

Australian absolute plate motions, reorganisations and LIPS in a mantle framework since the Jurassic

R.D. MÜLLER¹ AND T.H. TORSVIK²

¹ School of Geosciences, Build. H11, The Univ. of Sydney, NSW 2006, Australia; dietmar@geosci.usyd.edu.au

² Norwegian Geological Survey, Center for Geodynamics, N-7491 Trondheim, Norway; trond.torsvik@ngu.no

Based on a the first hybrid 'absolute' plate reference frame since the Jurassic we have constructed a global APW path for Africa, rotated into an Australian reference frame (Fig. 1a). The model is based on a moving hotspot frame for the last 100 Ma and a global palaeomagnetic frame adjusted 5 degrees in longitude to smooth the frame transition for earlier times. By fitting small-circles to the Australian APW path we model APW cusps and notice an event at 190 Ma, probably related to the destruction of the Palaeotethys, and a change between 170 to 160 Ma that may be related to the initiation of seafloor spreading in the central Atlantic. A clear cusp at 130-120 Ma is related to the initiation of seafloor spreading between India, Australia and Antarctica and a cusp at around 60 Ma corresponds to a well known global plate reorganisation at Chron 27. The time-dependent mean velocity for Australia and the degree of rotation for a point (Fig. 1b) reveal other events clearly, such as major reorganisations at around 100 and 50 Ma. Our new model is markedly different from fixed hotspot models, which result in substantial artefacts before 80Ma. We use our model to investigate the past position of Australia over dynamic topography highs and lows originating from mantle convection and the origin of large igneous provinces around Australia in relation to core-mantle boundary low-velocity zones.

