon_G4 - 40.d	Matrix	rim				
WGC2019J-25B-C15_mon_G4 - 41.d	Matrix	rim				
WGC2019A3-C1_mon_G1 - 1.d	Matrix	rim	N	~125µm	Equant	
WGC2019A3-C1_mon_G1 - 2.d	Matrix	rim				
WGC2019A3-C1_mon_G1 - 3.d	Matrix	rim				
WGC2019A3-C1_mon_G1 - 4.d	Matrix	core				
WGC2019A3-C1_mon_G1 - 5.d	Matrix	core				
WGC2019A3-C1_mon_G1 - 6.d	Matrix	rim				
WGC2019A3-C1_mon_G1 - 7.d	Matrix	rim				
WGC2019A3-C1_mon_G1 - 8.d	Matrix	core				
WGC2019A3-C1_mon_G1 - 9.d	Matrix	core				
WGC2019A3-C1_mon_G1 - 10.d	Matrix	rim				
~~**WGC2019A3-C1_mon_G2 - 1.d**~~	~~Matrix~~	~~rim~~	N	~225µm	Asymmetric	
WGC2019A3-C1_mon_G2 - 2.d	Matrix	rim				
WGC2019A3-C1_mon_G2 - 3.d	Matrix	mid				
WGC2019A3-C1_mon_G2 - 4.d	Matrix	core				Potentially along minor fracture
WGC2019A3-C1_mon_G2 - 5.d	Matrix	rim				
WGC2019A3-C1_mon_G2 - 6.d	Matrix	rim				
WGC2019A3-C1_mon_G2 - 7.d	Matrix	rim				
WGC2019A3-C1_mon_G2 - 8.d	Matrix	core				
WGC2019A3-C1_mon_G2 - 9.d	Matrix	core				
WGC2019A3-C1_mon_G2 - 10.d	Matrix	mid				
WGC2019A3-C1_mon_G2 - 11.d	Matrix	mid				
WGC2019A3-C1_mon_G2 - 12.d	Matrix	mid				
WGC2019A3-C1_mon_G2 - 13.d	Matrix	core				
WGC2019A3-C1_mon_G2 - 14.d	Matrix	rim				
WGC2019A3-C1_mon_G2 - 15.d	Matrix	rim				
WGC2019A3-C1_mon_G2 - 16.d	Matrix	core				
WGC2019A3-C2_mon_G3 - 1.d	Kyanite inclusion	rim	N	~375µm	Tabular	

WGC2019A3-C2_mon_G3 - 2.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 3.d	Kyanite inclusion	mid				
WGC2019A3-C2_mon_G3 - 4.d	Kyanite inclusion	mid				
WGC2019A3-C2_mon_G3 - 5.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 6.d	Kyanite inclusion	core				
WGC2019A3-C2_mon_G3 - 7.d	Kyanite inclusion	core				
WGC2019A3-C2_mon_G3 - 8.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 9.d	Kyanite inclusion	core				
WGC2019A3-C2_mon_G3 - 10.d	Kyanite inclusion	core				
WGC2019A3-C2_mon_G3 - 11.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 12.d	Kyanite inclusion	core				
WGC2019A3-C2_mon_G3 - 13.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 14.d	Kyanite inclusion	core				
WGC2019A3-C2_mon_G3 - 15.d	Kyanite inclusion	core				
WGC2019A3-C2_mon_G3 - 16.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 17.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 18.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 19.d	Kyanite inclusion	core				
WGC2019A3-C2_mon_G3 - 20.d	Kyanite inclusion	core				
WGC2019A3-C2_mon_G3 - 21.d	Kyanite inclusion	core				
WGC2019A3-C2_mon_G3 - 22.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 23.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 24.d	Kyanite inclusion	mid				
WGC2019A3-C2_mon_G3 - 25.d	Kyanite inclusion	rim				
WGC2019A3-C2_mon_G3 - 26.d	Kyanite inclusion	rim				
~~**WGC2019A3-C3_mon_G4 - 1.d**~~	~~Quartz edge~~	~~rim~~	N	~300µm	Asymmetric	Inclusion at edge of garnet. One side facing out into matrix.
WGC2019A3-C3_mon_G4 - 2.d	Quartz edge	rim				
WGC2019A3-C3_mon_G4 - 3.d	Quartz edge	rim				
WGC2019A3-C3_mon_G4 - 4.d	Quartz edge	rim				
WGC2019A3-C3_mon_G4 - 5.d	Quartz edge	mid				
WGC2019A3-C3_mon_G4 - 6.d	Quartz edge	rim				

WGC2019A3-C3_mon_G4 - 7.d	Quartz edge	rim			
WGC2019A3-C3_mon_G4 - 8.d	Quartz edge	core			
WGC2019A3-C3_mon_G4 - 9.d	Quartz edge	core			
WGC2019A3-C3_mon_G4 - 10.d	Quartz edge	core			
WGC2019A3-C3_mon_G4 - 11.d	Quartz edge	rim			
WGC2019A3-C3_mon_G4 - 12.d	Quartz edge	core			
WGC2019A3-C3_mon_G4 - 13.d	Quartz edge	rim			
WGC2019A3-C3_mon_G4 - 14.d	Quartz edge	mid			
WGC2019A3-C3_mon_G4 - 15.d	Quartz edge	rim			
WGC2019A3-C3_mon_G4 - 16.d	Quartz edge	rim			
WGC2019A3-C3_mon_G4 - 17.d	Quartz edge	rim			
WGC2019A3-C3_mon_G4 - 18.d	Quartz edge	rim			
WGC2019A3-C3_mon_G4 - 19.d	Quartz edge	mid			
~~**WGC2019A3-C3_mon_G4 - 20.d**~~	~~Quartz edge~~	~~rim~~			
WGC2019A3-C3_mon_G4 - 21.d	Quartz edge	rim			
WGC2019J-31A-2-C1_mon_G1 - 1.d	Matrix	rim	N	~100µm	Equant
WGC2019J-31A-2-C1_mon_G1 - 2.d	Matrix	rim			
WGC2019J-31A-2-C1_mon_G1 - 3.d	Matrix	core			
WGC2019J-31A-2-C1_mon_G1 - 4.d	Matrix	core			
WGC2019J-31A-2-C1_mon_G1 - 5.d	Matrix	rim			
WGC2019J-31A-2-C5_mon_G4 - 1.d	Matrix	core	N	~75µm	Elongate
WGC2019J-31A-2-C5_mon_G4 - 2.d	Matrix	rim			
WGC2019J-31A-2-C5_mon_G4 - 3.d	Matrix	rim			
WGC2019J-31A-2-C6_mon_G2 - 1.d	Matrix	core	N	~125µm	Prismatic
WGC2019J-31A-2-C6_mon_G2 - 2.d	Matrix	core			
WGC2019J-31A-2-C6_mon_G2 - 3.d	Matrix	core			
WGC2019J-31A-2-C6_mon_G2 - 4.d	Matrix	rim			
WGC2019J-31A-2-C6_mon_G2 - 5.d	Matrix	rim			
WGC2019J-31A-2-C9_mon_G7 - 1.d	Garnet inclusion	rim	N	~125µm	Aysmmetric
WGC2019J-31A-2-C9_mon_G7 - 2.d	Garnet inclusion	core			
WGC2019J-31A-2-C9_mon_G7 - 3.d	Garnet inclusion	core			

WGC2019J-31A-2-C9_mon_G7 - 4.d	Garnet inclusion	rim				
WGC2019J-31A-2-C9_mon_G7 - 5.d	Garnet inclusion	rim				
WGC2019J-31A-3-C1_mon_G1 - 1.d	Garnet inclusion	core	Y - patchy	~100µm	Asymmetric	Inclusion in core of garnet. Cross cuts garnet fracture. Zoning seems to radiate from lower right.
WGC2019J-31A-3-C1_mon_G1 - 2.d	Garnet inclusion	rim				
WGC2019J-31A-3-C1_mon_G1 - 3.d	Garnet inclusion	rim				
WGC2019J-31A-3-C1_mon_G1 - 4.d	Garnet inclusion	rim				
WGC2019J-31A-3-C2_mon_G2 - 1.d	Garnet inclusion	core	N	~125µm	Equant	Inclusion in core of garnet. Gt fracture continues and cuts through monazite
WGC2019J-31A-3-C2_mon_G2 - 2.d	Garnet inclusion	rim				
WGC2019J-31A-3-C2_mon_G2 - 3.d	Garnet inclusion	rim				
WGC2019J-31A-3-C7_mon_G3 - 1.d	Matrix	rim	N	~300µm	Elongate	Lots of pits
WGC2019J-31A-3-C7_mon_G3 - 2.d	Matrix	mid				
WGC2019J-31A-3-C7_mon_G3 - 3.d	Matrix	rim				
WGC2019J-31A-3-C7_mon_G3 - 4.d	Matrix	core				
WGC2019J-31A-3-C7_mon_G3 - 5.d	Matrix	mid				
WGC2019J-31A-3-C7_mon_G3 - 6.d	Matrix	mid				
WGC2019J-31A-3-C7_mon_G3 - 7.d	Matrix	rim				
WGC2019J-31A-3-C7_mon_G3 - 8.d	Matrix	mid				
WGC2019J-31A-3-C7_mon_G3 - 9.d	Matrix	rim				
WGC2019J-31A-3-C7_mon_G3 - 10.d	Matrix	rim				
WGC2019J-31A-3-C8_mon_G4 - 1.d	Garnet inclusion	rim	N	~125µm	Elongate	Inclusion in core of garnet. Cross cuts gt fracture
WGC2019J-31A-3-C8_mon_G4 - 2.d	Garnet inclusion	rim				
WGC2019J-31A-3-C8_mon_G4 - 3.d	Garnet inclusion	core				
WGC2019J-31A-3-C8_mon_G4 - 4.d	Garnet inclusion	core				
WGC2019J-31A-3-C9_mon_G7 - 1.d	Garnet inclusion	rim	N	~400µm	Elongate	Closer to edge of garnet than Grain 8 (same garnet). Very pitted.
WGC2019J-31A-3-C9_mon_G7 - 2.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G7 - 3.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G7 - 4.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G7 - 5.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G7 - 6.d	Garnet inclusion	mid				
WGC2019J-31A-3-C9_mon_G7 - 7.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G7 - 8.d	Garnet inclusion	core				

WGC2019J-31A-3-C9_mon_G7 - 9.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G7 - 10.d	Garnet inclusion	mid				
WGC2019J-31A-3-C9_mon_G7 - 11.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G7 - 12.d	Garnet inclusion	core				
WGC2019J-31A-3-C9_mon_G7 - 13.d	Garnet inclusion	mid				
WGC2019J-31A-3-C9_mon_G7 - 14.d	Garnet inclusion	core				
WGC2019J-31A-3-C9_mon_G7 - 15.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G7 - 16.d	Garnet inclusion	mid				
WGC2019J-31A-3-C9_mon_G8 - 1.d	Garnet inclusion	rim	N	~225µm	Equant	Inclusion in core of garnet
WGC2019J-31A-3-C9_mon_G8 - 2.d	Garnet inclusion	mid				
WGC2019J-31A-3-C9_mon_G8 - 3.d	Garnet inclusion	core				
WGC2019J-31A-3-C9_mon_G8 - 4.d	Garnet inclusion	mid				
WGC2019J-31A-3-C9_mon_G8 - 5.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G8 - 6.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G8 - 7.d	Garnet inclusion	core				
WGC2019J-31A-3-C9_mon_G8 - 8.d	Garnet inclusion	core				
WGC2019J-31A-3-C9_mon_G8 - 9.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G8 - 10.d	Garnet inclusion	core				
WGC2019J-31A-3-C9_mon_G8 - 11.d	Garnet inclusion	mid				
WGC2019J-31A-3-C9_mon_G8 - 12.d	Garnet inclusion	rim				
WGC2019J-31A-3-C9_mon_G8 - 13.d	Garnet inclusion	mid				
WGC2019J-31A-3-C9_mon_G5 - 1.d	Garnet inclusion	core	N	~30µm	Equant	Inclusion in core of garnet
WGC2019J-31A-3-C10_mon_G10 - 1.d	Matrix	rim	N	~100µm	Equant	
WGC2019J-31A-3-C10_mon_G10 - 2.d	Matrix	core				
WGC2019J-31A-3-C10_mon_G10 - 3.d	Matrix	rim				
WGC2019J-31A-3-C10_mon_G10 - 4.d	Matrix	core				
WGC2019J-31A-3-C10_mon_G10 - 5.d	Matrix	core				
WGC2019J-31A-3-C10_mon_G11 - 1.d	Garnet edge	rim	N	~225µm	Asymmetric	Inclusion at edge of garnet. One side facing out into matrix.
WGC2019J-31A-3-C10_mon_G11 - 2.d	Garnet edge	rim				
WGC2019J-31A-3-C10_mon_G11 - 3.d	Garnet edge	rim				
WGC2019J-31A-3-C10_mon_G11 - 4.d	Garnet edge	core				

WGC2019J-31A-3-C10_mon_G11 - 5.d	Garnet edge	core				
WGC2019J-31A-3-C10_mon_G11 - 6.d	Garnet edge	rim				
WGC2019J-31A-3-C10_mon_G11 - 7.d	Garnet edge	rim				
WGC2019J-31A-3-C15_mon_G21 - 1.d	Garnet edge	core	N	~75µm	Asymmetric	At edge of garnet, not quite touching. Alongside broken off fragments of garnet.
WGC2019J-31A-3-C16_mon_G20 - 1.d	Garnet edge	rim	N	~700µm	Tabular	
WGC2019J-31A-3-C16_mon_G20 - 2.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 3.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 4.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 5.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 6.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 7.d	Garnet edge	core				
WGC2019J-31A-3-C16_mon_G20 - 8.d	Garnet edge	core				
WGC2019J-31A-3-C16_mon_G20 - 9.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 10.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 11.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 12.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 13.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 14.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 15.d	Garnet edge	core				
WGC2019J-31A-3-C16_mon_G20 - 16.d	Garnet edge	core				
WGC2019J-31A-3-C16_mon_G20 - 17.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 18.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 19.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 20.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 21.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 22.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 23.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 24.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 25.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 26.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 27.d	Garnet edge	mid				

WGC2019J-31A-3-C16_mon_G20 - 28.d	Garnet edge	mid				
WGC2019J-31A-3-C16_mon_G20 - 29.d	Garnet edge	rim				
WGC2019J-31A-3-C16_mon_G20 - 30.d	Garnet edge	core				
WGC2019J-31A-3-C17_mon_G17 - 1.d	Garnet edge	rim	N	~100µm	Asymmetric	
WGC2019J-31A-3-C17_mon_G17 - 2.d	Garnet edge	rim				
WGC2019J-31A-3-C17_mon_G17 - 3.d	Garnet edge	rim				
WGC2019J-31A-3-C17_mon_G17 - 4.d	Garnet edge	core				
WGC2019J-31A-3-C17_mon_G17 - 5.d	Garnet edge	rim				
WGC2019J-31A-3-C18_mon_G15 - 1.d	Garnet inclusion	rim	N	~125µm	Tabular	
WGC2019J-31A-3-C18_mon_G15 - 2.d	Garnet inclusion	rim				
WGC2019J-31A-3-C18_mon_G15 - 3.d	Garnet inclusion	rim				
WGC2019J-31A-3-C18_mon_G15 - 4.d	Garnet inclusion	core				
WGC2019J-31A-3-C22_mon_Gx - 1.d	Matrix	core	-	~100µm	Tabular	No SEM image

Monazite geochronology

Sample	207/235	2σ	206/238	2σ	207/235	2σ	ErrCorr 6/38vs7/35	ErrCorr 38/6vs7/6	207/235 age	2σ	206/238 age	2σ	Concordant?	% discordance
WGC2019J-25B-C5_mon_G1 - 1.d	0.504	0.023	0.0647	0.0017	0.0573	0.0028	0.123	0.27173	414	15	404.1	10	C - Pop 1	2.391304348
WGC2019J-25B-C5_mon_G1 - 2.d	0.5459	0.013	0.06332	0.0012	0.06282	0.0011	0.17593	0.54847	442.2	8.2	395.8	7.4	D - pop 2	10.4929896
WGC2019J-25B-C5_mon_G1 - 3.d	0.582	0.016	0.06603	0.0014	0.0641	0.0013	0.42556	0.18753	465.3	10	412.2	8.7	D - pop 1	11.41199226
WGC2019J-25B-C5_mon_G1 - 4.d	0.6225	0.014	0.06064	0.0011	0.07468	0.001	0.58088	0.4151	491.3	8.5	379.9	6.8	D - pop 2	22.67453694
WGC2019J-25B-C5_mon_G1 - 5.d	0.6298	0.014	0.06067	0.0011	0.07531	0.001	0.48643	0.24963	496.3	8.8	379.7	6.6	D - pop 2	23.49385452
WGC2019J-25B-C5_mon_G1 - 6.d	0.6175	0.015	0.06179	0.0012	0.07283	0.001	0.7271	0.22778	488.1	9.1	386.5	7.3	D - pop 2	20.81540668
WGC2019J-25B-C5_mon_G1 - 7.d	0.5547	0.013	0.06182	0.0012	0.06542	0.001	0.55293	0.36258	447.9	8.4	386.7	7.3	D - pop 2	13.66376423
WGC2019J-25B-C5_mon_G1 - 8.d	0.6283	0.014	0.06081	0.0011	0.07497	0.001	0.56349	0.36503	494.9	8.6	380.5	6.9	D - pop 2	23.11578097
WGC2019J-25B-C6_mon_G2 - 1.d	0.6515	0.015	0.06318	0.0013	0.07471	0.0011	0.70765	0.25826	509.3	9.1	394.9	7.6	D - pop 2	22.46220302
WGC2019J-25B-C6_mon_G2 - 2.d	0.6316	0.014	0.06253	0.0012	0.07312	0.001	0.70357	0.26144	497	8.8	391	7.2	D - pop 2	21.32796781
WGC2019J-25B-C7_mon_G3 - 1.d	0.5759	0.013	0.06172	0.0012	0.06748	0.00097	0.68365	0.15822	461.6	8.7	386.1	7.3	D - pop 2	16.35615251
WGC2019J-25B-C7_mon_G3 - 2.d	0.6108	0.014	0.06068	0.0011	0.07285	0.001	0.65132	0.32569	483.9	8.6	379.7	6.9	D - pop 2	21.53337466
WGC2019J-25B-C7_mon_G3 - 3.d	0.6392	0.014	0.06152	0.0011	0.07524	0.0011	0.40984	0.34671	501.7	8.7	384.8	6.6	D - pop 2	23.30077736

WGC2019J-25B-C7_mon_G3 - 4.d	0.6396	0.014	0.06192	0.0011	0.07491	0.001	0.52771	0.41838	501.9	8.7	387.3	6.9	D - pop 2	22.83323371
WGC2019J-25B-C7_mon_G3 - 5.d	0.6346	0.014	0.06207	0.0012	0.0741	0.001	0.5515	0.27076	498.8	8.7	388.2	7	D - pop 2	22.17321572
WGC2019J-25B-C7_mon_G3 - 6.d	0.5441	0.012	0.06257	0.0012	0.06306	0.00096	0.54268	0.23858	441	8.1	391.3	7.2	D - pop 2	11.26984127
WGC2019J-25B-C7_mon_G3 - 7.d	0.6401	0.014	0.06208	0.0011	0.07496	0.00099	0.62916	0.34535	502.3	8.5	388.6	6.7	D - pop 2	22.63587498
WGC2019J-25B-C7_mon_G3 - 8.d	0.6459	0.014	0.06181	0.0011	0.07583	0.001	0.58883	0.29626	505.8	8.6	386.6	6.9	D - pop 2	23.56662713
WGC2019J-25B-C7_mon_G3 - 9.d	0.6815	0.015	0.06285	0.0011	0.07869	0.0011	0.71084	0.092926	527.6	8.9	392.9	6.9	D - pop 2	25.53070508
WGC2019J-25B-C7_mon_G3 - 10.d	0.6371	0.014	0.06185	0.0011	0.07471	0.001	0.58283	0.35464	500.4	8.6	386.9	6.8	D - pop 2	22.68185452
WGC2019J-25B-C7_mon_G3 - 11.d	0.6478	0.014	0.06106	0.0011	0.07695	0.0011	0.51321	0.20941	507.1	8.8	382.1	6.7	D - pop 2	24.64997042
WGC2019J-25B-C7_mon_G3 - 12.d	0.6446	0.014	0.06151	0.0011	0.07637	0.0011	0.59334	0.25074	505	8.9	384.8	7	D - pop 2	23.8019802
WGC2019J-25B-C7_mon_G3 - 13.d	0.6162	0.014	0.0613	0.0011	0.07272	0.001	0.49189	0.37091	487.4	8.5	383.5	6.8	D - pop 2	21.31719327
WGC2019J-25B-C7_mon_G3 - 14.d	0.5456	0.013	0.06278	0.0012	0.0632	0.00096	0.53965	0.30619	442	8.2	392.5	7.3	D - pop 2	11.19909502
WGC2019J-25B-C7_mon_G3 - 15.d	0.6161	0.014	0.06142	0.0012	0.07273	0.0011	0.57273	0.26046	487.3	8.7	384.3	7	D - pop 2	21.13687667
WGC2019J-25B-C7_mon_G3 - 16.d	0.6111	0.013	0.06117	0.0011	0.07235	0.001	0.564	0.2894	484.1	8.5	382.7	6.9	D - pop 2	20.94608552
WGC2019J-25B-C7_mon_G3 - 17.d	0.6499	0.015	0.06215	0.0012	0.07586	0.0011	0.71121	0.20063	508.3	9	388.7	7.1	D - pop 2	23.52941176
WGC2019J-25B-C7_mon_G3 - 18.d	0.6297	0.014	0.06226	0.0012	0.0735	0.001	0.73495	0.2354	495.8	8.9	389.3	7	D - pop 2	21.48043566
WGC2019J-25B-C7_mon_G3 - 19.d	0.614	0.013	0.06137	0.0011	0.07246	0.00097	0.56848	0.2941	486	8.3	383.9	6.8	D - pop 2	21.00823045
WGC2019J-25B-C7_mon_G3 - 20.d	0.6292	0.014	0.06122	0.0011	0.07445	0.001	0.5667	0.34133	495.5	8.6	383	6.9	D - pop 2	22.70433905
WGC2019J-25B-C7_mon_G3 - 21.d	0.6293	0.013	0.0612	0.0011	0.07436	0.00099	0.5073	0.41552	495.6	8.4	382.9	6.7	D - pop 2	22.74011299
WGC2019J-25B-C7_mon_G3 - 22.d	0.6275	0.013	0.06136	0.0011	0.074	0.001	0.57598	0.39278	494.4	8.4	383.9	6.8	D - pop 2	22.35032362
WGC2019J-25B-C7_mon_G3 - 23.d	0.6628	0.014	0.06181	0.0011	0.07744	0.0011	0.46771	0.40911	516.7	8.4	386.6	6.9	D - pop 2	25.17902071
WGC2019J-25B-C7_mon_G3 - 24.d	0.6356	0.014	0.06162	0.0011	0.0745	0.00099	0.60135	0.36924	499.5	8.5	385.5	6.9	D - pop 2	22.82282282
WGC2019J-25B-C7_mon_G3 - 25.d	0.6198	0.014	0.06124	0.0011	0.07313	0.00098	0.67828	0.036792	489.7	8.6	383.2	6.8	D - pop 2	21.74800899
WGC2019J-25B-C7_mon_G3 - 26.d	0.6135	0.013	0.06139	0.0011	0.07233	0.00096	0.61936	0.38531	486.1	8.3	384.1	7	D - pop 2	20.98333676
WGC2019J-25B-C7_mon_G3 - 27.d	0.6036	0.013	0.06084	0.0011	0.07164	0.001	0.47034	0.35398	479.4	8.4	380.7	6.7	D - pop 2	20.58823529
WGC2019J-25B-C7_mon_G3 - 28.d	0.6176	0.014	0.06147	0.0012	0.07266	0.001	0.68859	0.095517	488.2	9.1	384.6	7.1	D - pop 2	21.22081114
WGC2019J-25B-C7_mon_G3 - 29.d	0.6399	0.014	0.06077	0.0012	0.07623	0.001	0.69217	0.26969	502.1	8.9	380.3	7	D - pop 2	24.25811591
WGC2019J-25B-C7_mon_G3 - 30.d	0.6106	0.013	0.06131	0.0011	0.07191	0.00096	0.60667	0.36975	483.9	8.3	383.6	6.9	D - pop 2	20.72742302
WGC2019J-25B-C7_mon_G3 - 31.d	0.6237	0.014	0.06076	0.0012	0.07439	0.001	0.7683	0.27496	492.1	8.8	380.2	7	D - pop 2	22.73928063
WGC2019J-25B-C7_mon_G3 - 32.d	0.5886	0.014	0.06189	0.0012	0.06875	0.001	0.57572	0.31251	469.8	8.8	387.1	7.4	D - pop 2	17.60323542
WGC2019J-25B-C7_mon_G3 - 33.d	0.5846	0.014	0.06187	0.0012	0.06842	0.001	0.58936	0.3542	467.2	8.8	387	7.5	D - pop 2	17.16609589
WGC2019J-25B-C7_mon_G3 - 34.d	0.5701	0.013	0.06268	0.0012	0.06622	0.001	0.52624	0.32025	458.5	8.4	391.9	7.4	D - pop 2	14.52562704

WGC2019J-25B-C7_mon_G3 - 35.d	0.5968	0.013	0.05994	0.0011	0.0722	0.00097	0.47833	0.36871	475.1	8.2	375.2	6.6	D - pop 2	21.02715218
WGC2019J-25B-C7_mon_G3 - 36.d	0.5835	0.013	0.0616	0.0012	0.06874	0.0011	0.62094	0.19533	466.6	8.7	385.3	7.2	D - pop 2	17.4239177
WGC2019J-25B-C7_mon_G3 - 37.d	0.6145	0.014	0.06153	0.0011	0.07239	0.0011	0.46853	0.3088	486.3	8.5	384.9	6.8	D - pop 2	20.85132634
WGC2019J-25B-C7_mon_G3 - 38.d	0.6179	0.014	0.06136	0.0011	0.07263	0.001	0.6048	0.12999	488.4	8.6	383.9	6.8	D - pop 2	21.3963964
WGC2019J-25B-C7_mon_G3 - 39.d	0.5654	0.013	0.06275	0.0012	0.0653	0.00097	0.54699	0.22119	455.5	8.1	392.3	7.2	D - pop 2	13.87486279
WGC2019J-25B-C7_mon_G3 - 40.d	0.6122	0.013	0.0614	0.0011	0.07228	0.00096	0.52042	0.45082	485.3	8.6	384.1	6.9	D - pop 2	20.85308057
WGC2019J-25B-C15_mon_G4 - 1.d	0.5186	0.012	0.06037	0.0012	0.06213	0.0009	0.59503	0.39915	424.6	8	377.9	7.1	D - pop 2	10.99858691
WGC2019J-25B-C15_mon_G4 - 2.d	0.5564	0.012	0.06019	0.0011	0.06713	0.00093	0.62315	0.19039	449.1	8.1	376.8	6.7	D - pop 2	16.0988644
WGC2019J-25B-C15_mon_G4 - 3.d	0.5273	0.013	0.06114	0.0012	0.0622	0.001	0.5492	0.29307	430.4	8.5	382.5	7.3	D - pop 2	11.12918216
WGC2019J-25B-C15_mon_G4 - 4.d	0.6009	0.014	0.0606	0.0011	0.07195	0.001	0.60393	0.26453	477.7	8.6	379.3	6.9	D - pop 2	20.59870211
WGC2019J-25B-C15_mon_G4 - 5.d	0.6204	0.014	0.06182	0.0011	0.07294	0.001	0.63392	0.17001	490	8.5	386.7	6.9	D - pop 2	21.08163265
WGC2019J-25B-C15_mon_G4 - 6.d	0.5844	0.014	0.06085	0.0012	0.06972	0.001	0.65396	0.23995	467.2	8.7	380.8	7.3	D - pop 2	18.49315068
WGC2019J-25B-C15_mon_G4 - 7.d	0.5944	0.014	0.06161	0.0012	0.06967	0.001	0.67005	0.1631	473.5	9.1	385.4	7.4	D - pop 2	18.6061246
WGC2019J-25B-C15_mon_G4 - 8.d	0.5613	0.013	0.06194	0.0012	0.06536	0.00097	0.60025	0.16063	452.2	8.4	387.4	7.2	D - pop 2	14.3299425
WGC2019J-25B-C15_mon_G4 - 9.d	0.5635	0.013	0.0612	0.0012	0.06654	0.001	0.56638	0.27817	453.7	8.4	382.9	7.1	D - pop 2	15.60502535
WGC2019J-25B-C15_mon_G4 - 10.d	0.5872	0.014	0.06061	0.0012	0.07005	0.001	0.73945	0.10151	468.9	9	379.3	7.3	D - pop 2	19.10855193
WGC2019J-25B-C15_mon_G4 - 11.d	0.5906	0.014	0.06139	0.0012	0.06991	0.001	0.61047	0.22306	472.1	8.4	384.1	7.1	D - pop 2	18.64011862
WGC2019J-25B-C15_mon_G4 - 12.d	0.6018	0.014	0.06189	0.0012	0.07075	0.001	0.67943	0.23414	478.2	8.8	387.1	7.2	D - pop 2	19.05060644
WGC2019J-25B-C15_mon_G4 - 13.d	0.5944	0.013	0.06178	0.0012	0.07013	0.001	0.69631	0.16585	474.1	8.8	386.5	7.2	D - pop 2	18.47711453
WGC2019J-25B-C15_mon_G4 - 14.d	0.5909	0.013	0.06166	0.0012	0.06976	0.001	0.60772	0.33684	471.3	8.4	385.7	7.1	D - pop 2	18.16252917
WGC2019J-25B-C15_mon_G4 - 15.d	0.6014	0.014	0.06083	0.0012	0.0714	0.00099	0.77354	0.25696	478	8.7	380.7	7.2	D - pop 2	20.35564854
WGC2019J-25B-C15_mon_G4 - 16.d	0.6025	0.014	0.06222	0.0012	0.07054	0.001	0.6433	0.31405	478.7	8.8	389.1	7.3	D - pop 2	18.71735952
WGC2019J-25B-C15_mon_G4 - 17.d	0.6365	0.015	0.06215	0.0012	0.07431	0.0011	0.63111	0.22738	500.6	8.9	388.7	7.3	D - pop 2	22.35317619
WGC2019J-25B-C15_mon_G4 - 18.d	0.5974	0.014	0.06188	0.0012	0.07022	0.0011	0.58599	0.4346	475.4	8.7	387	7.4	D - pop 2	18.59486748
WGC2019J-25B-C15_mon_G4 - 19.d	0.6036	0.014	0.06169	0.0012	0.07092	0.001	0.62617	0.34498	479.4	8.7	385.9	7.4	D - pop 2	19.5035461
WGC2019J-25B-C15_mon_G4 - 20.d	0.6453	0.014	0.06085	0.0011	0.07677	0.001	0.72492	0.31646	505.5	8.7	380.8	7	D - pop 2	24.66864491
WGC2019J-25B-C15_mon_G4 - 21.d	0.6382	0.014	0.06139	0.0011	0.07533	0.0011	0.49423	0.26064	501.5	9	384.4	6.6	D - pop 2	23.34995015
WGC2019J-25B-C15_mon_G4 - 22.d	0.6048	0.013	0.05998	0.0011	0.07323	0.0011	0.64489	0.28226	480.2	8.5	375.5	6.8	D - pop 2	21.80341524
WGC2019J-25B-C15_mon_G4 - 23.d	0.6707	0.015	0.06114	0.0012	0.07941	0.0011	0.59584	0.32874	521	9	382.6	7	D - pop 2	26.56429942
WGC2019J-25B-C15_mon_G4 - 24.d	0.631	0.014	0.06076	0.0012	0.07542	0.001	0.63236	0.28535	497.1	8.5	380.2	7	D - pop 2	23.51639509
WGC2019J-25B-C15_mon_G4 - 25.d	0.6436	0.014	0.06197	0.0012	0.07553	0.0011	0.5431	0.49566	504.4	8.7	387.6	7.2	D - pop 2	23.15622522

WGC2019J-25B-C15_mon_G4 - 26.d	0.6477	0.015	0.06159	0.0011	0.07633	0.0011	0.74405	-0.024593	506.9	9.1	385.3	6.9	D - pop 2	23.98895246
WGC2019J-25B-C15_mon_G4 - 27.d	0.6412	0.014	0.06102	0.0011	0.07619	0.0011	0.60467	0.27514	503.5	9.2	381.8	6.9	D - pop 2	24.17080437
WGC2019J-25B-C15_mon_G4 - 28.d	0.6243	0.014	0.06071	0.0011	0.0749	0.0011	0.55072	0.27666	492.9	8.3	379.9	6.8	D - pop 2	22.92554271
WGC2019J-25B-C15_mon_G4 - 29.d	0.6397	0.014	0.06124	0.0011	0.07575	0.001	0.64298	0.39788	502	8.7	383.1	7	D - pop 2	23.68525896
WGC2019J-25B-C15_mon_G4 - 30.d	0.638	0.014	0.06146	0.0011	0.07554	0.001	0.61557	0.40364	501	8.7	384.5	7	D - pop 2	23.25349301
WGC2019J-25B-C15_mon_G4 - 31.d	0.6482	0.014	0.06214	0.0012	0.07579	0.0011	0.6322	0.25713	507.3	8.8	388.6	7	D - pop 2	23.3983836
WGC2019J-25B-C15_mon_G4 - 32.d	0.6291	0.014	0.06126	0.0012	0.07433	0.001	0.7076	0.21752	495.4	9	383.3	7	D - pop 2	22.62817925
WGC2019J-25B-C15_mon_G4 - 33.d	0.5988	0.013	0.06017	0.0011	0.07231	0.001	0.58726	0.20203	476.4	8.4	376.7	6.6	D - pop 2	20.92779177
WGC2019J-25B-C15_mon_G4 - 34.d	0.6367	0.014	0.06135	0.0011	0.07501	0.001	0.56813	0.29704	500.1	8.7	383.8	6.9	D - pop 2	23.25534893
WGC2019J-25B-C15_mon_G4 - 35.d	0.6498	0.014	0.06208	0.0011	0.07618	0.0011	0.61984	0.22633	508.2	8.7	388.2	6.9	D - pop 2	23.61275089
WGC2019J-25B-C15_mon_G4 - 36.d	0.5748	0.013	0.06249	0.0012	0.06701	0.00099	0.52408	0.21892	461	8.6	390.7	7.3	D - pop 2	15.2494577
WGC2019J-25B-C15_mon_G4 - 37.d	0.5975	0.013	0.0603	0.0011	0.07174	0.00099	0.53169	0.41942	475.6	8.3	377.4	6.8	D - pop 2	20.64760303
WGC2019J-25B-C15_mon_G4 - 38.d	0.6047	0.014	0.06108	0.0011	0.07201	0.001	0.67494	0.14314	480.6	8.9	382.2	6.9	D - pop 2	20.47440699
WGC2019J-25B-C15_mon_G4 - 39.d	0.6326	0.014	0.06084	0.0011	0.0755	0.0012	0.3411	0.46167	497.6	8.9	380.7	6.9	D - pop 2	23.49276527
WGC2019J-25B-C15_mon_G4 - 40.d	0.5989	0.015	0.06222	0.0012	0.06966	0.0011	0.69433	0.036176	476.3	9.4	389.1	7.5	D - pop 2	18.30778921
WGC2019J-25B-C15_mon_G4 - 41.d	0.5905	0.014	0.0616	0.0012	0.06896	0.001	0.67821	-0.021473	470.9	9.1	385.3	7.1	D - pop 2	18.1779571
WGC2019A3-C1_mon_G1 - 1.d	0.5314	0.012	0.06207	0.0011	0.0622	0.00096	0.54747	0.15274	432.6	8.2	388.2	6.9	D - pop 2	10.26352288
WGC2019A3-C1_mon_G1 - 2.d	0.5951	0.013	0.06101	0.0011	0.07072	0.00099	0.58707	0.32022	474.1	8.4	381.8	6.9	D - pop 2	19.46846657
WGC2019A3-C1_mon_G1 - 3.d	0.5077	0.012	0.06074	0.0012	0.06066	0.00085	0.68094	0.14925	416.8	7.8	380.1	7	D - pop 2	8.805182342
WGC2019A3-C1_mon_G1 - 4.d	0.597	0.014	0.0617	0.0011	0.07032	0.001	0.55879	0.1386	475.2	8.6	385.9	6.9	D - pop 2	18.79208754
WGC2019A3-C1_mon_G1 - 5.d	0.6176	0.014	0.0615	0.0012	0.07245	0.001	0.62419	0.23133	488.2	8.6	384.7	7	D - pop 2	21.20032773
WGC2019A3-C1_mon_G1 - 6.d	0.6264	0.014	0.06248	0.0012	0.07289	0.0011	0.65092	0.36978	493.7	8.8	390.6	7.5	D - pop 2	20.88312741
WGC2019A3-C1_mon_G1 - 7.d	0.5218	0.012	0.0612	0.0012	0.06185	0.00091	0.56673	0.36697	426.3	7.8	382.9	7.1	D - pop 2	10.18062397
WGC2019A3-C1_mon_G1 - 8.d	0.6009	0.014	0.06133	0.0012	0.07081	0.001	0.59707	0.25887	477.7	8.6	383.7	7	D - pop 2	19.67762194
WGC2019A3-C1_mon_G1 - 9.d	0.5604	0.013	0.06082	0.0011	0.06663	0.00099	0.53052	0.21229	452.2	8.2	380.6	6.9	D - pop 2	15.8337019
WGC2019A3-C1_mon_G1 - 10.d	0.5085	0.012	0.06048	0.0011	0.06071	0.00095	0.51282	0.2314	417.3	7.9	378.5	6.9	D - pop 2	9.297867242
WGC2019A3-C1_mon_G2 - 1.d	0.4987	0.011	0.06269	0.0012	0.0579	0.00085	0.52356	0.27182	410.7	7.7	391.9	7.2	D - between pops	4.577550523
WGC2019A3-C1_mon_G2 - 2.d	0.6035	0.014	0.06218	0.0011	0.07053	0.0011	0.43686	0.3548	479.3	8.6	388.9	7	D - pop 2	18.86083872
WGC2019A3-C1_mon_G2 - 3.d	0.566	0.013	0.06138	0.0012	0.06609	0.00095	0.55916	0.34878	455.3	8.2	384	7	D - pop 2	15.66000439
WGC2019A3-C1_mon_G2 - 4.d	0.5969	0.013	0.06102	0.0011	0.0705	0.001	0.42821	0.35889	475.2	8.5	381.8	6.8	D - pop 2	19.65488215
WGC2019A3-C1_mon_G2 - 5.d	0.5716	0.013	0.06079	0.0011	0.06801	0.00097	0.57502	0.30125	458.9	8.2	380.4	7	D - pop 2	17.10612334

WGC2019A3-C1_mon_G2 - 6.d	0.6184	0.014	0.06205	0.0011	0.07234	0.001	0.7075	-0.0061649	488.8	8.5	388	6.9	D - pop 2	20.62193126
WGC2019A3-C1_mon_G2 - 7.d	0.6032	0.013	0.06112	0.0011	0.07161	0.001	0.56948	0.16069	479.1	8.5	382.4	6.7	D - pop 2	20.18367773
WGC2019A3-C1_mon_G2 - 8.d	0.6082	0.013	0.0619	0.0011	0.07125	0.00099	0.55618	0.27761	482.3	8.3	387.1	6.9	D - pop 2	19.73875181
WGC2019A3-C1_mon_G2 - 9.d	0.6022	0.013	0.06067	0.0011	0.07213	0.001	0.50372	0.18369	478.5	8.4	379.7	6.7	D - pop 2	20.64785789
WGC2019A3-C1_mon_G2 - 10.d	0.6618	0.015	0.06332	0.0012	0.07607	0.0011	0.67518	0.166	515.6	9.3	395.8	7.3	D - pop 2	23.23506594
WGC2019A3-C1_mon_G2 - 11.d	0.5694	0.013	0.06151	0.0012	0.06743	0.00095	0.67336	0.34937	457.5	8.1	384.8	7.2	D - pop 2	15.89071038
WGC2019A3-C1_mon_G2 - 12.d	0.5918	0.013	0.06154	0.0012	0.06944	0.001	0.59386	0.36021	471.9	8.5	385	7	D - pop 2	18.41491841
WGC2019A3-C1_mon_G2 - 13.d	0.5974	0.013	0.06099	0.0011	0.07153	0.0011	0.42089	0.41418	475.5	8.5	381.6	6.9	D - pop 2	19.74763407
WGC2019A3-C1_mon_G2 - 14.d	0.572	0.013	0.06153	0.0012	0.06692	0.001	0.64813	0.084879	459.1	8.7	384.9	7.2	D - pop 2	16.1620562
WGC2019A3-C1_mon_G2 - 15.d	0.5604	0.013	0.06159	0.0012	0.06607	0.00097	0.5678	0.35586	451.7	8.2	385.3	7.1	D - pop 2	14.70002214
WGC2019A3-C1_mon_G2 - 16.d	0.6088	0.013	0.06089	0.0011	0.07236	0.001	0.50091	0.27388	482.7	8.4	381	6.7	D - pop 2	21.06898695
WGC2019A3-C2_mon_G3 - 1.d	0.5509	0.013	0.06473	0.0012	0.06185	0.00093	0.56794	0.22804	445.5	8.3	404.3	7.4	D - pop 1	9.248035915
WGC2019A3-C2_mon_G3 - 2.d	0.5467	0.013	0.06388	0.0012	0.06199	0.00092	0.63793	-8.535E-06	442.7	8.6	399.2	7.4	D - pop 1	9.826067314
WGC2019A3-C2_mon_G3 - 3.d	0.5563	0.013	0.06523	0.0012	0.06199	0.00093	0.62954	0.08336	449.5	8.3	407.3	7.5	D - pop 1	9.388209121
WGC2019A3-C2_mon_G3 - 4.d	0.5504	0.013	0.06466	0.0012	0.06204	0.00097	0.57497	0.22388	445.7	8.5	403.9	7.4	D - pop 1	9.378505721
WGC2019A3-C2_mon_G3 - 5.d	0.5498	0.012	0.06463	0.0013	0.06161	0.0009	0.68027	0.21353	444.7	8.1	403.7	7.7	D - pop 1	9.219698673
WGC2019A3-C2_mon_G3 - 6.d	0.5457	0.013	0.06417	0.0012	0.06162	0.00093	0.63326	0.15266	442.5	8.4	400.9	7.5	D - pop 1	9.401129944
WGC2019A3-C2_mon_G3 - 7.d	0.5507	0.013	0.06554	0.0013	0.06109	0.00094	0.48919	0.29768	445.3	8.3	409.2	7.6	D - pop 1	8.106894229
WGC2019A3-C2_mon_G3 - 8.d	0.562	0.013	0.06495	0.0012	0.06233	0.00091	0.5856	0.22238	452.7	8.5	405.6	7.3	D - pop 1	10.40424122
WGC2019A3-C2_mon_G3 - 9.d	0.5519	0.013	0.06504	0.0012	0.06122	0.00088	0.64726	0.19684	446.6	8.4	406.2	7.5	D - pop 1	9.046126288
WGC2019A3-C2_mon_G3 - 10.d	0.5341	0.012	0.06254	0.0012	0.06167	0.00089	0.67691	0.11936	434.4	8.3	391	7.3	D - pop 2	9.990791897
WGC2019A3-C2_mon_G3 - 11.d	0.5534	0.012	0.0648	0.0012	0.06153	0.00091	0.44118	0.34002	447.2	8	404.7	7.2	D - pop 1	9.503577818
WGC2019A3-C2_mon_G3 - 12.d	0.5474	0.012	0.06441	0.0012	0.06185	0.00096	0.49686	0.36643	443.2	8.1	402.4	7.5	D - pop 1	9.205776173
WGC2019A3-C2_mon_G3 - 13.d	0.5421	0.012	0.06447	0.0013	0.06146	0.00095	0.59962	0.38032	439.7	8.2	402.7	7.8	D - pop 1	8.414828292
WGC2019A3-C2_mon_G3 - 14.d	0.5549	0.012	0.06498	0.0012	0.06183	0.00086	0.54802	0.3192	448.1	8.1	405.8	7.5	D - pop 1	9.439857175
WGC2019A3-C2_mon_G3 - 15.d	0.5505	0.013	0.06475	0.0012	0.06152	0.00092	0.48495	0.099139	445.2	8.3	404.4	7.1	D - pop 2	9.164420485
WGC2019A3-C2_mon_G3 - 16.d	0.5476	0.013	0.06316	0.0012	0.06266	0.00093	0.61467	0.26367	443.3	8.3	394.8	7.5	D - pop 1	10.94067223
WGC2019A3-C2_mon_G3 - 17.d	0.5569	0.013	0.06497	0.0012	0.06204	0.00093	0.52437	0.27838	449.9	8.5	405.8	7.3	D - pop 1	9.802178262
WGC2019A3-C2_mon_G3 - 18.d	0.5566	0.012	0.06512	0.0012	0.06174	0.0009	0.46994	0.3696	449.2	8.1	406.7	7.5	D - pop 1	9.46126447
WGC2019A3-C2_mon_G3 - 19.d	0.5635	0.013	0.06523	0.0013	0.06236	0.00094	0.59227	0.17661	454.2	8.3	407.3	7.6	D - pop 1	10.32584764
WGC2019A3-C2_mon_G3 - 20.d	0.5523	0.013	0.06491	0.0013	0.06185	0.00094	0.56524	0.34825	446.4	8.2	405.4	7.6	D - pop 1	9.184587814

