Eucalyptus camaldulensis (river red gum) Biogeochemistry: An Innovative Tool for Mineral Exploration in the Curnamona Province and Adjacent Regions

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E. camaldulensis (leaves) Biogeochemistry Racecourse Creek Tibooburra W/NSW - (Mn)





HORIZONTAL DATUM: WGS84, UTM ZONE 54S







Figure 4.11: Mn concentrations within *E. camaldulensis* leaves flanking different landform settings along Racecourse Creek, G (granodiorite), DP1 (depositional 1), M (metasediment) and DP2 (depositional 2). Green region denotes 'values below the mean' and the dashed line indicates the 90^{th} percentile.

Element	Parameters	Total data			Data set comparison		
(ppm)		set	Granodiorite	Upper	Metasediment	Lower	
[detection			(SSer)	catchment	(SSer)	catchment	
limit]		(C)	(C)	depositional	(C)	depositional	
Analytical			n=38	(CHpd and	n=25	(CHpd, Aap,	
Method		n=98		Apd)		ISps and Apd)	
				(C)		(C)	
				n=16		n=19	
Mn	Concentration range	70-600	73-344	70-246	87-600	71-389	Regolith-landforms units
[1]	(Mean)	(171)	(160)	(141)	(221)	(166)	associated with granodiorite,
ICP-OES	at at						upper catchment depositional and
	25 th - 75 th percentile	115-200	120-186	96-202	188-221.04	51-169	lower catchment depositional
							regolith-landforms all have
	95% confidence level	17	21	34	56	29)	similarities at the 5% Sig Level,
							compared to the metasediment.
	>90th percentile	344-600	290-344	228-246	280-600	229-389	
	(outliers), # of	(5)	(2)	(4)	(6)	(3)	
	samples						
	E. camaldulensis	adjacent to	central &	southern margin	evenly scattered	southern margin	
	position with the	metasediment	adjacent to	& down stream	adjacent to ISps1	& down stream	
	greatest		flanking	of intersecting	regolith-landform	of intersecting	
	concentration.		CHpd3	Aed unit	unit flanking the	Aed unit	
			&CHpd4		metasediment		

Table 4.19: Variation of Mn concentrations within *E. camaldulensis* s (river red gums), flanking different land-form settings along Racecourse Creek. Initial values concentration range, $25^{\text{th}} - 75^{\text{th}}$ percentile concentration range, 95 % confidence level, >90th percentile (outliers) C= composite sample.

E. camaldulensis (leaves) Biogeochemistry Racecourse Creek Tibooburra W/NSW - (Nd)



HORIZONTAL DATUM: WGS84, UTM ZONE 54S

camaldulensis (leaves) down Racecourse Creek with accompanying boxplots, histogram EFigure 4.12: Raw data and spatial distribution of detectable Nd in cumulative frequency plot and summary statistics.



Figure 4.13: Nd concentrations within *E. camaldulensis* leaves flanking different landform settings along Racecourse Creek, G (granodiorite), DP1 (depositional 1), M (metasediment) and DP2 (depositional 2). Green region denotes 'values below the mean' and the dashed line indicates the 90^{th} percentile.

Element Parameters Total data Setting	Data set comparison
(ppm) set Granodiorite Upper Metasediment Lower	
[detection (SSer) catchment (SSer) catchment	
limit] (C) (C) depositional (C) depositional	
Analytical n=38 (CHpd and n=25 (CHpd, Aap	
Method n=98 Apd) ISps and Apd)
	D Pill R L
Nd Concentration range $0.05-0.20$ $0.05-0.13$ $0.05-0.11$ $0.05-0.15$ $0.08-0.20$	Regolith-landforms associated
$\begin{bmatrix} [0,01] \\ (0,08) \\ (0,08) \\ (0,07) \\ (0,07) \\ (0,11) \\ (0,13) \\$	with granodiorite upper
25^{th} 75^{th} percentile 0.07.0.12 0.07.0.10 0.055.0.10 0.00.0.12 0.12 0.12	landforms are similar at the 5 %
25 - 75 percente 0.07-0.12 0.05-0.10 0.05-0.12 0.12-0.13	Sig level in their median conc ⁿ
95% confidence level 0.006 0.006 0.01) 0.01 0.01	big is for in their meanin cone :
>90th percentile 0.20 No outliers' No outliers' 0.13-0.15 0.15-0.20	
(outlies), # of (1) (6) (5)	While the metasediment & lower
samples	catchment depositional regolith-
	landform units have major
<i>E. camaldulensis</i> southern northern margin northern margin southern margin & central & adjac	nt difference between each other
position with the part of of the & down stream of to flanking ISp	1 and other associated regolith-
greatest concentration. Racecourse granodiorite of intersecting intersecting Aed & ISps2	landforms at the 5 % Sig level.
Ck flanked by Aed unit unit	
CHpd2 &	
CHnd5	
cripa	

Table 4.20: Variation of Nd concentrations within *E. camaldulensis* s (river red gums), flanking different land-form settings along Racecourse Creek. Initial values concentration range, $25^{th} - 75^{th}$ percentile concentration range, 95 % confidence level, >90th percentile (outliers) C= composite sample.

