

PALAEOMAGNETIC TEST OF OROCLINAL ROTATION IN THE DUNDAS TROUGH, TASMANIA

Kathryn Job¹, Robert J. Musgrave^{2}, Michael Roach³*

*School of Earth Sciences, University of Tasmania, kjob@utas.edu.au¹, Geological Survey of NSW,
Division of Resources & Geoscience, NSW Department of Planning & Environment,
robert.musgrave@industry.nsw.gov.au², School of Earth Sciences, University of Tasmania,
michael.roach@utas.edu.au³*

Palaeozoic units of the Dundas Trough in western and northern Tasmania, which include the richly endowed Mount Read Volcanics, form an arcuate trend in outcrop and aeromagnetic images, wrapping around the Pre-Cambrian Tyennan region. Previous interpretations attributed the arcuate shape to sedimentation in pre-existing curved rift and graben systems, without rotation. New studies have reinterpreted the Trough as the result of oroclinal rotation of a former linear orogen. Palaeomagnetic samples were collected from selected early Palaeozoic sedimentary sequences at 22 localities around the Dundas Trough and correlative formations in the Adamsfield–Jubilee region. Low-temperature and thermal demagnetisation was conducted on most samples with selected units also demagnetised with the alternating field technique. From the 22 localities sampled, 11 produced clear demagnetisation results. Principal component analysis was used to determine characteristic remanent magnetisation (ChRM) directions.

Oroclinal rotation was tested by plotting ChRM declinations against regional strike (the “palaeomagnetic orocline test”). Declination correlates with strike, verifying the orocline hypothesis. Average declinations in the north-east limb of the trough (Dm 97.2°, Im 36.2°) suggest a clockwise rotation ~90°. A paleomagnetic pole determined from the western limb of the trough falls on the early Palaeozoic Gondwana apparent polar wander path, confirming that this limb was fixed to cratonic Australia.

These results both confirm the oroclinal curvature of the Dundas Trough, implying its continuation under Jurassic cover in eastern Tasmania, and more broadly support the hypothesis that oroclines played a fundamental role in crustal accretion in eastern Australia.