WGC2019A3-C2_mon_G3 - 21.d	0.5594	0.013	0.06542	0.0012	0.06165	0.001	0.17028	0.47644	451	8.3	408.5	7.3	D - pop 1	9.423503326
WGC2019A3-C2_mon_G3 - 22.d	0.5575	0.013	0.06502	0.0012	0.06255	0.00097	0.59182	0.12014	449.7	8.7	406	7.5	D - pop 1	9.717589504
WGC2019A3-C2_mon_G3 - 23.d	0.5615	0.013	0.06437	0.0012	0.06333	0.001	0.51755	0.3255	452.4	8.5	402.1	7.6	D - pop 1	11.11847922
WGC2019A3-C2_mon_G3 - 24.d	0.5581	0.013	0.06546	0.0012	0.06188	0.00093	0.46952	0.24226	450.2	8.5	408.7	7.5	D - pop 1	9.218125278
WGC2019A3-C2_mon_G3 - 25.d	0.5567	0.013	0.06519	0.0012	0.0622	0.00094	0.49417	0.31552	449.3	8.3	407.1	7.5	D - pop 1	9.392388159
WGC2019A3-C2_mon_G3 - 26.d	0.5543	0.012	0.06524	0.0012	0.06191	0.00096	0.32743	0.43778	448.1	8.3	407.4	7.4	D - pop 1	9.082794019
WGC2019A3-C3_mon_G4 - 1.d	0.5017	0.012	0.06207	0.0012	0.05838	0.00092	0.51668	0.25005	412.7	7.8	388.2	7.2	D - between pops	5.936515629
WGC2019A3-C3_mon_G4 - 2.d	0.5361	0.012	0.0613	0.0012	0.06347	0.00093	0.61055	0.17846	436.2	8	383.5	7	D - pop 2	12.08161394
WGC2019A3-C3_mon_G4 - 3.d	0.5379	0.012	0.06176	0.0012	0.06329	0.00094	0.47347	0.39811	437	8	386.3	7	D - pop 2	11.60183066
WGC2019A3-C3_mon_G4 - 4.d	0.5282	0.013	0.06116	0.0012	0.06252	0.001	0.59171	0.14998	431.6	8.8	382.7	7.3	D - pop 2	11.32993513
WGC2019A3-C3_mon_G4 - 5.d	0.5418	0.012	0.06137	0.0012	0.06435	0.00093	0.67272	0.21064	439.5	8.1	383.9	7.1	D - pop 2	12.65073948
WGC2019A3-C3_mon_G4 - 6.d	0.5604	0.013	0.06188	0.0012	0.06548	0.00093	0.69851	0.22942	451.7	8.3	387	7.2	D - pop 2	14.32366615
WGC2019A3-C3_mon_G4 - 7.d	0.5238	0.013	0.06076	0.0012	0.06273	0.00094	0.69663	0.15101	427.5	8.4	380.2	7.3	D - pop 2	11.06432749
WGC2019A3-C3_mon_G4 - 8.d	0.5577	0.013	0.05993	0.0011	0.06706	0.00097	0.60932	0.13551	449.8	8.5	375.2	6.9	D - pop 2	16.58514896
WGC2019A3-C3_mon_G4 - 9.d	0.5763	0.014	0.06142	0.0012	0.06765	0.001	0.58701	0.071458	461.9	8.8	384.3	7.1	D - pop 2	16.8001732
WGC2019A3-C3_mon_G4 - 10.d	0.5709	0.013	0.06153	0.0011	0.06722	0.001	0.54985	0.19766	458.4	8.6	384.9	7	D - pop 2	16.03403141
WGC2019A3-C3_mon_G4 - 11.d	0.5198	0.013	0.06105	0.0012	0.06167	0.00094	0.71637	0.039098	426.1	8.4	382	7.4	D - pop 2	10.34968317
WGC2019A3-C3_mon_G4 - 12.d	0.567	0.013	0.06128	0.0012	0.06731	0.00092	0.78272	-9.945E-05	456.6	8.6	383.4	7.1	D - pop 2	16.03153745
WGC2019A3-C3_mon_G4 - 13.d	0.5059	0.012	0.06064	0.0012	0.06051	0.00094	0.63122	0.13632	415.5	8.2	379.5	7.1	D - pop 2	8.664259928
WGC2019A3-C3_mon_G4 - 14.d	0.5726	0.013	0.06137	0.0012	0.06769	0.00095	0.70762	0.22084	459.6	8.6	383.9	7.2	D - pop 2	16.47084421
WGC2019A3-C3_mon_G4 - 15.d	0.5151	0.012	0.06109	0.0012	0.06119	0.00093	0.52882	0.38109	422.2	7.6	382.3	7.2	D - pop 2	9.450497395
WGC2019A3-C3_mon_G4 - 16.d	0.549	0.013	0.06155	0.0011	0.0649	0.00094	0.61027	0.1432	444.2	8.3	385	7	D - pop 2	13.32733003
WGC2019A3-C3_mon_G4 - 17.d	0.5865	0.014	0.0611	0.0012	0.06968	0.001	0.71278	0.12057	468.5	8.7	382.3	7.1	D - pop 2	18.39914621
WGC2019A3-C3_mon_G4 - 18.d	0.5965	0.014	0.06107	0.0012	0.07099	0.001	0.67335	0.25509	474.8	8.8	382.1	7.2	D - pop 2	19.52401011
WGC2019A3-C3_mon_G4 - 19.d	0.6059	0.014	0.06132	0.0012	0.07178	0.001	0.71646	0.12369	480.8	8.9	383.6	7.2	D - pop 2	20.21630616
WGC2019A3-C3_mon_G4 - 20.d	0.4844	0.012	0.06199	0.0012	0.0566	0.001	0.49883	0.075781	400.9	8.2	387.7	7.3	D - between pops	3.292591669
WGC2019A3-C3_mon_G4 - 21.d	0.6365	0.016	0.06253	0.0012	0.07421	0.0012	0.68072	-0.11585	499.8	10	391	7.2	D - pop 2	21.76870748
WGC2019J-31A-2-C1_mon_G1 - 1.d	0.4624	0.012	0.06111	0.0012	0.05515	0.0011	0.40969	0.1667	385.7	8.6	382.3	7.3	C - pop 3	0.88151413
WGC2019J-31A-2-C1_mon_G1 - 2.d	1.874	0.043	0.1769	0.0033	0.07692	0.0012	0.66201	0.0082006	1071.7	15	1049.7	18	NC - pop 1	2.052813287
WGC2019J-31A-2-C1_mon_G1 - 3.d	1.858	0.041	0.1778	0.0033	0.07571	0.0011	0.61249	0.32604	1066	15	1055.1	18	C - pop 1	1.022514071

WGC2019J-31A-2-C1_mon_G1 - 4.d	1.831	0.04	0.1771	0.0032	0.07476	0.0011	0.35829	0.39058	1057.1	14	1051.3	18	C - pop 1	0.548670892
WGC2019J-31A-2-C1_mon_G1 - 5.d	1.852	0.041	0.1786	0.0034	0.07501	0.001	0.70839	0.20882	1063.9	15	1059	19	C - pop 1	0.460569602
WGC2019J-31A-2-C5_mon_G4 - 1.d	0.541	0.016	0.06752	0.0013	0.0573	0.0013	0.16095	0.26778	438.4	10	421.2	7.8	NC - pop 2	3.923357664
WGC2019J-31A-2-C5_mon_G4 - 2.d	0.5257	0.013	0.0663	0.0012	0.05765	0.0011	0.21251	0.29912	428.7	8.7	413.8	7.4	NC - pop 2	3.475623979
WGC2019J-31A-2-C5_mon_G4 - 3.d	0.5062	0.014	0.06431	0.0012	0.0572	0.0013	0.1143	0.32661	415.5	9.5	401.8	7.4	NC - pop 2	3.29723225
WGC2019J-31A-2-C6_mon_G2 - 1.d	0.929	0.024	0.07031	0.0014	0.0958	0.0019	0.348	0.25762	667.4	13	438	8.2	D	34.37219059
WGC2019J-31A-2-C6_mon_G2 - 2.d	0.729	0.019	0.06821	0.0013	0.0779	0.0016	0.40943	0.15485	556.3	12	425.3	8.1	D	23.54844508
WGC2019J-31A-2-C6_mon_G2 - 3.d	0.614	0.016	0.06839	0.0014	0.0648	0.0014	0.34375	0.2269	485.5	10	426.4	8.3	D	12.17301751
WGC2019J-31A-2-C6_mon_G2 - 4.d	0.557	0.017	0.07022	0.0014	0.0573	0.0013	0.36948	0.1374	449.1	11	437.5	8.5	C - pop 2	2.582943665
WGC2019J-31A-2-C6_mon_G2 - 5.d	0.5273	0.014	0.06658	0.0013	0.058	0.0014	0.12334	0.3571	429.7	9.5	415.5	7.8	NC - pop 2	3.304631138
WGC2019J-31A-2-C9_mon_G7 - 1.d	0.84	0.027	0.0931	0.0025	0.06502	0.0012	0.84754	-0.19014	618	15	574	15	D	7.1197411
WGC2019J-31A-2-C9_mon_G7 - 2.d	1.253	0.031	0.1279	0.0025	0.07099	0.0012	0.55291	0.32512	824	14	775.9	15	D	5.837378641
WGC2019J-31A-2-C9_mon_G7 - 3.d	1.25	0.034	0.1275	0.0029	0.07119	0.0012	0.76261	-0.059901	822	15	774	17	D	5.839416058
WGC2019J-31A-2-C9_mon_G7 - 4.d	1.211	0.028	0.1253	0.0024	0.07042	0.001	0.51488	0.30622	805.2	13	761.2	14	D	5.464480874
WGC2019J-31A-2-C9_mon_G7 - 5.d	1.005	0.029	0.1057	0.0023	0.06856	0.0012	0.80723	-0.34187	705	15	647.5	13	D	8.156028369
WGC2019J-31A-3-C1_mon_G1 - 1.d	1.437	0.052	0.1425	0.0046	0.0743	0.0014	0.85602	0.093743	903	22	858	26	D	4.983388704
WGC2019J-31A-3-C1_mon_G1 - 2.d	1.782	0.04	0.1739	0.0032	0.07417	0.0011	0.41112	0.33165	1039.4	14	1033.4	18	C - pop 1	0.577256109
WGC2019J-31A-3-C1_mon_G1 - 3.d	1.789	0.04	0.1733	0.0032	0.07471	0.001	0.6463	0.22923	1041.1	15	1030.4	18	C - pop 1	1.027759101
WGC2019J-31A-3-C1_mon_G1 - 4.d	1.233	0.06	0.1274	0.0048	0.0697	0.0014	0.95323	-0.47051	813	27	773	27	D	4.9200492
WGC2019J-31A-3-C2_mon_G2 - 1.d	1.827	0.04	0.1768	0.0033	0.07502	0.001	0.66203	0.37951	1055.5	14	1049.4	18	C - pop 1	0.577925154
WGC2019J-31A-3-C2_mon_G2 - 2.d	1.858	0.044	0.1773	0.0035	0.07594	0.0011	0.66333	0.13304	1065.8	16	1052	19	C - pop 1	1.294802027
WGC2019J-31A-3-C2_mon_G2 - 3.d	1.836	0.042	0.1787	0.0034	0.07504	0.0012	0.49848	0.20834	1059	15	1059.6	18	C - pop 1	-0.05665722
WGC2019J-31A-3-C7_mon_G3 - 1.d	0.5384	0.014	0.06786	0.0013	0.05722	0.0011	0.37837	0.19151	437.1	9.1	423.2	7.7	NC - pop 2	3.180050332
WGC2019J-31A-3-C7_mon_G3 - 2.d	0.522	0.015	0.06795	0.0013	0.0557	0.0014	0.006926	0.39682	425.8	10	423.8	7.9	C - pop 2	0.469704086
WGC2019J-31A-3-C7_mon_G3 - 3.d	0.537	0.018	0.06752	0.0014	0.0583	0.0017	0.105	0.29652	437.3	12	421.2	8.3	NC - pop 2	3.681683055
WGC2019J-31A-3-C7_mon_G3 - 4.d	0.541	0.017	0.06977	0.0014	0.0558	0.0013	0.28462	0.20792	441.5	10	434.7	8.4	C - pop 2	1.540203851
WGC2019J-31A-3-C7_mon_G3 - 5.d	0.5213	0.014	0.06821	0.0013	0.0562	0.0012	0.18079	0.26778	426.6	8.9	425.8	7.9	C - pop 2	0.187529301
WGC2019J-31A-3-C7_mon_G3 - 6.d	0.5284	0.014	0.06771	0.0013	0.0571	0.0012	0.098319	0.3458	430.4	9.3	422.3	7.8	NC - pop 2	1.88197026
WGC2019J-31A-3-C7_mon_G3 - 7.d	0.538	0.017	0.06833	0.0013	0.0564	0.0015	0.27634	0.13835	436.5	11	426.1	7.9	C - pop 2	2.382588774
WGC2019J-31A-3-C7_mon_G3 - 8.d	0.519	0.014	0.06682	0.0013	0.0554	0.0013	0.12512	0.40229	424.1	9.4	417	7.9	C - pop 2	1.674133459
WGC2019J-31A-3-C7_mon_G3 - 9.d	0.542	0.017	0.06842	0.0014	0.0572	0.0016	-0.09975	0.5324	440	11	426.6	8.4	C - pop 2	3.045454545

WGC2019J-31A-3-C7_mon_G3 - 10.d	0.5177	0.013	0.06736	0.0013	0.0561	0.0011	0.28484	0.20091	423.3	8.9	420.2	7.8	C - pop 2	0.732341129
WGC2019J-31A-3-C8_mon_G4 - 1.d	1.879	0.043	0.1827	0.0035	0.07495	0.0012	0.49583	0.43387	1074.3	15	1081.7	19	C - pop 1	-0.68882063
WGC2019J-31A-3-C8_mon_G4 - 2.d	1.679	0.051	0.1665	0.0043	0.07294	0.0011	0.93377	-0.34759	999	20	993	24	C - pop 1	0.600600601
WGC2019J-31A-3-C8_mon_G4 - 3.d	1.847	0.043	0.1767	0.0033	0.07567	0.0011	0.58425	0.097866	1062.7	15	1049.1	18	C - pop 1	1.279759104
WGC2019J-31A-3-C8_mon_G4 - 4.d	0.892	0.022	0.0996	0.002	0.06533	0.00099	0.75254	0.068595	647.2	12	611.7	12	D	5.485166873
WGC2019J-31A-3-C9_mon_G7 - 1.d	1.339	0.05	0.136	0.0041	0.07142	0.0011	0.95028	-0.43739	860	22	821	23	D	4.534883721
WGC2019J-31A-3-C9_mon_G7 - 2.d	1.837	0.042	0.1774	0.0034	0.07497	0.0011	0.58791	0.20958	1058.5	15	1052.8	19	C - pop 1	0.538497874
WGC2019J-31A-3-C9_mon_G7 - 3.d	0.841	0.029	0.0944	0.0026	0.06472	0.001	0.92468	-0.34162	618	16	581	15	D	5.987055016
WGC2019J-31A-3-C9_mon_G7 - 4.d	0.5412	0.012	0.06856	0.0012	0.05691	0.00085	0.53198	0.050724	439.1	8.2	427.5	7.5	NC - pop 2	2.641767251
WGC2019J-31A-3-C9_mon_G7 - 5.d	1.843	0.042	0.1785	0.0033	0.07484	0.0011	0.54832	0.19309	1060.4	15	1058.9	18	C - pop 1	0.141456054
WGC2019J-31A-3-C9_mon_G7 - 6.d	1.796	0.04	0.1768	0.0033	0.07371	0.00099	0.63172	0.29183	1044.5	14	1049.3	18	C - pop 1	-0.45955002
WGC2019J-31A-3-C9_mon_G7 - 7.d	1.136	0.031	0.1199	0.0024	0.06866	0.0011	0.7402	-0.047412	769.6	15	729.8	14	D	5.171517672
WGC2019J-31A-3-C9_mon_G7 - 8.d	1.795	0.042	0.1758	0.0033	0.074	0.0011	0.63294	0.063317	1043.1	15	1043.7	18	C - pop 1	-0.05752085
WGC2019J-31A-3-C9_mon_G7 - 9.d	1.49	0.034	0.1492	0.0028	0.07298	0.0011	0.38588	0.38306	928.4	15	896.6	16	D	3.425247738
WGC2019J-31A-3-C9_mon_G7 - 10.d	1.723	0.039	0.1694	0.0031	0.07424	0.0011	0.57867	0.17359	1016.7	15	1008.7	17	C - pop 1	0.786859447
WGC2019J-31A-3-C9_mon_G7 - 11.d	1.794	0.04	0.1739	0.0032	0.07456	0.0011	0.48499	0.22895	1043	15	1033.4	17	C - pop 1	0.92042186
WGC2019J-31A-3-C9_mon_G7 - 12.d	1.829	0.041	0.177	0.0033	0.07507	0.0011	0.52048	0.29953	1055.4	15	1050.2	18	C - pop 1	0.492704188
WGC2019J-31A-3-C9_mon_G7 - 13.d	1.795	0.041	0.1751	0.0033	0.07459	0.0011	0.43611	0.33246	1044	14	1040	18	C - pop 1	0.383141762
WGC2019J-31A-3-C9_mon_G7 - 14.d	1.838	0.042	0.1781	0.0033	0.0754	0.0012	0.47225	0.30959	1058.7	15	1056.2	18	C - pop 1	0.236138661
WGC2019J-31A-3-C9_mon_G7 - 15.d	1.808	0.04	0.1746	0.0033	0.07498	0.001	0.57661	0.34657	1048	14	1037.3	18	C - pop 1	1.020992366
WGC2019J-31A-3-C9_mon_G7 - 16.d	1.846	0.042	0.1789	0.0034	0.07514	0.0011	0.52475	0.37766	1062.4	14	1060.6	19	C - pop 1	0.169427711
WGC2019J-31A-3-C9_mon_G8 - 1.d	1.844	0.043	0.1771	0.0034	0.07546	0.0011	0.65508	0.088775	1060.7	15	1051.2	18	C - pop 1	0.895634958
WGC2019J-31A-3-C9_mon_G8 - 2.d	1.864	0.042	0.1782	0.0034	0.07567	0.0011	0.55486	0.21443	1068	15	1058.1	18	C - pop 1	0.926966292
WGC2019J-31A-3-C9_mon_G8 - 3.d	1.84	0.041	0.178	0.0032	0.07536	0.0011	0.53366	0.1857	1060.2	15	1055.8	18	C - pop 1	0.415016035
WGC2019J-31A-3-C9_mon_G8 - 4.d	1.819	0.042	0.175	0.0033	0.0754	0.0011	0.62254	0.16675	1052.8	15	1039.3	18	C - pop 1	1.282294833
WGC2019J-31A-3-C9_mon_G8 - 5.d	1.84	0.043	0.1781	0.0033	0.07492	0.0011	0.58048	0.15431	1061.2	15	1056.8	18	C - pop 1	0.414624953
WGC2019J-31A-3-C9_mon_G8 - 6.d	1.868	0.043	0.1795	0.0034	0.07555	0.0012	0.50149	0.2279	1069.6	15	1064	19	C - pop 1	0.523560209
WGC2019J-31A-3-C9_mon_G8 - 7.d	1.829	0.041	0.1796	0.0034	0.07408	0.0011	0.30489	0.44607	1057.2	15	1064.4	18	C - pop 1	-0.68104427
WGC2019J-31A-3-C9_mon_G8 - 8.d	1.833	0.043	0.1783	0.0033	0.07434	0.0011	0.51931	0.16727	1056.7	15	1057.6	18	C - pop 1	-0.08517081
WGC2019J-31A-3-C9_mon_G8 - 9.d	1.828	0.042	0.177	0.0034	0.07467	0.0011	0.59365	0.20442	1056.1	15	1051.8	19	C - pop 1	0.407158413
WGC2019J-31A-3-C9_mon_G8 - 10.d	1.799	0.041	0.174	0.0032	0.0751	0.0011	0.50209	0.24206	1045.7	15	1033.9	18	C - pop 1	1.128430716

WGC2019J-31A-3-C9_mon_G8 - 11.d	1.838	0.043	0.1769	0.0033	0.07593	0.0011	0.62007	0.064401	1059.7	16	1049.8	18	C - pop 1	0.934226668
WGC2019J-31A-3-C9_mon_G8 - 12.d	1.828	0.042	0.1786	0.0034	0.07454	0.0012	0.35676	0.41173	1055.1	15	1059.4	18	C - pop 1	-0.40754431
WGC2019J-31A-3-C9_mon_G8 - 13.d	1.829	0.042	0.1768	0.0033	0.07515	0.0011	0.59211	0.045507	1055.3	15	1049.4	18	C - pop 1	0.559082725
WGC2019J-31A-3-C9_mon_G5 - 1.d	1.827	0.041	0.1772	0.0032	0.07501	0.0011	0.56227	0.21423	1054.8	15	1051.5	18	C - pop 1	0.312855518
WGC2019J-31A-3-C10_mon_G10 - 1.d	0.5147	0.014	0.06584	0.0013	0.0569	0.0013	0.13334	0.39147	422.1	9.4	411	7.8	NC - pop 2	2.6297086
WGC2019J-31A-3-C10_mon_G10 - 2.d	0.5147	0.014	0.06752	0.0013	0.0556	0.0012	0.19682	0.28365	421.2	9.4	421.2	7.8	C - pop 2	0
WGC2019J-31A-3-C10_mon_G10 - 3.d	0.514	0.015	0.06196	0.0013	0.0602	0.0014	0.28583	0.33882	421.7	10	387.5	7.8	NC - pop 3	8.110030828
WGC2019J-31A-3-C10_mon_G10 - 4.d	0.5288	0.015	0.0676	0.0014	0.0568	0.0012	0.38984	0.2148	431.4	9.9	421.6	8.3	C - pop 2	2.271673621
WGC2019J-31A-3-C10_mon_G10 - 5.d	0.536	0.015	0.06703	0.0014	0.0581	0.0013	0.14801	0.40035	435.2	9.8	418.2	8.3	NC - pop 2	3.90625
WGC2019J-31A-3-C10_mon_G11 - 1.d	0.522	0.015	0.0684	0.0014	0.0555	0.0013	0.33222	0.15131	426.2	10	426.5	8.2	C - pop 2	-0.07038949
WGC2019J-31A-3-C10_mon_G11 - 2.d	0.523	0.015	0.0675	0.0013	0.0564	0.0015	0.034236	0.40395	427	10	421	8	C - pop 2	1.405152225
WGC2019J-31A-3-C10_mon_G11 - 3.d	0.561	0.018	0.07002	0.0014	0.0577	0.0016	0.21772	0.20798	451.6	12	436.3	8.5	NC - pop 2	3.387953942
WGC2019J-31A-3-C10_mon_G11 - 4.d	0.539	0.019	0.06814	0.0014	0.0572	0.0018	0.13917	0.28303	437.8	12	424.9	8.6	C - pop 2	2.946550937
WGC2019J-31A-3-C10_mon_G11 - 5.d	0.529	0.016	0.06698	0.0013	0.0572	0.0015	0.16469	0.22528	430.7	11	418.5	8.2	NC - pop 2	2.832598096
WGC2019J-31A-3-C10_mon_G11 - 6.d	0.531	0.016	0.06826	0.0013	0.0565	0.0014	0.13533	0.28278	432.2	11	426.1	8	C - pop 2	1.411383619
WGC2019J-31A-3-C10_mon_G11 - 7.d	0.987	0.054	0.1056	0.0045	0.0675	0.0014	0.96832	-0.59224	691	28	646	26	D	6.512301013
WGC2019J-31A-3-C15_mon_G21 - 1.d	0.532	0.017	0.06814	0.0014	0.057	0.0017	-0.12171	0.48077	432.6	11	424.9	8.2	C - pop 2	1.779935275
WGC2019J-31A-3-C16_mon_G20 - 1.d	1.429	0.042	0.1442	0.0038	0.07217	0.001	0.91583	-0.14567	902	18	868	21	D	3.76940133
WGC2019J-31A-3-C16_mon_G20 - 2.d	1.857	0.041	0.1792	0.0033	0.07476	0.0011	0.46451	0.25279	1065.8	15	1062.6	18	C - pop 1	0.300243948
WGC2019J-31A-3-C16_mon_G20 - 3.d	1.848	0.04	0.1788	0.0033	0.0751	0.0011	0.44656	0.4515	1062.4	14	1060.3	18	C - pop 1	0.197665663
WGC2019J-31A-3-C16_mon_G20 - 4.d	0.546	0.016	0.06926	0.0015	0.0583	0.0013	0.74775	-0.23158	442	11	431.7	9.1	NC - pop 2	2.330316742
WGC2019J-31A-3-C16_mon_G20 - 5.d	1.849	0.04	0.1776	0.0033	0.07569	0.001	0.63287	0.45877	1063	14	1053.7	18	C - pop 1	0.874882408
WGC2019J-31A-3-C16_mon_G20 - 6.d	1.841	0.041	0.1784	0.0033	0.07495	0.001	0.62543	0.22855	1060.7	14	1058.4	18	C - pop 1	0.216837937
WGC2019J-31A-3-C16_mon_G20 - 7.d	1.843	0.04	0.1791	0.0033	0.0746	0.001	0.59362	0.24248	1061.3	14	1061.9	18	C - pop 1	-0.05653444
WGC2019J-31A-3-C16_mon_G20 - 8.d	1.83	0.04	0.1787	0.0033	0.07453	0.0011	0.48223	0.43271	1056	14	1059.9	18	C - pop 1	-0.36931818

WGC2019J-31A-3-C16_mon_G20 - 9.d	0.5171	0.012	0.06713	0.0012	0.05638	0.00096	0.38378	0.18749	423.6	8.5	418.8	7.4	C - pop 1	1.133144476
WGC2019J-31A-3-C16_mon_G20 - 10.d	1.809	0.04	0.1762	0.0034	0.07461	0.0011	0.66297	0.25206	1048.2	15	1045.9	18	C - pop 1	0.219423774
WGC2019J-31A-3-C16_mon_G20 - 11.d	1.852	0.04	0.1785	0.0033	0.07518	0.00098	0.68755	0.20894	1064	14	1058.9	18	C - pop 1	0.479323308
WGC2019J-31A-3-C16_mon_G20 - 12.d	1.783	0.038	0.1747	0.0032	0.07449	0.001	0.67282	0.26218	1039.2	14	1037.6	18	C - pop 1	0.153964588
WGC2019J-31A-3-C16_mon_G20 - 13.d	1.819	0.04	0.1766	0.0033	0.0746	0.0011	0.51383	0.28586	1052	14	1048.2	18	C - pop 1	0.36121673
WGC2019J-31A-3-C16_mon_G20 - 14.d	1.833	0.04	0.1767	0.0032	0.0752	0.001	0.53398	0.28534	1057.2	14	1048.8	18	C - pop 1	0.794551646
WGC2019J-31A-3-C16_mon_G20 - 15.d	1.841	0.041	0.1788	0.0034	0.07501	0.001	0.77212	0.072733	1060.8	15	1060.4	18	C - pop 1	0.037707391
WGC2019J-31A-3-C16_mon_G20 - 16.d	1.806	0.04	0.1748	0.0032	0.07508	0.0011	0.59003	0.23824	1047.5	14	1038.5	18	C - pop 1	0.859188544
WGC2019J-31A-3-C16_mon_G20 - 17.d	1.85	0.04	0.1782	0.0032	0.07512	0.001	0.63648	0.23007	1063.2	14	1057.2	18	C - pop 1	0.564334086
WGC2019J-31A-3-C16_mon_G20 - 18.d	0.5373	0.013	0.06854	0.0013	0.05686	0.0011	0.17694	0.37174	436.5	8.6	427.3	7.8	NC - pop 2	2.107674685
WGC2019J-31A-3-C16_mon_G20 - 19.d	1.834	0.04	0.1778	0.0033	0.07496	0.001	0.6477	0.36442	1057.4	14	1055.1	18	C - pop 1	0.217514659
WGC2019J-31A-3-C16_mon_G20 - 20.d	0.5354	0.013	0.06842	0.0013	0.05654	0.00097	0.31281	0.24892	435.2	8.3	427	7.4	C - pop 2	1.884191176
WGC2019J-31A-3-C16_mon_G20 - 21.d	0.5314	0.013	0.06867	0.0013	0.05647	0.001	0.08719	0.43478	432.5	8.4	428.1	7.7	C - pop 2	1.01734104
WGC2019J-31A-3-C16_mon_G20 - 22.d	0.5399	0.013	0.06871	0.0013	0.05732	0.0011	0.22446	0.34612	438.2	8.5	428.4	7.7	NC - pop 2	2.236421725
WGC2019J-31A-3-C16_mon_G20 - 23.d	0.5266	0.013	0.06862	0.0013	0.05585	0.00093	0.50817	0.039458	430	8.3	427.8	7.7	C - pop 2	0.511627907
WGC2019J-31A-3-C16_mon_G20 - 24.d	0.541	0.015	0.06892	0.0013	0.0571	0.0013	0.17828	0.23823	439.3	10	430.1	8.1	C - pop 2	2.094240838
WGC2019J-31A-3-C16_mon_G20 - 25.d	0.5438	0.013	0.06883	0.0013	0.05748	0.001	0.35673	0.10958	441.4	8.5	429.1	7.6	NC - pop 2	2.786588129
WGC2019J-31A-3-C16_mon_G20 - 26.d	0.524	0.015	0.06748	0.0013	0.0563	0.0013	0.037263	0.28006	427.3	9.9	420.9	7.7	C - pop 2	1.497776738
WGC2019J-31A-3-C16_mon_G20 - 27.d	0.517	0.015	0.06768	0.0014	0.0555	0.0013	0.22914	0.24529	423	10	422.2	8.2	C - pop 2	0.189125296
WGC2019J-31A-3-C16_mon_G20 - 28.d	0.5243	0.013	0.06782	0.0013	0.05588	0.0011	0.086142	0.42491	427.8	8.6	423	7.7	C - pop 2	1.122019635
WGC2019J-31A-3-C16_mon_G20 - 29.d	0.5427	0.013	0.06877	0.0013	0.05718	0.00095	0.51038	0.080378	440	8.6	428.7	7.7	NC - pop 2	2.568181818
WGC2019J-31A-3-C16_mon_G20 - 30.d	0.947	0.028	0.1032	0.0024	0.06682	0.0011	0.86326	-0.14607	675	15	632.9	14	D	6.237037037
WGC2019J-31A-3-C17_mon_G17 - 1.d	0.5186	0.014	0.06814	0.0013	0.0558	0.0012	0.36717	0.064636	423.8	9.6	424.9	7.7	C - pop 2	-0.25955639
WGC2019J-31A-3-C17_mon_G17 - 2.d	0.527	0.015	0.06785	0.0013	0.0565	0.0012	0.27211	0.21231	430.9	9.9	423.2	8	C - pop 2	1.786957531
WGC2019J-31A-3-C17_mon_G17 - 3.d	0.547	0.015	0.06838	0.0013	0.0581	0.0013	0.11104	0.31006	443.5	10	426.4	7.8	NC - pop 2	3.855693348

WGC2019J-31A-3-C17_mon_G17 - 4.d	0.5277	0.014	0.06775	0.0014	0.05646	0.0012	0.38524	0.1838	429.9	9.4	422.6	8.2	C - pop 2	1.698069318
WGC2019J-31A-3-C17_mon_G17 - 5.d	0.526	0.016	0.06843	0.0013	0.0559	0.0013	0.27414	0.16202	430.6	10	426.6	8	C - pop 2	0.928936368
WGC2019J-31A-3-C18_mon_G15 - 1.d	0.5563	0.013	0.06873	0.0013	0.05871	0.00097	0.079118	0.58	449.5	8.3	428.5	7.8	NC - pop 2	4.67185762
WGC2019J-31A-3-C18_mon_G15 - 2.d	0.556	0.013	0.06811	0.0013	0.05904	0.001	0.41325	0.27104	448.7	8.6	424.7	7.8	NC - pop 2	5.34878538
WGC2019J-31A-3-C18_mon_G15 - 3.d	0.553	0.013	0.06817	0.0013	0.05858	0.00093	0.45716	0.25137	446.8	8.6	425.1	8	NC - pop 2	4.856759176
WGC2019J-31A-3-C18_mon_G15 - 4.d	0.5469	0.013	0.0694	0.0013	0.05714	0.00098	0.4063	0.26814	442.8	8.6	432.5	8	NC - pop 2	2.326106594
WGC2019J-31A-3-C22_mon_Gx - 1.d	0.4641	0.012	0.0617	0.0012	0.055	0.0013	0.020753	0.39351	386.8	8.6	385.9	7.1	C - pop 3	0.232678387

C = concordant, NC = near concordant, D = discordant, RD = reversely discordant.

Monazite geochronology standards:

Standard	Type	207/235	2σ	206/238	2σ	207/206	2σ	ErrorCorr 6/38vs7/35	ErrorCorr 38/6vs7/6	207/235 age	2σ	206/238	2σ	Concordant?	% discordance
Ambat - 1.d	Secondary	0.6628	0.016	0.085	0	0.057	1E-03	0.31744	0.25305	516.7	9.8	524.9	9.5	C	-1.58699
Ambat - 2.d	Secondary	0.6777	0.017	0.085	0	0.058	0.001	0.26665	0.30793	525.1	10	525.9	9.6	C	-0.15235
~~**Ambat - 3.d**~~	~~Secondary~~	~~0.98~~	~~0.05~~	~~0.087~~	~~0~~	~~0.082~~	~~0.004~~	~~0.625~~	~~-0.51539~~	~~688~~	~~26~~	~~536.1~~	~~9.7~~	~~D~~	~~22.07849~~
Ambat - 4.d	Secondary	0.6717	0.016	0.085	0	0.057	0.001	0.30654	0.25835	522.2	9.7	525	9.4	C	-0.53619
Ambat - 5.d	Secondary	0.6601	0.015	0.084	0	0.057	1E-03	0.24276	0.40134	514.5	9.5	519.5	9.2	C	-0.97182
Ambat - 6.d	Secondary	0.6632	0.017	0.084	0	0.057	0.001	0.13407	0.42978	516.9	9.9	521	9.5	C	-0.79319
Ambat - 7.d	Secondary	0.659	0.016	0.083	0	0.057	0.001	0.36077	0.18029	513.7	10	516.7	9.3	C	-0.584
Ambat - 8.d	Secondary	0.6588	0.016	0.084	0	0.057	0.001	0.12992	0.42816	513.6	9.6	519.3	9.4	C	-1.10981
Ambat - 9.d	Secondary	0.654	0.017	0.083	0	0.057	0.001	0.32867	0.21233	510.7	10	516.1	9.5	C	-1.05737
~~**Ambat - 10.d**~~	~~Secondary~~	~~0.711~~	~~0.02~~	~~0.084~~	~~0~~	~~0.061~~	~~0.001~~	~~0.23745~~	~~0.1852~~	~~544.9~~	~~12~~	~~520.3~~	~~9.3~~	~~D~~	~~4.51459~~
Ambat - 11.d	Secondary	0.6586	0.016	0.085	0	0.057	0.001	0.18426	0.34587	514.2	9.8	523.6	9.2	C	-1.82808
~~**Ambat - 12.d**~~	~~Secondary~~	~~1.141~~	~~0.083~~	~~0.088~~	~~0~~	~~0.093~~	~~0.006~~	~~0.73626~~	~~-0.64908~~	~~759~~	~~41~~	~~546.5~~	~~11~~	~~D~~	~~27.99736~~

Ambat - 13.d	Secondary	0.6657	0.015	0.084	0	0.058	0.001	0.12973	0.55027	517.9	9.4	519.6	9.6	C	-0.32825
Ambat - 14.d	Secondary	0.656	0.016	0.084	0	0.057	0.001	0.24169	0.31098	511.9	9.8	517.3	9.3	C	-1.05489
Ambat - 15.d	Secondary	0.663	0.017	0.084	0	0.058	0.001	0.25146	0.29344	515.9	10	518.5	9.5	C	-0.50397
Ambat - 16.d	Secondary	0.6513	0.016	0.083	0	0.057	1E-03	0.35997	0.23489	509.1	9.6	515	9.4	C	-1.15891
MAdel - 1.d	Primary	0.6688	0.016	0.085	0	0.057	0.001	0.37765	0.21296	520.4	9.8	527	9.5	C	-1.26826
MAdel - 2.d	Primary	0.6552	0.015	0.084	0	0.057	9E-04	0.28418	0.36144	512.7	9.7	518.2	9.3	C	-1.07275
MAdel - 3.d	Primary	0.648	0.018	0.083	0	0.056	0.001	0.59354	0.099371	506.6	11	515.6	10	C	-1.77655
MAdel - 4.d	Primary	0.6612	0.016	0.084	0	0.057	9E-04	0.47313	0.10121	515.1	9.8	518.9	9.4	C	-0.73772
MAdel - 5.d	Primary	0.6515	0.015	0.084	0	0.057	1E-03	0.28355	0.31882	509.2	9.3	516.9	9.1	C	-1.51218
~~**MAdel - 6.d**~~	~~Primary~~	~~0.6551~~	~~0.016~~	~~0.084~~	~~0~~	~~0.056~~	~~9E-04~~	~~0.47146~~	~~0.12107~~	~~511.4~~	~~9.7~~	~~520.1~~	~~9.3~~	~~RD~~	~~-1.70121~~
MAdel - 7.d	Primary	0.649	0.017	0.083	0	0.057	0.001	0.20371	0.32182	507.7	10	514.5	9.4	C	-1.33937
MAdel - 8.d	Primary	0.658	0.016	0.084	0	0.057	1E-03	0.35308	0.32994	513.2	9.5	518.9	9.5	C	-1.11068
MAdel - 9.d	Primary	0.6621	0.016	0.083	0	0.058	1E-03	0.48531	0.085939	515.7	9.7	514.8	9.3	C	0.17452
MAdel - 11.d	Primary	0.6631	0.016	0.084	0	0.057	0.001	0.20623	0.36395	516.3	9.5	518.2	9.1	C	-0.368
MAdel - 12.d	Primary	0.6422	0.016	0.081	0	0.058	1E-03	0.57871	0.3391	503.4	10	502.6	9.9	C	0.158919
MAdel - 13.d	Primary	0.6585	0.015	0.083	0	0.057	1E-03	0.37792	0.34855	513.5	9.4	516.8	9.6	C	-0.64265
~~**MAdel - 14.d**~~	~~Primary~~	~~0.6496~~	~~0.016~~	~~0.084~~	~~0~~	~~0.056~~	~~1E-03~~	~~0.68105~~	~~0.063796~~	~~507.9~~	~~10~~	~~519.5~~	~~10~~	~~C~~	~~-2.28391~~
MAdel - 15.d	Primary	0.653	0.015	0.084	0	0.056	1E-03	0.37488	0.24186	510.1	9.5	519.9	9.3	RD	-1.92119
MAdel - 16.d	Primary	0.6587	0.015	0.084	0	0.057	1E-03	0.19502	0.36519	514.3	9.4	519.2	9	C	-0.95275
MAdel - 17.d	Primary	0.6553	0.015	0.083	0	0.057	9E-04	0.38336	0.3123	511.5	9.3	513.9	9.2	C	-0.46921
MAdel - 18.d	Primary	0.684	0.016	0.087	0	0.058	0.001	0.20472	0.33941	528.9	10	535.6	9.4	C	-1.26678
MAdel - 19.d	Primary	0.6519	0.015	0.083	0	0.057	1E-03	0.24512	0.31182	509.5	9.2	513	9.2	C	-0.68695
MAdel - 22.d	Primary	0.676	0.018	0.085	0	0.057	1E-03	0.69915	0.028346	524.8	11	527.8	10	C	-0.57165
MAdel - 23.d	Primary	0.6611	0.015	0.084	0	0.057	9E-04	0.45048	0.13614	515.7	9.7	518.9	9.2	C	-0.62052
MAdel - 24.d	Primary	0.6491	0.015	0.082	0	0.057	9E-04	0.30899	0.25189	508.3	9.5	510.8	9	C	-0.49184

