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THE RATHJEN GNEISS: CONSTRAINTS ON THE TECTONIC HISTORY OF THE KANMANTOO GROUP AROUND SPRINGTON, SOUTH AUSTRALIA.

by

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ABSTRACT

The Rathjen gneiss in the vicinity of Springton in the Mount Lofty Ranges is shown to be fundamentally important to our understanding of the metamorphic and deformational history of the Southern Adelaide Foldbelt. Field and geochemical criteria are used to prove conclusively that the Rathjen gneiss is a metamorphosed intrusive. A prominent N-S trending stretching lineation particularly well developed in the Rathjen gneiss indicates previously unrecognized N-S tectonic transport early in the history of the Delamerian Orogeny. Amphibole-plagioclase equilibria in the mapped area indicate metamorphic conditions (~700°C, < 5 kbars) consistent with the results of studies in nearby areas (e.g. Sandiford et al., in press), although the errors associated with these constraints are large and therefore the comparison tenuous. These temperatures are clearly in excess of those expected to be reached by crustal thickening and erosion and require some other heat source. Evidence of magmatic activity is abundant in the area with the Rathjen gneiss; a previously unidentified gabbronorite and leucogabbro and amphibolite dykes all being capable of supplying additional heat to the area through various stages of the metamorphic history.