Supplementary Materials

From slow to ultra-slow:

A previously undetected event at the Southwest Indian Ridge at ~24 Ma

Philippe Patriat, Heather Sloan & Daniel Sauter

Supplementary Methods

Synthetic anomaly model calculation. We use a two-dimensional block model assuming a constant 500 m thick magnetic layer with magnetization of ±8 A/m and the most recently published magnetic anomaly time scale (Cande and Kent, 1995). The generalised bathymetric profile of the model is based upon the accepted typical depth of the ridge crest and thermal subsidence curve of the flanks (Parson and Sclater, 1977).

Time of spreading rate change calculation. The spreading rate is reduced by approximately half between A8 (26.554 Ma) and A6 (20.131 Ma). In order to make a more precise estimate of when this change occurred we make the assumption that spreading rates for A13-A8 and A6-A5 remain constant until an instantaneous change of spreading rate and use the following equation to calculate that this change occurred ~24.2 Ma ago at 51°E, or close to A6C (24.118 Ma).

$(t-t_{A6})\, r_{A6-A5} + (t_{A8}-t)\, r_{A13-A8} = (t_{A8}- t_{A6})\, r_{A8-A6}$

Where t = age of spreading rate change, t_{A6} = age of A6, t_{A8} = age of A8, r_{A6-A5} = spreading rate for the period A6-A5, r_{A8-A6} = spreading rate for the period A8-A6, and r_{A8-A13} = spreading rate for the period A8-A13.

Finite poles and confidence ellipse parameters. Pole locations and parameters of the 95% confidence ellipses shown in Figure 3:

A5 from Lemaux et al. (2002);

A6: Long: -46.0˚, Lat: 10.8, angle: 2.7°, σxx: 1.028, σxy: 0.883, σxz: -0.234, σyy: 1.759, σyz:: -1.347, σzz: 2.237 in 0.10E-06 steradian;

A8: Long: -46.9˚, Lat: 14.3˚, angle: 3.91°, σxx: 1.484, σxy: 1.489, σxz: -0.966, σyy: 2.580, σyz:: -2.458, σzz: 3.702 in 0.10E-06 steradian;

A13: Long: -44.7˚, Lat: 16.2, angle: 5.66°, σxx: 0.856, σxy: 0.673, σxz: -0.166, σyy: 0.690, σyz:: -0.374, σzz: 0.582 in 0.10E-05 steradian.

New A13, A8, A6 and A5 identifications west of Andrew Bain FZ rotated about the newly calculated poles to superpose on their conjugate identifications

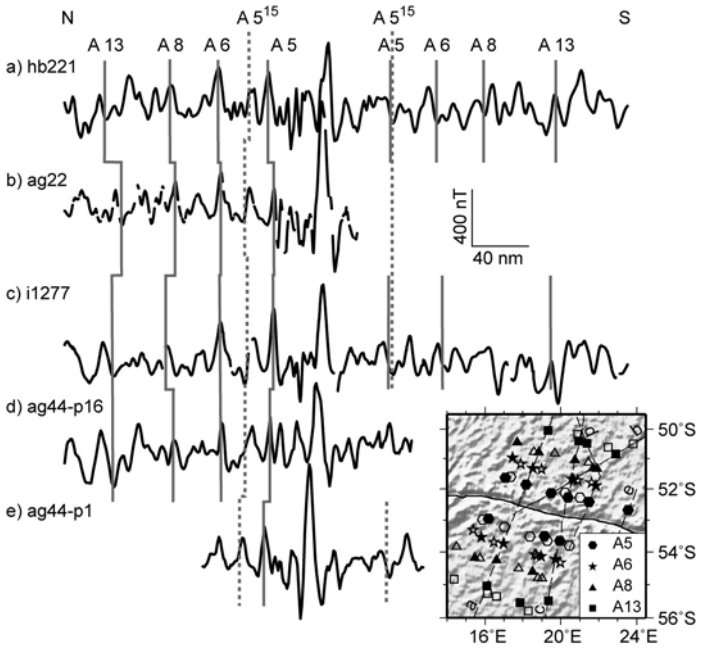

Figure DR1: Examples of magnetic anomaly profiles west of Andrew Bain Fracture Zone with our magnetic anomaly identifications compared with previously published identifications of A5 (Lemaux et al., 2002). Inset map shows the location of the profiles, the magnetic anomaly identifications (solid symbols) and the conjugate rotated anomaly identifications (open symbols) obtained using the previously published rotation pole3 based on data from east of Andrew Bain Fracture Zone for A5 and the poles for A6, A8 and A13 determined in this study.

References

Cande, S. C. & Kent, D. V., 1995, Revised calibration of the geomagnetic polarity timescale for the Late Cretaceous and Cenozoic: Journal of Geophysical Research, v. 100, p. 6093-6095.

Parsons, B. and Sclater, J. G., 1977, An analysis of the variation of ocean floor bathymetry and heat flow with age: Journal of Geophysical Research, v. 82, p., 803-827.

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