MAdel - 25.d	Primary	0.6487	0.016	0.083	0	0.057	0.001	0.34747	0.24864	508.1	9.8	515.8	9.1	C	-1.51545
MAdel - 26.d	Primary	0.6614	0.016	0.084	0	0.057	0.001	0.32173	0.20573	515.2	9.9	521.2	9.3	C	-1.1646
MAdel - 27.d	Primary	0.6596	0.015	0.083	0	0.057	9E-04	0.41587	0.28455	514.2	9.3	516.4	9.3	C	-0.42785
MAdel - 28.d	Primary	0.6662	0.016	0.084	0	0.058	0.001	0.074816	0.50145	518.2	9.5	517.2	9.4	C	0.192976
MAdel - 29.d	Primary	0.6684	0.016	0.084	0	0.058	1E-03	0.32069	0.29492	520.1	9.9	518.9	9.3	C	0.230725
MAdel - 30.d	Primary	0.6524	0.016	0.084	0	0.057	1E-03	0.29823	0.26359	509.7	9.6	519.6	9.1	C	-1.94232
MAdel - 31.d	Primary	0.658	0.016	0.084	0	0.057	1E-03	0.39232	0.20009	513.1	9.9	521	9.4	C	-1.53966
MAdel - 32.d	Primary	0.6561	0.015	0.083	0	0.057	9E-04	0.45765	0.22957	512.1	9.3	515.4	9.5	C	-0.64441
MAdel - 33.d	Primary	0.6609	0.016	0.083	0	0.057	1E-03	0.37179	0.14343	515	9.5	516.6	9	C	-0.31068
MAdel - 34.d	Primary	0.6579	0.016	0.084	0	0.057	0.001	0.4217	0.19892	513	9.9	518.1	9.3	C	-0.99415
MAdel - 35.d	Primary	0.67	0.018	0.085	0	0.058	0.001	0.332	0.18631	521.3	11	523.4	9.3	C	-0.40284
MAdel - 36.d	Primary	0.6559	0.015	0.083	0	0.057	9E-04	0.25651	0.31893	511.9	9.3	516.8	9.1	C	-0.95722
MAdel - 37.d	Primary	0.6616	0.016	0.084	0	0.057	9E-04	0.43845	0.16344	515.3	9.6	519.8	9.1	C	-0.87328
MAdel - 38.d	Primary	0.6677	0.016	0.084	0	0.058	0.001	0.20735	0.3534	519	10	517.1	9.4	C	0.366089
MAdel - 39.d	Primary	0.6546	0.016	0.084	0	0.056	0.001	0.22686	0.35086	511.1	9.7	518.1	9.5	C	-1.36959
~~**MAdel - 40.d**~~	~~Primary~~	~~0.6462~~	~~0.016~~	~~0.083~~	~~0~~	~~0.056~~	~~9E-04~~	~~0.41301~~	~~0.15328~~	~~506.6~~	~~9.4~~	~~515.6~~	~~9.3~~	~~RD~~	~~-1.77655~~
MAdel - 41.d	Primary	0.6512	0.015	0.084	0	0.057	9E-04	0.48059	0.20647	509.1	9.1	517	9.4	C	-1.55176
MAdel - 43.d	Primary	0.6538	0.016	0.083	0	0.057	1E-03	0.38794	0.22247	510.5	9.7	516.5	9.2	C	-1.17532
MAdel - 44.d	Primary	0.6555	0.016	0.084	0	0.057	1E-03	0.26637	0.32939	512.2	9.6	517.2	9.3	C	-0.97618
MAdel - 45.d	Primary	0.6568	0.015	0.084	0	0.057	9E-04	0.28867	0.27569	512.5	9.2	517.8	9.1	C	-1.03415
MAdel - 46.d	Primary	0.661	0.016	0.084	0	0.057	1E-03	0.32127	0.28674	515	9.8	520.2	9.2	C	-1.00971
~~**MAdel - 47.d**~~	~~Primary~~	~~0.6546~~	~~0.015~~	~~0.084~~	~~0~~	~~0.056~~	~~1E-03~~	~~0.20653~~	~~0.41319~~	~~511.1~~	~~9.3~~	~~521.6~~	~~9.3~~	~~RD~~	~~-2.05439~~
MAdel - 48.d	Primary	0.6616	0.016	0.084	0	0.057	9E-04	0.50041	0.077282	515.3	9.7	519.6	9.1	C	-0.83447
222 - 4.d	Secondary	0.5716	0.014	0.074	0	0.056	0.001	0.27588	0.36726	458.8	9.1	457.3	8.4	C	0.32694
222 - 5.d	Secondary	0.5655	0.014	0.073	0	0.056	1E-03	0.29958	0.30264	454.8	9.2	453.4	8.5	C	0.307828

222 - 6.d	Secondary	0.5486	0.014	0.071	0	0.056	1E-03	0.49272	-0.02341	443.9	9	442.6	7.8	C	0.292859
222 - 7.d	Secondary	0.5604	0.013	0.073	0	0.056	1E-03	0.3477	0.31509	451.6	8.6	454	8.3	C	-0.53144
222 - 8.d	Secondary	0.5672	0.013	0.073	0	0.056	9E-04	0.32914	0.2961	456	8.4	452.8	8.1	C	0.701754
222 - 9.d	Secondary	0.5589	0.013	0.073	0	0.056	1E-03	0.16849	0.34645	450.7	8.6	452.8	8	C	-0.46594
222 - 10.d	Secondary	0.5661	0.014	0.073	0	0.057	1E-03	0.28916	0.20651	455.3	8.8	452.1	7.9	C	0.702833
222 - 11.d	Secondary	0.5517	0.013	0.072	0	0.056	9E-04	0.47426	0.1607	445.9	8.5	447.8	8	C	-0.4261
222 - 12.d	Secondary	0.5622	0.013	0.072	0	0.056	1E-03	0.25705	0.36579	452.8	8.5	451.1	8.1	C	0.375442
222 - 13.d	Secondary	0.5707	0.014	0.073	0	0.057	0.001	0.1077	0.38779	458.2	9.2	451.3	8.1	C	1.505893
222 - 14.d	Secondary	0.5633	0.013	0.072	0	0.057	9E-04	0.38662	0.28402	453.6	8.3	446.8	8	C	1.499118
222 - 15.d	Secondary	0.5604	0.013	0.072	0	0.057	9E-04	0.50628	0.10683	451.6	8.5	446.5	8	C	1.129318
222 - 16.d	Secondary	0.5572	0.014	0.071	0	0.057	1E-03	0.25983	0.25299	449.5	8.8	444	7.9	C	1.223582
222 - 17.d	Secondary	0.5559	0.013	0.072	0	0.056	1E-03	0.34878	0.2894	448.7	8.6	447	8.2	C	0.378872
222 - 18.d	Secondary	0.5541	0.013	0.072	0	0.056	0.001	0.27967	0.2607	447.5	8.8	449.2	8	C	-0.37989
222 - 19.d	Secondary	0.5592	0.014	0.072	0	0.056	9E-04	0.4467	0.077217	450.8	8.9	449.7	8	C	0.244011
222 - 20.d	Secondary	0.5652	0.014	0.072	0	0.057	9E-04	0.54918	0.082237	454.7	8.9	450.7	8.3	C	0.879701
222 - 21.d	Secondary	0.5585	0.014	0.072	0	0.056	0.001	0.36772	0.13822	450.3	9	448.8	8	C	0.333111
222 - 22.d	Secondary	0.5597	0.014	0.072	0	0.056	1E-03	0.44894	0.13144	451.1	9	450.9	8.3	C	0.044336
222 - 23.d	Secondary	0.5638	0.014	0.073	0	0.056	0.001	0.42684	0.10877	454.4	8.9	452.6	8.1	C	0.396127
222 - 24.d	Secondary	0.5518	0.013	0.072	0	0.056	9E-04	0.59768	0.092871	446.6	8.3	446	8.1	C	0.134348
222 - 25.d	Secondary	0.5519	0.013	0.072	0	0.055	9E-04	0.33377	0.3198	446.1	8.5	450.4	8.1	C	-0.96391
222 - 26.d	Secondary	0.5661	0.013	0.073	0	0.056	0.001	0.2616	0.30645	456	8.5	451.8	8.1	C	0.921053
222 - 27.d	Secondary	0.5604	0.015	0.073	0	0.056	0.001	0.40103	0.089494	451.4	9.6	452.2	8.3	C	-0.17723
222 - 28.d	Secondary	0.5614	0.014	0.072	0	0.056	0.001	0.30294	0.23822	452.2	9	450.9	8.1	C	0.287483
222 - 29.d	Secondary	0.5579	0.013	0.072	0	0.056	9E-04	0.27933	0.3282	450	8.3	445.7	7.9	C	0.955556
222 - 30.d	Secondary	0.5652	0.015	0.074	0	0.055	0.001	0.21163	0.29139	455.4	9.9	461.3	8.4	C	-1.29556

222 - 31.d	Secondary	0.5695	0.014	0.072	0	0.057	0.001	0.23454	0.32168	457.5	9.1	449.2	8.4	C	1.814208
222 - 32.d	Secondary	0.5554	0.014	0.071	0	0.057	0.001	0.36543	0.21185	449	8.7	444.7	8.1	C	0.957684
223 - 32.d	Secondary	0.5597	0.013	0.072	0	0.056	9E-04	0.40874	0.16749	451.1	8.7	449.3	7.9	C	0.399025
224 - 32.d	Secondary	0.5591	0.013	0.072	0	0.056	1E-03	0.17143	0.42977	450.8	8.4	449.6	8	C	0.266193
225 - 32.d	Secondary	0.5479	0.013	0.071	0	0.056	9E-04	0.2431	0.36287	443.4	8.4	441.3	7.8	C	0.473613

~~Crossed out~~ = discordant, C = concordant, NC = near concordant, D = discordant, RD = reversely discordant.

Monazite trace elements:

	Chondrite normalised REEs + Y															
Sample	**La**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Y**	**Ho**	**Er**	**Tm**	**Yb**	**Lu**	**Total HREEs**	**Eu anomaly**
WGC2019J-25B-C5_mon_G1 - 1.d	412236.287	23868	173282.276	64527.03	25044.405	17819.1	5094.18283	1643.49593	699.7	544.32	196.938	64.7773	30.37267081	14.10569106	8287.894295	0.738579182
WGC2019J-25B-C5_mon_G1 - 2.d	413080.169	23782	169693.654	62918.92	24920.071	17060.3	4936.28809	1560.1626	600.1	472.16	155.188	45.1822	16.21118012	7.682926829	7792.975656	0.760615724
WGC2019J-25B-C5_mon_G1 - 3.d	413924.051	23717	170590.81	62837.84	24849.023	17120.6	4977.83934	1591.05691	611.8	485.53	158.938	45.3441	15.96273292	7.154471545	7893.626215	0.757598619
WGC2019J-25B-C5_mon_G1 - 4.d	413628.692	23739	168774.617	62945.95	24902.309	17135.68	4997.22992	1601.21951	614	494.87	162.063	46.8421	17.51552795	6.097560976	7939.838918	0.758237196
WGC2019J-25B-C5_mon_G1 - 5.d	411729.958	23502	166892.779	61932.43	24600.355	17075.38	4894.73684	1537.39837	586.6	471.61	155.313	39.1498	16.58385093	6.544715447	7707.937802	0.756479495
WGC2019J-25B-C5_mon_G1 - 6.d	417721.519	23836	169168.49	62297.3	25115.453	17236.18	4963.98892	1584.14634	605.8	480.22	158.313	42.7935	15.83850932	5.569105691	7856.668679	0.766453638
WGC2019J-25B-C5_mon_G1 - 7.d	411097.046	23426	168555.799	61216.22	24476.021	16814.07	5008.31025	1630.48078	628.4	497.25	164.938	45.7418	18.69565217	6.544715447	8000.377657	0.762906213
WGC2019J-25B-C5_mon_G1 - 8.d	409831.224	23340	167111.597	61141.89	24387.211	16874.37	4922.43767	1601.62602	617.3	496.7	161.25	44.4153	16.77018634	8.170731707	7868.670896	0.759239681
WGC2019J-25B-C6_mon_G2 - 1.d	420421.941	22855	158905.908	57567.57	23072.824	15467.34	4385.04155	1434.95935	610	453.48	151.25	42.7126	15.34161491	5.121951219	7097.906871	0.773221724
WGC2019J-25B-C6_mon_G2 - 2.d	412489.451	23394	166652.079	61689.19	24760.213	16994.97	5049.86015	1647.96748	638.1	523.81	167.438	47.4494	19.31677019	6.138211382	8100.080374	0.764697349
WGC2019J-25B-C7_mon_G3 - 1.d	409620.253	23329	166608.315	62094.59	24523.979	16658.29	4941.82825	1609.34959	626.2	486.26	158.688	43.8866	17.63975155	8.495934959	7892.351411	0.762515724
WGC2019J-25B-C7_mon_G3 - 2.d	425696.203	22963	162538.293	58743.24	21989.343	15010.05	3670.36011	1152.84553	506.4	376.01	136.188	46.1134	18.26086957	9.593495935	5915.768191	0.740529249
WGC2019J-25B-C7_mon_G3 - 3.d	435021.097	22273	152625.821	53966.22	20959.147	13040.2	2878.11634	878.455285	402.2	276.19	100.375	26.2753	10.93167702	4.837398374	4577.381483	0.790078939
WGC2019J-25B-C7_mon_G3 - 4.d	432869.198	22122	151334.792	52932.43	20746.004	12979.9	2822.71468	880.487805	386.2	270.33	91.3125	28.2591	10.06211180	2.886178862	4492.252057	0.791476195

WGC2019J-25B-C7_mon_G3 - 5.d	419409.283	23232 7.6	162407.002	59459.46	23818.828	16386.93	4864.26 593	1641.46 341	669.7	518.86	174.25	50.08 1	18.50931 677	5.934959 35	7943.0690 59	0.763064 138
WGC2019J-25B-C7_mon_G3 - 6.d	418143.46	22834 0.5	159540.481	57006.76	22824.156	15025.13	4216.06 648	1510.56 911	694.9	516.85	178	54.25 1	21.11801 242	8.333333 333	7200.0877 62	0.779870 531
WGC2019J-25B-C7_mon_G3 - 7.d	430801.688	22219 8.3	153304.158	54121.62	20863.233	12944.72	2858.72 576	873.577 236	392.6	271.61	96.43 75	26.03 24	9.627329 193	3.089430 894	4531.7013 68	0.788224 283
WGC2019J-25B-C7_mon_G3 - 8.d	431518.987	22446 1.2	152188.184	53074.32	20799.29	12804.02	2847.64 543	855.691 057	385.3	266.3	93.81 25	26.80 16	9.937888 199	4.715447 154	4490.2043 07	0.797871 752
WGC2019J-25B-C7_mon_G3 - 9.d	432911.392	22133 6.2	151334.792	52533.78	20337.478	12668.34	2781.16 343	862.195 122	389.2	267.4	92.12 5	31.41 7	10.74534 161	3.699186 992	4437.9443 57	0.788347 811
WGC2019J-25B-C7_mon_G3 - 10.d	424894.515	23114 2.2	162275.711	58155.41	23108.348	15834.17	4753.46 26	1597.15 447	646.9	496.7	168.9 38	47.77 33	16.39751 553	6.951219 512	7734.2798 87	0.761511 024
WGC2019J-25B-C7_mon_G3 - 11.d	420337.553	23049 5.7	161750.547	57750	23143.872	15793.97	4739.61 219	1582.92 683	633.8	498.72	166.3 75	50.89 07	15.65217 391	5.447154 472	7693.4219 83	0.766327 436
WGC2019J-25B-C7_mon_G3 - 12.d	427848.101	22877 1.6	157789.934	56439.19	22024.867	14763.82	4033.24 1	1313.82 114	553	409.89	135	40	15.46583 851	4.674796 748	6505.0928 81	0.762998 264
WGC2019J-25B-C7_mon_G3 - 13.d	402531.646	23868 5.3	172603.939	63783.78	24422.735	16492.46	4379.50 139	1281.30 081	474.2	385.53	127.6 25	36.55 87	14.09937 888	6.544715 447	6705.3611 32	0.753002 492
WGC2019J-25B-C7_mon_G3 - 14.d	433755.274	22424 5.7	151816.193	52817.57	20692.718	12949.75	2833.79 501	863.008 13	385.8	273.44	92.56 25	26.03 24	10.24844 72	3.821138 211	4488.7108 41	0.791220 737
WGC2019J-25B-C7_mon_G3 - 15.d	432489.451	21961 2.1	150568.928	52763.51	20621.67	12698.49	2831.02 493	848.373 984	376.8	264.65	91.06 25	25.99 19	9.503105 59	3.414634 146	4450.8230 72	0.796674 449
WGC2019J-25B-C7_mon_G3 - 16.d	422362.869	22079 7.4	152647.702	53209.46	20373.002	12829.15	2825.48 476	843.902 439	380.5	257.14	88.37 5	26.76 11	9.627329 193	3.861788 618	4435.6553 12	0.779761 396
WGC2019J-25B-C7_mon_G3 - 17.d	415189.873	22931 0.3	158118.162	55445.95	22131.439	13778.89	3321.32 964	1029.67 48	437.2	315.57	107.2 5	31.01 21	11.30434 783	4.756097 561	5258.0947 93	0.800695 821
WGC2019J-25B-C7_mon_G3 - 18.d	431223.629	22586 2.1	152472.648	54128.38	20905.861	12844.22	2847.64 543	892.276 423	395.5	277.84	93.18 75	29.35 22	8.695652 174	3.739837 398	4548.2358 96	0.792869 43
WGC2019J-25B-C7_mon_G3 - 19.d	430801.688	22144 4	151094.092	53263.51	20738.899	12829.15	2883.65 651	868.699 187	389	269.6	92.75	28.21 86	11.36645 963	3.292682 927	4546.5805 32	0.793362 953
WGC2019J-25B-C7_mon_G3 - 20.d	399029.536	23933 1.9	171706.783	64594.59	25097.691	17346.73	4756.23 269	1443.49 593	526.6	423.63	138.1 25	38.05 67	15.03105 59	6.747967 48	7347.9156 99	0.749767 866
WGC2019J-25B-C7_mon_G3 - 21.d	404641.35	22995 6.9	163019.694	58445.95	22735.346	14055.28	3052.63 158	915.040 65	396.1	275.46	93.43 75	22.51 01	9.503105 59	3.048780 488	4767.7296 12	0.793240 142
WGC2019J-25B-C7_mon_G3 - 22.d	405485.232	23038 7.9	161072.21	56466.22	21953.819	13542.71	2958.44 875	889.430 894	390.3	265.38	90.68 75	25.54 66	8.819875 776	3.252032 52	4631.8702 3	0.793894 67
WGC2019J-25B-C7_mon_G3 - 23.d	419746.835	23243 5.3	162231.947	57837.84	23001.776	15130.65	4476.45 429	1600	690	538.64	183.7 5	59.10 93	19.13043 478	8.902439 024	7575.9911 68	0.777546 748
WGC2019J-25B-C7_mon_G3 - 24.d	434725.738	22801 7.2	157417.943	56128.38	21793.961	13798.99	3193.90 582	967.073 171	426.1	306.59	104.6 88	30.89 07	12.42236 025	4.146341 463	5045.8192 84	0.783107 155
WGC2019J-25B-C7_mon_G3 - 25.d	405822.785	23706 9	168030.635	61418.92	24351.687	16869.35	4855.95 568	1529.26 829	584.2	470.7	152.1 88	43.36 03	13.47826 087	7.154471 545	7656.3004 98	0.756534 684
WGC2019J-25B-C7_mon_G3 - 26.d	407594.937	23760 7.8	170853.392	62385.14	24973.357	17005.03	4869.80 609	1539.02 439	574	458.42	150.5 63	43.52 23	16.58385 093	6.341463 415	7658.2654 74	0.766739 305
WGC2019J-25B-C7_mon_G3 - 27.d	429113.924	22683 1.9	155667.396	55635.14	21705.151	13809.05	3235.45 706	984.552 846	439.3	311.17	110.6 25	31.37 65	12.67080 745	6.422764 228	5131.5771 6	0.783080 504
WGC2019J-25B-C7_mon_G3 - 28.d	416455.696	23566 8.1	169299.781	62567.57	24884.547	17145.73	4947.36 842	1572.35 772	600.8	475.27	153.1 25	45.87 04	15.52795 031	8.008130 081	7818.3323 96	0.759761 236
WGC2019J-25B-C7_mon_G3 - 29.d	410970.464	23663 7.9	168971.554	62567.57	24831.261	16964.82	4922.43 767	1578.45 528	597.3	464.47	155.2 5	43.23 89	18.44720 497	5.934959 35	7785.5328 53	0.762165 805

WGC2019J-25B-C7_mon_G3 - 30.d	401687.764	24105	171050.328	63581.08	24920.071	16778.89	4678.67036	1409.34959	514.9	413.55	137.188	36.5587	13.41614907	5.731707317	7209.3671 28	0.762963305
WGC2019J-25B-C7_mon_G3 - 31.d	410126.582	24019 4	172757.112	63783.78	25328.597	17361.81	5000	1572.76423	599.5	477.66	159.813	46.5587	16.27329193	7.398373984	7879.9627 76	0.76112941
WGC2019J-25B-C7_mon_G3 - 32.d	396202.532	24644 4	186652.079	91081.08	15133.215	47638.19	26177.2853	14837.3984	947 0	7326	3706.25	1469.64	636.6459627	328.8617886	63952.084 4	0.229741515
WGC2019J-25B-C7_mon_G3 - 33.d	414852.321	24288 7.9	183304.158	69797.3	16053.286	25226.13	10692.5208	5056.91057	295 0	2349 .8	1101.88	440.486	202.484472	96.34146341	22890.434 96	0.382577406
WGC2019J-25B-C7_mon_G3 - 34.d	402953.586	25377 1.6	193435.449	94527.03	14991.119	56633.17	33933.518	18902.439	119 90	9487 .2	4387.5	1655.87	725.4658385	369.1056911	81451.078 49	0.204889939
WGC2019J-25B-C7_mon_G3 - 35.d	422447.257	23265 0.9	162669.584	59459.46	23570.16	16402.01	4903.04709	1625.60976	670.5	515.02	170.75	49.5951	18.07453416	5.894308943	7958.4891 47	0.75475068
WGC2019J-25B-C7_mon_G3 - 36.d	425738.397	23028 0.2	162013.129	59054.05	23712.256	16497.49	5000	1708.94309	683.7	527.29	179.688	55.1012	19.50310559	8.577235772	8182.8015 23	0.759694722
WGC2019J-25B-C7_mon_G3 - 37.d	424894.515	23502 1.6	164792.123	60500	24103.02	16638.19	4886.42659	1602.03252	627.7	502.01	166.813	48.9069	18.57142857	7.235772358	7859.7003 49	0.759697528
WGC2019J-25B-C7_mon_G3 - 38.d	407172.996	23750 0	171531.729	64527.03	24973.357	17065.33	4742.38227	1431.30081	538.8	430.77	141.625	43.7247	15.0310559	6.016260163	7349.6493 28	0.752573281
WGC2019J-25B-C7_mon_G3 - 39.d	422784.81	22920 2.6	161378.556	58804.05	23943.162	16211.06	4941.82825	1659.34959	690.5	521.61	174.813	52.1457	19.62732919	8.252032520	8068.1271 81	0.77548289
WGC2019J-25B-C7_mon_G3 - 40.d	435738.397	22974 1.4	164835.886	65540.54	25399.645	15160.8	2418.28255	426.016 26	129.7	104.4	31	9.230 77	2.043478261	0.853658537	3121.5223 19	0.805770784
WGC2019J-25B-C15_mon_G4 - 1.d	433755.274	23071 1.2	165798.687	65270.27	25186.501	15256.28	2529.08587	466.666 667	143.2	105.86	36.375	7.773 28	3.291925466	1.422764228	3293.6763 14	0.798152329
WGC2019J-25B-C15_mon_G4 - 2.d	404219.409	23825 4.3	171553.611	64054.05	24831.261	17311.56	4806.09418	1477.64228	549.7	447.62	149.125	42.7935	16.08695652	5.447154472	7494.5081 4	0.745688406
WGC2019J-25B-C15_mon_G4 - 3.d	426582.278	22661 6.4	156389.497	55020.27	21385.435	13537.69	3002.77008	897.967 48	398.5	273.08	98.5	27.40 89	11.42857143	3.739837398	4713.3918 02	0.783582043
WGC2019J-25B-C15_mon_G4 - 4.d	425316.456	21864 2.2	150743.982	52601.35	20426.288	12638.19	2767.31302	839.837 398	364.7	254.4	85.375	26.7611	9.813664596	2.154471545	4350.3502 92	0.792224991
WGC2019J-25B-C15_mon_G4 - 5.d	431645.57	22209 0.5	149978.118	51729.73	20017.762	12351.76	2689.75069	808.943 089	358.3	251.83	88.8125	22.6316	8.385093168	2.682926829	4231.3373 83	0.791919461
WGC2019J-25B-C15_mon_G4 - 6.d	411392.405	22370 6.9	153588.621	53621.62	20746.004	12603.02	2781.16343	841.463 415	366.8	249.08	84.4375	24.41 3	8.571428571	4.756097561	4360.6890 8	0.798044756
WGC2019J-25B-C15_mon_G4 - 7.d	403375.527	23965 5.2	172319.475	62702.7	24191.829	16241.21	4277.00831	1242.68293	454.5	358.97	119.375	33.3198	11.49068323	4.756097561	6502.1072 15	0.758082453
WGC2019J-25B-C15_mon_G4 - 8.d	407763.713	23081 9	162166.302	57628.38	22611.012	14356.78	3418.28255	1089.43089	463.5	337.55	115.755	35.5887	12.29813665	3.821138211	5476.2155 5	0.786091073
WGC2019J-25B-C15_mon_G4 - 9.d	415569.62	22532 3.3	156892.779	54135.14	20905.861	12748.74	2844.87535	838.211 382	374.7	264.84	81.625	24.0486	9.130434783	2.682926829	4440.1088 38	0.795783188
WGC2019J-25B-C15_mon_G4 - 10.d	426160.338	22133 6.2	149934.354	51716.22	20035.524	12351.76	2681.44044	804.878049	360.4	248.9	87.3125	22.9525	10.31055901	2.642276422	4218.8403 92	0.792725069
WGC2019J-25B-C15_mon_G4 - 11.d	414767.932	22446 1.2	152910.284	53986.49	20728.242	13005.03	2844.87535	850	371.5	259.52	84.3125	23.9271	9.503105590	2.642276422	4446.2841 63	0.782283791
WGC2019J-25B-C15_mon_G4 - 12.d	411054.852	22920 2.6	158949.672	55810.81	21811.723	13537.69	2950.13085	879.674 797	387.1	261.17	88.4375	25.5061	8.881987577	3.170731707	4604.0817 54	0.793521226
WGC2019J-25B-C15_mon_G4 - 13.d	417721.519	23146 5.5	163019.694	58520.27	23392.54	15286.43	4157.89474	1380.48 78	559.1	425.46	141.313	43.5223	15.83850932	7.073170731	6730.6868 64	0.782115966
WGC2019J-25B-C15_mon_G4 - 14.d	418987.342	22262 9.3	153544.858	53621.62	21012.433	12989.95	2878.11634	873.983 74	386.4	271.98	91.1875	27.0875	10.06211180	3.780487805	4542.5932 25	0.796164195

WGC2019J-25B-C15_mon_G4 - 15.d	424894.515	22198 2.8	154201.313	54533. 78	21190.053	13180. 9	2908.58726	883.739837	389. 6	266. 3	91.68 75	26.43 72	8.322981366	3.739837398	4578.4150 27	0.790363045
WGC2019J-25B-C15_mon_G4 - 16.d	425105.485	22316 8.1	152866.521	54479. 73	21207.815	13155. 78	2905.81717	881.707317	393	275. 09	91.56 25	26.35 63	8.447204969	3.577235772	4585.5592 83	0.792173257
WGC2019J-25B-C15_mon_G4 - 17.d	442194.093	21767 2.4	147855.58	51027. 03	19721.137	12301. 51	2711.91136	828.455285	379. 8	260. 81	89.5	29.23 08	10	4.308943089	4314.0122 15	0.787141198
WGC2019J-25B-C15_mon_G4 - 18.d	426582.278	22456 9	155908.096	54817. 57	21349.911	13457. 29	2980.60942	906.504065	402	279. 85	97.87 5	30.16 19	12.79503106	4.756097561	4714.5550 35	0.786063163
WGC2019J-25B-C15_mon_G4 - 19.d	417299.578	22467 6.7	153960.613	54837. 84	21332.149	13437. 19	2933.51801	882.520325	391. 3	273. 81	89.37 5	26.27 53	9.875776398	4.227642276	4610.9015 77	0.785851141
WGC2019J-25B-C15_mon_G4 - 20.d	412953.586	22575 4.3	155929.978	54851. 35	21580.817	13170. 85	2969.52909	889.837398	387. 6	270. 33	90.43 75	27.81 38	8.633540373	4.512195122	4648.6931 55	0.802910699
WGC2019J-25B-C15_mon_G4 - 21.d	404219.409	23017 2.4	164923.414	58209. 46	22806.394	14070. 35	3138.50416	935.772358	407. 1	284. 8	93.06 25	25.02 02	10.18633 54	4.105691057	4898.5498 17	0.796906498
WGC2019J-25B-C15_mon_G4 - 22.d	414767.932	23609 9.1	166017.505	61418. 92	24511.545	16517. 59	4891.96676	1605.28455	634. 2	499. 27	163	46.19 43	15.90062112	6.544715447	7862.3583 8	0.769566747
WGC2019J-25B-C15_mon_G4 - 23.d	422784.81	23125 0	160875.274	57662. 16	23232.682	15969. 85	4753.46 26	1655.69106	699. 1	538. 28	188.2 5	51.17 41	22.42236025	7.479674797	7915.8581 73	0.765602 74
WGC2019J-25B-C15_mon_G4 - 24.d	427848.101	22165 9.5	153085.339	53358. 11	20746.004	12753. 77	2806.09418	843.495935	377	254. 95	87.68 75	26.23 48	9.254658385	2.804878049	4407.5170 27	0.795270 67
WGC2019J-25B-C15_mon_G4 - 25.d	405021.097	23200 4.3	161728.665	57837. 84	22717.584	14005. 03	3044.32133	908.130081	398	277. 11	91.37 5	27.77 33	8.198757764	3.414634146	4758.3193 09	0.798204513
WGC2019J-25B-C15_mon_G4 - 26.d	421012.658	23071 1.2	162166.302	58587. 84	23321.492	15839. 2	4728.53186	1581.70732	641. 4	505. 68	162	48.74 49	16.95652174	8.170731707	7693.1890 21	0.765571 98
WGC2019J-25B-C15_mon_G4 - 27.d	405063.291	23620 6.9	167155.361	62614. 86	24600.355	17085. 43	4781.16343	1471.13821	550. 6	435. 53	145.3 75	37.44 94	14.72049689	4.593495935	7440.5711 67	0.752124498
WGC2019J-25B-C15_mon_G4 - 28.d	413628.692	23750 0	170503.282	63283. 78	24795.737	16909. 55	4770.08 31	1468.69919	547. 3	438. 1	138.2 5	40.24 29	14.78260 87	5.487804878	7422.9408 56	0.757992325
WGC2019J-25B-C15_mon_G4 - 29.d	403291.139	24084 0.5	171159.737	63925. 68	24902.309	17050. 25	4761.77285	1437.39837	521. 8	425. 27	137.1 88	39.59 51	15.83850932	5.406504065	7344.2736 08	0.754286897
WGC2019J-25B-C15_mon_G4 - 30.d	406329.114	22952 5.9	158752.735	56554. 05	21989.343	13723. 62	3055.40166	912.195122	395. 6	275. 27	88.62 5	24.21 05	9.627329193	2.560975 61	4763.4953 4	0.789307204
WGC2019J-25B-C15_mon_G4 - 31.d	405907.173	23793 1	168730.853	63175. 68	25026.643	17256. 28	4947.36842	1558.94309	582. 5	480. 04	155.9 38	44.85 83	15.90062112	5.528455285	7791.0730 17	0.757973537
WGC2019J-25B-C15_mon_G4 - 32.d	410970.464	22898 7.1	162713.348	57864. 86	22841.918	13834. 17	3094.18283	916.666667	402. 2	281. 68	92.75	26.51 82	9.378881988	3.414634146	4826.7962 09	0.807325248
WGC2019J-25B-C15_mon_G4 - 33.d	412236.287	22640 0.9	158402.626	55655. 41	21438.721	13221. 11	2897.50693	876.016 26	377. 5	269. 78	88.12 5	25.42 51	8.571428571	2.682926829	4545.6078 62	0.790335 18
WGC2019J-25B-C15_mon_G4 - 34.d	403206.751	24062 5	171597.374	64121. 62	25150.977	17391. 96	4831.02493	1471.54472	540. 2	441. 03	139.9 38	42.87 45	14.47204969	5.650406504	7486.7297 37	0.753144569
WGC2019J-25B-C15_mon_G4 - 35.d	419831.224	22230 6	151247.265	54168. 92	20710.48	12989. 95	2844.87535	856.097561	375. 2	265. 2	87.87 5	22.95 55	9.006211 18	3.130081301	4464.3411 31	0.780748819
WGC2019J-25B-C15_mon_G4 - 36.d	411814.346	22963 3.6	157527.352	55283. 78	21563.055	13216. 08	2897.50693	880.487805	386. 9	264. 29	82.93 75	24.29 15	7.826086957	3.455284553	4547.6908 14	0.797737625
WGC2019J-25B-C15_mon_G4 - 37.d	424050.633	22413 7.9	154595.186	55574. 32	21385.435	13296. 48	2944.59834	878.048 78	386. 9	270. 88	88.93 75	25.66 8	9.006211 18	3.170731707	4607.2086 98	0.786706276
WGC2019J-25B-C15_mon_G4 - 38.d	399578.059	23965 5.2	169387.309	62500	24031.972	16110. 55	4301.93906	1245.93496	451. 9	365. 02	117.9 38	31.37 65	12.73291925	4.146341463	6530.9856 11	0.757345715
WGC2019J-25B-C15_mon_G4 - 39.d	429535.865	22683 1.9	155798.687	54554. 05	21101.243	13221. 11	2897.50693	856.910569	383	264. 29	94.18 75	24.33 2	9.689440994	2.520325203	4532.4324 59	0.785707041

WGC2019J-25B-C15_mon_G4 - 40.d	432067.511	22295 2.6	152319.475	53885.14	20799.29	13125.63	2897.50693	878.04878	391.6	273.81	90.3125	27.6923	10.68322981	4.146341463	4573.799608	0.782085014
WGC2019J-25B-C15_mon_G4 - 41.d	442194.093	22004 3.1	149212.254	51966.22	19715.808	12216.08	2675.90028	812.195122	362.4	251.1	83.5	26.9636	10.43478261	2.479674797	4224.97232	0.782506754
WGC2019A3-C1_mon_G1 - 1.d	447679.325	22941 8.1	160612.691	63581.08	25452.931	17567.84	4736.84211	1389.8374	492.1	397.44	124.813	34.17	13.35403727	4.715447154	7193.267426	0.761578487
WGC2019A3-C1_mon_G1 - 2.d	446413.502	22413 7.9	157855.58	61277.03	24529.307	16809.05	4335.18006	1232.52033	447.3	365.2	113.313	32.3887	9.751552795	4.552845528	6540.207408	0.764301862
WGC2019A3-C1_mon_G1 - 3.d	464135.021	21734 9.1	151531.729	58716.22	24458.259	17678.39	5559.55679	1793.90244	693.2	552.56	176.75	45.9919	17.20496894	6.178861789	8845.349062	0.759145698
WGC2019A3-C1_mon_G1 - 4.d	447679.325	22607 7.6	158949.672	61486.49	24440.497	17020.1	4434.90305	1254.87805	456.4	369.23	117.375	31.7814	11.61490683	4.593495935	6680.776644	0.755508127
WGC2019A3-C1_mon_G1 - 5.d	463291.139	22112 0.7	153851.204	59391.89	24973.357	18015.08	5551.24654	1808.13008	679	541.94	176.188	49.3117	16.89440994	7.398373984	8830.110035	0.763475085
WGC2019A3-C1_mon_G1 - 6.d	481012.658	21530 1.7	145448.578	55405.41	23214.92	16743.72	5542.93629	1945.93496	772.1	620.33	202.688	60.8502	19.93788082	7.967479675	9172.743988	0.762193369
WGC2019A3-C1_mon_G1 - 7.d	479324.895	21422 4.1	143807.44	54587.84	22753.108	16391.96	5371.19114	1923.98374	796.6	626.19	210.688	63.3603	20.80745342	9.227642276	9022.048271	0.760636827
WGC2019A3-C1_mon_G1 - 8.d	448523.207	22446 1.2	158030.635	61216.22	24245.115	16748.74	4470.91413	1295.12195	470.6	384.07	119.563	32.7512	12.42236025	4.715447154	6790.155357	0.757181033
WGC2019A3-C1_mon_G1 - 9.d	464556.962	22176 7.2	151006.565	58952.7	24937.833	18175.88	5703.60111	1858.94309	720.9	578.02	184.688	54.3725	18.63354037	7.886178862	9127.045864	0.761831087
WGC2019A3-C1_mon_G1 - 10.d	451476.793	22349 1.4	157833.698	61871.62	25150.977	18331.66	5376.7313	1663.00813	608.6	508.79	157.375	47.3684	15.09316077	4.471544715	8381.438774	0.746806746
WGC2019A3-C1_mon_G2 - 1.d	454008.439	22241 3.8	154201.313	56608.11	21509.769	14698.49	3559.55679	996.341463	359.4	289.38	98.3125	26.8016	9.254658385	3.170731707	5342.215049	0.745692939
WGC2019A3-C1_mon_G2 - 2.d	490295.359	21056 0.3	140984.683	53175.68	21793.961	15738.69	5182.82548	1878.45528	799.2	617.95	203.563	60.9717	20.37267081	9.227642276	8772.56396	0.753347447
WGC2019A3-C1_mon_G2 - 3.d	454008.439	22381 4.7	157592.998	61824.32	25683.837	18798.99	5689.75069	1796.34146	672.9	545.97	175.563	47.6518	17.63975155	7.398373984	8953.215299	0.753377929
WGC2019A3-C1_mon_G2 - 4.d	464008.439	22284 4.8	153129.103	59270.27	24813.499	17929.65	5518.00554	1824.39024	678.4	549.82	177.188	51.9028	18.13664596	8.211382113	8826.050996	0.761173522
WGC2019A3-C1_mon_G2 - 5.d	468776.371	21799 5.7	150831.51	57297.3	24156.306	17457.29	5487.53463	1854.06504	710	577.29	183.688	51.9838	17.63975155	7.520325203	8889.720426	0.763791949
WGC2019A3-C1_mon_G2 - 6.d	453586.498	22575 4.3	157417.943	61966.22	25772.647	18226.13	5506.92521	1694.71545	612.6	503.66	158.375	44.6154	16.83229814	5.447154471	8543.173496	0.766892144
WGC2019A3-C1_mon_G2 - 7.d	447257.384	22629 3.1	159102.845	63243.24	26216.696	18648.24	5393.3518	1621.13821	582.8	475.27	148.25	40.7692	13.78881988	6.260162602	8281.632905	0.763399651
WGC2019A3-C1_mon_G2 - 8.d	441350.211	23275 8.6	163457.33	64459.46	26465.364	18477.39	5795.01385	2141.86992	906	713.19	242.5	66.8016	24.09937888	8.170731707	9897.642312	0.766856079
WGC2019A3-C1_mon_G2 - 9.d	468354.43	22209 0.5	151225.383	58668.92	24706.927	17839.2	5423.82271	1793.90244	687	546.89	179.438	51.2146	18.19875776	7.032520325	8707.494954	0.763707497
WGC2019A3-C1_mon_G2 - 10.d	456118.143	22349 1.4	157549.234	62702.7	26234.458	18798.99	5531.85596	1689.43089	611.2	503.11	159.438	42.5911	15.65217391	7.195121951	8560.476292	0.764120153
WGC2019A3-C1_mon_G2 - 11.d	435021.097	22974 1.4	166083.151	66959.46	27069.272	18728.64	5900.27701	2144.30894	892	711.36	231.875	64.7773	24.09937888	9.227642276	9977.920612	0.764394308
WGC2019A3-C1_mon_G2 - 12.d	453164.557	22586 2.1	155623.632	61418.92	25985.79	18567.84	5650.96953	1757.31707	655.3	531.14	170.313	50.7616	16.89440994	5.609756097	8838.308003	0.769492098
WGC2019A3-C1_mon_G2 - 13.d	467932.489	22112 0.7	153238.512	57702.7	24458.259	17427.14	5565.09695	2036.99187	822	654.58	218.75	63.5628	21.80124224	9.471544715	9392.253117	0.771284248

WGC2019A3-C1_mon_G2 - 14.d	475527.426	21853 4.5	149015.317	57297.3	23783.304	17537.69	5681.44044	1963.82114	771	613.37	206.625	61.2551	18.88198758	8.292682927	9324.6862 76	0.750272345
WGC2019A3-C1_mon_G2 - 15.d	439662.447	23254 3.1	164989.059	67027.03	27406.75	19216.08	5916.89751	2113.82114	875	699.63	235.625	63.4413	22.98136646	8.373983 74	9935.7739 91	0.763660187
WGC2019A3-C1_mon_G2 - 16.d	431054.852	23060 3.4	166477.024	66040.54	26838.366	18753.77	5814.40443	2133.33333	896	701.28	232.438	68.8259	22.91925466	8.170731707	9877.3732 14	0.762616997
WGC2019A3-C2_mon_G3 - 1.d	428016.878	23965 5.2	178533.917	81351.35	34724.689	20165.83	3240.99723	573.983 74	148.9	123.08	39.5625	10.7692	2.795031056	2.235772358	4142.3204 27	0.857329839
WGC2019A3-C2_mon_G3 - 2.d	436286.92	23793 1	175995.624	77094.59	32291.297	18366.83	2526.31579	433.739837	122.3	99.084	34.3125	9.2307	3.478260 87	1.382113821	3229.8435 2	0.858136485
WGC2019A3-C2_mon_G3 - 3.d	427426.16	23814 6.6	177308.534	81283.78	34564.831	20100.5	3130.19391	519.918699	130.3	104.76	32.5625	8.0568	3.416149068	1.219512195	3930.4293 51	0.855123866
WGC2019A3-C2_mon_G3 - 4.d	438818.565	23663 7.9	175864.333	77567.57	32113.677	18170.85	2379.50139	403.658537	118.2	91.392	32.8125	6.9635	2.118012422	1.626016026	3036.2719 54	0.855386265
WGC2019A3-C2_mon_G3 - 5.d	432489.451	23609 9.1	176783.37	77364.86	31829.485	18105.53	2556.78067	428.455285	122.9	93.773	33.8125	8.1375	3.105590062	1.341463415	3248.3120 87	0.850456553
WGC2019A3-C2_mon_G3 - 6.d	443459.916	23480 6	173982.495	76756.76	31047.957	17522.61	2318.55956	386.585366	113.3	89.744	29.5625	7.9352	2.422360248	2.235772358	2950.3443 68	0.846594202
WGC2019A3-C2_mon_G3 - 7.d	441350.211	23308 1.9	171728.665	75135.14	31101.243	17195.98	2349.03047	382.926829	110.5	89.56	31.375	7.4085	3.354037267	0.975609756	2975.1312 94	0.865252277
WGC2019A3-C2_mon_G3 - 8.d	425738.397	23642 2.4	175908.096	79527.03	33516.874	19592.96	2897.50693	482.926829	123	99.634	30.9375	7.9752	2.236024845	1.138211382	3645.3548 99	0.849094548
WGC2019A3-C2_mon_G3 - 9.d	424894.515	23588 3.6	176608.315	80000	33765.542	19778.89	2972.29917	491.463415	123.2	96.154	30.875	8.1375	2.236024845	0.252032 52	3724.6171 39	0.848843685
WGC2019A3-C2_mon_G3 - 10.d	430801.688	24073 2.8	180962.801	81283.78	34458.259	20462.31	3116.34349	517.073171	128	106.59	33.3125	9.2307	2.173913043	1.869918699	3914.5971 69	0.844916969
WGC2019A3-C2_mon_G3 - 11.d	437552.743	23448 2.8	172603.939	76351.35	31829.485	18402.01	2601.10803	426.016 26	116	90.11	31.8125	8.6631	1.677018634	1.504065041	3276.8917 35	0.849158213
WGC2019A3-C2_mon_G3 - 12.d	427848.101	23868 5.3	176542.67	80878.38	34689.165	20346.73	3207.75623	535.365854	130	103.66	31.625	7.8947	2.173913043	1.260162602	4019.7389 02	0.855126334
WGC2019A3-C2_mon_G3 - 13.d	435864.979	23825 4.3	176170.678	77770.27	32646.536	18482.41	2578.94737	424.796748	113.6	90.11	30.8125	8.2992	2.422360248	0.934959 35	3249.9234 21	0.861094834
WGC2019A3-C2_mon_G3 - 14.d	435864.979	23696 1.2	174573.304	78108.11	32859.68	18773.87	2739.61219	450.813008	120.3	96.886	29.375	5.9514	3.105590062	1.341463415	3447.3851 14	0.858100942
WGC2019A3-C2_mon_G3 - 15.d	429957.806	24030 1.7	178118.162	81486.49	33801.066	19517.59	2933.51801	475.609756	122.2	99.084	30.75	7.2465	2.484472 05	1.585365854	3672.4788 12	0.847567948
WGC2019A3-C2_mon_G3 - 16.d	429957.806	23394 4	173588.621	78108.11	32877.442	19301.51	2911.35734	474.796748	120.1	95.421	31.375	7.8137	2.484472 05	0.975609756	3644.3241 81	0.846748331
WGC2019A3-C2_mon_G3 - 17.d	429957.806	23631 4.7	178227.571	80810.81	33978.686	20045.23	3094.18283	511.788618	123.6	101.65	31.0625	7.4085	2.298136646	1.138211382	3873.1275 5	0.844240851
WGC2019A3-C2_mon_G3 - 18.d	429535.865	23976 2.9	177571.116	81351.35	34564.831	20015.08	3102.49307	508.130081	127.7	100.92	34.625	8.3802	2.857142857	0.934959 35	3886.0365 76	0.856590868
WGC2019A3-C2_mon_G3 - 19.d	434599.156	23965 5.2	178008.753	80743.24	34316.163	20180.9	3224.37673	529.674797	125.6	104.21	31.25	8.1375	3.229813665	1.829268293	4028.3107 16	0.850110379
WGC2019A3-C2_mon_G3 - 20.d	422784.81	23566 8.1	177768.053	79391.89	33960.924	19683.42	2925.20776	489.837398	125.7	102.01	34.3125	8.4615	2.732919255	0.894308943	3689.1610 73	0.859094957
WGC2019A3-C2_mon_G3 - 21.d	435021.097	23674 5.7	175317.287	79797.3	33925.4	19592.96	2991.68975	498.373984	124.6	100.92	32.125	8.5833	2.919254658	1.097560976	3760.3042 97	0.857987186
WGC2019A3-C2_mon_G3 - 22.d	435443.038	23685 3.4	177921.225	80608.11	34209.591	20371.86	3163.43 49	524.390244	129.9	108.61	31.625	8.0568	3.354037267	1.585365854	3970.9542 89	0.844195805

