

# Relationships between magmatism and deformation in southeastern Proterozoic Australia

Thesis submitted in accordance with the requirements of the University of  
Adelaide for an Honours Degree in Geology/Geophysics

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November 2016



THE UNIVERSITY  
*of* ADELAIDE

## **CONSTRAINTS ON MESOPROTEROZOIC MAGMATISM AND DEFORMATION IN THE SOUTHERN GAWLER CRATON, SOUTH AUSTRALIA**

### **MAGMATISM AND DEFORMATION IN YORKE PENINSULA**

#### **ABSTRACT**

The ca. 1600–1580 Ma time slice is recognised as a significant period of magmatism and deformation throughout eastern Proterozoic Australia. Within the northern Yorke Peninsula, this period was associated with the emplacement of multiple phases of the Tickera Granite; an intensely foliated orange granite, a white leucogranite and a red granite. These granites belong to the broader Hiltaba Suite that was emplaced at shallow crustal levels, throughout the Gawler Craton. Geochemical and isotopic analysis suggests these granite phases were derived from a heterogeneous source region. The orange and red granites were derived from the Donington Suite and/or the Wallaroo Group metasediments with slight contamination from an Archean basement. The white leucogranite is sourced from a similar but slightly more mafic/lower crustal source. Phases of the Tickera Granite were emplaced synchronously with deformation that resulted in development of a prominent northeast trending structural grain throughout the Yorke Peninsula region. This fabric is a composite of two fold generations; early isoclinal folds that were refolded by later open upright folds. Isoclinal folding may have occurred during the ca. 1730–1690 Ma Kimban Orogeny, or just prior to emplacement of the Tickera Granite at ca. 1597–1577 Ma. The upright fold generation was contemporaneous with the emplacement of the Tickera Granite. The Yorke Peninsula shares a common geological history with the Curnamona Province, which was deformed during the ca. 1600–1585 Ma Olarian Orogeny, and resulted in development of early isoclinal (recumbent) folds overprinted by an upright fold generation, a dominant northeast–trending structural grain and spatially and temporally related intrusions. This suggests that an apparent correlation with the geological history of the Curnamona Province, and that the Olarian Orogeny may have also affected the southeastern Gawler Craton. Constraint on the timing of the earlier isoclinal fold generation in the Yorke Peninsula will allow further understanding of the similarities between the two regions.

#### **KEYWORDS**

Mesoproterozoic; Magmatism; Deformation; Yorke Peninsula; Tickera Granite; Hiltaba Suite; Olarian Orogeny; Gawler Craton; Curnamona Province

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