E. camaldulensis (leaves) Biogeochemistry Racecourse Creek Tibooburra W/NSW - (P)



Creek with accompanying boxplots, histogram camaldulensis (leaves) down Racecourse E. Figure 4.14: Raw data and spatial distribution of detectable P in cumulative frequency plot and summary statistics.



Figure 4.15: P concentrations within *E. camaldulensis* leaves flanking different landform settings along Racecourse Creek, G (granodiorite), DP1 (depositional 1), M (metasediment) and DP2 (depositional 2). Green region denotes 'values below the mean' and the dashed line indicates the 90th percentile.

Element	Parameters	Total data	Setting				Data set comparison
(ppm) [detection limit] Analytical Method		set (C) n=98	Granodiorite (SSer) (C) n=38	Upper catchment depositional (CHpd and Apd) (C) n=16	Metasediment (SSer) (C) n=25	Lower catchment depositional (CHpd, Aap, ISps and Apd)	
						n=19	
P [20] ICP-OES	Concentration range (Mean)	654-3166 (1193)	924-3166 (1448)	669-1268 (949)	710-1574 (1006)	654-1840 (1114)	Regolith-landforms units associated with the metasediment upper catchment
	25 th - 75 th percentile	920-1452	1123-1612	804.5-1078.5	905-1006	1081-1114	depositional & lower catchment depositional have slight
	95% confidence level	80	146	101	121	135	differences at the 5% Sig Level in their median conc ⁿ .
	>90th percentile (outliers), # of samples	2297-3166 (2)	3166 (1)	No outliers'	1342-1574 (4)	1525-1840 (4)	
	<i>E. camaldulensis</i> position with the greatest concentration.	northern part of Racecourse Ck	adjacent to granodiorite & at a point were Racecourse Ck is quite narrow	at the interface between the granodiorite and northern margin of the upper catchment depositional	southern margin, flanked by ISps1 & CHpd6	down stream of intersecting Aed unit	However regolith-landforms associated with the granodiorite has major differences with all other land-forms at the 5% Sig Level.

Table 4.21: Variation of P concentrations within *E. canaldulensis* s (river red gums), flanking different land-form settings along Racecourse Creek. Initial values concentration range, $25^{th} - 75^{th}$ percentile concentration range, 95% confidence level, $>90^{th}$ percentile (outliers) C= composite sample.

E. camaldulensis (leaves) Biogeochemistry Racecourse Creek Tibooburra W/NSW - (S)









Figure 4.17: S concentrations within *E. camaldulensis* leaves flanking different landform settings along Racecourse Creek, G (granodiorite), DP1 (depositional 1), M (metasediment) and DP2 (depositional 2). Green region denotes 'values below the mean' and the dashed line indicates the 90^{th} percentile.

Element	Parameters	Total data set	Setting				Data set comparison
(ppm)			Granodiorite	Upper	Metasediment	Lower catchment	_
[detection		(C)	(SSer)	catchment	(SSer)	depositional (CHpd,	
limit]			(C)	depositional	(C)	Aap, ISps and Apd)	
Analytical		n=98	n=38	(CHpd and	n=25	(C)	
Method				Apd)		n=19	
				(C)			
				n=16			
S	Concentration range	805-1550	857-1291	805-1270	958-1145	869-1550	Regolith-landforms units
[10]	(Mean)	(1099)	(1045)	(1061)	(1144)	(1173)	associated with the
ICP-OES	ah ah						granodiorite & upper
	25 th - 75 th percentile	1002-1176	993-1103	982.5-1154.5	1093-1144	1143-1176	catchment depositional
							similar at the 5% Sig
	95% confidence	27	33	65	60	64	Level in their median
	level						conc".
	. 004	1201	1201	M	1214 1445	1000 1550	
	>90th percentile	(1)	(1)	No outners	1314-1445	1282-1550	Depolith londforms
	(outliers), # of	(1)	(1)		(5)	(3)	Regolitin-fandronnis
	samples						associated with the
	E agmaldulancis	down stream of	couthern margin	down stream of	conthern margin	at the interface	antehment depositional
	Desition with the	metasediment &	of granodiorite	intersecting	& flanked by	between the	similar at the 5% Sig
	greatest	intersecting Aed	& down stream	NE/SW And	Aan1 &CHnd6	metasediment and	I evel in their median
	concentration	units	of intersecting	units	ларт астрио	northern margin of the	conc ⁿ
	concentration.	units	Aed unit	units		upper catchment	cone .
			rica anne			depositional	
						depositional	However both groups
							display differences at the
							5% Sig Level.

Table 4.22: Variation of S concentrations within *E. camaldulensis* s (river red gums), flanking different land-form settings along Racecourse Creek. Initial values concentration range, $25^{\text{th}} - 75^{\text{th}}$ percentile concentration range, 95 % confidence level, >90th percentile (outliers) C= composite sample.