WGC2019A3-C2_mon_G3 - 23.d	437130.802	23534 4.8	174682.713	78331.08	32611.012	18798.99	2653.73961	441.056911	122.4	96.154	32.875	8.21862	3.291925466	1.138211382	3358.874129	0.849825788
WGC2019A3-C2_mon_G3 - 24.d	437130.802	23793 1	178293.217	79729.73	33605.684	19527.64	2825.48476	471.95122	122.7	96.703	32.625	6.63968	2.00621118	1.910569106	3560.020737	0.851682515
WGC2019A3-C2_mon_G3 - 25.d	432489.451	23556 0.3	176761.488	78918.92	33250.444	19261.31	2855.95568	477.235772	123.3	97.07	31.3125	8.82591	2.670807453	1.504065041	3597.874332	0.852833035
WGC2019A3-C2_mon_G3 - 26.d	436708.861	23631 4.7	175514.223	77702.7	32575.488	18497.49	2512.46537	417.479675	117.1	90.476	31.0625	7.65182	2.857142857	0.569105691	3179.661881	0.859243991
WGC2019A3-C3_mon_G4 - 1.d	458227.848	22532 3.3	157768.053	59094.59	22646.536	15517.59	3886.42659	1105.69106	395.1	323.44	100.875	29.6356	10.49689441	3.617886179	5855.286281	0.747852248
WGC2019A3-C3_mon_G4 - 2.d	451476.793	22209 0.5	156214.442	60945.95	25399.645	18346.73	5415.51247	1678.45528	608	506.96	161.375	47.5709	14.78260087	7.235772358	8439.891688	0.759584079
WGC2019A3-C3_mon_G4 - 3.d	457383.966	22801 7.2	158905.908	62027.03	24973.357	17638.19	4628.80886	1362.60163	495.8	393.41	128.625	38.3806	11.05590062	5.284552846	7063.963104	0.755021681
WGC2019A3-C3_mon_G4 - 4.d	453164.557	22381 4.7	154004.376	59993.24	25186.501	18160.8	5457.06371	1684.55285	619.2	498.35	157.813	41.0526	15.96273292	5.650406504	8479.646477	0.763043206
WGC2019A3-C3_mon_G4 - 5.d	452742.616	22295 2.6	158730.853	60405.41	24209.591	16914.57	4429.36288	1285.36585	461.6	374.91	118.313	31.9433	11.55279503	5.406504065	6718.452278	0.757389084
WGC2019A3-C3_mon_G4 - 6.d	456540.084	22155 1.7	155798.687	60337.84	25364.121	18467.34	5540.16062	1743.90244	641.1	517.22	165.313	44.7368	17.45341615	7.560975609	8677.448495	0.759841146
WGC2019A3-C3_mon_G4 - 7.d	452573.84	22672 4.1	158862.144	62432.43	24955.595	17356.78	4595.56787	1326.01626	479.6	391.03	128.25	31.9433	11.80124224	5.975609756	6970.179904	0.758102926
WGC2019A3-C3_mon_G4 - 8.d	447679.325	22403 0.2	158687.09	62500	25381.883	18015.08	5038.78116	1504.87805	551.6	448.17	137.125	38.7449	12.91925466	4.918699187	7737.135604	0.756424842
WGC2019A3-C3_mon_G4 - 9.d	465822.785	22219 8.3	152866.521	58716.22	24706.927	17874.37	5493.07479	1788.61789	670.7	540.48	172.438	45.2227	18.63354037	7.113821138	8736.276402	0.762648307
WGC2019A3-C3_mon_G4 - 10.d	470464.135	21691 8.1	146849.015	56432.43	23321.492	17246.23	5653.73961	1965.04065	797	642.86	214.375	61.1336	22.79503106	10.93495935	9367.875999	0.747557916
WGC2019A3-C3_mon_G4 - 11.d	475105.485	21336 2.1	146433.26	54722.97	22948.49	16723.62	5468.14404	1929.26829	776.2	628.21	202.688	57.6113	19.25465839	8.902439024	9090.273399	0.758584835
WGC2019A3-C3_mon_G4 - 12.d	445147.679	22532 3.3	158315.098	62905.41	25808.171	18412.06	5080.33241	1486.58537	531.8	440.11	138.563	36.9231	13.78881988	6.626016260	7734.728079	0.758336644
WGC2019A3-C3_mon_G4 - 13.d	465822.785	22446 1.2	159168.49	71148.65	21207.815	37688.44	24072.0222	15601.626	119.60	9139.2	5012.5	2178.14	999.3788082	517.0731707	69479.93202	0.409551049
WGC2019A3-C3_mon_G4 - 14.d	499578.059	20959 0.5	139562.363	52162.16	20923.623	16613.07	6204.98615	2739.8374	152.0	1188.6	543.75	214.575	96.89440994	50.40650407	12559.09405	0.710778392
WGC2019A3-C3_mon_G4 - 15.d	448101.266	22629 3.1	161312.91	63716.22	25577.265	18899.5	5556.78067	1865.85366	822	664.84	271.875	104.049	42.67080745	20.40650406	9348.476421	0.737061093
WGC2019A3-C3_mon_G4 - 16.d	449367.089	22629 3.1	160043.764	63378.38	25843.694	18145.73	4955.67867	1443.90244	517	425.82	128.875	34.6154	11.67701863	5.487804878	7523.060493	0.762073449
WGC2019A3-C3_mon_G4 - 17.d	446835.443	22790 9.5	158862.144	63608.11	25861.456	18597.99	5213.29064	1553.25203	555.6	455.68	145.063	39.9595	12.79503106	4.674796748	7980.317929	0.751906322
WGC2019A3-C3_mon_G4 - 18.d	448523.207	22435 3.4	158205.689	61743.24	25612.789	18472.36	5329.63989	1611.38211	584.1	476.37	146.813	40.0813	14.72049689	4.308943089	8207.418541	0.758404556
WGC2019A3-C3_mon_G4 - 19.d	445569.62	22467 6.7	157855.58	62168.92	25595.027	17949.75	4847.64543	1424.39024	512.8	414.84	134.375	36.8421	10.80745342	5.325203252	7387.020613	0.766195755
WGC2019A3-C3_mon_G4 - 20.d	453375.527	22446 1.2	156520.788	61351.35	25452.931	18326.63	5379.50139	1673.98374	603.7	493.22	153.063	43.3603	13.72670807	5.243902439	8365.802003	0.759074471
WGC2019A3-C3_mon_G4 - 21.d	455696.203	22327 5.9	156083.151	60736.49	25506.217	18226.13	5445.98338	1678.45528	616.4	496.89	154.313	44.9798	14.53416149	5.772357723	8457.323887	0.766609105

WGC2019J-31A-2-C1_mon_G1 - 1.d	428607.595	24482 7.6	190065.646	12891 8.9	20657.194	10281 4.1	65401.6 62	30894.3 089	170 60	1263 7	5581.25	2255.06	1086.956 522	609.7560 976	135526.35 7	0.179426 554
WGC2019J-31A-2-C1_mon_G1 - 2.d	419831.224	24504 3.1	184288.84	95067.57	9378.3304	46834.17	23157.8 947	9796.74 797	464 0	3864 .5	1637.5	631.5 79	293.1677 019	148.7804 878	44170.138 71	0.140549 051
WGC2019J-31A-2-C1_mon_G1 - 3.d	413544.304	24676 7.2	185754.923	10297 3	2218.4725	50060.3	19958.4 488	5731.70 732	179 5	1424 .9	423.7 5	126.3 16	61.30434 783	33.86178 862	29555.296 42	0.030899 09
WGC2019J-31A-2-C1_mon_G1 - 4.d	408860.759	24471 9.8	185776.805	10216 2.2	2222.0249	50351.76	20052.6 316	5646.34 146	178 3	1435 .9	446.2 5	136.0 32	59.06832 298	35.24390 244	29594.465 09	0.030981 08
WGC2019J-31A-2-C1_mon_G1 - 5.d	410548.523	24547 4.1	188577.681	10162 1.6	2113.6767	49497.49	19271.4 681	5467.47 967	172 9	1393 .8	418.1 25	131.9 84	57.88819 876	35.32520 325	28505.042 92	0.029802 585
WGC2019J-31A-2-C5_mon_G4 - 1.d	437974.684	23426 7.2	169452.954	68040.54	10223.801	25075.38	9335.18 006	3252.03 252	127 0	1012 .8	331.8 75	99.59 51	34.78260 87	15.97560 976	15352.261 45	0.247516 855
WGC2019J-31A-2-C5_mon_G4 - 2.d	432067.511	23092 6.7	162078.775	49864.86	10134.991	8904.523	1526.31 579	285.772 358	65.7	57.6 92	16.31 25	5.263 16	1.509316 77	0.813008 13	1959.3784 38	0.480973 035
WGC2019J-31A-2-C5_mon_G4 - 3.d	436708.861	23383 6.2	166345.733	60202.7	14884.547	13718.59	2966.75 9	614.227 642	164	121. 79	33.62 5	7.570 85	3.416149 068	1.829268 293	3913.2227 84	0.517932 119
WGC2019J-31A-2-C6_mon_G2 - 1.d	413080.169	24278 0.2	181400.438	75337.84	6717.5844	14909.55	2163.43 49	281.707 317	46.9	44.1 39	11.12 5	2.631 58	0.614906 832	0.260162 602	2550.8130 63	0.200435 35
WGC2019J-31A-2-C6_mon_G2 - 2.d	431223.629	24385 7.8	183938.731	87094.59	9225.5773	25683.42	4883.65 651	742.682 927	131. 3	115. 02	21.93 75	4.777 33	2.670807 453	1.178861 789	5903.2222 49	0.195061 494
WGC2019J-31A-2-C6_mon_G2 - 3.d	431223.629	24375 0	184857.768	85270.27	8502.6643	25427.14	4695.29 086	717.073 171	122. 6	106. 04	20.56 25	4.210 53	1.813664 596	1.300813 008	5668.8954 89	0.182602 825
WGC2019J-31A-2-C6_mon_G2 - 4.d	424894.515	24558 1.9	185886.214	87972.97	9383.6597	26693.47	5146.81 44	871.544 715	201	171. 43	54.37 5	20.24 29	10.06211 18	5.406504 065	6480.8742 22	0.193640 006
WGC2019J-31A-2-C6_mon_G2 - 5.d	428945.148	24094 8.3	180612.691	82635.14	15097.691	24010.05	4551.24 654	706.504 065	126. 9	108. 97	27.06 25	5.627 53	2.173913 043	1.707317 073	5530.1962 22	0.338946 868
WGC2019J-31A-2-C9_mon_G7 - 1.d	438396.624	23911 6.4	181838.074	90878.38	8365.897	40552.76	14570.6 371	3813.00 813	111 8	868. 32	246.8 75	72.46 96	29.81366 46	13.25203 252	20732.370 6	0.137807 229
WGC2019J-31A-2-C9_mon_G7 - 2.d	428016.878	24170 2.6	180853.392	94054.05	3676.7318	44120.6	15997.2 299	3943.08 943	107 1	819. 23	209.3 75	56.72 06	24.09937 888	11.95121 951	22132.696 36	0.057075 861
WGC2019J-31A-2-C9_mon_G7 - 3.d	433333.333	24558 1.9	183085.339	94729.73	3667.8508	44874.37	16415.5 125	4049.59 35	113 5	869. 6	223.8 75	61.53 85	27.20496 894	12.27642 276	22794.597 88	0.056256 061
WGC2019J-31A-2-C9_mon_G7 - 4.d	429535.865	24116 3.8	182363.239	95810.81	4033.7478	45984.92	17000	4402.43 902	127 9	979. 85	275	77.73 28	30.68322 981	16.58536 585	24061.293 89	0.060770 63
WGC2019J-31A-2-C9_mon_G7 - 5.d	431645.57	24051 7.2	182078.775	92229.73	7868.5613	40854.27	14626.0 388	3747.96 748	109 5	820. 51	219.3 75	64.37 25	25.21739 13	13.45528 455	20611.939 23	0.128186 157
WGC2019J-31A-3-C1_mon_G1 - 1.d	417721.519	24536 6.4	187089.716	98513.51	21598.579	53216.08	31218.8 366	16300.8 13	841 0	6904 .8	2818.75	1004.05	466.4596 273	189.4308 943	67313.100 58	0.298301 773
WGC2019J-31A-3-C1_mon_G1 - 2.d	433755.274	24073 2.8	183807.44	93918.92	5097.6909	48341.71	23296.3 989	10121.9 512	540 0	4084 .2	1775	587.0 45	260.8695 652	129.2682 927	45654.781 59	0.075654 708
WGC2019J-31A-3-C1_mon_G1 - 3.d	432911.392	23879 3.1	181794.311	95945.95	5527.5311	54170.85	29731.3 019	11922.7 642	457 6	3655 .7	1124.38	321.4 57	132.2360 248	60.60975 61	51524.422 09	0.076671 69
WGC2019J-31A-3-C1_mon_G1 - 4.d	437130.802	23954 7.4	180306.346	93648.65	16110.124	48793.97	25844.8 753	11434.9 593	524 0	4056 .8	1396.25	420.6 48	164.5962 733	67.47967 48	48625.584 97	0.238322 507
WGC2019J-31A-3-C2_mon_G2 - 1.d	421940.928	24428 8.8	184551.422	97297.3	2602.1314	51557.79	23551.2 465	7747.96 748	235 0	1835 .2	443.1 25	111.7 41	47.39130 435	21.34146 341	36107.977 51	0.036739 37
WGC2019J-31A-3-C2_mon_G2 - 2.d	431223.629	24536 6.4	186805.252	97229.73	2678.508	51356.78	23952.9 086	7943.08 943	245 3	1862 .6	446.2 5	108.0 97	39.93788 82	18.00813 008	36823.928 57	0.037904 825
WGC2019J-31A-3-C2_mon_G2 - 3.d	429535.865	24213 3.6	182713.348	96081.08	2923.6234	50854.27	24681.4 404	8451.21 951	279 0	2108 .1	490.6 25	125.1 01	46.08695 652	20.08130 081	38712.613 04	0.041825 272

WGC2019J-31A-3-C7_mon_G3 - 1.d	437130.802	23911 6.4	179059.081	90000	15714.032	42567.84	18493.0748	6768.29268	273 4	2217.9	756.8 75	237.6 52	102.4844 72	49.59349 593	31359.920 98	0.253878 296
WGC2019J-31A-3-C7_mon_G3 - 2.d	415443.038	24816 8.1	185667.396	76756. 76	5671.4032	15251.26	2346.26039	347.154472	70.4	61.905	18.43 75	4.696 36	1.658385 093	0.459349 593	2850.9712 12	0.165759 873
WGC2019J-31A-3-C7_mon_G3 - 3.d	418987.342	24321 1.2	182035.011	68986. 49	7371.2256	12829.15	1817.17452	243.495935	42.9	38.828	11.93 75	3.238 87	1.124223 602	0.154471 545	2158.8533 51	0.247775 761
WGC2019J-31A-3-C7_mon_G3 - 4.d	433333.333	24245 6.9	183501.094	81824. 32	13646.536	31175.88	9376.7313	2330.4878	691	565.2	152.5	43.44 13	15.52795 031	7.398373 984	13182.288 19	0.270191 616
WGC2019J-31A-3-C7_mon_G3 - 5.d	416877.637	24579 7.4	183982.495	83581. 08	8861.4565	21638.19	3753.4626	572.764228	116	95.788	25.81 25	6.315 79	1.590062 112	1.300813 008	4573.0335 42	0.208372 615
WGC2019J-31A-3-C7_mon_G3 - 6.d	412362.869	24773 7.1	185973.742	81283. 78	7298.4014	18989.95	3055.40166	450.406504	84.2	68.498	18.87 5	2.995 95	1.490683 23	0.853658 537	3682.7216 28	0.185764 996
WGC2019J-31A-3-C7_mon_G3 - 7.d	405907.173	24719 8.3	187374.179	78716. 22	5758.4369	16608.04	2506.92521	355.691057	63.6	53.663	17.12 5	2.591 09	1.018633 54	0.317073 171	3000.9310 68	0.159262 422
WGC2019J-31A-3-C7_mon_G3 - 8.d	400000	25096 9.8	189759.3	84527. 03	6222.0249	18889.45	2977.83934	439.430894	84.1	69.78	16.93 75	4.210 53	1.527950 311	0.268292 683	3594.0947 19	0.155712 802
WGC2019J-31A-3-C7_mon_G3 - 9.d	419578.059	24525 8.6	183807.44	69121. 62	5642.984	12658.29	1750.41551	234.959 35	42.3	36.264	12.68 75	2.388 66	0.583850 932	0.142276 423	2079.7408 9	0.190771 861
WGC2019J-31A-3-C7_mon_G3 - 10.d	432911.392	23954 7.4	178271.335	86621. 62	13571.936	30839.2	7612.18837	1467.47967	363.3	277.29	71.87 5	16.47 77	5.590062 112	3.292682 927	9817.4928 96	0.262589 361
WGC2019J-31A-3-C8_mon_G4 - 1.d	425316.456	24579 7.4	186433.26	99189. 19	2497.3357	48894.47	18603.8781	4756.09756	128 3	1017	240.6 25	62.67 21	25.77639 752	12.43902 439	26001.521 13	0.035860 379
WGC2019J-31A-3-C8_mon_G4 - 2.d	424472.574	24299 5.7	183829.322	96216. 22	7175.8437	45427.14	17110.8033	4536.58537	130 8	1016.5	264.3 75	66.39 68	28.81987 578	13.73983 74	24345.203 68	0.108540 335
WGC2019J-31A-3-C8_mon_G4 - 3.d	416877.637	24784 4.8	189671.772	10412 1.6	2710.4796	49698.49	18565.097	4707.31707	129 7	993.04	240.6 25	63.15 79	24.96894 41	13.33333 333	25904.539 49	0.037679 408
WGC2019J-31A-3-C8_mon_G4 - 4.d	432911.392	24073 2.8	180853.392	89324. 32	17246.892	39145.73	14523.5457	4333.33333	145 5	1122.7	305	74.89 88	27.70186 335	11.91056 911	21854.100 88	0.291664 636
WGC2019J-31A-3-C9_mon_G7 - 1.d	427004.219	24471 9.8	185120.35	95270. 27	12113.677	43216.08	15429.3629	3788.61789	103 8	771.06	188.7 5	51.90 28	18.94409 938	7.276422 764	21293.916 39	0.188788 09
WGC2019J-31A-3-C9_mon_G7 - 2.d	420337.553	24536 6.4	187899.344	10013 5.1	2529.3073	47437.19	17360.1108	4166.66667	107 9	810.26	190.1 88	51.65 99	18.07453 416	8.170731 707	23684.126 57	0.036698 549
WGC2019J-31A-3-C9_mon_G7 - 3.d	440928.27	24116 3.8	177461.707	87432. 43	15808.171	38844.22	15595.5679	5365.85366	217 0	1749.1	637.5	214.9 8	89.44099 379	46.34146 341	25868.767 99	0.271257 73
WGC2019J-31A-3-C9_mon_G7 - 4.d	450632.911	23200 4.3	168468.271	73581. 08	24209.591	22608.04	5171.74515	835.365854	168.5	118.86	26.81 25	5.627 53	2.857142 857	1.219512 195	6330.9921 6	0.593571 336
WGC2019J-31A-3-C9_mon_G7 - 5.d	429831.224	24321 1.2	182757.112	95540. 54	2360.5684	44959.8	16265.928	3905.69106	994	754.4	176.6 25	49.39 27	16.27329 193	7.804878 049	22170.110 52	0.036017 251
WGC2019J-31A-3-C9_mon_G7 - 6.d	420632.911	24903 0.2	187089.716	10135 1.4	2614.5648	49246.23	17803.3241	4195.93496	108 9	815.75	193.9 38	44.41 3	16.64596 273	9.796747 967	24168.803 14	0.037008 215
WGC2019J-31A-3-C9_mon_G7 - 7.d	436708.861	23900 8.6	179431.072	75540. 54	9733.5702	25025.13	8088.64266	2138.21138	627	489.01	132.5	35.42 51	13.97515 528	6.260162 602	11531.025 45	0.223869 014
WGC2019J-31A-3-C9_mon_G7 - 8.d	420506.329	25021 5.5	187527.352	10081 0.8	2628.7744	48653.27	17279.7784	4117.88618	105 3	811.17	194.0 63	49.91 9	20.31055 901	8.252032 52	23534.380 85	0.037535 635
WGC2019J-31A-3-C9_mon_G7 - 9.d	425316.456	24482 7.6	185842.451	98378. 38	5062.167	48241.21	19252.0776	6036.58537	224 0	1760.1	582.5	195.9 51	83.35403 727	41.05691 057	30191.598 55	0.073481 423
WGC2019J-31A-3-C9_mon_G7 - 10.d	424472.574	24709 0.5	185689.278	99054. 05	2856.1279	47130.65	17157.8947	4117.88618	106 6	808.42	194.8 75	47.89 47	17.26708 075	9.268292 683	23419.510 93	0.041801 3
WGC2019J-31A-3-C9_mon_G7 - 11.d	420506.329	24622 8.4	187855.58	99527. 03	2625.222	47336.68	17185.5956	4093.49593	105 7	806.59	177.1 88	43.92 71	19.56521 739	9.918699 187	23393.283 45	0.038246 933

WGC2019J-31A-3-C9_mon_G7 - 12.d	424472.574	24859 9.1	186870.897	10013 5.1	2509.7 691	47839. 2	17409.9 723	4227.64 228	110 0	845. 6	186.8 75	49.39 27	19.75155 28	8.780487 805	23848.018 72	0.036261 736
WGC2019J-31A-3-C9_mon_G7 - 13.d	421645.57	24493 5.3	186564.551	99324. 32	2552.3 979	47587. 94	17127.4 238	4117.88 618	107 5	820. 51	190.6 88	51.82 19	15.77639 752	7.439024 39	23406.547 61	0.037125 483
WGC2019J-31A-3-C9_mon_G7 - 14.d	427004.219	24989 2.2	188993.435	10087 8.4	2477.7 975	47537. 69	17069.2 521	4142.27 642	107 6	820. 33	188.3 75	48.86 64	18.07453 416	8.536585 366	23371.710 69	0.035780 61
WGC2019J-31A-3-C9_mon_G7 - 15.d	421561.181	25053 8.8	188621.444	10040 5.4	2547.0 693	47738. 69	17415.5 125	4227.64 228	107 5	816. 3	192.7 5	52.10 53	18.38509 317	9.186991 87	23806.882 46	0.036789 759
WGC2019J-31A-3-C9_mon_G7 - 16.d	418143.46	24946 1.2	189956.236	10358 1.1	2626.9 982	50854. 27	18401.6 62	4369.91 87	110 2	853. 66	200.6 25	50.40 49	19.06832 298	8.983739 837	25006.325 67	0.036195 605
WGC2019J-31A-3-C9_mon_G8 - 1.d	417721.519	24762 9.3	187746.171	10000 0	2506.2 167	47537. 69	16880.8 864	4142.27 642	108 4	835. 35	195.8 75	48.98 79	17.82608 696	5.894308 943	23211.094 08	0.036349 596
WGC2019J-31A-3-C9_mon_G8 - 2.d	423206.751	24299 5.7	185076.586	98243. 24	2547.0 693	46934. 67	17238.2 271	4313.00 813	115 5	875. 64	207.9 38	55.46 56	22.60869 565	12.03252 033	23879.920 61	0.037509 607
WGC2019J-31A-3-C9_mon_G8 - 3.d	417637.131	24903 0.2	189934.354	10263 5.1	2680.2 842	49497. 49	18349.0 305	4609.75 61	124 2	964. 1	222.2 5	64.77 73	22.73291 925	12.35772 358	25487.007 1	0.037604 623
WGC2019J-31A-3-C9_mon_G8 - 4.d	419451.477	24461 2.1	186433.26	10033 7.8	2555.9 503	47683. 42	17822.7 147	4475.60 976	120 6	911. 36	215.3 75	58.70 45	19.50310 559	10.81300 813	24720.075 32	0.036951 863
WGC2019J-31A-3-C9_mon_G8 - 5.d	426582.278	24881 4.7	185733.042	98986. 49	2490.2 309	47286. 43	17132.9 64	4170.73 171	108 5	827. 66	190.2 5	45.10 12	18.81987 578	9.186991 87	23479.709 46	0.036398 492
WGC2019J-31A-3-C9_mon_G8 - 6.d	424472.574	24191 8.1	181794.311	95878. 38	2428.0 639	44251. 26	16063.7 119	3930.89 431	104 9	784. 43	184.0 63	48.98 79	18.63354 037	8.333333 333	22088.055 68	0.037276 659
WGC2019J-31A-3-C9_mon_G8 - 7.d	426877.637	24191 8.1	181378.556	93581. 08	2404.9 734	44381. 91	16210.5 263	4077.23 577	113 1	846. 15	208.5	56.55 87	22.85714 286	11.38211 382	22564.213 9	0.037317 561
WGC2019J-31A-3-C9_mon_G8 - 8.d	426582.278	24547 4.1	185164.114	97972. 97	2605.6 838	49447. 24	19844.8 753	5508.13 008	173 0	1335 .2	401.2 5	123.8 87	54.65838 509	26.42276 423	29024.388 05	0.037436 7
WGC2019J-31A-3-C9_mon_G8 - 9.d	424177.215	24622 8.4	184551.422	95810. 81	2484.9 023	46180. 9	16584.4 875	4077.23 577	107 8	827. 11	190.8 75	50.68 83	18.32298 137	9.308943 089	22836.024 72	0.037356 901
WGC2019J-31A-3-C10_mon_G10 - 1.d	415189.873	24547 4.1	187658.643	98581. 08	2468.9 165	47608. 04	17878.1 163	4544.71 545	125 1	965. 57	240.6 25	64.45 34	23.91304 348	11.66666 667	24980.057 71	0.036038 729
WGC2019J-31A-3-C10_mon_G10 - 2.d	428270.042	24515 0.9	183982.495	95337. 84	2431.6 163	44969. 85	16243.7 673	4040.65 041	107 4	814. 84	193.0 63	47.77 33	18.63354 037	8.658536 585	22441.380 74	0.037136 561
WGC2019J-31A-3-C10_mon_G10 - 3.d	418565.401	24730 6	186673.961	10020 2.7	2527.5 311	47462. 31	17326.8 698	4272.35 772	112 1	846. 15	190.2 5	43.52 23	20.31055 901	8.252032 52	23828.716 23	0.036650 706
WGC2019J-31A-3-C10_mon_G10 - 4.d	410126.582	24612 0.7	188905.908	10222 9.7	2618.1 172	48944. 72	18246.5 374	4678.86 179	127 1	982. 42	233.1 25	61.13 36	22.98136 646	12.88617 886	25508.942 92	0.037012 425
WGC2019J-31A-3-C10_mon_G10 - 5.d	425738.397	24547 4.1	186367.615	98986. 49	2579.0 409	47035. 18	17407.2 022	4487.80 488	123 5	941. 58	230	58.78 54	24.09937 888	10.69105 691	24395.158 05	0.037797 135
WGC2019J-31A-3-C11 - 1.d	418143.46	24633 6.2	182275.711	74189. 19	8916.5 187	15190. 95	2512.46 537	439.430 894	114. 8	91.0 26	31.43 75	10.52 63	3.788819 876	1.747967 48	3205.2225 12	0.265602 693
WGC2019J-31A-3-C10_mon_G10 - 2.d	412194.093	24245 6.9	179824.945	71081. 08	6296.6 252	14281. 41	2291.96 676	399.186 992	104. 6	84.0 66	27.12 5	7.611 34	2.981366 46	1.219512 195	2918.7569	0.197626 57
WGC2019J-31A-3-C10_mon_G10 - 3.d	435443.038	23900 8.6	178074.398	80945. 95	22007. 105	27788. 94	7700.83 102	1918.69 919	604	478. 02	151.8 75	44.93 93	18.63354 037	9.674796 748	10926.674 8	0.464012 129
WGC2019J-31A-3-C10_mon_G10 - 4.d	412236.287	24375 0	179102.845	70743. 24	6090.5 861	14241. 21	2307.47 922	381.300 813	103. 3	82.0 51	29.31 25	6.558 7	2.857142 857	1.463414 634	2914.3230 81	0.191885 97
WGC2019J-31A-3-C10_mon_G10 - 5.d	421814.346	24299 5.7	177877.462	66648. 65	6621.6 696	12864. 32	2102.49 307	362.601 626	104. 1	78.0 22	28.68 75	7.327 94	3.416149 068	1.666666 667	2688.3149 3	0.226140 522
WGC2019J-31A-3-C11 - 1.d	408860.759	24094 8.3	177964.989	64932. 43	5310.8 348	11969. 85	1855.95 568	297.154 472	75.8	57.6 92	20.75	5.425 1	1.962732 919	0.894308 943	2315.6346 01	0.190496 77

WGC2019J-31A-3-C10_mon_G11 - 2.d	412658.228	24310 3.4	181838.074	72972.97	5781.5275	14346.73	2160.66482	314.634146	67.6	52.0 15	18.12 5	3.076 92	0.968944 099	0.272357 724	2617.3568 43	0.178683 751
WGC2019J-31A-3-C10_mon_G11 - 3.d	426582.278	24267 2.4	181531.729	74662.16	6051.5098	15788.94	2351.80055	326.829268	66.8	54.3 96	17.93 75	3.603 24	1.291925 466	1.260162 602	2823.9182 54	0.176253 157
WGC2019J-31A-3-C10_mon_G11 - 4.d	422784.81	24008 6.2	181619.256	73986.49	5912.9663	15778.89	2315.78947	319.918699	60.1	49.4 51	15.56 25	3.522 27	1.198757 764	0.211382 114	2765.7536 29	0.173057 694
WGC2019J-31A-3-C10_mon_G11 - 5.d	417299.578	24299 5.7	182713.348	76013.51	6188.2771	15924.62	2315.78947	318.699187	58.3	48.1 68	12.56 25	2.307 69	0.621118 012	0.126016 26	2756.5744 85	0.177864 701
WGC2019J-31A-3-C10_mon_G11 - 6.d	424894.515	24040 9.5	183873.085	88581.08	11527.531	32964.82	10387.8116	3130.0813	109 0	908. 42	275.6 25	75.70 85	28.26086 957	11.58536 585	15907.497 58	0.213324 351
WGC2019J-31A-3-C10_mon_G11 - 7.d	439240.506	24062 5	180809.628	93310.81	16376.554	48341.71	23656.5097	9707.31707	466 0	3199 .6	1098. 13	331.1 74	132.9192 547	60.16260 163	42845.841 41	0.243834 721
WGC2019J-31A-3-C15_mon_G21 - 1.d	425105.485	24267 2.4	182056.893	81148.65	10138.544	23613.07	4074.79224	550.406504	104	85.3 48	20.68 75	5.708 5	2.285714 286	0.934959 35	4844.1634 09	0.231610 764
WGC2019J-31A-3-C16_mon_G20 - 1.d	427426.16	24741 3.8	187811.816	96824.32	7300.1776	48944.72	21326.8698	6959.34959	221 4	1648 .4	408.1 25	95.54 66	35.34161 491	16.13821 138	32703.722 43	0.106044 525
WGC2019J-31A-3-C16_mon_G20 - 2.d	428691.983	24515 0.9	186214.442	97432.43	2671.4032	50050.25	23196.6759	7849.59 35	251 2	1884 .6	458.1 25	113.7 65	41.80124 224	21.74796 748	36078.324 17	0.038254 677
WGC2019J-31A-3-C16_mon_G20 - 3.d	427004.219	24978 4.5	191378.556	10128 3.8	2742.4512	52045.23	24260.3878	8296.74797	268 1	2005 .5	503.7 5	128.7 45	50.55900 621	24.95934 959	37951.643 58	0.037772 74
WGC2019J-31A-3-C16_mon_G20 - 4.d	444303.797	23846 9.8	181838.074	93851.35	19680.284	41758.79	13961.2188	3682.92683	107 0	835. 16	208.7 5	53.44 13	17.45341 615	6.788617 886	19835.743 83	0.314367 127
WGC2019J-31A-3-C16_mon_G20 - 5.d	424894.515	24536 6.4	186323.851	10250 0	3266.4298	54824.12	25318.5596	8349.59 35	265 4	2027 .5	536.2 5	150.2 02	54.03726 708	28.61788 618	39118.733 16	0.043573 813
WGC2019J-31A-3-C16_mon_G20 - 6.d	423206.751	24730 6	188096.28	10371 6.2	3191.8295	54824.12	25462.6039	8528.45528	274 0	2075 .1	546.8 75	148.5 83	58.50931 677	26.05691 057	39586.174 96	0.042328 269
WGC2019J-31A-3-C16_mon_G20 - 7.d	428270.042	24795 2.6	189343.545	10135 1.4	2964.476	53065.33	24961.2188	8239.83 74	263 7	2001 .8	503.1 25	133.6 03	50.99378 882	22.80487 805	38550.414 64	0.040422 926
WGC2019J-31A-3-C16_mon_G20 - 8.d	424894.515	24709 0.5	187680.525	10081 0.8	2936.0568	51457.29	23783.9335	7930.89431	254 6	1913 .9	482.5	133.6 03	50.12422 36	25.77235 772	36866.747 06	0.040765 002
WGC2019J-31A-3-C16_mon_G20 - 9.d	433544.304	24590 5.2	186039.387	87837.84	9751.3321	35100.5	11440.4432	2756.91057	616. 7	532. 97	108.3 75	20.85 02	9.440993 789	5.121951 22	15490.808 96	0.175616 964
WGC2019J-31A-3-C16_mon_G20 - 10.d	435021.097	24105 6	180306.346	94391.89	2923.6234	48442.21	22304.7091	7247.96748	228 5	1727 .1	440	122.2 67	46.52173 913	20.60975 61	34194.181 55	0.043235 662
WGC2019J-31A-3-C16_mon_G20 - 11.d	427004.219	24838 3.6	188030.635	10675 6.8	3639.4316	58190.95	27814.4044	9138.21138	287 8	2181 .3	583.7 5	165.5 87	70	34.51219 512	42865.783 74	0.046175 131
WGC2019J-31A-3-C16_mon_G20 - 12.d	421940.928	24687 5	186652.079	10445 9.5	3905.8615	56582.91	26969.5291	8800.81301	278 5	2117 .2	548.7 5	162.3 48	64.78260 87	33.82113 821	41482.260 14	0.050804 279
WGC2019J-31A-3-C16_mon_G20 - 13.d	424472.574	24612 0.7	187855.58	10101 3.5	3115.4529	53266.33	25166.205	8414.63415	276 7	2098 .9	540.6 25	145.7 49	56.95652 174	28.94308 943	39219.013 83	0.042472 23
WGC2019J-31A-3-C16_mon_G20 - 14.d	431645.57	24375 0	181816.193	99527.03	3142.0959	53065.33	25983.3795	8882.11382	284 4	2157 .5	553.7 5	146.9 64	61.67701 863	27.19512 195	40656.588 18	0.043235 8
WGC2019J-31A-3-C16_mon_G20 - 15.d	431223.629	24579 7.4	185820.569	97567.57	2932.5044	50100.5	23385.0416	7772.35772	252 3	1912 .1	494.3 75	132.7 94	54.72049 689	24.67479 675	36299.051	0.041943 522
WGC2019J-31A-3-C16_mon_G20 - 16.d	425316.456	24622 8.4	185995.624	10027 0.3	3238.0107	52512.56	24360.1108	8268.29268	266 7	2029 .3	533.1 25	146.5 59	57.76397 516	26.01626 016	38088.171 46	0.044623 186
WGC2019J-31A-3-C16_mon_G20 - 17.d	422236.287	24515 0.9	185842.451	10243 2.4	3172.2913	56130.65	27296.3989	9329.26829	302 6	2302 .2	580	154.2 51	64.84472 05	33.29268 293	42786.253 4	0.041836 396
WGC2019J-31A-3-C16_mon_G20 - 18.d	437763.713	24040 9.5	183260.394	90675.68	19639.432	38155.78	12700.831	3230.0813	835	663. 74	149.8 75	32.95 55	12.29813 665	6.788617 886	17631.565 81	0.333889 954

WGC2019J-31A-3-C16_mon_G20 - 19.d	429535.865	24784 4.8	187045.952	10304 0.5	3264.6536	55829.15	27199.4 46	9325.20325	303 7	2307 .7	581.8 75	153.4 41	66.95652 174	29.34959 35	42700.963 95	0.043043 002
WGC2019J-31A-3-C16_mon_G20 - 20.d	427004.219	24181 0.3	181444.201	91283. 78	20195.382	38145.73	13512.4 654	3552.84 553	895	726. 74	146	27.81 38	7.639751 553	4.227642 276	18872.731 99	0.342241 204
WGC2019J-31A-3-C16_mon_G20 - 21.d	425147.679	24321 1.2	180525.164	89459. 46	20532.86	33618.09	9667.59 003	2044.71 545	437	340. 29	68.37 5	13.07 69	4.968944 099	2.886178 862	12578.905 56	0.374412 021
WGC2019J-31A-3-C16_mon_G20 - 22.d	431223.629	24536 6.4	184004.376	90472. 97	20266.43	30447.24	7506.92 521	1726.42 276	517. 8	410. 26	122.6 88	36.63 97	14.22360 248	6.585365 854	10341.540 53	0.386139 19
WGC2019J-31A-3-C16_mon_G20 - 23.d	430801.688	24461 2.1	183019.694	90743. 24	20230.906	30321.61	7562.32 687	1728.86 179	529. 4	419. 41	118.1 25	32.83 4	14.09937 888	7.926829 268	10412.987 79	0.385684 394
WGC2019J-31A-3-C16_mon_G20 - 24.d	432489.451	24105 6	184879.65	90067. 57	11010.657	35175.88	10277.0 083	2747.96 748	915	787. 55	243.1 25	70.44 53	30.12422 36	15.52845 528	15086.744 6	0.195616 977
WGC2019J-31A-3-C16_mon_G20 - 25.d	439662.447	23965 5.2	179934.354	89864. 86	19911.19	38693.47	13797.7 839	3959.34 959	112 4	916. 85	214.3 75	43.56 28	13.72670 807	6.260162 602	20075.907 97	0.337662 966
WGC2019J-31A-3-C16_mon_G20 - 26.d	424556.962	24504 3.1	184463.895	83851. 35	8687.389	28869.35	8565.09 695	2215.44 715	569. 6	517. 4	122	23.31 98	8.136645 963	3.048780 488	12024.048 64	0.176569 528
WGC2019J-31A-3-C16_mon_G20 - 27.d	422784.81	24579 7.4	186695.842	87500	9559.5027	32261.31	9911.35 734	2605.69 106	669	633. 7	146.2 5	29.95 95	9.316770 186	2.113821 138	14007.388 14	0.179924 497
WGC2019J-31A-3-C16_mon_G20 - 28.d	424894.515	24892 2.4	186192.56	89256. 76	11634.103	37587.94	13628.8 089	4260.16 26	134 4	1170 .3	321.8 75	81.78 14	26.27329 193	12.76422 764	20845.995 03	0.200857 519
WGC2019J-31A-3-C16_mon_G20 - 29.d	430801.688	24353 4.5	181947.484	90472. 97	20266.43	35331.66	11157.8 947	2423.17 073	515. 8	399. 63	68.37 5	11.86 23	5.341614 907	2.398373 984	14584.476 51	0.358455 962
WGC2019J-31A-3-C16_mon_G20 - 30.d	440928.27	24127 1.6	184682.713	95337. 84	15719.361	44447.24	16645.4 294	4760.16 26	142 3	1115 .4	283.7 5	74.49 39	26.33540 373	12.27642 276	24340.832 33	0.241479 266
WGC2019J-31A-3-C17_mon_G17 - 1.d	428059.072	24525 8.6	185908.096	82628. 38	8218.4725	20944.72	3991.68 975	739.430 894	211. 1	166. 85	52.12 5	15.95 14	6.024844 72	2.520325 203	5185.6920 49	0.197555 522
WGC2019J-31A-3-C17_mon_G17 - 2.d	428270.042	24816 8.1	187308.534	86621. 62	9378.3304	26010.05	5351.80 055	1012.19 512	282	203. 11	62.56 25	17.20 65	8.633540 373	3.861788 618	6941.3735 36	0.197579 452
WGC2019J-31A-3-C17_mon_G17 - 3.d	437130.802	24364 2.2	182013.129	87229. 73	11229.13	34035.18	9157.89 474	1792.68 293	426	304. 21	71.06 25	17.20 65	6.832298 137	3.902439 024	11779.793 83	0.206086 638
WGC2019J-31A-3-C17_mon_G17 - 4.d	432911.392	24202 5.9	183085.339	88716. 22	11559.503	31859.3	7742.38 227	1503.65 854	416	303. 66	86.81 25	20.93 12	10.18633 54	3.658536 585	10087.292 36	0.217430 044
WGC2019J-31A-3-C17_mon_G17 - 5.d	429535.865	24224 1.4	181115.974	87500	11566.607	32467.34	8155.12 465	1515.04 065	360. 2	269. 23	68.37 5	16.15 38	4.596273 292	3.455284 553	10392.176 48	0.217009 446
WGC2019J-31A-3-C18_mon_G15 - 1.d	431645.57	24202 5.9	181925.602	89256. 76	29076.377	33487.44	9659.27 978	2354.47 154	718. 8	543. 04	150.2 5	42.34 82	13.47826 087	6.951219 512	13488.619 27	0.531837 281
WGC2019J-31A-3-C18_mon_G15 - 2.d	447552.743	24331 9	180415.755	83310. 81	29769.094	26994.97	5803.32 41	997.560 976	239. 8	166. 85	42.5	9.838 06	3.726708 075	2.113821 138	7265.7134 78	0.627730 853
WGC2019J-31A-3-C18_mon_G15 - 3.d	442194.093	24321 1.2	181509.847	89054. 05	28898.757	33015.08	9335.18 006	2288.61 789	682	521. 98	146.8 75	36.43 72	13.41614 907	5.487804 878	13029.992 16	0.532961 901
WGC2019J-31A-3-C18_mon_G15 - 4.d	439662.447	24213 3.6	181903.72	88783. 78	30621.67	37206.03	12950.1 385	3357.31 707	931	687. 55	160.1 88	37.00 4	12.73291 925	4.918699 187	18140.844 53	0.532789 153
WGC2019J-31A-3-C22_mon_Gx - 1.d	437130.802	24181 0.3	184704.595	99864. 86	15968.028	57185.93	27202.2 161	10987.8 049	510 0	4022	1538. 75	531.5 79	224.2236 025	108.5365 854	49715.088 1	0.211300 412

