

GEOCHRONOLOGY, PALAEOMAGNETISM AND MAGNETIC FABRIC OF METAMORPHIC ROCKS IN THE NE FRASER BELT, WESTERN AUSTRALIA

De Waele, B. and Pisarevsky, S.A.*

Tectonics Special Research Centre, The University of Western Australia, School of Earth and Geographical Sciences, Nedlands, WA6009, Western Australia

**Present address: The British Geological Survey, Kingsley Dunham Centre, Keyworth, NG5 5GG, UK*

The first zircon U-Pb SHRIMP dating on high-grade meta-igneous units in the northernmost parts of the Fraser Belt along the southern margin of the West Australian Yilgarn Craton, reveal crystallisation ages between 1299 ± 10 and 1250 ± 23 Ma. A small number of older xenocrystic zircons, incorporated in some samples, indicate the presence of late-Palaeoproterozoic crust in the region, similar in age to that reported in the literature (e.g. Nelson et al., 1995; Bodorkos and Clark, 2004). Zircon that crystallised within a melt accumulated in the neck of a boudinaged mafic unit was dated at 1296 ± 4 Ma, indicating that the emplacement of the igneous protoliths took place syntectonically, during the so-called “Stage I” event of Clark et al. (1999). Our geochronological data show no direct evidence of the “Stage II” event at between 1215-1140 Ma, as defined by Clarke et al. (1999, 2000). The anisotropy of magnetic susceptibility (AMS) of the granulites indicates minimum axes with a mean inclination of 4° towards 130° , corresponding to a nearly vertical SW-NE (50° - 230°) magnetic foliation. This is very close to the structural trend of the Fraser Belt suggesting that the magnetic fabric was also acquired syntectonically, during the collision between the Yilgarn and Gawler cratons.

The palaeomagnetic data on the granulites overlap with published poles for various 1.2 Ga units in the Albany Belt and the 1.2 Ga-old Fraser dykes (Pisarevsky et al., 2003), possibly suggesting that the remanence was acquired during the second stage of the Fraser tectonism. A younger magnetisation component resembles a pole of uncertain age published for Bremer Bay in the Albany Belt (BB2 pole of Pisarevsky and Harris, 2001). Dating the latter pole would help refine the proposed Apparent Polar Wander Path for Australia.

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