Monazite trace elements standards

Standard	La	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
NIST610_51 - 1.d	194100	198400	189600	202300	197300	197100	193500	192400	198200	200400	191800	198300	193400
NIST610_51 - 2.d	193800	197000	190600	198800	196100	197400	191600	192000	196400	200900	190900	197700	192200
NIST610_51 - 3.d	194700	197700	191500	199000	197200	197600	193200	194100	198100	201000	192600	199100	193800
NIST610_51 - 4.d	195600	198500	191300	202000	198400	197100	194000	193000	198600	201300	193200	199800	194000
NIST610_51 - 5.d	193400	198400	188800	200300	197900	199300	192900	192800	198200	200300	192400	198500	193900
NIST610_51 - 6.d	193200	196500	190000	197900	197300	197900	192000	192100	197200	200000	190900	197200	193300
NIST610_51 - 7.d	194500	198000	188600	198000	196000	199500	191800	192200	197900	200200	191400	197900	193600
NIST610_51 - 8.d	193700	198200	189800	201000	196500	198500	192140	192300	198800	200000	191400	197800	192900
NIST610_51 - 9.d	194200	196400	189300	200400	196800	196400	192400	191700	197500	200000	191100	198700	193100
NIST610_51 - 10.d	194400	198400	191000	200000	198400	199800	194000	193200	199000	202100	193200	200000	195000
NIST610_51 - 11.d	193000	198300	188300	199700	197300	199000	193100	193400	197800	200500	192300	197400	193800
NIST610_51 - 12.d	194600	197900	190200	201600	197300	199700	193800	194500	199400	202300	192700	198800	195000
NIST610_51 - 13.d	194300	198300	189800	201500	198200	198600	193300	194100	199300	202100	192500	199200	194690
NIST610_51 - 14.d	195400	197300	189600	198300	197300	197300	193000	193100	198100	200200	191900	199500	193400
NIST610_51 - 15.d	194200	197800	187600	200100	197000	198500	191600	194000	197000	200500	192300	198500	193600
NIST610_51 - 16.d	195200	197400	188700	200100	198300	198600	193600	193100	199000	201800	192100	199400	194800
NIST610_51 - 17.d	194700	197000	191900	199000	197300	198500	194200	193400	198900	201600	192300	199500	194400
NIST610_51 - 18.d	195200	198500	190200	200100	197500	199200	194200	193200	198800	202300	192600	199100	194200
NIST610_51 - 19.d	194400	197100	190200	199800	198200	198700	193000	192200	198800	200800	192300	199800	194200
NIST610_51 - 20.d	193600	197400	189900	198700	197400	199900	193000	193700	198500	201900	192000	198200	194500
NIST610_51 - 21.d	194500	198500	193100	198600	198400	197700	193900	194300	199100	202000	193000	200200	194900
NIST610_51 - 22.d	193500	197600	188000	199000	197900	197400	192300	192500	198600	201700	192100	199200	193800
NIST610_51 - 23.d	194200	198000	189200	199800	197100	197300	192800	192800	198000	202100	192400	199100	193600
NIST610_51 - 24.d	194400	196400	189000	199700	197200	197100	192500	192200	197600	200300	190900	198200	193200
NIST610_51 - 25.d	194700	199400	189000	201500	196900	199300	193100	193400	198800	200000	192700	200000	194200
NIST610_51 - 26.d	193600	198100	190700	199900	197400	196000	193000	193600	199000	200200	191900	197800	194100
NIST610_51 - 27.d	193600	198800	190200	199200	197300	200900	192600	194000	197900	201500	191900	198700	194100
NIST610_51 - 28.d	193900	197100	191000	201200	196400	198800	192600	192400	197700	201200	192100	197700	193200

NIST610_51 - 29.d	194000	197000	189500	201100	197400	197000	193200	192300	197500	201600	192100	197600	193100
NIST610_51 - 30.d	194800	196600	188900	196900	196600	195400	191200	191300	196800	198400	190200	196500	191100
NIST610_51 - 31.d	194600	198600	191200	201100	197700	199200	193200	193100	198400	201400	192200	199300	194300
NIST610_51 - 32.d	194300	197700	189300	201900	196400	198200	192700	192100	197100	199300	191400	197800	192500
NIST610_19 - 1.d	192200	197000	185100	198700	195500	195600	190800	189100	195300	197700	189100	194700	187400
NIST610_19 - 2.d	190800	198400	189500	202600	197000	197800	192100	191600	196400	199800	187200	193600	189500
NIST610_19 - 3.d	197300	200500	187300	200900	199600	198700	194300	194800	199800	197800	192200	194800	192100
NIST610_19 - 4.d	190600	197500	190500	204900	196300	196300	190200	188700	194800	195500	188700	194600	188800
NIST610_19 - 5.d	187100	192700	187500	196400	193000	192400	185700	183100	191600	192700	181400	192000	185100
NIST610_19 - 6.d	192400	196700	185900	198300	192500	192700	187000	191100	193100	193100	186800	189600	188000
NIST610_19 - 7.d	193200	198300	188800	196600	196200	195000	190300	187900	193500	195400	188200	194100	190400
NIST610_19 - 8.d	193200	198100	196000	200500	195800	192300	191900	190100	193400	196500	189200	194300	188000
NIST610_19 - 9.d	193600	198900	190800	197200	196500	198800	190500	190000	194100	197700	189200	196300	190500
NIST610_19 - 10.d	191400	195500	186200	192700	192400	193600	184400	188600	193100	193000	185700	192300	187500
NIST610_19 - 11.d	190200	195800	186200	193100	197800	194500	188100	190800	195500	199400	186400	195000	188900
NIST610_19 - 12.d	194800	196300	185800	196400	195700	190800	188500	193500	194400	195100	189600	196300	187600
NIST610_19 - 13.d	194700	202100	192900	200000	196800	201000	191400	190000	194300	198600	191700	195200	191800
NIST610_19 - 14.d	192400	196600	186000	192600	196500	197800	189000	189200	191300	196000	189100	190400	186100
NIST610_19 - 15.d	194100	195100	184800	199900	196700	187900	188800	190500	194900	199100	188000	190600	190900
NIST610_19 - 16.d	190000	195900	185800	198200	192600	194700	185100	187800	189500	196100	186500	191600	187700

APPENDIX 3D: LA–ICP–MS APATITE RESULTS

Apatite morphology

Sample	Textural location	Size (long axis)	Crystal Habit	Spot location	Comments
3-C2_ap - 1.d	Matrix	~700µm	Equant	rim	
3-C2_ap - 2.d	Matrix			mid	
3-C2_ap - 3.d	Matrix			rim	
3-C2_ap - 4.d	Matrix			rim	
3-C2_ap - 5.d	Matrix			mid	
3-C2_ap - 6.d	Matrix			rim	
3-C2_ap - 7.d	Matrix			core	
3-C2_ap - 8.d	Matrix			core	
3-C2_ap - 9.d	Matrix			mid	
3-C2_ap - 10.d	Matrix			rim	
3-C2_ap - 11.d	Matrix			core	
3-C2_ap - 12.d	Matrix			core	
3-C2_ap - 13.d	Matrix			mid	
3-C2_ap - 14.d	Matrix			rim	
3-C2_ap - 15.d	Matrix			rim	
3-C2_ap - 16.d	Matrix			rim	
3-C2_ap - 17.d	Matrix			rim	
3-C2_ap - 18.d	Matrix			mid	
3-C2_ap - 19.d	Matrix			rim	
3-C2_ap - 20.d	Matrix			rim	
3-C3_ap - 1.d	Matrix	~2500µm	Tabular	rim	
3-C3_ap - 2.d	Matrix			rim	
3-C3_ap - 3.d	Matrix			rim	
3-C3_ap - 4.d	Matrix			mid	
3-C3_ap - 5.d	Matrix			core	
3-C3_ap - 6.d	Matrix			core	

3-C3_ap - 7.d	Matrix	mid
3-C3_ap - 8.d	Matrix	rim
3-C3_ap - 9.d	Matrix	core
3-C3_ap - 10.d	Matrix	core
3-C3_ap - 11.d	Matrix	core
3-C3_ap - 12.d	Matrix	mid
3-C3_ap - 13.d	Matrix	mid
3-C3_ap - 14.d	Matrix	core
3-C3_ap - 15.d	Matrix	core
3-C3_ap - 16.d	Matrix	core
3-C3_ap - 17.d	Matrix	core
3-C3_ap - 18.d	Matrix	core
3-C3_ap - 19.d	Matrix	mid
3-C3_ap - 20.d	Matrix	mid
3-C3_ap - 21.d	Matrix	mid
3-C3_ap - 22.d	Matrix	rim
3-C3_ap - 23.d	Matrix	core
3-C3_ap - 24.d	Matrix	rim
3-C3_ap - 25.d	Matrix	rim
3-C3_ap - 26.d	Matrix	mid
3-C3_ap - 27.d	Matrix	rim
3-C3_ap - 28.d	Matrix	rim
3-C3_ap - 29.d	Matrix	rim
3-C3_ap - 30.d	Matrix	rim
3-C3_ap - 31.d	Matrix	core
3-C3_ap - 32.d	Matrix	mid
3-C3_ap - 33.d	Matrix	rim
3-C3_ap - 34.d	Matrix	mid
3-C3_ap - 35.d	Matrix	core
3-C3_ap - 36.d	Matrix	core
3-C3_ap - 37.d	Matrix	rim

3-C3_ap - 38.d	Matrix			rim
3-C3_ap - 39.d	Matrix			rim
3-C3_ap - 40.d	Matrix			rim
3-C3_ap - 41.d	Matrix			core
3-C3_ap - 42.d	Matrix			rim
3-C3_ap - 43.d	Matrix			mid
3-C3_ap - 44.d	Matrix			core
3-C3_ap - 45.d	Matrix			mid
3-C3_ap - 46.d	Matrix			rim
3-C3_ap - 47.d	Matrix			rim
3-C3_ap - 48.d	Matrix			mid
3-C3_ap - 49.d	Matrix			rim
3-C3_ap - 50.d	Matrix			mid
25B-3a-C1_ap - 1.d	Garnet inclusion	~600µm	Equant	mid
25B-3a-C1_ap - 2.d	Garnet inclusion			core
25B-3a-C1_ap - 3.d	Garnet inclusion			core
25B-3a-C1_ap - 4.d	Garnet inclusion			core
25B-3a-C1_ap - 5.d	Garnet inclusion			core
25B-3a-C1_ap - 6.d	Garnet inclusion			mid
25B-3a-C1_ap - 7.d	Garnet inclusion			rim
25B-3a-C1_ap - 8.d	Garnet inclusion			rim
25B-3a-C1_ap - 9.d	Garnet inclusion			mid
25B-3a-C1_ap - 10.d	Garnet inclusion			rim
25B-3a-C1_ap - 11.d	Garnet inclusion			mid
25B-3a-C1_ap - 12.d	Garnet inclusion			mid
25B-3a-C1_ap - 14.d	Garnet inclusion			rim
25B-3a-C2_ap1 - 1.d	Garnet inclusion	~300µm	Equant	rim
25B-3a-C2_ap1 - 2.d	Garnet inclusion			mid
25B-3a-C2_ap1 - 3.d	Garnet inclusion			rim
25B-3a-C2_ap1 - 4.d	Garnet inclusion			mid
25B-3a-C2_ap1 - 5.d	Garnet inclusion			rim

25B-3a-C2_ap1 - 6.d	Garnet inclusion			rim	
25B-3a-C2_ap1 - 7.d	Garnet inclusion			core	
25B-3a-C2_ap1 - 8.d	Garnet inclusion			rim	
25B-3a-C2_ap2 - 1.d	Garnet inclusion	~250µm	Equant	rim	
25B-3a-C2_ap2 - 2.d	Garnet inclusion			core	
25B-3a-C2_ap2 - 3.d	Garnet inclusion			rim	
25B-3a-C2_ap2 - 4.d	Garnet inclusion			rim	
25B-3a-C2_ap2 - 5.d	Garnet inclusion			rim	
25B-3a-C2_ap2 - 6.d	Garnet inclusion			rim	
25B-3a-C3_ap1 - 1.d	Garnet edge	~250µm	Equant	mid	matrix-facing edge
25B-3a-C3_ap1 - 3.d	Garnet edge			mid	matrix-facing edge
25B-3a-C3_ap1 - 4.d	Garnet edge			core	
25B-3a-C3_ap1 - 6.d	Garnet edge			rim	garnet-facing edge
25B-3a-C3_ap1 - 7.d	Garnet edge			rim	garnet-facing edge
25B-3a-C3_ap2 - 1.d	Garnet inclusion	~250µm	Equant	rim	
25B-3a-C3_ap2 - 2.d	Garnet inclusion			mid	
25B-3a-C3_ap2 - 3.d	Garnet inclusion			rim	
25B-3a-C3_ap2 - 4.d	Garnet inclusion			rim	
25B-3a-C3_ap2 - 5.d	Garnet inclusion			core	
25B-3a-C3_ap2 - 6.d	Garnet inclusion			rim	
25B-3a-C4_ap - 1.d	Matrix	~2500µm	Asymmetric/triangular	rim	
25B-3a-C4_ap - 2.d	Matrix			rim	
25B-3a-C4_ap - 3.d	Matrix			mid	
25B-3a-C4_ap - 4.d	Matrix			mid	
25B-3a-C4_ap - 5.d	Matrix			mid	
25B-3a-C4_ap - 6.d	Matrix			mid	
25B-3a-C4_ap - 7.d	Matrix			mid	
25B-3a-C4_ap - 8.d	Matrix			mid	
25B-3a-C4_ap - 9.d	Matrix			mid	
25B-3a-C4_ap - 10.d	Matrix			mid	
25B-3a-C4_ap - 11.d	Matrix			mid	

25B-3a-C4_ap - 12.d	Matrix			mid	
25B-3a-C4_ap - 13.d	Matrix			mid	
25B-3a-C4_ap - 14.d	Matrix			rim	
25B-3a-C4_ap - 15.d	Matrix			rim	
25B-3a-C4_ap - 17.d	Matrix			rim	
25B-3a-C4_ap - 19.d	Matrix			core	
25B-3a-C4_ap - 20.d	Matrix			core	
25B-3a-C4_ap - 21.d	Matrix			core	
25B-3a-C4_ap - 22.d	Matrix			mid	
25B-3a-C4_ap - 23.d	Matrix			mid	
25B-3a-C4_ap - 25.d	Matrix			core	
25B-3a-C4_ap - 26.d	Matrix			core	
25B-3a-C4_ap - 27.d	Matrix			rim	
25B-3a-C4_ap - 28.d	Matrix			rim	
25B-3a-C4_ap - 29.d	Matrix			mid	
25B-3a-C4_ap - 30.d	Matrix			core	
25B-3a-C4_ap - 31.d	Matrix			mid	
25B-3a-C4_ap - 32.d	Matrix			rim	
25B-3a-C4_ap - 33.d	Matrix			mid	
25B-3a-C4_ap - 34.d	Matrix			rim	
25B-3a-C4_ap - 35.d	Matrix			mid	
25B-3b-C7_ap - 1.d	Garnet edge	~2000µm	Asymmetric	rim	garnet-facing edge
25B-3b-C7_ap - 2.d	Garnet edge			rim	garnet-facing edge
25B-3b-C7_ap - 3.d	Garnet edge			rim	
25B-3b-C7_ap - 4.d	Garnet edge			rim	
25B-3b-C7_ap - 5.d	Garnet edge			rim	
25B-3b-C7_ap - 6.d	Garnet edge			rim	
25B-3b-C7_ap - 7.d	Garnet edge			rim	
25B-3b-C7_ap - 9.d	Garnet edge			core	
25B-3b-C7_ap - 10.d	Garnet edge			core	
25B-3b-C7_ap - 11.d	Garnet edge			core	garnet-facing edge

25B-3b-C7_ap - 12.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 13.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 14.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 15.d	Garnet edge	core	garnet-facing edge
25B-3b-C7_ap - 16.d	Garnet edge	core	
25B-3b-C7_ap - 17.d	Garnet edge	core	
25B-3b-C7_ap - 18.d	Garnet edge	core	
25B-3b-C7_ap - 19.d	Garnet edge	core	
25B-3b-C7_ap - 20.d	Garnet edge	rim	
25B-3b-C7_ap - 21.d	Garnet edge	mid	garnet-facing edge
25B-3b-C7_ap - 22.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 23.d	Garnet edge	mid	garnet-facing edge
25B-3b-C7_ap - 24.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 25.d	Garnet edge	mid	garnet-facing edge
25B-3b-C7_ap - 26.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 27.d	Garnet edge	mid	
25B-3b-C7_ap - 28.d	Garnet edge	core	
25B-3b-C7_ap - 29.d	Garnet edge	rim	
25B-3b-C7_ap - 30.d	Garnet edge	rim	
25B-3b-C7_ap - 32.d	Garnet edge	rim	
25B-3b-C7_ap - 33.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 34.d	Garnet edge	mid	garnet-facing edge
25B-3b-C7_ap - 35.d	Garnet edge	mid	garnet-facing edge
25B-3b-C7_ap - 36.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 37.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 38.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 39.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 40.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 41.d	Garnet edge	rim	
25B-3b-C7_ap - 42.d	Garnet edge	rim	
25B-3b-C7_ap - 43.d	Garnet edge	rim	

25B-3b-C7_ap - 44.d	Garnet edge	rim	garnet-facing edge
25B-3b-C7_ap - 45.d	Garnet edge	rim	garnet-facing edge

Apatite geochronology

Sample	207/235	2σ	206/238	2σ	207/206	2σ	ErrCorr 6/38vs7/35	ErrCorr 38/6vs7/6	207/235 age	2σ	206/238 age	2σ	Concordant?	% discordance
3-C2_ap - 1.d	3.365	0.081	0.0891	0.003	0.2756	0.0071	0.24341	0.38902	1496	18	550.3	18	D	63.21524064
3-C2_ap - 2.d	3.414	0.067	0.0898	0.0029	0.2749	0.0057	0.11765	0.52705	1506	15	554.5	17	D	63.18061089
3-C2_ap - 3.d	3.043	0.081	0.0886	0.0028	0.2494	0.0076	-0.042264	0.50354	1415	20	547.2	17	D	61.32862191
3-C2_ap - 4.d	3.127	0.07	0.0883	0.0027	0.2546	0.0057	0.24641	0.32086	1437	17	545.2	16	D	62.0598469
3-C2_ap - 5.d	3.162	0.07	0.0867	0.0028	0.2651	0.0053	0.20182	0.32176	1449	17	536.2	16	D	62.99516908
3-C2_ap - 6.d	2.864	0.061	0.084	0.0027	0.2455	0.006	0.075491	0.5022	1371	16	519.8	16	D	62.08606856
3-C2_ap - 7.d	3.325	0.083	0.0899	0.0028	0.2678	0.0066	0.39748	0.06943	1487	20	554.9	17	D	62.68325488
3-C2_ap - 8.d	3.216	0.071	0.08736	0.0027	0.2669	0.006	0.12262	0.37166	1464	16	539.9	16	D	63.1215847
3-C2_ap - 9.d	3.344	0.078	0.091	0.0031	0.2649	0.0049	0.54637	0.14767	1489	18	561.2	18	D	62.31027535
3-C2_ap - 10.d	3.153	0.075	0.08776	0.0027	0.2602	0.0066	0.00417	0.41389	1446	19	542.2	16	D	62.50345781
3-C2_ap - 11.d	3.377	0.071	0.088	0.0028	0.2775	0.0062	0.21932	0.36789	1497	16	543.9	17	D	63.66733467
3-C2_ap - 12.d	3.068	0.062	0.08633	0.0026	0.2593	0.0055	0.14123	0.35691	1430	15	533.7	16	D	62.67832168
3-C2_ap - 13.d	2.902	0.068	0.0878	0.0027	0.2396	0.0057	0.24509	0.33362	1380	18	542.6	16	D	60.68115942
3-C2_ap - 14.d	3.203	0.077	0.0871	0.0029	0.267	0.0069	-0.028223	0.53917	1456	19	538	17	D	63.04945055
3-C2_ap - 15.d	3.507	0.093	0.0896	0.003	0.2862	0.0085	0.14331	0.46576	1535	21	552.8	18	D	63.98697068
3-C2_ap - 16.d	3.541	0.091	0.0914	0.0029	0.2804	0.0078	0.17622	0.40242	1533	20	563.7	17	D	63.22896282
3-C2_ap - 17.d	3.504	0.079	0.0916	0.003	0.2779	0.008	0.083562	0.57373	1529	18	564.9	18	D	63.05428385
3-C2_ap - 18.d	3.443	0.076	0.0911	0.0031	0.2747	0.007	0.1852	0.48307	1514	17	561.9	18	D	62.88639366
3-C2_ap - 19.d	3.366	0.088	0.0897	0.003	0.2701	0.0066	0.30953	0.31061	1497	20	553.5	18	D	63.0260521
3-C2_ap - 20.d	3.381	0.066	0.0885	0.0029	0.2752	0.0058	0.20383	0.40668	1498	15	546.6	17	D	63.51134846
3-C3_ap - 1.d	3.843	0.082	0.0951	0.0031	0.2972	0.0072	0.063642	0.5298	1602	17	585.6	18	D	63.44569288
3-C3_ap - 2.d	4.148	0.097	0.0964	0.0031	0.3157	0.0091	0.067549	0.534	1669	19	593	18	D	64.46974236
3-C3_ap - 3.d	4.54	0.12	0.1008	0.0033	0.3296	0.0075	0.48026	0.13057	1743	22	619.2	19	D	64.47504303
3-C3_ap - 4.d	4.052	0.078	0.0963	0.0032	0.3023	0.0061	0.23689	0.47545	1643	16	592.7	19	D	63.92574559
3-C3_ap - 5.d	3.974	0.086	0.0961	0.0031	0.3009	0.0073	0.20247	0.39289	1629	17	592.8	18	D	63.60957643

3-C3_ap - 6.d	3.74	0.07	0.0942	0.0029	0.2903	0.0054	0.28971	0.34228	1583	15	580	17	D	63.36070752
3-C3_ap - 7.d	3.493	0.08	0.0911	0.0029	0.2765	0.0069	0.19363	0.37028	1526	17	562	17	D	63.17169069
3-C3_ap - 8.d	5.33	0.13	0.1068	0.0035	0.3622	0.0086	0.32838	0.25781	1874	21	654	21	D	65.10138741
3-C3_ap - 9.d	3.555	0.077	0.0922	0.003	0.2812	0.0063	0.25681	0.4095	1537	17	568.5	18	D	63.01236174
3-C3_ap - 10.d	3.238	0.063	0.08813	0.0027	0.2662	0.0059	0.02669	0.4751	1465	15	544.4	16	D	62.83959044
3-C3_ap - 11.d	3.462	0.088	0.0912	0.0029	0.2794	0.0076	0.16511	0.32139	1525	20	562.9	17	D	63.08852459
3-C3_ap - 12.d	3.219	0.083	0.08654	0.0027	0.2702	0.0067	0.29978	0.16929	1464	21	535	16	D	63.45628415
3-C3_ap - 13.d	3.214	0.073	0.0872	0.0028	0.2672	0.0065	0.26332	0.30449	1463	18	538.6	16	D	63.18523582
3-C3_ap - 14.d	3.101	0.08	0.0849	0.0027	0.263	0.007	0.074384	0.35964	1430	20	525	16	D	63.28671329
3-C3_ap - 15.d	3.254	0.078	0.0889	0.0028	0.2659	0.0058	0.39752	0.046119	1471	18	548.8	17	D	62.69204623
3-C3_ap - 16.d	3.079	0.067	0.0867	0.0027	0.2581	0.0061	0.20571	0.3302	1433	17	536.1	16	D	62.58897418
3-C3_ap - 17.d	3.174	0.056	0.0887	0.0028	0.2603	0.0057	0.061635	0.46046	1452	14	548	17	D	62.25895317
3-C3_ap - 18.d	3.538	0.083	0.0904	0.0029	0.2869	0.0073	0.22925	0.34234	1536	19	558	17	D	63.671875
3-C3_ap - 19.d	3.355	0.083	0.0896	0.0029	0.2688	0.0056	0.36631	0.18992	1496	19	552.9	17	D	63.04144385
3-C3_ap - 20.d	3.162	0.068	0.0871	0.0028	0.2646	0.0066	0.057225	0.51309	1446	17	538.6	17	D	62.75242047
3-C3_ap - 21.d	3.211	0.074	0.0876	0.0028	0.2676	0.0069	-0.019077	0.47973	1463	18	541	16	D	63.02118934
3-C3_ap - 22.d	3.46	0.093	0.0889	0.0029	0.2818	0.0085	0.21002	0.36525	1515	21	548.9	17	D	63.7689769
3-C3_ap - 23.d	3.288	0.064	0.0896	0.0028	0.2675	0.0061	0.19773	0.38903	1477	15	553.1	17	D	62.55247123
3-C3_ap - 24.d	3.207	0.088	0.0875	0.0028	0.2676	0.0065	0.31156	0.24982	1464	21	540.5	17	D	63.08060109
3-C3_ap - 25.d	2.845	0.05	0.08285	0.0026	0.2469	0.0047	0.14451	0.52355	1366	13	513.1	15	D	62.43777452
3-C3_ap - 26.d	2.942	0.068	0.0847	0.0027	0.2514	0.0062	0.079995	0.46	1390	17	523.9	16	D	62.30935252
3-C3_ap - 27.d	3.366	0.071	0.0889	0.003	0.2746	0.0072	0.25759	0.43328	1497	17	548.8	18	D	63.34001336
3-C3_ap - 28.d	3.202	0.079	0.0867	0.0029	0.2681	0.0058	0.43519	0.20836	1458	19	535.7	17	D	63.25788752
3-C3_ap - 29.d	3.031	0.068	0.0852	0.0027	0.2583	0.0054	0.40435	0.24093	1416	18	528	16	D	62.71186441
3-C3_ap - 30.d	3.049	0.076	0.0842	0.0027	0.2617	0.007	0.10777	0.42953	1420	18	521.2	16	D	63.29577465
3-C3_ap - 31.d	2.866	0.067	0.0828	0.0026	0.2503	0.0063	0.17694	0.42425	1375	17	512.6	16	D	62.72
3-C3_ap - 32.d	2.901	0.069	0.0854	0.0028	0.2428	0.0061	0.25892	0.27758	1383	18	528.3	16	D	61.80043384
3-C3_ap - 33.d	3.21	0.071	0.0862	0.0028	0.2685	0.0069	0.14007	0.38572	1460	17	533.2	16	D	63.47945205
3-C3_ap - 34.d	3.032	0.066	0.0853	0.0027	0.2576	0.0053	0.25644	0.34797	1414	17	527.5	16	D	62.69448373
3-C3_ap - 35.d	2.982	0.06	0.08304	0.0026	0.259	0.0055	0.30303	0.29879	1401	15	514.2	15	D	63.29764454
3-C3_ap - 36.d	2.708	0.064	0.0819	0.0026	0.2407	0.0057	0.27984	0.28385	1328	17	507.4	15	D	61.79216867

3-C3_ap - 37.d	2.947	0.064	0.0853	0.0027	0.2529	0.0055	0.11231	0.41625	1399	17	527.4	16	D	62.30164403
3-C3_ap - 38.d	2.944	0.072	0.0845	0.0027	0.2507	0.0061	0.12191	0.33132	1391	18	523	16	D	62.40115025
3-C3_ap - 39.d	2.767	0.062	0.0845	0.0027	0.2387	0.0054	0.11481	0.37505	1345	17	522.7	16	D	61.13754647
3-C3_ap - 40.d	2.829	0.059	0.08453	0.0026	0.2412	0.0054	0.21436	0.28861	1366	15	523.1	16	D	61.7057101
3-C3_ap - 41.d	2.78	0.063	0.08302	0.0026	0.2435	0.0063	0.095394	0.37286	1348	17	514.1	15	D	61.8620178
3-C3_ap - 42.d	3.018	0.063	0.0866	0.0027	0.2498	0.0056	0.16701	0.38602	1415	17	535.1	16	D	62.18374558
3-C3_ap - 43.d	2.808	0.064	0.0823	0.0026	0.2442	0.0052	0.30498	0.32504	1361	18	511	15	D	62.45407788
3-C3_ap - 44.d	2.896	0.076	0.08577	0.0027	0.2457	0.0061	0.11944	0.061899	1378	20	530.4	16	D	61.50943396
3-C3_ap - 45.d	2.705	0.057	0.0842	0.0027	0.2318	0.0056	0.098031	0.41993	1328	16	521.1	16	D	60.76054217
3-C3_ap - 46.d	2.631	0.063	0.0815	0.0026	0.2291	0.0054	0.33199	0.24593	1307	18	504.9	16	D	61.36954858
3-C3_ap - 47.d	2.673	0.055	0.0828	0.0027	0.2347	0.0055	0.23655	0.34492	1322	16	512.7	16	D	61.21785174
3-C3_ap - 48.d	2.629	0.057	0.0826	0.0026	0.2299	0.0056	-0.041374	0.49765	1310	15	511.3	16	D	60.96946565
3-C3_ap - 49.d	2.519	0.061	0.0825	0.0026	0.2214	0.0052	0.35144	0.17183	1275	18	511.2	15	D	59.90588235
3-C3_ap - 50.d	2.765	0.054	0.084	0.0026	0.2404	0.0055	0.087541	0.47318	1349	15	519.7	16	D	61.47516679
25B-3a-C1_ap - 1.d	5.06	0.25	0.1018	0.0043	0.353	0.021	-0.016869	0.53177	1831	42	625	25	D	65.86564719
25B-3a-C1_ap - 2.d	4.8	0.18	0.1007	0.0041	0.347	0.015	0.22288	0.45053	1787	31	618	24	D	65.41689983
25B-3a-C1_ap - 3.d	6.38	0.29	0.1167	0.0053	0.393	0.024	0.039323	0.60101	2022	40	711	30	D	64.83679525
25B-3a-C1_ap - 4.d	7.7	0.48	0.1306	0.0064	0.424	0.031	0.070934	0.55699	2184	58	791	36	D	63.78205128
25B-3a-C1_ap - 5.d	5	0.37	0.1002	0.006	0.348	0.029	-0.017613	0.5273	1809	64	615	35	D	66.00331675
25B-3a-C1_ap - 6.d	4.08	0.2	0.0971	0.0046	0.304	0.016	0.39733	0.43301	1663	38	597	27	D	64.10102225
25B-3a-C1_ap - 7.d	6.32	0.31	0.1097	0.005	0.426	0.017	0.43876	0.20017	2014	44	670	29	D	66.73286991
25B-3a-C1_ap - 8.d	4.2	0.25	0.0962	0.0047	0.312	0.017	0.4168	0.16827	1675	45	595	27	D	64.47761194
25B-3a-C1_ap - 9.d	4.48	0.19	0.0988	0.0038	0.331	0.015	0.31141	0.33901	1721	34	607	22	D	64.72980825
25B-3a-C1_ap - 10.d	4.68	0.26	0.0974	0.0042	0.335	0.016	0.65956	0.38097	1764	44	599	24	D	66.0430839
25B-3a-C1_ap - 11.d	5.02	0.2	0.1043	0.0046	0.35	0.018	0.19575	0.56001	1816	35	639	27	D	64.81277533
25B-3a-C1_ap - 12.d	4.95	0.24	0.1012	0.0047	0.362	0.022	0.15152	0.53701	1811	43	621	28	D	65.70955273
25B-3a-C1_ap - 14.d	4.11	0.19	0.0939	0.0049	0.328	0.02	0.11442	0.52485	1650	39	582	30	D	64.72727273
25B-3a-C2_ap1 - 1.d	1.85	0.12	0.076	0.003	0.172	0.011	0.19248	0.29477	1064	39	474	17	D	55.45112782
25B-3a-C2_ap1 - 2.d	2.06	0.13	0.0786	0.0036	0.191	0.013	0.23815	0.3041	1148	40	487	21	D	57.57839721
25B-3a-C2_ap1 - 3.d	1.94	0.12	0.075	0.003	0.191	0.012	0.14731	0.2768	1085	43	466	18	D	57.05069124
25B-3a-C2_ap1 - 4.d	2.12	0.14	0.0757	0.0032	0.207	0.014	-0.065741	0.53299	1157	45	470	19	D	59.37770095

25B-3a-C2_ap1 - 5.d	2.22	0.13	0.0795	0.0036	0.209	0.014	0.1965	0.35639	1192	41	493	22	D	58.6409396
25B-3a-C2_ap1 - 6.d	2.05	0.16	0.0771	0.0034	0.189	0.015	0.19481	0.26047	1133	52	479	21	D	57.72285966
25B-3a-C2_ap1 - 7.d	2.31	0.12	0.0794	0.0032	0.214	0.013	0.020207	0.51362	1223	35	492	19	D	59.77105478
25B-3a-C2_ap1 - 8.d	1.89	0.13	0.0757	0.0031	0.183	0.012	0.34917	0.01151	1075	44	470	18	D	56.27906977
25B-3a-C2_ap2 - 1.d	1.87	0.14	0.0745	0.0031	0.185	0.014	0.62925	0.065359	1059	49	463	19	D	56.27950897
25B-3a-C2_ap2 - 2.d	1.852	0.077	0.0755	0.0034	0.1782	0.0076	0.075295	0.57761	1060	27	469	21	D	55.75471698
25B-3a-C2_ap2 - 3.d	2.09	0.11	0.0779	0.0031	0.195	0.012	0.21963	0.27581	1138	37	483	19	D	57.55711775
25B-3a-C2_ap2 - 4.d	1.95	0.12	0.0765	0.0029	0.188	0.012	0.15174	0.26489	1112	36	475	17	D	57.28417266
25B-3a-C2_ap2 - 5.d	1.66	0.1	0.0754	0.0041	0.165	0.013	0.1888	0.53609	990	40	469	25	D	52.62626263
25B-3a-C2_ap2 - 6.d	2.05	0.12	0.0757	0.003	0.198	0.01	0.51466	-0.12702	1129	40	470	18	D	58.37023915
25B-3a-C3_ap1 - 1.d	6.11	0.86	0.116	0.011	0.365	0.037	0.63329	0.070373	1960	120	707	64	D	63.92857143
25B-3a-C3_ap1 - 3.d	5.26	0.56	0.1056	0.0076	0.356	0.029	0.33314	0.30706	1863	82	647	44	D	65.27106817
25B-3a-C3_ap1 - 4.d	7.2	1.3	0.141	0.033	0.38	0.098	0.1517	0.57159	2130	160	850	180	D	60.09389671
25B-3a-C3_ap1 - 6.d	3.51	0.2	0.0862	0.0058	0.293	0.019	0.58975	0.4488	1524	45	532	34	D	65.09186352
25B-3a-C3_ap1 - 7.d	3.9	0.34	0.0943	0.0062	0.29	0.026	0.32993	0.30789	1612	69	580	37	D	64.01985112
25B-3a-C3_ap2 - 1.d	3.13	0.2	0.092	0.0043	0.256	0.018	0.065019	0.49414	1436	47	567	25	D	60.51532033
25B-3a-C3_ap2 - 2.d	3.98	0.27	0.0905	0.0048	0.321	0.022	0.30981	0.3078	1626	54	558	28	D	65.68265683
25B-3a-C3_ap2 - 3.d	3.3	0.24	0.0875	0.0042	0.271	0.018	0.27207	0.26283	1466	58	540	25	D	63.16507503
25B-3a-C3_ap2 - 4.d	4.24	0.33	0.0948	0.0051	0.31	0.023	0.26735	0.46806	1679	63	584	30	D	65.2173913
25B-3a-C3_ap2 - 5.d	2.69	0.3	0.085	0.0045	0.236	0.025	0.24002	0.17327	1336	87	525	27	D	60.70359281
25B-3a-C3_ap2 - 6.d	2.91	0.26	0.0873	0.0047	0.239	0.02	0.52651	-0.062922	1364	64	539	28	D	60.48387097
25B-3a-C4_ap - 1.d	2.75	0.23	0.0885	0.0049	0.223	0.018	0.56475	0.1125	1334	63	547	29	D	58.99550225
25B-3a-C4_ap - 2.d	1.76	0.13	0.0748	0.0038	0.171	0.0078	0.84612	-0.091431	1014	40	465	23	D	54.14201183
25B-3a-C4_ap - 3.d	2.39	0.14	0.0815	0.0041	0.218	0.012	0.63308	0.1755	1234	40	505	24	D	59.07617504
25B-3a-C4_ap - 4.d	2.123	0.091	0.0766	0.003	0.1996	0.0094	0.46587	0.23229	1153	29	476	18	D	58.71639202
25B-3a-C4_ap - 5.d	1.866	0.099	0.0751	0.0029	0.178	0.011	0.3706	0.031452	1065	35	467	17	D	56.15023474
25B-3a-C4_ap - 6.d	2.33	0.12	0.079	0.004	0.215	0.013	0.49149	0.29083	1217	35	490	24	D	59.73705834
25B-3a-C4_ap - 7.d	1.88	0.11	0.0767	0.0039	0.177	0.013	0.25138	0.54712	1070	40	476	23	D	55.51401869
25B-3a-C4_ap - 8.d	2.1	0.12	0.0752	0.0027	0.201	0.013	0.3935	0.073608	1145	39	467.1	16	D	59.20524017
25B-3a-C4_ap - 9.d	2.16	0.12	0.0769	0.0032	0.205	0.011	0.3943	0.17861	1164	39	478	19	D	58.9347079
25B-3a-C4_ap - 10.d	2.034	0.098	0.079	0.0029	0.186	0.011	0.12088	0.31344	1124	33	490	17	D	56.40569395

25B-3a-C4_ap - 11.d	2.128	0.099	0.0773	0.0036	0.2015	0.0078	0.65508	0.11217	1162	29	480	21	D	58.6919105
25B-3a-C4_ap - 12.d	2.29	0.18	0.0798	0.0038	0.204	0.01	0.87878	-0.53145	1199	55	495	22	D	58.71559633
25B-3a-C4_ap - 13.d	2.16	0.12	0.0808	0.0035	0.1954	0.0094	0.22711	0.24045	1176	34	501	21	D	57.39795918
25B-3a-C4_ap - 14.d	2.76	0.14	0.0864	0.0036	0.228	0.012	0.40577	0.24405	1341	39	534	21	D	60.17897092
25B-3a-C4_ap - 15.d	2.137	0.093	0.0778	0.003	0.1977	0.0086	0.55005	0.093324	1158	30	483	18	D	58.29015544
25B-3a-C4_ap - 17.d	7.8	1.3	0.138	0.014	0.39	0.041	0.94158	-0.8203	2190	160	832	81	D	62.00913242
25B-3a-C4_ap - 19.d	3.51	0.37	0.1002	0.0076	0.251	0.016	0.84408	-0.36549	1514	77	615	44	D	59.37912814
25B-3a-C4_ap - 20.d	2.55	0.16	0.0801	0.0032	0.2233	0.0099	0.83957	-0.17869	1282	45	497	19	D	61.2324493
25B-3a-C4_ap - 21.d	2.37	0.11	0.0788	0.0037	0.217	0.012	0.43398	0.12567	1230	35	489	22	D	60.24390244
25B-3a-C4_ap - 22.d	2.6	0.1	0.0809	0.0034	0.2324	0.0092	0.50535	0.27766	1298	28	502	20	D	61.32511556
25B-3a-C4_ap - 23.d	2.33	0.15	0.0784	0.0032	0.21	0.012	0.24348	0.2148	1215	45	486	19	D	60
25B-3a-C4_ap - 25.d	2.35	0.1	0.0784	0.0032	0.2155	0.0099	0.7258	-0.19319	1225	31	486	19	D	60.32653061
25B-3a-C4_ap - 26.d	2.38	0.16	0.0799	0.003	0.209	0.015	-0.1331	0.44349	1230	49	495	18	D	59.75609756
25B-3a-C4_ap - 27.d	2.18	0.14	0.0768	0.0032	0.207	0.012	0.19247	0.19751	1170	46	477	19	D	59.23076923
25B-3a-C4_ap - 28.d	2.29	0.12	0.0768	0.0034	0.221	0.015	0.45344	-0.064402	1224	47	477	20	D	61.02941176
25B-3a-C4_ap - 29.d	2.99	0.23	0.0833	0.004	0.255	0.021	0.21681	0.26645	1397	59	521	21	D	62.70579814
25B-3a-C4_ap - 30.d	3.5	0.34	0.097	0.0083	0.279	0.026	0.76922	-0.26985	1580	110	596	48	D	62.27848101
25B-3a-C4_ap - 31.d	2.61	0.12	0.0794	0.0036	0.232	0.011	0.27924	0.55492	1302	32	492	22	D	62.21198157
25B-3a-C4_ap - 32.d	2.23	0.15	0.0798	0.0036	0.2	0.015	0.18417	0.33928	1185	47	495	21	D	58.2278481
25B-3a-C4_ap - 33.d	3.31	0.35	0.0963	0.0081	0.251	0.014	0.88416	-0.39061	1482	85	592	48	D	60.05398111
25B-3a-C4_ap - 34.d	2.48	0.17	0.0789	0.0034	0.22	0.011	0.7838	0.11911	1260	48	489	21	D	61.19047619
25B-3a-C4_ap - 35.d	5.09	0.51	0.1109	0.008	0.318	0.025	0.41505	0.24653	1843	76	677	46	D	63.26641346
25B-3b-C7_ap - 1.d	2.51	0.15	0.0796	0.0035	0.228	0.013	0.52155	0.020152	1279	42	494	21	D	61.37607506
25B-3b-C7_ap - 2.d	3.14	0.15	0.0865	0.0035	0.257	0.015	-0.13798	0.56197	1439	37	535	21	D	62.82140375
25B-3b-C7_ap - 3.d	2.94	0.15	0.084	0.0035	0.25	0.013	0.40165	0.49896	1405	39	520	21	D	62.98932384
25B-3b-C7_ap - 4.d	3.1	0.12	0.0857	0.0039	0.2662	0.0085	0.63511	0.30441	1430	32	530	23	D	62.93706294
25B-3b-C7_ap - 5.d	3.02	0.14	0.0835	0.0032	0.259	0.016	0.47466	0.31405	1409	36	517	19	D	63.30731015
25B-3b-C7_ap - 6.d	3.1	0.17	0.0867	0.0038	0.256	0.011	0.6163	-0.054138	1426	41	536	23	D	62.41234222
25B-3b-C7_ap - 7.d	3.29	0.17	0.0862	0.0037	0.278	0.012	0.67993	-0.13604	1485	35	533	22	D	64.10774411
25B-3b-C7_ap - 9.d	3.67	0.21	0.0902	0.0032	0.291	0.013	0.43762	0.020105	1558	44	557	19	D	64.24903723
25B-3b-C7_ap - 10.d	4.78	0.26	0.1011	0.0055	0.335	0.015	0.71932	0.097766	1774	45	621	32	D	64.99436302

25B-3b-C7_ap - 11.d	3.18	0.16	0.0852	0.0035	0.267	0.013	0.26946	0.33959	1456	42	527	21	D	63.80494505
25B-3b-C7_ap - 12.d	2.68	0.14	0.0821	0.0055	0.25	0.016	0.80961	0.080754	1319	39	508	32	D	61.48597422
25B-3b-C7_ap - 13.d	2.925	0.098	0.0816	0.0029	0.26	0.011	0.31886	0.27934	1394	23	506	17	D	63.70157819
25B-3b-C7_ap - 14.d	2.87	0.16	0.0848	0.0042	0.25	0.016	0.60035	-0.0048308	1369	42	524	25	D	61.72388605
25B-3b-C7_ap - 15.d	3.16	0.14	0.0846	0.003	0.267	0.013	-0.088606	0.52763	1450	32	523.4	18	D	63.90344828
25B-3b-C7_ap - 16.d	3.6	0.19	0.0885	0.0037	0.29	0.018	0.064628	0.59316	1543	42	546	22	D	64.61438756
25B-3b-C7_ap - 17.d	3.63	0.18	0.0893	0.0036	0.291	0.014	0.44185	0.25461	1550	40	551	21	D	64.4516129
25B-3b-C7_ap - 18.d	3.67	0.16	0.0914	0.004	0.284	0.012	0.31105	0.56176	1561	33	564	24	D	63.86931454
25B-3b-C7_ap - 19.d	3.52	0.24	0.0876	0.0035	0.283	0.016	0.55695	-0.052126	1523	53	541	21	D	64.47800394
25B-3b-C7_ap - 20.d	3.35	0.18	0.0857	0.004	0.279	0.012	0.70737	-0.010541	1487	43	530	24	D	64.35776732
25B-3b-C7_ap - 21.d	3.42	0.19	0.0845	0.0033	0.294	0.012	0.6567	-0.037241	1504	43	523	20	D	65.22606383
25B-3b-C7_ap - 22.d	3.13	0.14	0.086	0.0043	0.268	0.012	0.50084	0.37943	1435	35	532	25	D	62.92682927
25B-3b-C7_ap - 23.d	3.24	0.17	0.085	0.0039	0.274	0.016	0.1089	0.50964	1469	43	526	23	D	64.1933288
25B-3b-C7_ap - 24.d	2.74	0.14	0.0815	0.0041	0.243	0.01	0.82549	-0.32149	1335	37	505	24	D	62.17228464
25B-3b-C7_ap - 25.d	3.15	0.13	0.0849	0.0033	0.273	0.013	0.6469	0.046486	1442	31	525	19	D	63.59223301
25B-3b-C7_ap - 26.d	5.8	1.5	0.113	0.014	0.38	0.052	0.91548	-0.38816	1940	260	688	82	D	64.53608247
25B-3b-C7_ap - 27.d	3.57	0.18	0.0894	0.0035	0.293	0.017	0.10507	0.52016	1546	42	552	21	D	64.29495472
25B-3b-C7_ap - 28.d	3.66	0.25	0.0899	0.0042	0.289	0.017	0.66372	0.058888	1563	54	555	24	D	64.49136276
25B-3b-C7_ap - 29.d	3.51	0.19	0.0891	0.0038	0.28	0.015	0.28377	0.33082	1525	42	550	23	D	63.93442623
25B-3b-C7_ap - 30.d	3.5	0.14	0.0893	0.0037	0.284	0.013	0.29685	0.54504	1524	32	551	22	D	63.84514436
25B-3b-C7_ap - 32.d	3.58	0.19	0.0893	0.004	0.293	0.019	0.23393	0.42194	1540	42	551	24	D	64.22077922
25B-3b-C7_ap - 33.d	2.81	0.13	0.082	0.0039	0.245	0.01	0.52182	0.30271	1353	35	508	23	D	62.45380636
25B-3b-C7_ap - 34.d	3.49	0.28	0.0891	0.0047	0.275	0.016	0.71489	-0.051976	1513	58	550	28	D	63.6483807
25B-3b-C7_ap - 35.d	2.93	0.22	0.0811	0.0039	0.261	0.016	0.38457	0.13123	1397	53	503	23	D	63.99427344
25B-3b-C7_ap - 36.d	3.03	0.16	0.0841	0.0041	0.256	0.013	0.32824	0.39614	1411	41	520	24	D	63.14670446
25B-3b-C7_ap - 37.d	3.14	0.22	0.0844	0.005	0.261	0.013	0.66786	-0.019901	1435	54	522	30	D	63.62369338
25B-3b-C7_ap - 38.d	2.59	0.15	0.0799	0.0031	0.236	0.01	0.70162	-0.15347	1292	42	496	19	D	61.60990712
25B-3b-C7_ap - 39.d	2.58	0.15	0.0793	0.0033	0.234	0.012	0.43518	0.073859	1288	43	492	20	D	61.80124224
25B-3b-C7_ap - 40.d	2.71	0.15	0.0812	0.0033	0.246	0.014	0.48667	0.24638	1325	42	503	20	D	62.03773585
25B-3b-C7_ap - 41.d	3.58	0.23	0.0909	0.0052	0.284	0.015	0.27506	0.49073	1537	51	560	31	D	63.56538712
25B-3b-C7_ap - 42.d	3.45	0.16	0.0876	0.004	0.276	0.011	0.186	0.53688	1511	36	541	24	D	64.19589676

25B-3b-C7_ap - 43.d	3.29	0.14	0.0848	0.0033	0.284	0.014	0.14367	0.46879	1483	31	525	20	D	64.59878624
25B-3b-C7_ap - 44.d	2.5	0.17	0.0747	0.0041	0.241	0.012	0.75665	0.1013	1266	50	464	25	D	63.34913112
25B-3b-C7_ap - 45.d	2.35	0.16	0.0765	0.003	0.22	0.012	0.75719	0.18184	1220	46	475	18	D	61.06557377

C = concordant, NC = near concordant, D = discordant, RD = reversely discordant.

Apatite geochronology standards

Standard	Type	207/235	2σ	206/238	2σ	207/206	2σ	ErrorCorr 6/38vs7/35	ErrorCorr 38/6vs7/6	207/235 age	2σ	206/238 age	2σ	Concordant?	%discordance
MAD - 1.d	Primary	0.626	0.077	0.0775	0.0029	0.0582	0.0074	-0.01052	0.22355	497	55	481	18	C	3.219315895
MAD - 2.d	Primary	0.593	0.074	0.0762	0.0029	0.0564	0.0076	-0.24213	0.42168	468	46	473	18	C	-1.068376068
MAD - 3.d	Primary	0.594	0.071	0.0735	0.0026	0.0575	0.0073	-0.27514	0.42196	465	43	457	16	C	1.720430108
MAD - 4.d	Primary	0.571	0.074	0.0769	0.0027	0.0542	0.007	-0.12588	0.29687	455	49	477.3	16	C	-4.901098901
MAD - 5.d	Primary	0.593	0.092	0.0753	0.0028	0.0574	0.0091	0.063975	0.090343	445	63	468	17	C	-5.168539326
MAD - 6.d	Primary	0.636	0.09	0.0762	0.0028	0.0606	0.0086	-0.12548	0.28167	485	58	473	17	C	2.474226804
MAD - 7.d	Primary	0.613	0.069	0.0772	0.0028	0.0587	0.007	-0.37541	0.51492	471	44	479	17	C	-1.6985138
MAD - 8.d	Primary	0.604	0.08	0.0782	0.0028	0.0563	0.0073	-0.05846	0.16457	468	52	485	17	C	-3.632478632
MAD - 9.d	Primary	0.59	0.068	0.0749	0.0027	0.0552	0.0067	-0.14375	0.32744	457	44	465.6	16	C	-1.881838074
MAD - 10.d	Primary	0.629	0.087	0.0771	0.0028	0.0624	0.009	-0.21733	0.3735	490	57	478.9	17	C	2.265306122
MAD - 11.d	Primary	0.605	0.077	0.0761	0.0026	0.0591	0.0075	-0.01288	0.11439	468	51	472.6	16	C	-0.982905983
MAD - 12.d	Primary	0.601	0.077	0.0759	0.0031	0.0551	0.0078	-0.092	0.31609	475	47	471	18	C	0.842105263
MAD - 13.d	Primary	0.591	0.071	0.0762	0.0028	0.0564	0.0072	-0.06159	0.24256	492	47	473	17	C	3.861788618
MAD - 14.d	Primary	0.59	0.08	0.0766	0.0027	0.0569	0.0084	-0.11588	0.30371	460	50	475.8	16	C	-3.434782609
MAD - 15.d	Primary	0.607	0.075	0.0774	0.0028	0.0564	0.0069	0.1725	0.030963	480	46	481	17	C	-0.208333333
MAD - 16.d	Primary	0.582	0.06	0.0761	0.003	0.0572	0.006	0.056991	0.19498	466	39	473	18	C	-1.502145923
MAD - 17.d	Primary	0.613	0.08	0.0759	0.0027	0.0578	0.0076	0.038839	0.092386	473	52	472	16	C	0.21141649
MAD - 18.d	Primary	0.626	0.07	0.0781	0.0027	0.0569	0.0064	-0.28145	0.40895	486	45	484.7	16	C	0.267489712
MAD - 19.d	Primary	0.6	0.066	0.0776	0.0028	0.0568	0.007	-0.33083	0.49673	476	45	482	17	C	-1.260504202
MAD - 20.d	Primary	0.572	0.076	0.0743	0.0025	0.0563	0.0074	-0.19358	0.32635	440	51	462.2	15	C	-5.045454545
MAD - 21.d	Primary	0.592	0.087	0.0762	0.0027	0.0557	0.0081	-0.06873	0.22057	479	53	473.3	16	C	1.189979123
MAD - 22.d	Primary	0.628	0.079	0.0754	0.0027	0.0601	0.0076	0.098359	0.041346	476	50	468.8	16	C	1.512605042
McClure - 1.d	Secondary	3.8	0.24	0.1139	0.0055	0.246	0.017	0.21638	0.30143	1587	54	695	32	D	56.20667927

McClure - 2.d	Secondary	4.52	0.24	0.1209	0.0058	0.269	0.019	0.15194	0.45411	1728	46	735	33	D	57.46527778
McClure - 3.d	Secondary	4.17	0.32	0.1163	0.0057	0.264	0.023	-0.01307	0.23595	1637	64	708	33	D	56.75015272
McClure - 4.d	Secondary	2.55	0.13	0.105	0.0039	0.1732	0.009	0.086255	0.36257	1281	36	644	23	D	49.72677596
McClure - 5.d	Secondary	4.06	0.24	0.1151	0.0046	0.261	0.014	0.41402	0.13939	1643	48	702	27	D	57.27328058
McClure - 6.d	Secondary	2.99	0.13	0.1082	0.0039	0.2032	0.0096	0.19505	0.3179	1397	34	662	23	D	52.61274159
McClure - 7.d	Secondary	4.41	0.22	0.1178	0.005	0.269	0.015	0.09433	0.42995	1708	40	717	29	D	58.02107728
McClure - 8.d	Secondary	2.08	0.11	0.0985	0.0039	0.1562	0.0093	0.009003	0.45478	1148	38	605	23	D	47.29965157
McClure - 9.d	Secondary	2.56	0.17	0.1072	0.0043	0.178	0.013	0.017532	0.39488	1299	48	656	25	D	49.49961509
McClure - 10.d	Secondary	3.84	0.2	0.1139	0.0044	0.251	0.014	0.29899	0.30491	1606	43	695	25	D	56.72478207
McClure - 11.d	Secondary	3.98	0.2	0.1147	0.0049	0.251	0.011	0.29023	0.44262	1628	39	699	28	D	57.06388206
McClure - 12.d	Secondary	2.49	0.15	0.0996	0.004	0.183	0.011	0.14589	0.35718	1274	44	612	23	D	51.96232339
McClure - 13.d	Secondary	5.01	0.29	0.1194	0.0046	0.298	0.018	0.14303	0.36853	1810	49	727	27	D	59.83425414
McClure - 14.d	Secondary	2.45	0.17	0.102	0.0041	0.171	0.01	0.28663	0.16244	1247	47	626	24	D	49.79951885
McClure - 15.d	Secondary	3.48	0.18	0.1118	0.0042	0.225	0.012	0.20465	0.15624	1518	40	683	24	D	55.00658762
McClure - 16.d	Secondary	3.53	0.18	0.1101	0.0043	0.231	0.013	0.14896	0.37215	1526	42	673	25	D	55.89777195
McClure - 17.d	Secondary	3.27	0.16	0.1068	0.0043	0.223	0.012	0.13569	0.34891	1468	39	654	25	D	55.44959128
McClure - 18.d	Secondary	3.53	0.18	0.1091	0.0043	0.236	0.013	0.129	0.37062	1550	41	667	25	D	56.96774194
McClure - 19.d	Secondary	2.61	0.12	0.1008	0.0038	0.1884	0.0098	0.1205	0.37319	1309	37	619	22	D	52.71199389
McClure - 20.d	Secondary	2.74	0.2	0.1003	0.0042	0.196	0.012	0.35505	0.15834	1339	52	616	24	D	53.99551904
McClure - 21.d	Secondary	3.01	0.2	0.1038	0.0045	0.205	0.011	0.49938	0.058352	1392	49	636	26	D	54.31034483
McClure - 22.d	Secondary	5.03	0.27	0.1214	0.0047	0.303	0.015	0.48843	-0.00541	1815	47	738	27	D	59.33884298
401 - 1.d	Secondary	0.793	0.08	0.0871	0.0036	0.0658	0.0066	0.13892	0.1339	584	46	538	21	C	7.876712329
401 - 2.d	Secondary	0.71	0.082	0.0885	0.0035	0.0615	0.0062	0.16537	0.099332	565	46	546	21	C	3.362831858
401 - 3.d	Secondary	0.84	0.091	0.088	0.0035	0.065	0.0075	-0.09617	0.39674	606	51	544	21	C	10.2310231
401 - 4.d	Secondary	0.765	0.069	0.0896	0.004	0.0635	0.0056	0.15172	0.15303	586	39	553	23	C	5.631399317
401 - 5.d	Secondary	0.781	0.082	0.0894	0.0039	0.0636	0.0065	0.25505	-0.03473	582	49	552	23	C	5.154639175
401 - 6.d	Secondary	0.725	0.078	0.0887	0.0038	0.0583	0.0064	0.16411	0.15019	546	43	547	23	C	-0.183150183
401 - 7.d	Secondary	0.713	0.095	0.0884	0.004	0.0593	0.0082	-0.09956	0.3467	530	57	546	23	C	-3.018867925
401 - 8.d	Secondary	0.71	0.08	0.0906	0.0035	0.0572	0.0064	0.091367	0.11839	548	48	559	21	C	-2.00729927
401 - 9.d	Secondary	0.635	0.076	0.0874	0.0035	0.055	0.0068	0.04687	0.16224	518	48	540	21	C	-4.247104247
401 - 10.d	Secondary	0.788	0.079	0.0848	0.0034	0.0674	0.007	-0.06085	0.32186	601	43	524	20	D	12.81198003

401 - 11.d	Secondary	0.79	0.083	0.0882	0.0036	0.0659	0.0069	0.076044	0.16665	582	48	545	21	C	6.357388316
401 - 12.d	Secondary	0.831	0.073	0.0853	0.0032	0.0683	0.0064	0.058899	0.20377	609	39	527	19	D	13.46469622
401 - 13.d	Secondary	0.802	0.084	0.0837	0.0033	0.0684	0.0079	0.018059	0.20794	597	47	518	20	D	13.23283082
401 - 14.d	Secondary	0.735	0.078	0.0835	0.003	0.063	0.0067	0.15472	0.07166	543	47	517	18	C	4.788213628
401 - 15.d	Secondary	0.752	0.074	0.0855	0.0037	0.0614	0.0062	0.098307	0.29629	561	42	531	22	C	5.347593583
401 - 16.d	Secondary	0.79	0.12	0.0861	0.004	0.0652	0.0094	0.23484	-0.01088	567	70	532	24	C	6.172839506
401 - 17.d	Secondary	0.738	0.075	0.0835	0.0036	0.0625	0.0068	0.04037	0.26552	547	44	517	21	C	5.484460695
401 - 18.d	Secondary	0.779	0.072	0.0845	0.0035	0.0657	0.0071	-0.07232	0.32157	572	42	523	21	C	8.566433566
401 - 19.d	Secondary	0.832	0.088	0.0867	0.0041	0.0707	0.0074	0.30087	0.065756	610	50	538	24	D	11.80327869
401 - 20.d	Secondary	0.846	0.085	0.0909	0.0039	0.07	0.0069	0.22314	0.051197	621	47	560	23	D	9.822866345
401 - 21.d	Secondary	0.715	0.074	0.0849	0.0037	0.0623	0.0073	-0.05213	0.41459	551	44	525	22	C	4.718693285
401 - 22.d	Secondary	0.759	0.092	0.0857	0.0035	0.0646	0.008	0.129	0.26067	584	50	530	21	C	9.246575342

C = concordant, NC = near concordant, D = discordant, RD = reversely discordant.

Apatite trace elements

	Chondrite normalised REEs + Y																
Sample	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Y	Ho	Er	Tm	Yb	Lu	Total HREEs	Eu anomaly
3-C2_ap - 1.d	462.447	892.822	1292.02	1687.08	2399.32	727.531	2221.60	1654.29	1310.56	136	946.520	731.2	494.331	360.248	265.447	7130.66	0.31511
	2574	186	5862	9716	4324	0835	804	3629	9106	8	1465	5	9838	4472	1545	0467	8104
3-C2_ap - 2.d	475.949	922.675	1322.19	1722.53	2450.67	728.419	2223.11	1669.80	1295.52	135	945.970	723.1	492.712	350.931	272.357	7101.43	0.31207
	3671	367	8276	8293	5676	1829	5578	6094	8455	1	696	25	5506	677	7236	2197	3889
3-C2_ap - 3.d	489.873	953.833	1377.15	1787.30	2487.83	749.023	2268.84	1679.77	1328.86	137	958.424	735.6	498.785	365.838	273.983	7213.29	0.31526
	4177	6052	5172	8534	7838	0906	4221	8393	1789	2	9084	25	4251	5093	7398	7765	9409
3-C2_ap - 4.d	508.860	978.140	1391.16	1827.35	2505.40	745.115	2261.30	1668.69	1296.34	135	939.560	726.2	493.927	357.763	265.447	7102.98	0.31304
	7595	2936	3793	2298	5405	4529	6533	8061	1463	5	4396	5	1255	9752	1545	8219	3612
3-C2_ap - 5.d	529.113	1014.19	1418.10	1844.42	2560.81	765.541	2247.23	1680.05	1328.45	135	957.326	735.6	509.716	357.763	269.105	7193.04	0.31912
	9241	2496	3448	0131	0811	7407	6181	5402	5285	5	0073	25	5992	9752	6911	7959	1283
3-C2_ap - 6.d	518.143	997.553	1422.41	1840.26	2549.32	760.568	2260.80	1700	1327.23	137	953.113	740	501.214	365.217	264.227	7222.00	0.31680
	4599	0179	3793	2582	4324	3837	402		5772	1	5531		5749	3913	6423	8934	6632
3-C2_ap - 7.d	515.611	995.106	1417.02	1829.32	2555.40	762.699	2242.21	1693.90	1331.70	137	948.717	735	499.190	364.596	275.609	7225.72	0.31862
	8143	0359	5862	1663	5405	8224	1055	5817	7317	7	9487		2834	2733	7561	7396	9143
3-C2_ap - 8.d	506.329	967.862	1379.31	1778.99	2489.18	757.548	2259.79	1687.81	1319.51	138	954.578	746.2	503.643	372.049	272.764	7237.61	0.31940
	1139	969	0345	3435	9189	8455	8995	1634	2195	1	7546	5	7247	6894	2276	0226	873
3-C2_ap - 9.d	464.556	907.504	1294.18	1711.15	2481.08	711.190	2216.08	1652.07	1300	135	941.575	728.1	497.165	363.354	273.577	7113.87	0.30330
	962	0783	1034	9737	1081	0533	0402	7562		8	0916	25	9919	0373	2358	4919	002
3-C2_ap - 10.d	405.485	828.058	1212.28	1619.25	2359.45	715.275	2210.05	1673.13	1314.22	137	964.285	749.3	513.765	362.111	264.227	7217.12	0.31323
	2321	7276	4483	6018	9459	3108	0251	0194	7642	6	7143	75	1822	8012	6423	3176	1839

3-C2_ap - 11.d	502.953 5865	962.642 7406	1365.30 1724	1759.29 9781	2455.40 5405	715.808 1705	2197.98 995	1653.73 9612	1278.45 5285	134 5	936.630 0366	712.5	490.283 4008	354.658 3851	268.699 187	7039.96 5906	0.30812 1637
3-C2_ap - 12.d	508.860 7595	975.530 1794	1383.62 069	1806.12 6915	2529.05 4054	742.451 1545	2261.80 9045	1706.64 8199	1338.61 7886	138 8	961.355 3114	735.6 25	493.117 4089	365.217 3913	271.544 7154	7260.12 5913	0.31042 7983
3-C2_ap - 13.d	515.189 8734	995.432 3002	1411.63 7931	1835.88 6214	2544.59 4595	742.451 1545	2277.38 6935	1709.14 1274	1342.68 2927	138 2	970.512 8205	741.8 75	491.093 1174	371.428 5714	266.666 6667	7275.40 0377	0.30841 8325
3-C2_ap - 14.d	459.071 73	889.885 8075	1280.17 2414	1678.33 698	2364.18 9189	701.776 1989	2183.41 7085	1642.65 928	1285.77 2358	134 3	943.406 5934	725.6 25	492.712 5506	357.142 8571	273.170 7317	7063.48 937	0.30887 9559
3-C2_ap - 15.d	400.421 9409	777.324 633	1117.45 6897	1484.90 1532	2130.40 5405	657.015 9858	2030.15 0754	1571.74 5152	1259.34 9593	133 7	918.864 4689	713.7 5	489.878 5425	367.080 7453	276.016 2602	6933.68 4763	0.31592 2578
3-C2_ap - 16.d	410.970 4641	800.489 3964	1149.78 4483	1514.22 3195	2181.08 1081	658.792 1847	2054.27 1357	1574.79 2244	1240.65 0407	131 9	923.626 3736	713.7 5	478.542 5101	355.279 5031	265.853 6585	6871.49 4696	0.31123 1559
3-C2_ap - 17.d	446.835 443	859.216 9657	1223.06 0345	1611.59 7374	2295.27 027	680.106 5719	2102.51 2563	1596.95 2909	1262.19 5122	132 6	907.692 3077	708.1 25	479.757 085	354.658 3851	268.699 187	6904.07 9995	0.30959 2732
3-C2_ap - 18.d	476.793 2489	912.234 9103	1295.25 8621	1696.06 1269	2350	708.348 135	2162.31 1558	1637.67 313	1267.47 9675	133 8	934.432 2344	713.7 5	488.663 9676	357.142 8571	268.292 6829	7005.43 4547	0.31423 4373
3-C2_ap - 19.d	452.742 616	893.800 9788	1281.25	1680.52 5164	2337.16 2162	688.454 7069	2150.75 3769	1591.41 2742	1247.96 748	132 0	925.641 0256	709.3 75	463.967 6113	342.857 1429	255.691 0569	6856.91 2059	0.30706 8738
3-C2_ap - 20.d	448.945 1477	877.487 7651	1248.92 2414	1640.04 3764	2356.08 1081	687.566 6075	2136.68 3417	1603.04 7091	1274.39 0244	133 9	926.923 0769	723.7 5	479.352 2267	359.006 2112	270.731 7073	6976.20 0557	0.30644 2905
3-C3_ap - 1.d	532.489 4515	1067.21 044	1553.87 931	1995.62 3632	2577.02 7027	738.721 1368	1844.72 3618	1111.08 0332	768.699 187	798 .7	532.967 033	414.3 75	316.194 332	265.217 3913	205.284 5528	4412.51 7829	0.33880 9348
3-C3_ap - 2.d	442.194 0928	914.681 8923	1368.53 4483	1789.93 4354	2464.86 4865	722.024 8668	1797.48 7437	1124.93 0748	775.203 252	816 .3	549.267 3993	425	334.817 8138	266.459 6273	211.788 6179	4503.76 7458	0.34302 2546
3-C3_ap - 3.d	365.400 8439	768.515 4976	1159.48 2759	1568.92 779	2276.35 1351	695.737 1226	1716.58 2915	1096.39 8892	757.317 0732	812 .1	534.432 2344	426.2 5	327.935 2227	265.838 5093	209.349 5935	4429.62 1525	0.35195 986
3-C3_ap - 4.d	448.523 2068	941.598 6949	1413.79 3103	1838.07 4398	2518.91 8919	754.529 3073	1861.30 6533	1137.39 6122	806.910 5691	841	561.721 6117	446.2 5	341.700 4049	273.913 0435	217.073 1707	4625.96 4922	0.34846 5726
3-C3_ap - 5.d	517.721 519	1044.20 8809	1540.94 8276	1986.87 0897	2599.32 4324	738.543 5169	1893.46 7337	1138.78 1163	794.715 4472	822 .3	543.406 5934	426.8 75	320.242 915	263.975 1553	204.065 0407	4514.36 1315	0.33290 2415
3-C3_ap - 6.d	562.869 1983	1130.34 2577	1617.45 6897	2098.46 8271	2653.37 8378	765.186 5009	1902.01 005	1141.27 4238	800.813 0081	832	550.549 4505	444.3 75	321.052 6316	265.838 5093	209.349 5935	4565.25 2431	0.34061 3066
3-C3_ap - 7.d	606.329 1139	1212.07 1778	1731.68 1034	2196.93 6543	2713.51 3514	763.232 6821	1920.10 0503	1152.90 8587	793.902 439	812 .9	547.069 5971	424.3 75	320.242 915	263.478 2609	201.626 0163	4516.50 2815	0.33437 1292
3-C3_ap - 8.d	304.219 4093	686.460 0326	1084.05 1724	1481.18 1619	2192.56 7568	668.916 5187	1700.50 2513	1073.96 1219	773.983 7398	818	534.798 5348	430.6 25	324.696 3563	270.807 4534	215.040 6504	4441.91 2954	0.34642 3056
3-C3_ap - 9.d	542.194 0928	1093.96 4111	1588.36 2069	2077.02 407	2676.35 1351	782.238 0107	1922.11 0553	1171.46 8144	804.471 5447	845 .1	559.890 1099	448.1 25	329.959 5142	267.701 8634	215.040 6504	4641.75 6827	0.34488 8069
3-C3_ap - 10.d	558.649 789	1141.27 2431	1655.17 2414	2131.29 1028	2743.24 3243	780.994 6714	1948.24 1206	1192.24 3767	828.861 7886	860 .3	563.003 663	451.2 5	342.510 1215	278.881 9876	221.951 2195	4739.00 2547	0.33782 715
3-C3_ap - 11.d	579.324 8945	1155.95 4323	1663.79 3103	2126.91 4661	2705.40 5405	777.264 6536	1902.51 2563	1160.94 1828	799.186 9919	836 .2	554.212 4542	441.8 75	327.935 2227	271.242 236	212.601 626	4604.19 5359	0.34260 1275
3-C3_ap - 12.d	618.143 4599	1223.98 0424	1778.01 7241	2266.95 8425	2807.43 2432	803.197 1581	1982.91 4573	1196.95 2909	825.609 7561	844 .5	565.384 6154	442.5	341.295 5466	272.049 6894	208.943 0894	4697.23 5606	0.34042 0343
3-C3_ap - 13.d	627.848 1013	1236.05 2202	1785.56 0345	2266.95 8425	2812.16 2162	790.586 1456	1991.95 9799	1194.45 9834	824.796 748	853 .4	562.271 0623	448.7 5	334.008 0972	280.745 3416	214.634 1463	4713.06 5229	0.33403 2508
3-C3_ap - 14.d	642.616 0338	1256.93 3116	1786.63 7931	2275.71 116	2783.10 8108	787.744 2274	1978.39 196	1190.58 1717	819.105 6911	854	568.131 8681	444.3 75	330.364 3725	274.534 1615	216.260 1626	4697.35 2973	0.33570 9802
3-C3_ap - 15.d	595.358 6498	1198.69 4943	1726.29 3103	2223.19 4748	2775	794.671 4032	1960.80 402	1190.85 8726	832.113 8211	851	558.974 359	447.5	332.388 664	271.428 5714	217.073 1707	4701.33 7312	0.34067 4006

3-C3_ap -	629.113	1254.15	1782.32	2266.95	2822.97	768.206	1966.33	1175.06	833.333	845	568.681	447.5	340.080	273.291	213.414	4696.37	0.32605
16.d	9241	9869	7586	8425	2973	0391	1658	9252	3333		3187		9717	9255	6341	1435	8834
3-C3_ap -	644.303	1280.26	1828.66	2304.15	2860.13	782.415	1992.46	1203.60	828.861	866	587.179	451.2	331.174	272.049	218.699	4759.41	0.32775
17.d	7975	1011	3793	7549	5135	6306	2312	1108	7886	.6	4872	5	0891	6894	187	5349	4893
3-C3_ap -	614.767	1222.83	1773.70	2234.13	2753.37	772.113	1952.76	1176.17	812.195	853	563.003	443.7	323.076	267.080	212.195	4650.47	0.33298
18.d	9325	8499	6897	5667	8378	6767	3819	7285	122		663	5	9231	7453	122	8861	4054
3-C3_ap -	567.510	1153.01	1676.72	2146.60	2739.18	762.344	1936.18	1157.06	815.040	851	556.776	453.1	335.627	273.913	217.073	4659.91	0.33102
19.d	5485	7945	4138	8315	9189	5826	0905	3712	6504	.3	5568	25	5304	0435	1707	9664	9988
3-C3_ap -	599.156	1218.27	1768.31	2264.77	2836.48	801.953	2012.06	1209.41	852.845	892	583.882	468.7	350.202	281.987	219.512	4858.59	0.33569
20.d	1181	0799	8966	0241	6486	8188	0302	8283	5285		7839	5	4291	5776	1951	8797	0077
3-C3_ap -	624.050	1236.21	1776.93	2242.88	2786.48	774.422	1990.95	1183.37	828.048	859	565.018	449.3	331.578	273.291	216.666	4706.55	0.32879
21.d	6329	5334	9655	8403	6486	7353	4774	9501	7805	.2	315	75	9474	9255	6667	9136	0247
3-C3_ap -	579.746	1170.14	1715.51	2199.12	2743.24	760.035	1971.85	1183.65	832.113	865	570.879	450.6	324.696	272.670	211.382	4711.32	0.32678
22.d	8354	6819	7241	4726	3243	524	9296	651	8211	.3	1209	25	3563	8075	1138	3729	6248
3-C3_ap -	637.974	1265.41	1811.42	2293.21	2778.37	777.975	1995.47	1227.42	843.902	881	582.051	456.8	339.676	277.018	215.853	4823.80	0.33040
23.d	6835	5987	2414	663	8378	1332	7387	3823	439		2821	75	1134	6335	6585	0949	5003
3-C3_ap -	695.780	1350.89	1904.09	2404.81	2900.67	791.651	1999.49	1218.28	839.430	863	582.783	453.7	344.534	273.291	209.756	4785.62	0.32871
24.d	5907	7227	4828	4004	5676	865	7487	2548	8943	.8	8828	5	413	9255	0976	9762	8557
3-C3_ap -	701.687	1384.99	1963.36	2463.89	2984.45	810.657	2084.42	1248.19	865.853	892	590.109	470	349.797	282.608	223.983	4922.55	0.32502
25.d	7637	1843	2069	4967	9459	1936	2111	9446	6585		8901		5709	6957	7398	3001	1106
3-C3_ap -	676.371	1327.73	1894.39	2374.17	2900	801.420	2049.24	1219.39	843.495	890	586.630	468.1	355.465	281.925	215.447	4860.47	0.32874
26.d	308	2463	6552	9431		9591	6231	0582	935		0366	25	587	4658	1545	9761	9139
3-C3_ap -	489.451	1011.09	1503.23	1978.11	2547.29	683.481	1812.06	1136.84	793.089	841	556.959	441.2	332.388	267.701	215.447	4585.17	0.31812
27.d	4768	2985	2759	8162	7297	3499	0302	2105	4309	.5	707	5	664	8634	1545	8925	6999
3-C3_ap -	581.012	1154.32	1697.19	2179.43	2766.89	762.344	1943.21	1195.01	836.178	869	579.120	455	337.246	275.155	219.105	4765.82	0.32877
28.d	6582	3002	8276	1072	1892	5826	608	385	8618		8791		9636	2795	6911	1525	1888
3-C3_ap -	523.628	1083.84	1623.92	2076.58	2688.51	734.991	1928.14	1178.39	806.097	859	574.542	446.8	340.080	280.124	216.666	4701.77	0.32281
29.d	692	9918	2414	6433	3514	119	0704	3352	561		1245	75	9717	2236	6667	9899	7164
3-C3_ap -	657.805	1308.31	1869.61	2369.80	2850	781.349	2019.09	1244.87	863.821	897	600.549	468.7	344.939	282.608	225.203	4927.74	0.32572
30.d	9072	9739	2069	3063		9112	5477	5346	1382		4505	5	2713	6957	252	7154	0212
3-C3_ap -	667.510	1306.03	1871.76	2376.36	2858.78	791.296	2022.61	1217.45	848.780	881	587.179	470.6	342.105	280.745	214.634	4842.92	0.32907
31.d	5485	5889	7241	7615	3784	6252	3065	1524	4878	.4	4872	25	2632	3416	1463	125	3003
3-C3_ap -	702.109	1355.62	1911.63	2404.81	2870.94	781.527	2022.11	1235.45	863.821	881	592.490	468.7	346.153	272.049	215.853	4875.57	0.32436
32.d	7046	8059	7931	4004	5946	5311	0553	7064	1382		8425	5	8462	6894	6585	6239	1519
3-C3_ap -	616.033	1246.32	1783.40	2275.71	2736.48	745.293	1975.87	1213.29	832.113	873	585.714	464.3	333.603	278.881	211.788	4792.77	0.32051
33.d	7553	9527	5172	116	6486	0728	9397	6399	8211		2857	75	2389	9876	6179	335	6369
3-C3_ap -	682.278	1338.82	1911.63	2411.37	2905.40	778.863	2044.72	1226.59	852.439	903	603.113	473.7	346.153	277.018	220.731	4902.79	0.31955
34.d	481	5449	7931	8556	5405	2327	3618	2798	0244		5531	5	8462	6335	7073	9562	1254
3-C3_ap -	701.687	1353.99	1898.70	2407.00	2873.64	790.053	2069.84	1244.87	876.829	906	602.197	478.7	354.251	282.608	224.390	4969.90	0.32394
35.d	7637	6737	6897	2188	8649	286	9246	5346	2683		8022	5	0121	6957	2439	2368	4188
3-C3_ap -	711.814	1375.20	1932.11	2413.56	2918.91	765.008	2050.25	1229.63	848.780	898	592.673	470	355.465	284.472	226.016	4905.04	0.31271
36.d	346	3915	2069	674	8919	881	1256	9889	4878		9927		587	0497	2602	8267	7307
3-C3_ap -	691.139	1320.88	1869.61	2328.22	2806.08	728.241	1946.73	1175.90	826.829	852	573.992	453.1	341.700	273.291	220.325	4717.16	0.31158
37.d	2405	0914	2069	7571	1081	5631	3668	0277	2683		674	25	4049	9255	2033	4753	1802
3-C3_ap -	716.455	1375.53	1945.04	2444.20	2910.81	764.120	2041.70	1236.84	873.170	903	601.648	472.5	353.846	275.776	217.073	4933.85	0.31344
38.d	6962	0179	3103	1313	0811	7815	8543	2105	7317		3516		1538	3975	1707	6911	2692
3-C3_ap -	763.713	1415.98	1960.12	2452.95	2885.81	779.573	2031.15	1222.99	868.699	893	605.128	476.8	353.036	283.229	215.447	4919.10	0.32199
39.d	0802	6949	931	4048	0811	7123	5779	169	187	.7	2051	75	4372	8137	1545	7487	6864
3-C3_ap -	741.772	1409.46	1947.19	2459.51	2886.48	763.232	2046.73	1222.16	865.040	901	604.945	473.7	354.251	278.260	221.544	4921.85	0.31400
40.d	1519	1664	8276	86	6486	6821	3668	0665	6504	.9	0549	5	0121	8696	7154	2967	8589

3-C3_ap - 41.d	747.257 384	1419.24 9592	1985.99 1379	2461.70 6783	2909.45 9459	772.113 6767	2072.86 4322	1240.44 3213	891.869 9187	925	619.597 0696	491.8 75	357.085 0202	288.819 8758	228.455 2846	5043.14 5382	0.31440 5151
3-C3_ap - 42.d	747.679 3249	1420.88 0914	1994.61 2069	2470.45 9519	2921.62 1622	777.087 0337	2086.93 4673	1270.63 7119	886.991 8699	927	624.908 4249	488.1 25	365.587 0445	283.229 8137	221.138 2114	5067.61 7484	0.31470 4715
3-C3_ap - 43.d	756.962 0253	1438.82 5449	1980.60 3448	2485.77 6805	2971.62 1622	772.646 5364	2031.65 8291	1249.30 7479	888.617 8862	926	621.245 4212	477.5	357.085 0202	285.093 1677	222.764 2276	5027.61 3202	0.31445 5196
3-C3_ap - 44.d	779.324 8945	1432.30 0163	2006.46 5517	2468.27 1335	2921.62 1622	766.429 8401	2059.79 8995	1260.94 1828	882.113 8211	907	618.681 3187	476.2 5	352.226 7206	275.155 2795	226.422 7642	4998.79 1732	0.31242 6598
3-C3_ap - 45.d	751.898 7342	1414.02 9364	1970.90 5172	2477.02 407	2909.45 9459	763.765 5417	2073.36 6834	1241.27 4238	886.585 3659	927	613.369 9634	493.7 5	359.514 17	284.472 0497	221.138 2114	5027.10 3999	0.31096 8094
3-C3_ap - 46.d	770.042 1941	1449.75 5302	2006.46 5517	2538.29 3217	2968.91 8919	770.692 7176	2093.46 7337	1283.37 9501	900.813 0081	937 .6	632.783 8828	488.1 25	365.991 9028	292.546 5839	227.235 7724	5128.47 5651	0.30913 5579
3-C3_ap - 47.d	752.320 6751	1403.09 9511	1969.82 7586	2466.08 3151	2895.94 5946	746.536 4121	2033.16 5829	1232.68 6981	865.040 6504	908 .6	607.142 8571	486.2 5	361.943 3198	284.472 0497	223.983 7398	4970.11 9598	0.30765 8819
3-C3_ap - 48.d	747.257 384	1404.73 0832	1964.43 9655	2470.45 9519	2900.67 5676	755.772 6465	2067.33 6683	1256.78 6704	876.422 7642	925 .3	618.864 4689	487.5	357.085 0202	286.335 4037	218.292 6829	5026.58 7044	0.30862 8464
3-C3_ap - 49.d	743.881 8565	1420.71 7781	1966.59 4828	2472.64 7702	2938.51 3514	731.971 5808	2069.34 6734	1263.43 4903	876.016 2602	914	614.285 7143	475.6 25	347.368 4211	278.944 0994	224.796 748	4994.47 1146	0.29683 4066
3-C3_ap - 50.d	764.556 962	1438.82 5449	2031.25	2516.41 1379	2969.59 4595	791.829 4849	2110.55 2764	1281.44 0443	900	935	632.234 4322	508.7 5	368.421 0526	295.155 2795	231.300 813	5152.30 2021	0.31628 965
25B-3a-C1_ap - 1.d	370.886 0759	919.249 5922	1422.41 3793	1827.13 3479	1977.70 2703	1083.48 135	1058.79 397	438.781 1634	184.959 3496	108 .2	76.3736 2637	37.25	18.6234 8178	11.1180 1242	7.92682 9268	883.232 4629	0.74874 7193
25B-3a-C1_ap - 2.d	359.493 6709	911.908 646	1425.64 6552	1861.48 7965	2104.05 4054	1097.69 0941	1095.97 9899	452.908 5873	186.585 3659	113 .7	82.9670 3297	40.18 75	20	10.7453 4161	5.81300 813	912.906 8358	0.72285 3585
25B-3a-C1_ap - 3.d	341.350 211	857.911 9086	1340.51 7241	1748.35 8862	1927.02 7027	1044.40 4973	1058.79 397	425.484 7645	175.203 252	104 .7	73.0769 2308	35.81 25	16.1943 3198	8.44720 4969	6.01626 0163	844.935 2368	0.73117 1574
25B-3a-C1_ap - 4.d	399.156 1181	907.014 6819	1411.63 7931	1781.18 1619	1997.29 7297	1078.15 2753	1065.82 9146	442.382 2715	191.869 9187	112 .4	78.9377 2894	35.62 5	18.0971 6599	10.3726 7081	6.58536 5854	896.270 1218	0.73895 0152
25B-3a-C1_ap - 5.d	392.405 0633	990.212 0718	1536.63 7931	1925.60 1751	2124.32 4324	1133.21 492	1158.79 397	453.462 6039	190.243 9024	115 .6	82.2344 3223	37.56 25	20.4048 583	9.25465 8385	8.78048 7805	917.543 443	0.72226 8641
25B-3a-C1_ap - 6.d	425.316 4557	1053.01 7945	1613.14 6552	2080.96 2801	2238.51 3514	1227.35 3464	1235.17 5879	495.844 8753	205.284 5528	119 .9	89.0109 8901	41.68 75	18.4615 3846	11.0559 0062	6.62601 626	987.871 3725	0.73811 7311
25B-3a-C1_ap - 7.d	403.797 4684	983.686 7863	1489.22 4138	1932.16 6302	2058.10 8108	1119.00 5329	1116.58 2915	448.199 446	189.430 8943	111 .1	76.9230 7692	38.12 5	16.4372 4696	10.5590 0621	6.26016 2602	897.034 833	0.73816 3512
25B-3a-C1_ap - 8.d	373.839 6624	902.120 7178	1414.87 069	1824.94 5295	2090.54 0541	1161.63 4103	1139.69 8492	475.069 2521	206.097 561	127 .4	95.4212 4542	47	26.9635 6275	19.3788 8199	17.8455 2846	1015.17 6032	0.75256 6825
25B-3a-C1_ap - 9.d	415.611 8143	1023.00 1631	1563.57 7586	2010.94 0919	2180.40 5405	1149.20 071	1186.93 4673	476.177 2853	189.430 8943	114 .5	85.5311 3553	41.87 5	19.9595 1417	10.4968 9441	6.50406 5041	944.474 7888	0.71435 4611
25B-3a-C1_ap - 10.d	395.358 6498	978.792 8222	1517.24 1379	1943.10 7221	2116.21 6216	1158.08 1705	1143.71 8593	461.772 8532	188.617 8862	109 .8	84.4322 3443	40.25	19.5951 417	10.2484 472	5.73170 7317	920.448 27	0.74438 839
25B-3a-C1_ap - 11.d	381.856 5401	955.791 1909	1503.23 2759	1936.54 267	2127.02 7027	1158.08 1705	1166.83 4171	471.745 1524	197.154 4715	116 .5	85.1648 3516	41.62 5	20.0809 7166	11.4906 8323	7.11382 1138	950.874 9351	0.73510 2885
25B-3a-C1_ap - 12.d	381.856 5401	963.784 6656	1506.46 5517	1973.74 1794	2197.29 7297	1236.23 4458	1211.55 7789	493.351 8006	201.626 0163	121 .8	86.6300 3663	43.5	17.4898 7854	12.4223 6025	7.39837 3984	984.218 4662	0.75767 7459
25B-3a-C1_ap - 14.d	346.413 5021	881.239 8042	1397.62 931	1853.39 1685	2041.89 1892	1134.99 1119	1136.68 3417	451.523 5457	190.650 4065	113	83.8827 8388	37.18 75	19.6356 2753	10.6211 1801	7.52032 5203	914.021 3068	0.74500 0096
25B-3a-C2_ap1 - 1.d	328.691 9831	715.986 9494	1088.36 2069	1486.21 4442	1773.64 8649	998.934 2806	965.326 6332	355.955 6787	135.040 6504	74. 3	54.0293 0403	25.37 5	13.5222 6721	9.37888 1988	7.27642 2764	674.878 2051	0.76342 4295
25B-3a-C2_ap1 - 2.d	376.793 2489	752.039 1517	1119.61 2069	1507.65 8643	1742.56 7568	987.566 6075	938.190 9548	353.462 6039	137.398 374	77. 2	59.5238 0952	29.93 75	15.3036 4372	10	7.23577 2358	690.061 7035	0.77237 1006

25B-3a-	364.135	749.102	1123.92	1531.94	1739.18	966.252	928.140	357.617	134.796	71.	50.1831	25.75	13.7246	8.81987	7.92682	670.619	0.76051
C2_ap1 - 3.d	0211	7732	2414	7484	9189	2202	7035	7285	748	8	5018		9636	5776	9268	0281	9198
25B-3a-	311.814	680.750	1064.65	1450.76	1672.29	941.385	922.110	340.997	130.487	71.	51.6483	26.56	14.3724	8.69565	6.82926	650.693	0.75808
C2_ap1 - 4.d	346	4078	5172	5864	7297	4352	5528	2299	8049	1	5165	25	6964	2174	8293	2765	7324
25B-3a-	272.194	611.745	956.896	1346.38	1604.05	888.099	887.939	325.761	123.252	70	50.5494	25	11.7813	8.81987	4.02439	619.188	0.74414
C2_ap1 - 5.d	0928	5139	5517	9497	4054	4671	6985	7729	0325		5055		7652	5776	0244	8985	9807
25B-3a-	300.843	661.174	1035.56	1418.16	1623.64	917.761	883.417	324.376	127.235	70.	48.7179	26.5	11.2145	8.94409	6.70731	624.096	0.76630
C2_ap1 - 6.d	8819	5514	0345	1926	8649	9893	0854	7313	7724	4	4872		749	9379	7073	4437	4087
25B-3a-	318.565	673.898	1042.02	1402.62	1636.48	904.085	861.306	324.376	124.430	67.	48.1684	24.43	12.0242	7.63975	4.30894	612.986	0.76150
C2_ap1 - 7.d	4008	8581	5862	5821	6486	2575	5327	7313	8943	6	9817	75	915	1553	3089	6099	7711
25B-3a-	368.354	742.740	1133.62	1527.35	1723.64	982.238	954.773	347.091	134.065	74.	54.5787	25.68	17.4089	9.44099	6.34146	668.714	0.76567
C2_ap1 - 8.d	4304	6199	069	2298	8649	0107	8693	4127	0407	1	5458	75	0688	3789	3415	0721	0831
25B-3a-	258.649	577.487	903.017	1229.75	1432.43	866.785	780.904	281.440	108.536	58.	41.0256	19.62	9.63562	4.59627	2.84552	526.205	0.81954
C2_ap2 - 1.d	789	7651	2414	93	2432	0799	5226	4432	5854	5	4103	5	753	3292	8455	0989	9869
25B-3a-	318.143	659.543	977.370	1284.02	1406.08	849.378	749.246	277.285	104.390	54.	41.3919	18.18	7.89473	4.16149	2.07317	510.334	0.82752
C2_ap2 - 2.d	4599	23	6897	6258	1081	3304	2312	3186	2439	95	4139	75	6842	0683	0732	4021	9931
25B-3a-	324.050	655.791	963.362	1247.26	1383.10	811.722	722.613	263.988	99.2682	52.	37.3626	15.37	7.12550	4.40993	3.53658	483.736	0.81194
C2_ap2 - 3.d	6329	1909	069	477	8108	913	0653	9197	9268	67	3736	5	6073	7888	5366	879	5421
25B-3a-	344.303	691.843	1007.54	1300.65	1425.67	829.484	738.190	266.759	101.829	56.	42.3076	18.06	8.50202	4.90683	2.60162	501.108	0.80856
C2_ap2 - 4.d	7975	3931	3103	6455	5676	9023	9548	0028	2683	14	9231	25	4291	2298	6016	946	2799
25B-3a-	321.518	684.991	998.922	1310.72	1485.81	893.428	788.442	289.196	110.975	58.	39.7435	19.37	9.19028	4.40993	1.91056	532.901	0.82545
C2_ap2 - 5.d	9873	8434	4138	2101	0811	0639	2111	6759	6098	1	8974	5	3401	7888	9106	6658	4044
25B-3a-	242.194	545.350	842.672	1169.58	1331.75	804.618	719.597	259.833	99.2276	53.	40.2930	17.75	8.34008	4.65838	2.84552	486.698	0.82192
C2_ap2 - 6.d	0928	7341	4138	4245	6757	1172	9899	795	4228	75	4029		0972	5093	8455	4721	5363
25B-3a-	123.628	281.566	485.991	759.299	1056.08	635.879	658.291	248.199	103.252	56.	40.8424	15.93	6.76113	2.67080	1.58536	475.748	0.76263
C3_ap1 - 1.d	692	0685	3793	7812	1081	2185	4573	446	0325	5	9084	75	3603	7453	5854	7763	5278
25B-3a-	118.438	280.587	475.215	754.923	1052.02	634.103	649.246	251.800	102.845	57.	41.2087	18.56	7.61133	3.41614	3.13008	485.674	0.76725
C3_ap1 - 3.d	8186	2757	5172	4136	7027	0195	2312	554	5285	1	9121	25	6032	9068	1301	9401	8404
25B-3a-	121.518	292.006	506.465	792.122	1182.43	676.731	663.316	271.468	107.723	60.	46.1538	17.43	6.47773	5.83850	4.02439	519.923	0.76413
C3_ap1 - 4.d	9873	5253	5172	5383	2432	794	5829	144	5772	8	4615	75	2794	9317	0244	6998	1295
25B-3a-	106.835	272.593	488.146	784.245	1175	679.928	727.135	291.412	116.260	63.	44.5054	21.06	6.51821	4.16149	2.07317	549.393	0.73559
C3_ap1 - 6.d	443	801	5517	0766		952	6784	7424	1626	4	9451	25	8623	0683	0732	7795	179
25B-3a-	101.308	251.712	450.431	715.973	1039.18	609.946	673.869	250.692	98.3739	57.	40.8424	19.62	7.97570	3.60248	1.34146	480.353	0.72888
C3_ap1 - 7.d	0169	8874	0345	7418	9189	714	3467	5208	8374	9	9084	5	8502	4472	3415	6517	1177
25B-3a-	98.9029	250.570	478.448	798.687	1202.70	693.783	760.804	284.487	102.601	52.	36.0805	15.12	4.81781	2.54658	1.50406	499.503	0.72528
C3_ap2 - 1.d	5359	9625	2759	0897	2703	3037	0201	5346	626	34	8608	5	3765	3851	5041	2094	4341
25B-3a-	94.5569	237.683	447.413	746.170	1142.56	659.502	721.608	268.144	94.9593	48.	38.6446	16.62	4.29149	3.04347	2.47967	476.997	0.72631
C3_ap2 - 2.d	6203	5237	7931	6783	7568	6643	0402	0443	4959	81	8864	5	7976	8261	4797	7336	4855
25B-3a-	91.3080	238.825	450.431	758.205	1131.08	692.717	753.266	260.664	97.1951	49.	38.6446	15.75	5.58704	3.16770	1.09756	471.806	0.75047
C3_ap2 - 3.d	1688	4486	0345	6893	1081	5844	3317	8199	2195	7	8864		4534	1863	0976	9379	2987
25B-3a-	94.0928	232.952	424.784	705.251	1029.05	596.269	644.723	231.578	91.0569	43.	32.2344	12.25	5.22267	2.91925	2.72357	421.085	0.73204
C3_ap2 - 4.d	27	6917	4828	6411	4054	9822	6181	9474	1057	1	3223		2065	4658	7236	7941	3793
25B-3a-	244.725	384.991	629.310	956.236	1404.05	811.722	854.271	321.329	118.699	58.	43.5897	17.68	6.76113	3.72670	3.08943	573.683	0.74117
C3_ap2 - 5.d	7384	8434	3448	3239	4054	913	3568	6399	187	8	4359	75	3603	8075	0894	343	0233
25B-3a-	119.240	292.006	540.948	900.656	1327.70	786.856	836.180	319.944	117.479	60.	43.2234	17.31	5.70850	4.96894	1.95121	570.688	0.74678
C3_ap2 - 6.d	5063	5253	2759	4551	2703	1279	9045	5983	6748	1	4322	25	2024	4099	9512	882	3629
25B-3a-	385.654	944.535	1480.60	1934.35	2222.97	555.950	1316.58	603.878	329.268	260	180.402	126.8	79.7570	62.1118	51.2195	1693.91	0.32497
C4_ap - 1.d	0084	0734	3448	4486	2973	2664	2915	1163	2927	.4	9304	75	8502	0124	122	2738	1103
25B-3a-	418.565	995.106	1526.93	1997.81	2218.24	571.225	1271.35	618.836	319.105	251	174.358	119.0	87.0445	62.9813	48.7804	1681.47	0.34014
C4_ap - 2.d	4008	0359	9655	1816	3243	5773	6784	5651	6911	.3	9744	625	3441	6646	878	0119	911

25B-3a-	404.641	986.949	1493.53	1936.54	2137.83	603.907	1226.63	547.368	284.552	213	153.479	91.25	63.5627	54.6583	42.5203	1451.29	0.37292
C4_ap - 3.d	3502	429	4483	267	7838	6377	3166	4211	8455	.9	8535		5304	8509	252	2583	8686
25B-3a-	434.177	1022.83	1547.41	1995.62	2220.27	632.326	1234.17	576.177	293.495	224	153.663	95.06	64.3724	55.6521	41.9918	1504.81	0.38198
C4_ap - 4.d	2152	8499	3793	3632	027	8206	0854	2853	935	.4	0037	25	6964	7391	6992	5237	916
25B-3a-	429.957	1047.30	1602.37	2045.95	2289.86	656.305	1308.04	586.149	301.219	237	167.216	109.7	70.4453	65.0310	42.6829	1579.69	0.37921
C4_ap - 5.d	8059	832	069	186	4865	5062	0201	5845	5122	.2	1172	5	4413	559	2683	4541	9425
25B-3a-	332.067	850.897	1331.89	1746.17	2054.72	609.236	1209.54	554.847	281.300	211	150	93.75	62.7530	45.8385	37.9268	1437.71	0.38645
C4_ap - 6.d	5105	2268	6552	0678	973	2345	7739	6454	813	.3			3644	0932	2927	6833	3163
25B-3a-	438.818	1053.83	1616.37	2074.39	2285.13	644.760	1297.98	597.229	304.065	234	169.597	105.4	73.2793	62.1118	47.5609	1593.88	0.37437
C4_ap - 7.d	5654	3605	931	8249	5135	2131	995	9169	0407	.6	0696	375	5223	0124	7561	1656	4812
25B-3a-	422.362	1030.99	1572.19	2002.18	2310.81	648.312	1264.32	589.750	307.317	225	155.128	98.25	62.7530	49.6273	41.8699	1530.59	0.37929
C4_ap - 8.d	8692	5106	8276	8184	0811	611	1608	6925	0732	.9	2051		3644	2919	187	6255	1835
25B-3a-	437.552	1040.78	1603.44	2043.76	2253.37	653.641	1296.98	572.022	296.747	220	152.380	102.7	58.7044	47.3913	38.1707	1488.16	0.38234
C4_ap - 9.d	7426	3034	8276	3676	8378	2078	4925	1607	9675		9524	5	5344	0435	3171	757	4545
25B-3a-	437.552	1047.30	1592.67	2102.84	2346.62	648.667	1286.93	604.155	304.471	224	157.692	98.37	63.1578	52.1739	40.2439	1544.96	0.37326
C4_ap - 10.d	7426	832	2414	4639	1622	8508	4673	1247	5447	.7	3077	5	9474	1304	0244	9687	9572
25B-3a-	431.645	1026.10	1592.67	2041.57	2302.70	660.746	1316.08	593.905	309.349	228	163.736	99.56	60.7287	52.7950	43.0894	1551.76	0.37955
C4_ap - 11.d	5696	1142	2414	5492	2703	0036	0402	8172	5935	.6	2637	25	4494	3106	3089	7381	4722
25B-3a-	422.784	1009.78	1551.72	2010.94	2254.05	632.504	1275.37	603.878	294.715	224	152.197	105.2	74.4939	49.5652	42.2764	1547.17	0.37304
C4_ap - 12.d	8101	7928	4138	0919	4054	4405	6884	1163	4472	.8	8022	5	2713	1739	2276	6933	5791
25B-3a-	431.645	1034.25	1574.35	2063.45	2279.05	628.774	1309.54	600.831	305.691	228	160.439	100.8	64.7773	53.1055	39.8373	1554.05	0.36396
C4_ap - 13.d	5696	7749	3448	733	4054	4227	7739	0249	0569	.5	5604	75	2794	9006	9837	6959	2707
25B-3a-	424.472	1024.46	1591.59	2059.08	2344.59	584.369	1307.03	607.479	297.154	223	151.648	99.75	58.2995	47.1428	36.9918	1521.46	0.33381
C4_ap - 14.d	5738	9821	4828	0963	4595	4494	5176	2244	4715		3516		9514	5714	6992	637	818
25B-3a-	436.708	1047.30	1598.06	2074.39	2293.91	632.326	1312.06	618.005	290.243	223	158.791	101.1	62.1457	49.7515	42.2764	1545.73	0.36448
C4_ap - 15.d	8608	832	0345	8249	8919	8206	0302	5402	9024	.4	2088	25	4899	528	2276	9376	1654
25B-3a-	268.354	716.150	1118.53	1520.78	1851.35	509.769	1090.45	495.844	261.788	195	140.659	80.62	65.5870	44.7204	32.5203	1316.74	0.35877
C4_ap - 17.d	4304	0816	4483	7746	1351	0941	2261	8753	6179		3407	5	4453	9689	252	5701	7954
25B-3a-	445.991	1066.88	1659.48	2070.02	2222.97	666.074	1236.18	554.016	281.300	207	138.461	84.18	51.4170	46.2732	30.8943	1394.35	0.40180
C4_ap - 19.d	5612	4176	2759	1882	2973	6004	0905	6205	813	.8	5385	75	0405	9193	0894	1077	4472
25B-3a-	449.367	1078.30	1593.75	2070.02	2238.51	650.088	1222.61	557.063	269.918	201	134.981	88.43	55.0607	41.4285	34.6747	1382.96	0.39295
C4_ap - 20.d	0886	3426		1882	3514	8099	3065	7119	6992	.4	685	75	2874	7143	9675	5693	9972
25B-3a-	512.236	1182.70	1735.99	2253.82	2433.10	719.360	1332.16	600.831	292.682	217	147.802	86.5	54.6558	39.7515	32.5203	1471.74	0.39956
C4_ap - 21.d	2869	7993	1379	9322	8108	5684	0804	0249	9268		1978		7045	528	252	3898	5148
25B-3a-	448.101	1053.83	1576.50	2002.18	2280.40	669.626	1229.14	565.650	268.292	204	148.168	86.62	51.8218	41.1801	35.3658	1401.50	0.39996
C4_ap - 22.d	2658	3605	8621	8184	5405	9982	5729	9695	6829	.4	4982	5	6235	2422	5366	4991	7991
25B-3a-	395.358	975.530	1539.87	1949.67	2218.91	641.207	1214.07	550.692	271.951	205	142.673	90.18	56.9230	46.7080	32.5203	1396.75	0.39066
C4_ap - 23.d	6498	1794	069	1772	8919	8153	0352	5208	2195	.1	9927	75	7692	7453	252	671	6493
25B-3a-	453.164	1054.64	1599.13	2048.14	2264.86	641.385	1248.24	562.880	284.552	210	151.098	90.75	62.3481	48.3850	35.3658	1445.48	0.38145
C4_ap - 25.d	557	9266	7931	0044	4865	4352	1206	8864	8455	.1	9011		7814	9317	5366	1758	9723
25B-3a-	468.354	1089.72	1643.31	2087.52	2237.16	660.746	1265.82	575.069	284.146	215	143.956	93.31	60.3238	45.2173	35.7723	1452.79	0.39264
C4_ap - 26.d	4304	2675	8966	7352	2162	0036	9146	2521	3415		044	25	8664	913	5772	7773	3368
25B-3a-	396.624	973.898	1539.87	2032.82	2295.27	626.998	1303.01	587.257	300.406	220	154.578	96.87	59.1093	56.0248	36.0162	1510.46	0.36255
C4_ap - 27.d	4726	8581	069	2757	027	2238	5075	6177	5041	.2	7546	5	1174	4472	6016	8293	5648
25B-3a-	388.607	969.004	1516.16	2052.51	2383.10	623.445	1321.60	593.905	295.528	222	153.296	94.37	64.3724	50.1242	38.2113	1512.71	0.35129
C4_ap - 28.d	5949	894	3793	6411	8108	8259	804	8172	4553	.9	7033	5	6964	236	8211	4051	7867
25B-3a-	485.232	1107.66	1669.18	2153.17	2302.70	682.060	1301.00	589.473	299.593	226	150.366	91.31	57.8947	50.4347	34.9593	1500.33	0.39406
C4_ap - 29.d	0675	721	1034	2867	2703	3908	5025	6842	4959	.3	3004	25	3684	8261	4959	485	1864
25B-3a-	473.417	1081.56	1610.99	2050.32	2263.51	666.074	1211.55	534.626	268.699	205	133.150	82.5	45.7489	42.2981	32.3170	1344.63	0.40221
C4_ap - 30.d	7215	6069	1379	8228	3514	6004	7789	0388	187	.3	1832		8785	3665	7317	9607	5923

25B-3a-	451.476	1071.77	1590.51	2063.45	2245.94	667.850	1241.70	558.448	272.764	197	139.926	82.75	55.0607	36.9565	34.1463	1377.15	0.39991
C4_ap - 31.d	7932	814	7241	733	5946	7993	8543	7535	2276	.1	7399		2874	2174	4146	3313	7092
25B-3a-	374.683	946.166	1452.58	1910.28	2081.08	653.641	1208.04	544.598	257.723	202	132.783	85.75	51.8218	45.2173	36.1788	1356.57	0.41224
C4_ap - 32.d	5443	3948	6207	4464	1081	2078	0201	338	5772	.5	8828		6235	913	6179	3913	3892
25B-3a-	439.662	1019.57	1526.93	1929.97	2162.16	623.445	1198.99	528.808	258.536	198	124.542	80.81	47.7732	39.4409	26.0162	1304.33	0.38720
C4_ap - 33.d	4473	5856	9655	8118	2162	8259	4975	8643	5854	.4	1245	25	7935	9379	6016	0607	9415
25B-3a-	450.210	1057.09	1607.75	2054.70	2191.89	655.417	1214.57	558.171	273.170	199	137.362	83.81	52.6315	42.2360	36.1788	1382.96	0.40169
C4_ap - 34.d	9705	6248	8621	4595	1892	4067	2864	7452	7317	.4	6374	25	7895	2484	6179	408	5179
25B-3a-	441.772	1017.94	1496.76	1914.66	2027.02	658.969	1095.47	534.626	249.593	190	119.963	75	46.9635	45.9627	36.9918	1299.10	0.44221
C4_ap - 35.d	1519	4535	7241	0832	7027	8046	7387	0388	4959		37		6275	3292	6992	107	5577
25B-3b-	364.978	924.469	1438.57	1916.84	2237.83	804.618	1265.82	607.479	324.796	254	177.472	113.5	76.5182	63.7267	49.5934	1667.64	0.47806
C7_ap - 1.d	903	8206	7586	9015	7838	1172	9146	2244	748	.5	5275	625	1862	0807	9593	9422	6107
25B-3b-	367.088	910.277	1438.57	1912.47	2177.02	820.603	1247.73	582.271	295.934	231	157.692	106.2	61.1336	48.9440	38.2113	1521.83	0.49789
C7_ap - 2.d	6076	3246	7586	2648	7027	9076	8693	4681	9593	.4	3077	5	0324	9938	8211	782	7389
25B-3b-	360.759	910.440	1460.12	1929.97	2197.97	808.170	1272.86	596.121	313.008	231	160.256	100.3	61.5384	52.9813	43.4959	1559.47	0.48317
C7_ap - 3.d	4937	4568	931	8118	2973	5151	4322	8837	1301	.7	4103	75	6154	6646	3496	7187	0901
25B-3b-	321.940	829.690	1324.35	1739.60	2114.18	815.275	1200.50	594.459	295.934	228	156.593	96.87	67.2064	50.4968	40.8130	1530.67	0.51174
C7_ap - 4.d	9283	0489	3448	6127	9189	3108	2513	8338	9593	.3	4066	5	7773	9441	0813	958	1727
25B-3b-	272.151	719.412	1174.56	1634.57	2027.02	770.870	1165.82	570.914	296.341	227	158.424	99.37	67.2064	47.6397	43.7398	1511.44	0.50145
C7_ap - 5.d	8987	7243	8966	3304	7027	3375	9146	1274	4634	.8	9084	5	7773	5155	374	1566	7476
25B-3b-	406.329	985.318	1522.62	1986.87	2261.48	854.351	1250.75	562.049	297.560	222	157.142	94.37	61.3765	50.0621	34.4308	1479.09	0.50798
C7_ap - 6.d	1139	1077	931	0897	6486	6874	3769	8615	9756	.1	8571	5	1822	118	9431	8219	8374
25B-3b-	465.822	1078.30	1600.21	2085.33	2285.13	880.994	1275.37	578.116	286.585	214	148.717	89	59.5141	40.7453	34.9593	1452.13	0.51605
C7_ap - 7.d	7848	3426	5517	9168	5135	6714	6884	3435	3659	.5	9487		7004	4161	4959	8519	7468
25B-3b-	241.772	684.176	1162.71	1623.63	2043.24	838.365	1233.66	561.772	291.463	221	150.915	91.56	59.1093	47.5776	33.2113	1456.81	0.52804
C7_ap - 9.d	1519	1827	5517	2385	3243	897	8342	8532	4146	.2	7509	25	1174	3975	8211	2852	9162
25B-3b-	191.983	560.848	953.663	1365.42	1845.27	744.227	1115.07	537.119	271.951	214	146.703	93	53.4412	43.4782	39.5934	1400.08	0.51882
C7_ap - 10.d	1224	2871	7931	6696	027	3535	5377	1136	2195	.8	2967		9555	6087	9593	6682	814
25B-3b-	371.729	924.959	1454.74	1940.91	2217.56	849.023	1232.66	568.698	284.146	216	150.549	91.56	58.7044	42.8571	35	1447.91	0.51352
C7_ap - 11.d	9578	217	1379	9037	7568	0906	3317	0609	3415	.4	4505	25	5344	4286		7949	1741
25B-3b-	217.130	658.238	1148.70	1621.44	1964.18	792.184	1149.74	543.213	279.674	213	141.575	92.56	58.0566	46.6459	36.7479	1411.97	0.52714
C7_ap - 12.d	8017	1729	6897	4201	9189	7247	8744	2964	7967	.5	0916	25	8016	6273	6748	6295	8935
25B-3b-	399.578	982.055	1494.61	2002.18	2222.29	843.694	1216.08	573.407	287.398	217	146.153	94	53.0364	44.4099	35.2032	1451.40	0.51321
C7_ap - 13.d	0591	4649	2069	8184	7297	4938	0402	2022	374	.8	8462		3725	3789	5203	905	9313
25B-3b-	235.864	650.897	1120.68	1557.98	1959.45	761.989	1132.66	532.963	271.138	216	151.831	95.56	53.4412	46.3975	34.6341	1402.26	0.51148
C7_ap - 14.d	9789	2268	9655	6871	9459	3428	3317	9889	2114	.3	5018	25	9555	1553	4634	916	1981
25B-3b-	398.312	951.060	1487.06	1943.10	2187.16	841.918	1210.05	547.922	291.869	213	142.124	93.56	54.1700	44.9068	32.7235	1420.87	0.51752
C7_ap - 15.d	2363	3589	8966	7221	2162	2948	0251	4377	9187	.6	5421	25	4049	323	7724	9849	0731
25B-3b-	512.236	1148.45	1672.41	2113.78	2299.32	859.680	1270.35	564.819	280.894	219	147.435	88.37	62.7530	42.6086	33.2926	1439.27	0.50300
C7_ap - 16.d	2869	0245	3793	5558	4324	2842	1759	9446	3089	.1	8974	5	3644	9565	8293	9566	7955
25B-3b-	528.691	1153.34	1687.5	2157.54	2307.43	877.442	1277.38	589.196	289.837	219	145.054	91.68	55.8704	40.4347	38.2113	1469.89	0.51108
C7_ap - 17.d	9831	4209		9234	2432	2735	6935	6759	3984	.6	9451	75	4534	8261	8211	3129	4633
25B-3b-	487.763	1101.14	1628.23	2067.83	2243.91	865.541	1228.14	560.110	283.739	209	141.758	85.93	49.7975	41.3664	33.7398	1406.15	0.52138
C7_ap - 18.d	7131	1925	2759	3698	8919	7407	0704	8033	8374	.7	2418	75	7085	5963	374	025	7211
25B-3b-	486.919	1099.51	1619.61	2059.08	2212.16	863.232	1233.66	582.271	276.829	211	143.772	90	51.0121	40.6832	31.9105	1428.37	0.52254
C7_ap - 19.d	8312	0604	2069	0963	2162	6821	8342	4681	2683	.9	8938		4575	2981	6911	9575	0774
25B-3b-	399.156	949.429	1441.81	1927.78	2165.54	833.037	1216.58	555.678	273.577	212	150.549	85.5	56.2753	41.4906	31.3414	1407.11	0.51322
C7_ap - 20.d	1181	0375	0345	9934	0541	3002	2915	6704	2358	.7	4505		0364	8323	6341	2807	8106
25B-3b-	378.902	924.959	1454.74	1954.04	2204.72	857.904	1248.24	565.096	280.487	217	142.673	91.93	60.3238	46.6459	34.9186	1439.38	0.51714
C7_ap - 21.d	9536	217	1379	814	973	0853	1206	9529	8049	.3	9927	75	8664	6273	9919	4799	4368

25B-3b-C7_ap - 22.d	246.413	687.112	1157.32	1630.19	2027.70	785.079	1185.92	575.623	296.341	224	152.564	94.12	59.1093	49.6894	38.2113	1490.26	0.50627
	5021	5612	7586	6937	2703	929	9648	2687	4634	.6	1026	5	1174	4099	8211	397	0091
25B-3b-C7_ap - 23.d	478.481	1120.71	1659.48	2164.11	2305.40	822.380	1257.28	586.426	297.967	225	156.043	99.87	65.5870	46.2732	34.8780	1512.45	0.48303
	0127	7781	2759	3786	5405	1066	6432	5928	4797	.4	956	5	4453	9193	4878	1414	859
25B-3b-C7_ap - 24.d	894.514	1696.57	2327.58	2781.18	2709.45	934.280	1427.13	648.753	323.170	247	170.329	111.3	71.6599	53.0434	38.1300	1664.19	0.47512
	7679	4225	6207	1619	9459	6394	5678	4626	7317	.8	6703	125	1903	7826	813	9843	0084
25B-3b-C7_ap - 25.d	377.637	944.535	1462.28	1899.34	2196.62	776.198	1217.58	555.678	293.089	222	148.717	96.18	64.7773	44.0993	36.1788	1461.12	0.47461
	1308	0734	4483	3545	1622	9343	794	6704	4309	.4	9487	75	2794	7888	6179	9119	9138
25B-3b-C7_ap - 26.d	309.282	781.402	1267.24	1708.97	1891.89	701.598	1075.37	512.465	266.666	213	128.937	93.75	46.9635	43.4782	23.5772	1328.83	0.49188
	7004	9364	1379	1554	1892	579	6884	374	6667		7289		6275	6087	3577	8829	1167
25B-3b-C7_ap - 27.d	372.151	923.654	1480.60	1910.28	2154.05	809.946	1239.19	575.623	288.211	225	144.505	97.62	61.1336	44.3478	32.1544	1468.60	0.49574
	8987	1599	3448	4464	4054	714	598	2687	3821		4945	5	0324	2609	7154	1046	4781
25B-3b-C7_ap - 28.d	414.767	996.737	1495.68	1993.43	2223.64	843.694	1206.53	558.448	284.552	223	146.336	89.93	59.9190	44.7204	36.3414	1443.25	0.51508
	9325	3573	9655	5449	8649	4938	2663	7535	8455		9963	75	2834	9689	6341	7084	9373
25B-3b-C7_ap - 29.d	509.704	1127.24	1650.86	2113.78	2279.05	856.127	1268.84	587.811	300	228	153.296	96.5	61.1336	47.2049	37.0325	1511.07	0.50345
	6414	3067	2069	5558	4054	8863	4221	6343		.1	7033		0324	6894	2033	943	0965
25B-3b-C7_ap - 30.d	477.637	1096.24	1616.37	2076.58	2254.05	827.708	1237.18	573.961	293.495	226	151.831	91.25	67.2064	45.2795	38.4959	1487.82	0.49565
	1308	7961	931	6433	4054	7034	593	2188	935	.3	5018		7773	0311	3496	0571	3152
25B-3b-C7_ap - 32.d	477.215	1075.04	1587.28	2052.51	2233.78	891.651	1250.75	572.576	288.617	219	150.366	92.56	59.1093	36.8322	40.9349	1460.09	0.53344
	1899	0783	4483	6411	3784	865	3769	1773	8862	.1	3004	25	1174	9814	5935	9433	4013
25B-3b-C7_ap - 33.d	481.434	1109.29	1658.40	2096.28	2314.86	776.198	1271.85	599.722	312.195	247	168.131	110.5	70.0404	47.6397	45.1219	1601.21	0.45236
	5992	8532	5172	0088	4865	9343	9296	9917	122	.8	8681	625	8583	5155	5122	467	6761
25B-3b-C7_ap - 34.d	422.784	1004.89	1504.31	1936.54	2155.40	754.884	1196.48	560.387	289.024	231	153.663	102.5	58.7044	47.5155	34.9593	1477.95	0.47007
	8101	3964	0345	267	5405	5471	2412	8116	3902	.2	0037		5344	2795	4959	4537	0386
25B-3b-C7_ap - 35.d	419.831	982.707	1490.30	1927.78	2170.27	751.332	1226.13	584.764	312.601	248	178.571	111.8	76.1133	54.3478	42.2764	1608.85	0.46058
	2236	9935	1724	9934	027	1492	0653	5429	626	.3	4286	75	6032	2609	2276	0207	1709
25B-3b-C7_ap - 36.d	378.059	934.747	1450.43	1910.28	2168.91	735.346	1274.87	597.506	334.146	269	184.065	120.6	72.4696	56.4596	46.3414	1681.21	0.44221
	0717	1452	1034	4464	8919	3588	4372	9252	3415	.6	9341	25	3563	2733	6341	4927	8179
25B-3b-C7_ap - 37.d	396.624	952.691	1473.06	1899.34	2139.18	706.927	1227.13	604.155	320.325	260	172.344	113.0	75.3036	61.3664	49.5934	1656.75	0.43631
	4726	6803	0345	3545	9189	1758	5678	1247	2033	.6	3223	625	4372	5963	9593	075	8661
25B-3b-C7_ap - 38.d	382.278	936.378	1410.56	1888.40	2131.75	693.605	1305.02	648.476	377.235	313	214.652	149	101.214	72.4223	58.5365	1935.33	0.41584
	481	4666	0345	2626	6757	6838	5126	4543	7724	.8	0147		5749	6025	8537	7762	7776
25B-3b-C7_ap - 39.d	354.430	876.508	1373.92	1827.13	2133.78	668.383	1300	665.373	387.804	324	224.175	155.1	101.619	82.9192	61.7886	2003.16	0.40130
	3797	9723	2414	3479	3784	659		9612	878	.3	8242	875	4332	5466	1789	9469	9039
25B-3b-C7_ap - 40.d	423.206	972.267	1487.06	1925.60	2214.18	673.001	1342.71	704.986	398.373	340	239.194	155.6	105.668	85.7142	73.9837	2104.14	0.39031
	7511	5367	8966	1751	9189	7762	3568	1496	9837	.6	1392	25	0162	8571	3984	5314	6723
25B-3b-C7_ap - 41.d	264.978	694.616	1134.69	1540.48	1829.72	625.222	1140.70	544.875	301.219	252	171.978	115.7	72.0647	56.2732	48.7804	1563.54	0.43276
	903	6395	8276	14	973	0249	3518	3463	5122	.6	022	5	7733	9193	878	1437	7268
25B-3b-C7_ap - 42.d	297.046	752.854	1191.81	1617.06	1892.56	637.477	1185.42	604.432	330.487	269	182.234	126.3	74.4939	67.7018	49.1869	1704.04	0.42560
	4135	8124	0345	7834	7568	7975	7136	133	8049	.2	4322	125	2713	6335	9187	9652	0309
25B-3b-C7_ap - 43.d	308.438	750.570	1198.27	1628.00	1911.48	632.326	1141.20	575.900	319.105	263	184.065	122.1	85.0202	62.6708	48.3739	1660.72	0.42812
	8186	9625	5862	8753	6486	8206	603	277	6911	.4	9341	875	4291	0745	8374	4436	8321
25B-3b-C7_ap - 44.d	2531.64	2691.68	2780.17	2735.22	2385.13	726.465	1412.06	768.975	447.154	377	271.428	192.5	122.672	92.5465	82.1138	2355.19	0.39585
	557	0261	2414	9759	5135	3641	0302	0693	4715	.8	5714		0648	8385	2114	0582	1046
25B-3b-C7_ap - 45.d	313.080	766.721	1228.44	1680.52	2043.91	609.236	1288.44	687.257	404.065	349	243.406	173.7	113.360	91.9254	71.9512	2135.01	0.37542
	1688	044	8276	5164	8919	2345	2211	6177	0407	.3	5934	5	3239	6584	1951	6261	3471

Apatite trace element standards

Standard	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
NIST610 - 27.d	2075	2146	2111	2036	2146	2100	2123	2066	2064	2125	2147	2053	2118	2070
NIST610 - 28.d	2079	2131	2121	2032	2137	2116	2125	2065	2068	2122	2163	2064	2141	2074
NIST610 - 29.d	2126	2196	2162	2080	2200	2159	2148	2112	2110	2170	2193	2097	2146	2116
NIST610 - 30.d	2105	2162	2137	2043	2140	2127	2153	2071	2075	2136	2160	2067	2136	2081
NIST610 - 31.d	2226	2295	2267	2170	2282	2276	2295	2236	2217	2294	2327	2228	2318	2252
NIST610 - 32.d	2196	2262	2231	2150	2241	2231	2247	2197	2187	2246	2284	2178	2248	2190
NIST610 - 33.d	2163	2220	2206	2119	2232	2190	2200	2146	2143	2209	2239	2138	2209	2153
NIST610 - 34.d	2133	2191	2159	2063	2186	2165	2176	2110	2112	2167	2183	2105	2171	2121
NIST610 - 35.d	2165	2227	2197	2107	2193	2184	2214	2130	2147	2200	2220	2128	2199	2148
NIST610 - 36.d	2103	2190	2138	2059	2173	2131	2147	2079	2077	2150	2182	2078	2145	2092
NIST610 - 37.d	2073	2131	2104	2024	2119	2098	2109	2060	2052	2109	2142	2043	2115	2062

APPENDIX 3E: LA–ICP–MS RUTILE RESULTS

Rutile morphology

Sample	Textural location	Size (long axis)	Crystal Habit	Spot location	Comments
WGC2019J-25B-C2_rut - 1.d	Garnet inclusion	~250µm	Elongate	core	
WGC2019J-25B-C2_rut - 2.d	Garnet edge	~250µm	Tabular	core	
WGC2019J-25B-C2_rut - 3.d	Garnet edge			rim	
WGC2019J-25B-C2_rut - 4.d	Garnet edge			rim	
WGC2019J-25B-C3_rut - 1.d	Garnet inclusion	~250µm	Elongate	core	
WGC2019J-25B-C3_rut - 2.d	Garnet inclusion	~150µm	Elongate	core	
WGC2019J-25B-C3_rut - 3.d	Garnet inclusion	~100µm	Tabular	core	
WGC2019J-25B-C3_rut - 4.d	Garnet inclusion	~250µm	Elongate	rim	Located in rounded end of grain
WGC2019J-25B-C3_rut - 5.d	Garnet inclusion			core	Located in elongate part of grain
WGC2019J-25B-C3_rut - 6.d	Garnet inclusion	~300µm	Tabular	rim	
WGC2019J-25B-C3_rut - 7.d	Garnet inclusion			rim	
WGC2019J-25B-C3_rut - 8.d	Garnet inclusion			core	
WGC2019J-25B-C8_rut - 1.d	Garnet inclusion	~400µm	Elongate	core	
WGC2019J-25B-C8_rut - 2.d	Garnet inclusion			rim	
WGC2019J-25B-C9_rut - 1.d	Garnet inclusion	~250µm	Elongate	rim	
WGC2019J-25B-C9_rut - 2.d	Garnet inclusion			core	
WGC2019J-25B-C10_rut - 1.d	Garnet inclusion - within fracture?	~250µm	Triangular	rim	
WGC2019J-25B-C10_rut - 2.d	Garnet inclusion - within fracture?			core	
WGC2019J-25B-C10_rut - 3.d	Garnet inclusion - within fracture?			rim	
WGC2019J-25B-C10_rut - 4.d	Garnet inclusion - within fracture?	~100µm	Tabular	core	broken off fragment
WGC2019J-25B-C10_rut - 5.d	Matrix	~100µm	Equant	core	
WGC2019J-25B-C11_rut - 1.d	Garnet inclusion	~300µm	Asymmetric	rim	Angular, asymmetric shape
WGC2019J-25B-C11_rut - 2.d	Garnet inclusion			rim	
WGC2019J-25B-C11_rut - 3.d	Garnet inclusion			core	

WGC2019J-25B-C11_rut - 4.d	Garnet inclusion			rim	
WGC2019J-25B-C11_rut - 5.d	Garnet inclusion	~200µm	Tabular	core	
WGC2019J-25B-C11_rut - 6.d	Garnet inclusion			core	
WGC2019J-25B-C11_rut - 7.d	Garnet inclusion	~100µm	Elongate	core	
WGC2019J-25B-C12_rut - 1.d	Garnet inclusion	~150µm	Tabular	core	
WGC2019J-25B-C12_rut - 2.d	Garnet inclusion	~400µm	Tabular	rim	
WGC2019J-25B-C12_rut - 3.d	Garnet inclusion			rim	
WGC2019J-25B-C12_rut - 5.d	Garnet inclusion			core	
WGC2019J-25B-C12_rut - 6.d	Garnet inclusion			core	
WGC2019J-25B-C12_rut - 7.d	Garnet inclusion	~300µm	Equant	rim	
WGC2019J-25B-C12_rut - 8.d	Garnet inclusion			core	
WGC2019J-25B-C12_rut - 9.d	Garnet inclusion			rim	
WGC2019J-25B-C13_rut - 1.d	Garnet inclusion	~250µm	Tabular	rim	
WGC2019J-25B-C13_rut - 2.d	Garnet inclusion			core	
WGC2019J-25B-C13_rut - 3.d	Garnet inclusion	~50µm	Equant	core	
WGC2019J-25B-C13_rut - 4.d	Garnet inclusion	~300µm	Tabular	rim	
WGC2019J-25B-C13_rut - 5.d	Garnet inclusion			core	
WGC2019J-25B-C13_rut - 6.d	Garnet inclusion			rim	
WGC2019J-25B-C13_rut - 7.d	Garnet inclusion	~200µm	Tabular	rim	
WGC2019J-25B-C13_rut - 8.d	Garnet inclusion	~100µm	Tabular	core	
WGC2019J-25B-C13_rut - 9.d	Garnet inclusion	~250µm	Tabular	rim	
WGC2019J-25B-C13_rut - 10.d	Garnet inclusion			rim	
WGC2019J-25B-C13_rut - 11.d	Garnet inclusion	~50µm	Equant	core	
WGC2019J-25B-C13_rut - 12.d	Garnet inclusion	~250µm	Tabular	core	part of grain 23
WGC2019J-25B-C14_rut - 1.d	Garnet inclusion	~250µm	Triangular	core	
WGC2019J-31A-2-C2_rut - 1.d	Matrix	~200µm	Tabular	core	
WGC2019J-31A-2-C3_rut - 1.d	Garnet inclusion	~300µm	Tabular	rim	
WGC2019J-31A-2-C3_rut - 2.d	Garnet inclusion			core	
WGC2019J-31A-2-C3_rut - 3.d	Garnet inclusion	~100µm	Tabular	core	Don't have a reflected light image for this grain
WGC2019J-31A-2-C3_rut - 4.d	Garnet inclusion	~50µm	Equant	core	
WGC2019J-31A-2-C4_rut - 1.d	Matrix	~200µm	Elongate	core	

WGC2019J-31A-2-C4_rut - 2.d	Matrix	~250µm	Tabular	rim	
WGC2019J-31A-2-C4_rut - 3.d	Matrix			rim	
WGC2019J-31A-2-C8_rut - 1.d	Edge of garnet	~400µm	Tabular	rim	
WGC2019J-31A-2-C8_rut - 2.d	Edge of garnet			rim	
WGC2019J-31A-2-C8_rut - 3.d	Edge of garnet			rim	
WGC2019J-31A-2-C8_rut - 4.d	Edge of garnet			rim	
WGC2019J-31A-2-C8_rut - 5.d	Edge of garnet			core	
WGC2019J-31A-2-C10_rut - 1.d	Matrix	~150µm	Tabular	core	Inclusion at edge of kyanite maybe?
WGC2019J-31A-3-C3_rut - 1.d	Matrix	~125µm	Tabular	core	
WGC2019J-31A-3-C4_rut - 1.d	Matrix	~175µm	Equant	rim	Equant grain with elongate tail
WGC2019J-31A-3-C5_rut - 1.d	Edge of garnet	~150µm	Triangular	rim	
WGC2019J-31A-3-C5_rut - 2.d	Edge of garnet			core	
WGC2019J-31A-3-C6_rut - 1.d	Edge of garnet	~200µm	Diamond	core	Diamond-shaped grain with circle eaten out
WGC2019J-31A-3-C12_rut - 1.d	Garnet inclusion	~75µm	Equant	core	
WGC2019J-31A-3-C19_rut - 1.d	Garnet inclusion	~150µm	Elongate	core	
WGC2019J-31A-3-C19_rut - 2.d	Garnet inclusion			core	
WGC2019J-31A-3-C20_rut - 1.d	Matrix	~650µm	Asymmetric	rim	Analyses all located within an equant section of the grain
WGC2019J-31A-3-C20_rut - 2.d	Matrix			core	
WGC2019J-31A-3-C20_rut - 3.d	Matrix			core	
WGC2019J-31A-3-C20_rut - 4.d	Matrix			core	
WGC2019J-31A-3-C20_rut - 5.d	Matrix			rim	
WGC2019J-31A-3-C20_rut - 6.d	Matrix			core	
WGC2019J-31A-3-C20_rut - 7.d	Matrix			rim	
WGC2019J-31A-3-C21_rut - 1.d	Matrix	~250µm	Elongate	core	
WGC2019J-31A-3-C21_rut - 2.d	Matrix	~200µm	Tabular	core	

Rutile geochronology

Sample	207/235	2σ	206/238	2σ	207/206	2σ	ErrCorr 6/38vs7/35	ErrCorr 38/6vs7/6	207/235 age	2σ	206/238 age	2σ	Concordant?	% discordance
WGC2019J-25B-C2_rut - 1.d	0.67	0.02	0.06592	0.0014	0.0733	0.0019	0.45392	0.07999	519	12	411.5	8.4	D	20.71290944
WGC2019J-25B-C2_rut - 2.d	0.546	0.022	0.068	0.0016	0.0585	0.0022	0.34399	0.14569	440	14	424.1	9.8	D	3.613636364
WGC2019J-25B-C2_rut - 3.d	0.572	0.021	0.07	0.0017	0.059	0.0019	0.33781	0.1604	456	13	435.8	10	NC - old Caledonian	4.429824561
WGC2019J-25B-C2_rut - 4.d	0.54	0.025	0.0699	0.0016	0.0567	0.0024	0.51133	-0.15958	435	16	435.4	9.5	C - old Caledonian	-0.09195402
WGC2019J-25B-C3_rut - 1.d	0.708	0.024	0.06529	0.0014	0.0791	0.0027	0.15791	0.22405	542	14	407.6	8.4	D	24.79704797
WGC2019J-25B-C3_rut - 2.d	1.07	0.15	0.0697	0.0031	0.114	0.014	0.49015	-0.4738	712	67	434	19	D	39.04494382
WGC2019J-25B-C3_rut - 3.d	0.494	0.017	0.06423	0.0013	0.0559	0.002	-0.044848	0.41934	407	11	401.2	8	C - old Caledonian	1.425061425
WGC2019J-25B-C3_rut - 4.d	0.522	0.019	0.06253	0.0012	0.0606	0.0022	0.10775	0.2203	426	13	391.4	7.4	NC - old Caledonian	8.122065728
WGC2019J-25B-C3_rut - 5.d	0.493	0.015	0.06564	0.0013	0.0545	0.0016	0.13649	0.25286	407.7	9.9	409.8	7.8	C - old Caledonian	-0.51508462
WGC2019J-25B-C3_rut - 6.d	0.529	0.018	0.06446	0.0013	0.059	0.0019	0.28825	0.070578	432	12	402.6	7.8	NC - old Caledonian	6.805555556
WGC2019J-25B-C3_rut - 7.d	0.487	0.015	0.06482	0.0013	0.0544	0.0018	0.078021	0.26399	402	10	404.8	7.7	C - old Caledonian	-0.69651741
WGC2019J-25B-C3_rut - 8.d	0.498	0.016	0.06687	0.0013	0.0544	0.0018	0.022895	0.37043	409	11	417.2	8.1	C - old Caledonian	-2.00488998
WGC2019J-25B-C8_rut - 1.d	0.562	0.022	0.0648	0.0018	0.0626	0.0026	0.15384	0.39061	452	14	404.6	11	NC - old Caledonian	10.48672566
WGC2019J-25B-C8_rut - 2.d	0.585	0.025	0.0672	0.0018	0.0632	0.0028	0.18546	0.28068	463	16	419.1	11	NC - old Caledonian	9.481641469
WGC2019J-25B-C9_rut - 1.d	1.242	0.068	0.0807	0.0024	0.1112	0.0049	0.61564	-0.16728	808	30	500	14	D	38.11881188
WGC2019J-25B-C9_rut - 2.d	0.574	0.029	0.0727	0.002	0.0571	0.0028	0.20629	0.23937	458	19	453.3	12	C - old Caledonian	1.026200873
WGC2019J-25B-C10_rut - 1.d	0.491	0.016	0.0643	0.0016	0.056	0.0018	0.36638	0.23164	405	11	401.4	9.5	C - old Caledonian	0.888888889
WGC2019J-25B-C10_rut - 2.d	0.502	0.017	0.0674	0.0017	0.0548	0.0017	0.35896	0.22104	414	11	420.4	10	C - old Caledonian	-1.54589372
WGC2019J-25B-C10_rut - 3.d	0.906	0.028	0.0803	0.0019	0.082	0.0021	0.50362	0.12931	654	15	498	11	D	23.85321101
WGC2019J-25B-C10_rut - 4.d	0.47	0.018	0.0631	0.0015	0.0543	0.0019	0.21565	0.20672	393	12	394.1	9.1	C - old Caledonian	-0.27989822
WGC2019J-25B-C10_rut - 5.d	0.558	0.033	0.0704	0.0019	0.0579	0.0035	0.16745	-0.060148	443	22	439.3	12	C - old Caledonian	0.835214447
WGC2019J-25B-C11_rut - 1.d	0.508	0.017	0.0682	0.0017	0.0541	0.0016	0.42831	0.18675	415	11	425.4	10	C - old Caledonian	-2.5060241
WGC2019J-25B-C11_rut - 2.d	0.495	0.018	0.0656	0.0017	0.0551	0.0018	0.3801	0.17379	408	12	409.7	10	C - old Caledonian	-0.41666667
WGC2019J-25B-C11_rut - 3.d	0.514	0.018	0.0676	0.0018	0.0558	0.0018	0.3406	0.23809	423	12	421.6	11	C - old Caledonian	0.330969267
WGC2019J-25B-C11_rut - 4.d	0.472	0.018	0.0651	0.0017	0.0531	0.0019	0.31547	0.20126	392	12	406.3	10	C - old Caledonian	-3.64795918
WGC2019J-25B-C11_rut - 5.d	0.496	0.02	0.066	0.0017	0.0557	0.0022	0.36429	0.16035	409	13	412	10	C - old Caledonian	-0.73349633
WGC2019J-25B-C11_rut - 6.d	0.563	0.024	0.0641	0.0015	0.0633	0.0029	0.045161	0.32088	453	16	400.3	8.9	NC - old Caledonian	11.63355408
WGC2019J-25B-C11_rut - 7.d	1.921	0.05	0.0801	0.0018	0.1699	0.0051	0.13627	0.36458	1089	18	496.6	11	D	54.39853076

WGC2019J-25B-C12_rut - 1.d	0.524	0.017	0.0685	0.0017	0.0564	0.0019	0.2625	0.30322	428	11	426.8	10	C - old Caledonian	0.280373832
WGC2019J-25B-C12_rut - 2.d	0.683	0.022	0.0672	0.0018	0.0756	0.0018	0.60153	-0.06159	526	13	419	11	D	20.34220532
WGC2019J-25B-C12_rut - 3.d	0.567	0.014	0.0694	0.0015	0.0593	0.0015	0.23537	0.33087	456	9.3	432.3	9.3	NC - old Caledonian	5.197368421
WGC2019J-25B-C12_rut - 5.d	0.535	0.015	0.0693	0.0016	0.0568	0.0015	0.33682	0.28396	436	10	431.9	9.6	C - old Caledonian	0.940366972
WGC2019J-25B-C12_rut - 6.d	0.737	0.056	0.07423	0.0015	0.072	0.0055	0.057285	0.030418	546	29	461.5	9.2	D	15.47619048
WGC2019J-25B-C12_rut - 7.d	0.522	0.018	0.0697	0.0018	0.0546	0.0019	0.35692	0.18187	425	12	434.4	11	C - old Caledonian	-2.21176471
WGC2019J-25B-C12_rut - 8.d	0.555	0.022	0.0719	0.0021	0.0568	0.002	0.41924	0.20739	449	15	448	13	C - old Caledonian	0.222717149
WGC2019J-25B-C12_rut - 9.d	0.524	0.02	0.0708	0.0017	0.0537	0.0019	0.32152	0.18003	426	13	440.6	10	C - old Caledonian	-3.42723005
WGC2019J-25B-C13_rut - 1.d	0.607	0.023	0.0705	0.0018	0.0632	0.002	0.46947	0.0028485	481	15	439	11	NC - old Caledonian	8.731808732
WGC2019J-25B-C13_rut - 2.d	0.505	0.015	0.0672	0.0015	0.0549	0.0016	0.22631	0.31968	416	10	419.2	9.3	C - old Caledonian	-0.76923077
WGC2019J-25B-C13_rut - 3.d	0.563	0.014	0.068	0.0016	0.0609	0.0014	0.36456	0.33326	452.8	9.3	424.3	9.5	NC - old Caledonian	6.294169611
WGC2019J-25B-C13_rut - 4.d	0.504	0.018	0.061	0.0014	0.0606	0.0023	-0.031981	0.40716	416	12	381.9	8.7	NC - young Caledonian	8.197115385
WGC2019J-25B-C13_rut - 5.d	0.884	0.033	0.084	0.0029	0.0772	0.0024	0.5357	0.36061	645	18	520	17	D	19.37984496
WGC2019J-25B-C13_rut - 6.d	0.516	0.023	0.0706	0.0017	0.0532	0.0024	0.16535	0.24652	425	15	439.7	10	C - old Caledonian	-3.45882353
WGC2019J-25B-C13_rut - 7.d	0.484	0.021	0.066	0.0017	0.0531	0.002	0.32506	0.189	403	14	412	10	C - old Caledonian	-2.23325062
WGC2019J-25B-C13_rut - 8.d	0.827	0.031	0.068	0.0017	0.0879	0.0027	0.59053	0.041155	612	17	423.8	11	D	30.75163399
WGC2019J-25B-C13_rut - 9.d	0.504	0.024	0.0647	0.0018	0.0573	0.0026	0.26616	0.19818	415	17	403.7	11	C - old Caledonian	2.722891566
WGC2019J-25B-C13_rut - 10.d	0.64	0.022	0.0706	0.002	0.0669	0.0021	0.49311	0.18824	502	14	439	12	NC - old Caledonian	12.5498008
WGC2019J-25B-C13_rut - 11.d	0.439	0.019	0.0591	0.0014	0.0545	0.0024	0.050972	0.31048	369	13	370.1	8.2	C - young Caledonian	-0.29810298
WGC2019J-25B-C13_rut - 12.d	0.531	0.024	0.07	0.0018	0.0546	0.0023	0.37794	0.082227	428	16	436	11	C - old Caledonian	-1.86915888
WGC2019J-25B-C14_rut - 1.d	0.598	0.045	0.0704	0.0023	0.0625	0.005	0.014571	0.11973	463	27	438	14	D	5.399568035
WGC2019J-31A-2-C2_rut - 1.d	2.46	0.27	0.0837	0.0042	0.195	0.016	0.6953	-0.34975	1183	83	519	25	D	56.1284869
WGC2019J-31A-2-C3_rut - 1.d	0.48	0.04	0.0679	0.0022	0.0514	0.0041	0.16293	0.2204	394	27	423	13	C - young Caledonian	-7.36040609
WGC2019J-31A-2-C3_rut - 2.d	0.512	0.041	0.0667	0.0021	0.0563	0.0047	0.03224	0.31766	410	28	416	13	C - young Caledonian	-1.46341463
WGC2019J-31A-2-C3_rut - 3.d	0.484	0.038	0.0606	0.0022	0.0577	0.005	0.016448	0.37882	390	26	379	13	C - young Caledonian	2.820512821
WGC2019J-31A-2-C3_rut - 4.d	0.715	0.063	0.0708	0.0029	0.0747	0.0063	0.27013	0.087419	543	38	441	18	D	18.78453039
WGC2019J-31A-2-C4_rut - 1.d	0.532	0.043	0.063	0.0021	0.0608	0.005	0.074139	0.30433	423	29	393	13	D	7.092198582
WGC2019J-31A-2-C4_rut - 2.d	0.454	0.044	0.0643	0.0023	0.0507	0.0049	0.10686	0.24585	378	31	402	14	C - young Caledonian	-6.34920635
WGC2019J-31A-2-C4_rut - 3.d	0.498	0.048	0.066	0.0024	0.0564	0.0057	0.052524	0.27443	424	31	412	15	C - young Caledonian	2.830188679
WGC2019J-31A-2-C8_rut - 1.d	0.49	0.039	0.0615	0.0024	0.0571	0.0047	0.12781	0.31232	396	27	384	14	C - young Caledonian	3.03030303
WGC2019J-31A-2-C8_rut - 2.d	0.449	0.041	0.0608	0.0022	0.0535	0.005	0.072172	0.24826	373	28	381	13	C - young Caledonian	-2.14477212

WGC2019J-31A-2-C8_rut - 3.d	0.511	0.045	0.0622	0.0019	0.0598	0.0054	0.071972	0.050641	404	30	389.1	11	C - young Caledonian	3.688118812
WGC2019J-31A-2-C8_rut - 4.d	0.476	0.041	0.0612	0.0023	0.0562	0.0051	0.14756	0.41536	394	28	382	14	C - young Caledonian	3.045685279
WGC2019J-31A-2-C8_rut - 5.d	0.464	0.041	0.0644	0.0025	0.0531	0.0048	0.12048	0.26675	392	30	403	15	C - young Caledonian	-2.80612245
WGC2019J-31A-2-C10_rut - 1.d	22.28	0.57	0.2533	0.0072	0.637	0.012	0.65513	0.25973	3191	25	1453	37	D	54.46568474
WGC2019J-31A-3-C3_rut - 1.d	0.468	0.037	0.0633	0.0022	0.0554	0.0045	0.20152	0.10256	391	26	395	13	C - young Caledonian	-1.0230179
WGC2019J-31A-3-C4_rut - 1.d	1.014	0.068	0.0709	0.0025	0.1064	0.0076	0.088709	0.34438	699	34	443	15	D	36.62374821
WGC2019J-31A-3-C5_rut - 1.d	0.943	0.084	0.0675	0.0029	0.1023	0.0095	-0.083695	0.33052	649	41	421	17	D	35.13097072
WGC2019J-31A-3-C5_rut - 2.d	0.585	0.054	0.0721	0.0029	0.0596	0.0059	0.11406	0.29595	457	35	449	17	C - old Caledonian	1.750547046
WGC2019J-31A-3-C6_rut - 1.d	0.613	0.055	0.0667	0.0027	0.068	0.0063	0.091126	0.43781	467	35	416	16	D	10.92077088
WGC2019J-31A-3-C12_rut - 1.d	0.436	0.04	0.0604	0.0021	0.0525	0.005	0.13628	0.24677	364	28	378	13	C - young Caledonian	-3.84615385
WGC2019J-31A-3-C19_rut - 1.d	0.409	0.04	0.0616	0.0024	0.0475	0.0047	0.11854	0.33087	349	29	385	15	D - under concordia?	-10.3151862
WGC2019J-31A-3-C19_rut - 2.d	0.501	0.04	0.0629	0.0022	0.0571	0.0047	0.11621	0.31247	406	27	393	13	C - young Caledonian	3.201970443
WGC2019J-31A-3-C20_rut - 1.d	0.474	0.038	0.062	0.0019	0.0544	0.0044	-0.076741	0.45679	390	26	389	12	C - young Caledonian	0.256410256
WGC2019J-31A-3-C20_rut - 2.d	0.481	0.035	0.0651	0.0019	0.0537	0.0041	0.043777	0.37418	402	23	406.1	12	C - young Caledonian	-1.0199005
WGC2019J-31A-3-C20_rut - 3.d	0.494	0.038	0.0637	0.0021	0.0566	0.0045	0.095851	0.31853	410	26	399	12	C - young Caledonian	2.682926829
WGC2019J-31A-3-C20_rut - 4.d	0.495	0.04	0.0638	0.0022	0.0569	0.0049	0.079976	0.27871	407	28	399	13	C - young Caledonian	1.965601966
WGC2019J-31A-3-C20_rut - 5.d	0.585	0.043	0.0711	0.0023	0.0594	0.0044	0.06276	0.2441	467	26	442	14	C - old Caledonian	5.353319058
WGC2019J-31A-3-C20_rut - 6.d	0.422	0.031	0.0634	0.002	0.0498	0.0039	-0.025681	0.33832	355	22	396	12	C - young Caledonian	-11.5492958
WGC2019J-31A-3-C20_rut - 7.d	0.491	0.03	0.0639	0.002	0.0554	0.0034	0.025468	0.41604	411	20	399	12	C - young Caledonian	2.919708029
WGC2019J-31A-3-C21_rut - 1.d	0.47	0.04	0.063	0.002	0.0552	0.0046	0.19219	0.16521	382	27	394	12	C - young Caledonian	-3.14136126
WGC2019J-31A-3-C21_rut - 2.d	0.553	0.053	0.0633	0.0025	0.067	0.0066	0.15488	0.18461	437	34	395	15	D	9.610983982

~~Crossed out~~ = discordant, C = concordant, NC = near concordant, D = discordant, RD = reversely discordant.

Rutile geochronology standards

Standard	Type	207/235	2σ	206/238	2σ	207/206	2σ	ErrorCorr 6/38vs7/35	ErrorCorr 38/6vs7/6	207/235 age	2σ	206/238	2σ	Concordant?	%discordance
R10 - 1.d	Primary	1.935	0.04	0.1831	0.0035	0.0773	0.0016	0.13529	0.29149	1090	14	1083.5	19	C	0.59633
R10 - 2.d	Primary	1.917	0.043	0.1835	0.0035	0.0756	0.0017	0.19835	0.29195	1088	15	1086	19	C	0.183824
R10 - 3.d	Primary	1.925	0.042	0.1848	0.0036	0.0752	0.0015	0.2751	0.23626	1090	15	1093	19	C	-0.27523

R10 - 4.d	Primary	1.936	0.041	0.1868	0.0037	0.0753	0.0018	0.17065	0.36397	1091	14	1104	20	C	-1.19157
R10 - 5.d	Primary	1.906	0.035	0.182	0.0036	0.0757	0.0016	0.053938	0.46206	1087	12	1078	19	C	0.827967
R10 - 6.d	Primary	1.963	0.039	0.186	0.0035	0.0766	0.0014	0.15806	0.29765	1104	13	1099.7	19	C	0.389493
R10 - 7.d	Primary	1.925	0.036	0.187	0.0037	0.075	0.0015	-0.06523	0.60079	1089	12	1105	20	C	-1.46924
R10 - 8.d	Primary	1.91	0.039	0.1848	0.0037	0.0746	0.0017	0.14296	0.39101	1082	14	1093	20	C	-1.01664
R10 - 9.d	Primary	1.942	0.042	0.1847	0.0036	0.0761	0.0018	-0.03304	0.29847	1093	13	1092	19	C	0.091491
R10 - 10.d	Primary	1.935	0.04	0.1844	0.0036	0.0757	0.0016	0.18311	0.42164	1090	14	1091	20	C	-0.09174
R10 - 11.d	Primary	1.934	0.04	0.1849	0.0036	0.0752	0.0017	0.009938	0.4182	1096	14	1096	19	C	0
R10 - 12.d	Primary	1.928	0.038	0.1854	0.0037	0.0756	0.0016	0.10749	0.42868	1088	13	1097	21	C	-0.82721
R10 - 13.d	Primary	1.901	0.037	0.1816	0.0036	0.0764	0.0016	0.19288	0.37506	1085	13	1077	20	C	0.737327
R10 - 14.d	Primary	1.925	0.034	0.1856	0.0036	0.0751	0.0014	0.11281	0.45255	1088	12	1097	20	C	-0.82721
R10 - 15.d	Primary	1.959	0.041	0.1837	0.0035	0.0774	0.0016	0.17313	0.27141	1100	14	1086.7	19	C	1.209091
R19 - 1.d	Secondary	0.645	0.089	0.08	0.0034	0.0628	0.0094	0.028538	0.041773	452	51	495	20	C	-9.51327
R19 - 2.d	Secondary	0.609	0.062	0.08	0.0032	0.0565	0.006	0.053472	0.29259	484	39	497	19	C	-2.68595
R19 - 3.d	Secondary	0.663	0.075	0.0841	0.0031	0.0588	0.0069	0.02353	0.34624	496	47	520	19	C	-4.83871
R19 - 4.d	Secondary	0.565	0.065	0.0833	0.0032	0.054	0.0065	-0.09272	0.34619	479	43	517	19	C	-7.93319
R19 - 5.d	Secondary	0.608	0.065	0.0827	0.003	0.0534	0.0059	0.074996	0.23923	496	40	512	18	C	-3.22581
R19 - 6.d	Secondary	0.629	0.056	0.0791	0.0033	0.0579	0.0057	-0.00126	0.34378	489	34	490	20	C	-0.2045
R19 - 7.d	Secondary	0.671	0.069	0.08	0.0034	0.0618	0.0069	0.12495	0.23054	528	40	495	20	C	6.25
R19 - 8.d	Secondary	0.579	0.044	0.0765	0.0024	0.0538	0.0045	-0.02444	0.38228	459	29	475	14	C	-3.48584
R19 - 9.d	Secondary	0.648	0.067	0.081	0.0031	0.0596	0.0064	-0.00174	0.36687	512	40	502	18	C	1.953125
R19 - 10.d	Secondary	0.611	0.066	0.0796	0.003	0.0543	0.0061	0.009795	0.34401	494	40	493	18	C	0.202429

Zr-rutile thermometry

Sample	Concordant?	Zr (ppm)	±	Pressure (kbar)	±		T (Tomkins et al. 2007)	±
WGC2019J-25B-C2_rut - 3.d	NC - old Caledonian	474.2	4.4	25		5	755.1779691	151.7802717
WGC2019J-25B-C2_rut - 4.d	C - old Caledonian	376.5	3.7	25		5	734.0813921	147.547847
WGC2019J-25B-C3_rut - 3.d	C - old Caledonian	649	3.6	25		5	785.3329491	157.7975535
WGC2019J-25B-C3_rut - 4.d	NC - old Caledonian	555.7	3.6	25		5	770.2006798	154.7656408
WGC2019J-25B-C3_rut - 5.d	C - old Caledonian	549.4	3.3	25		5	769.1060582	154.5411554
WGC2019J-25B-C3_rut - 6.d	NC - old Caledonian	412.3	3.3	25		5	742.2831495	149.172237
WGC2019J-25B-C3_rut - 7.d	C - old Caledonian	473.7	2.4	25		5	755.0794903	151.714852
WGC2019J-25B-C3_rut - 8.d	C - old Caledonian	445.4	3.6	25		5	749.3616397	150.5957083
WGC2019J-25B-C8_rut - 1.d	NC - old Caledonian	673.3	5.5	25		5	788.9813703	158.5590044
WGC2019J-25B-C8_rut - 2.d	NC - old Caledonian	729	11	25		5	796.9570304	160.2901208
WGC2019J-25B-C9_rut - 2.d	C - old Caledonian	390.9	4.1	25		5	737.4543704	148.2357112
WGC2019J-25B-C10_rut - 1.d	C - old Caledonian	620.6	5.4	25		5	780.9254051	156.9470392
WGC2019J-25B-C10_rut - 2.d	C - old Caledonian	624.9	5.6	25		5	781.6031495	157.0868412
WGC2019J-25B-C10_rut - 4.d	C - old Caledonian	709.5	5.2	25		5	794.2229365	159.6020502
WGC2019J-25B-C10_rut - 5.d	C - old Caledonian	590.2	5.4	25		5	776.0216658	155.9677152
WGC2019J-25B-C11_rut - 1.d	C - old Caledonian	517	4.4	25		5	763.3090972	153.4040848
WGC2019J-25B-C11_rut - 2.d	C - old Caledonian	494.9	5.3	25		5	759.1823291	152.6067988
WGC2019J-25B-C11_rut - 3.d	C - old Caledonian	550.1	5.7	25		5	769.228187	154.6205317
WGC2019J-25B-C11_rut - 4.d	C - old Caledonian	475.7	5.6	25		5	755.4728968	151.8792006
WGC2019J-25B-C11_rut - 5.d	C - old Caledonian	480.5	4.8	25		5	756.4115791	152.0385701
WGC2019J-25B-C11_rut - 6.d	NC - old Caledonian	543.7	6.4	25		5	768.1068253	154.4190909
WGC2019J-25B-C12_rut - 1.d	C - old Caledonian	597.1	5.4	25		5	777.152427	156.1934849
WGC2019J-25B-C12_rut - 3.d	NC - old Caledonian	603.4	5	25		5	778.1756036	156.3889114
WGC2019J-25B-C12_rut - 5.d	C - old Caledonian	618	6.8	25		5	780.5137499	156.8997101
WGC2019J-25B-C12_rut - 7.d	C - old Caledonian	460	3.9	25		5	752.3474775	151.2006876
WGC2019J-25B-C12_rut - 8.d	C - old Caledonian	492.1	4.2	25		5	758.6487843	152.4678035
WGC2019J-25B-C12_rut - 9.d	C - old Caledonian	505.1	5.1	25		5	761.1053191	152.983653
WGC2019J-25B-C13_rut - 1.d	NC - old Caledonian	514.5	5.2	25		5	762.8495837	153.334406

WGC2019J-25B-C13_rut - 2.d	C - old Caledonian	514	4.6	25	5	762.7574622	153.299065
WGC2019J-25B-C13_rut - 3.d	NC - old Caledonian	548.5	5.4	25	5	768.9488487	154.5563538
WGC2019J-25B-C13_rut - 4.d	NC - young Caledonian	703.8	6	25	5	793.4122299	159.4541807
WGC2019J-25B-C13_rut - 6.d	C - old Caledonian	703.1	5.3	25	5	793.3123024	159.4215193
WGC2019J-25B-C13_rut - 7.d	C - old Caledonian	597.7	5	25	5	777.2502502	156.2039672
WGC2019J-25B-C13_rut - 9.d	C - old Caledonian	584.5	9.9	25	5	775.0794063	155.9358081
WGC2019J-25B-C13_rut - 10.d	NC - old Caledonian	564.8	7.5	25	5	771.7640642	155.1834878
WGC2019J-25B-C13_rut - 11.d	C - young Caledonian	554.1	5.1	25	5	769.9236436	154.7428846
WGC2019J-25B-C13_rut - 12.d	C - old Caledonian	529.1	5.1	25	5	765.5078237	153.8616455
					C & NC weighted mean	**767.96**	**5.21**
					C weighted mean	**768.32**	**5.31**
WGC2019J-31A-2-C3_rut - 1.d	C - young Caledonian	656.7	5.7	25	5	786.5008785	158.0672801
WGC2019J-31A-2-C3_rut - 2.d	C - young Caledonian	660.2	4.8	25	5	787.0280786	158.1555437
WGC2019J-31A-2-C3_rut - 3.d	C - young Caledonian	846.8	6.7	25	5	812.3180166	163.2455422
WGC2019J-31A-2-C4_rut - 2.d	C - young Caledonian	684.4	5.1	25	5	790.6124295	158.8779391
WGC2019J-31A-2-C4_rut - 3.d	C - young Caledonian	730.1	6.7	25	5	797.1094858	160.2064236
WGC2019J-31A-2-C8_rut - 1.d	C - young Caledonian	954.7	8.3	25	5	824.9387038	165.7925367
WGC2019J-31A-2-C8_rut - 2.d	C - young Caledonian	1025.1	9.9	25	5	832.5654205	167.3400456
WGC2019J-31A-2-C8_rut - 3.d	C - young Caledonian	936.4	7.5	25	5	822.882185	165.3698192
WGC2019J-31A-2-C8_rut - 4.d	C - young Caledonian	801	7.4	25	5	806.5646888	162.1076855
WGC2019J-31A-2-C8_rut - 5.d	C - young Caledonian	925.1	8.6	25	5	821.5960721	165.1296541
WGC2019J-31A-3-C3_rut - 1.d	C - young Caledonian	767.9	6.8	25	5	802.2386411	161.2326519
WGC2019J-31A-3-C5_rut - 2.d	C - old Caledonian	767.9	7.5	25	5	802.2386411	161.2462704
WGC2019J-31A-3-C12_rut - 1.d	C - young Caledonian	741.3	6.1	25	5	798.6512499	160.5031151
WGC2019J-31A-3-C19_rut - 2.d	C - young Caledonian	486.3	5.3	25	5	757.5356384	152.2788898
WGC2019J-31A-3-C20_rut - 1.d	C - young Caledonian	714.8	5.2	25	5	794.9720231	159.7519511
WGC2019J-31A-3-C20_rut - 2.d	C - young Caledonian	718.9	5.8	25	5	795.5484197	159.8774603
WGC2019J-31A-3-C20_rut - 3.d	C - young Caledonian	722.3	5.6	25	5	796.0243878	159.9691479
WGC2019J-31A-3-C20_rut - 4.d	C - young Caledonian	692.1	5.8	25	5	791.7313083	159.1144226
WGC2019J-31A-3-C20_rut - 5.d	C - old Caledonian	696.9	5	25	5	792.423687	159.238709

WGC2019J-31A-3-C20_rut - 6.d	C - young Caledonian	698.6	5.6	25	5	792.6679761	159.2979307
WGC2019J-31A-3-C20_rut - 7.d	C - young Caledonian	707.2	5.5	25	5	793.8964477	159.5418144
WGC2019J-31A-3-C21_rut - 1.d	C - young Caledonian	710.8	6.3	25	5	794.4070939	159.6587916
					C weighted mean	**799.13**	**7.15**

C = concordant, NC = near concordant

APPENDIX 3F: LA–ICP–MS BIOTITE AND K-FELDSPAR RESULTS

Biotite:

Source file	Pb207_204_Final	Pb207_204_Final_Prop 2SE	Pb206_204_Final	Pb206_204_Final_Prop 2SE	Pb208_206_Final	Pb208_206_Final_Prop 2SE	Pb207_206_Final	Pb207_206_Final_Prop 2SE
25B-3b-C8_bio - 1.d	20.5	4.3	24.1	4.9	2.037	0.064	0.866	0.02
25B-3b-C8_bio - 2.d	13.7	6.8	15.8	8.1	2.09	0.069	0.856	0.021
25B-3b-C8_bio - 3.d	19.6	3.4	22.5	3.9	2.108	0.056	0.876	0.018
25B-3b-C8_bio - 4.d	21.5	4.7	25.2	5.5	2.049	0.054	0.88	0.021
25B-3b-C8_bio - 5.d	20	4.6	21.5	7.1	2.041	0.049	0.839	0.016
25B-3b-C8_bio - 6.d	20.7	4.5	24.9	5.8	2.071	0.066	0.864	0.021
25B-3b-C8_bio - 7.d	15.7	4	18.6	4.8	2.131	0.051	0.847	0.017
25B-3b-C8_bio - 8.d	19.3	3.5	22.5	4.1	2.137	0.044	0.866	0.016
25B-3b-C8_bio - 9.d	23	3.2	27.2	3.8	2.088	0.043	0.845	0.015
25B-3b-C8_bio - 10.d	18.3	3.3	20.4	3.4	2.113	0.072	0.875	0.023
25B-3b-C8_bio - 11.d	24.8	5.1	29.4	6.2	2.066	0.073	0.861	0.02
25B-3b-C8_bio - 12.d	18.3	7	21.6	8.1	2.039	0.073	0.855	0.02
25B-3b-C8_bio - 13.d	20.2	5	22.7	5.7	2.134	0.077	0.863	0.023
25B-3b-C8_bio - 14.d	15.5	4.1	18.6	4.4	2.094	0.052	0.859	0.016
25B-3b-C8_bio - 15.d	16.1	9.5	18	11	2.134	0.081	0.88	0.024
25B-3b-C8_bio - 16.d	19.7	4.8	23.5	5.9	2.064	0.078	0.849	0.02
						Weighted mean:	**0.8593**	**± 0.0068**

Source file	Pb207_204_Final	Pb207_204_Final_Prop 2SE	Pb206_204_Final	Pb206_204_Final_Prop 2SE	Pb208_206_Final	Pb208_206_Final_Prop 2SE	Pb207_206_Final	Pb207_206_Final_Prop 2SE
31A-3-C2_bio - 1.d	2	11	3	13	2.094	0.043	0.838	0.012

31A-3-C2_bio - 2.d	18.6	3.5	22.3	4.1	2.051	0.042	0.834	0.014
~~**31A-3-C2_bio - 3.d**~~	~~19~~	~~3.3~~	~~24.8~~	~~4.5~~	~~2.009~~	~~0.045~~	~~0.785~~	~~0.016~~
31A-3-C2_bio - 4.d	17	1.2	19.9	1.4	2.111	0.031	0.8435	0.0084
31A-3-C2_bio - 5.d	21.1	3.1	24.6	3.6	2.135	0.047	0.86	0.016
31A-3-C2_bio - 6.d	21.9	3.9	25.6	4.6	2.07	0.035	0.852	0.014
31A-3-C4_bio - 1.d	21.9	3.8	25.6	4.3	2.126	0.044	0.854	0.015
31A-3-C4_bio - 2.d	21.1	3.2	25	3.8	2.043	0.04	0.847	0.013
31A-3-C4_bio - 3.d	16.6	1.1	19.5	1.2	2.087	0.025	0.8466	0.0086
31A-3-C4_bio - 4.d	18.4	4.7	19.8	6.4	2.067	0.045	0.848	0.014
31A-3-C4_bio - 5.d	19.6	3.5	23.5	4.2	2.092	0.051	0.843	0.014
31A-3-C4_bio - 6.d	19.9	2.9	23.8	3.4	2.066	0.039	0.837	0.012
~~**31A-3-C5_bio - 1.d**~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~
~~**31A-3-C5_bio - 2.d**~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~
~~**31A-3-C5_bio - 3.d**~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~
~~**31A-3-C5_bio - 4.d**~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~	~~no value~~	~~NAN~~
31A-3-C5_bio - 5.d	0.63	0.62	-2.9	3.3	1.8	1.7	-0.11	0.25
31A-3-C7_bio - 1.d	15.8	4	18.7	5	2.104	0.049	0.83	0.019
31A-3-C7_bio - 2.d	16.7	4.2	20	5	2.124	0.045	0.83	0.015
31A-3-C7_bio - 3.d	20.6	3.4	24.7	4.2	2.147	0.061	0.848	0.017
31A-3-C7_bio - 4.d	20.6	3.1	24.1	3.6	2.082	0.047	0.847	0.015
31A-3-C7_bio - 5.d	21.3	3.7	24.2	4.1	2.131	0.048	0.863	0.014
31A-3-C7_bio - 6.d	19.1	3.9	22.8	4.6	2.094	0.046	0.831	0.015
						Weighted mean:	**0.8443**	**± 0.0045**

K-feldspar:

Source file	Pb207_204_Final	Pb207_204_Final_Prop 2SE	Pb206_204_Final	Pb206_204_Final_Prop 2SE	Pb208_206_Final	Pb208_206_Final_Prop 2SE	Pb207_206_Final	Pb207_206_Final_Prop 2SE
31A-3-C1_kspar - 1.d	15.6	0.55	18.7	0.65	2.065	0.03	0.8355	0.0099
31A-3-C1_kspar - 2.d	15.67	0.29	18.65	0.33	2.09	0.02	0.8393	0.0039
31A-3-C1_kspar - 3.d	16.19	0.55	19.31	0.66	2.073	0.02	0.8403	0.006
31A-3-C1_kspar - 4.d	17.9	1.4	20.7	1.5	2.03	0.027	0.853	0.011
31A-3-C1_kspar - 5.d	17.7	1.4	20.6	1.6	2.079	0.03	0.851	0.012
31A-3-C1_kspar - 6.d	16.13	0.59	19.14	0.72	2.05	0.033	0.844	0.012
31A-3-C1_kspar - 7.d	17	1.5	19.9	1.6	2.047	0.024	0.841	0.011
31A-3-C1_kspar - 8.d	17.9	1.2	20.9	1.4	2.058	0.031	0.852	0.011
31A-3-C1_kspar - 9.d	20.9	2.5	24.5	2.8	2.085	0.03	0.8505	0.0098
31A-3-C1_kspar - 10.d	17.6	1.6	20.3	1.8	2.093	0.035	0.853	0.012
31A-3-C6_kspar - 1.d	17.3	1.3	20.4	1.6	2.101	0.03	0.8432	0.0099
31A-3-C6_kspar - 2.d	17.3	1.1	20.9	1.4	2.078	0.03	0.8397	0.0099
31A-3-C6_kspar - 3.d	18.5	1.6	21.5	1.8	2.063	0.03	0.8455	0.0097
31A-3-C6_kspar - 4.d	17.2	1.1	20	1.3	2.083	0.026	0.8508	0.0077
						Weighted mean:	**0.8434**	**± 0.0032**

31A combined ksp + bi weighted mean = 0.84370 ± 0.00245

APPENDIX 4A: EXTENDED MINERAL EQUILIBRIA FORWARD MODELLING METHODS

Modelling oxidation state

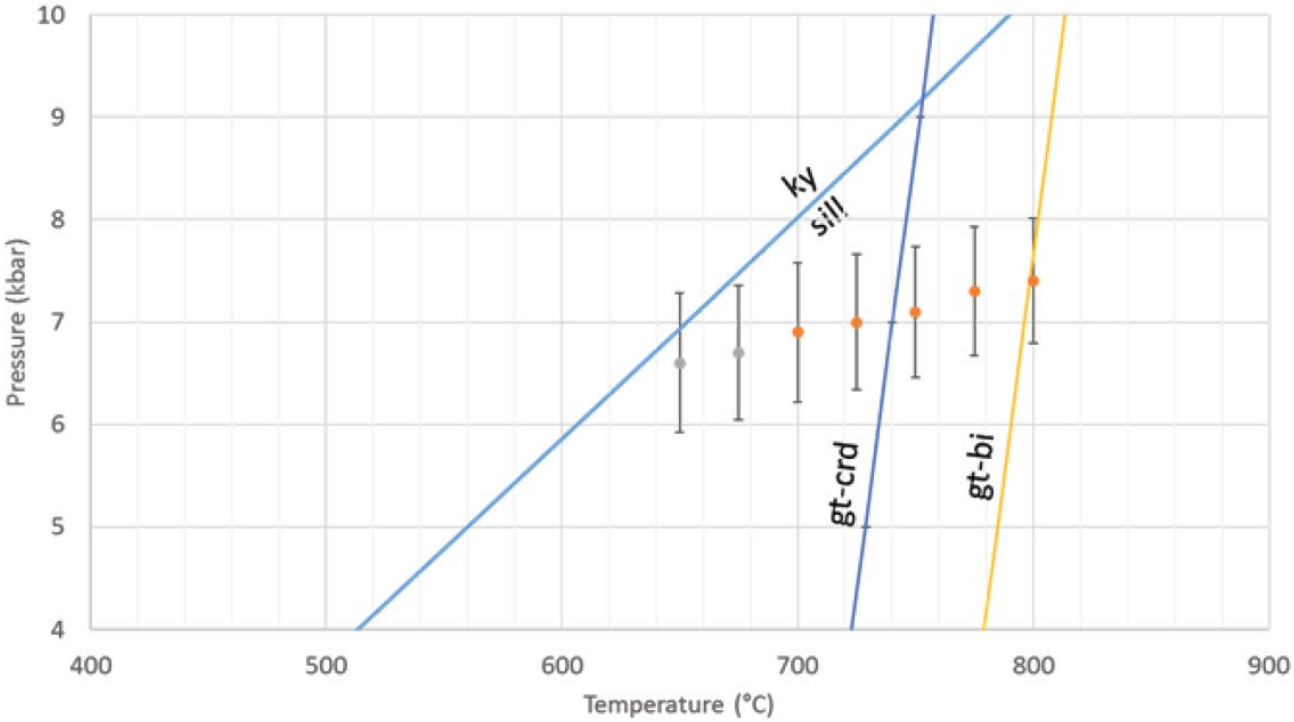
Iron (Fe) has two oxidation states: FeO (Fe^{2+}) which is reduced, and Fe_2O_3 (Fe^{3+}) which is oxidised. Oxidation state has a large impact on how a rock will react when subject to evolving *P-T* conditions. Thus, it is essential to differentiate between these oxidation states in order to calculate meaningful and accurate *P-T* diagrams.
Oxidation state is estimated in WGC2019J-25B by creating a 'PMo' (also known as a *P–X*). A PMo can be calculated by modelling pressure versus oxidation state at a fixed temperature, in this instance temperature was fixed at 790°C. The calculation of a PMo using THERMOCALC follows the same steps as will be detailed below, but without the ability to calculate points. Users are instead required to manually estimate point data by monitoring mineral abundances along lines, recording when a second phase reaches $<10^{-6}$. The completed diagram is then imported into THERMOCALC Investigator (TCI) (Pearce et al., 2016), and calculated mineral composition and abundance contours are compared with the known composition of the rock to constrain oxidation state.
In WGC2019J-31A, oxidation state was estimated by finding the volume percentage of garnet and biotite in thin section, and then converting these values to wt% by multiplying by mineral volume % by mineral density and dividing by rock density. These values were then converted to Fe^{3+} and Fe^{2+} cations and used to calculated FeO and Fe_2O_3 wt% based on the assumption that $FeO/Fe_2O_3 = 1.112$.

Calculating *P–T* diagrams

After calculating relevant preliminary diagrams, *PꚛT* diagrams can be modelled using THERMOCALC. THERMOCALC v.3.40 was used in this study. Prior to commencing phase diagram calculations, the user must first study the petrographic relationships within their rock and identify the stable mineral assemblage. This provides the user with a starting point for their phase diagram calculations. The location of this initial stable assemblage in *P–T* space is then estimated using a Gibb's free energy minimisation calculation (also known as a 'dogmin'). Dogmins are a useful tool but are dependent on the user accurately inputting all phases present for a set *P–T* interval. They are also susceptible to erroneous results, so should not be too heavily relied upon. The phase equilibria model is then progressively built up from the initial assemblage through the trial and error calculation of lines and points. Lines represent the zero abundance of a singular phase within an assemblage (as specified by the user), whilst points signify the exact position at which two phases within an assemblage are zero and four lines intersect. In order to accurately calculate these points and lines, the assemblage that they are included within must also be input correctly. Phase equilibria calculations require an advanced understanding of the stability of different minerals across *P–T* space in order to predict the subtle addition of accessory phases. Missing a phase can be difficult to notice, and often only causes issues after significant progress in the diagram, ultimately resulting in the loss of many calculations. THERMOCALC software also requires the frequent updating of 'starting guesses'; compositional variables of phases that

THERMOCALC uses during its least-squares calculation for the output. The choice of starting guesses not only impacts how a line or point plots, but also THERMOCALC's ability to run a specific calculation at all.
The principal uncertainties on bulk composition when calculating phase diagrams are H_2O and oxidation. H_2O was calculated based on biotite abundance, however oxidation required the separate modelling of a *PMo* prior to calculation of a *P–T*.
Phase equilibria models are contoured using the Matlab-based, automated software TCInvestigator v2.0 (Pearce et al., 2016). Input into TCI requires THERMOCALC input files, executable (.exe) files, and the finished *P–T* model (.eps).

Calculating a *P–T* point



Garnet-cordierite and garnet-biotite thermometer calculations were performed based on several assumptions:

1. The most Ca-rich plagioclase and Ca-poor garnet was considered representative.
2. Average compositions of cordierite, spinel and biotite were used.
3. It was assumed that biotite occurred in chemical equilibrium with garnet rims, spinel, cordierite, ilmenite, rutile, quartz and plagioclase rims.
4. It was assumed that the rock didn't have fluid (i.e. that the fluid was existing within a melt).
5. Grossular content in garnet was arbitrarily changed by a small degree so that calculations passed a statistical test.

Average P calculations (grey and orange circles) were calculated following Powell and Holland, 1994. Average P calculations fit an optimised result to a series of calculated mineral reactions based on the activities of the mineral endmembers. Calculations were performed every 25 °C between 650-800 °C. Orange circles pass a Chi-squared test, grey circles fail. Failed results may be indicative of compositional dispersion within the minerals.

The final calculated retrograde *P–T* point was defined based on the intersect between the garnet-cordierite thermometry line and the average P calculations (740 °C, 7 kbar). The garnet-cordierite thermometer is preferred over the garnet-biotite thermometer due to cordierite being a newly formed mineral.

APPENDIX 4B: EXTENDED MINERAL EQUILIBRIA FORWARD MODELLING RESULTS