

Paper Number: 5422

Palaeoproterozoic palaeomagnetism and the geodynamic setting of the Indian shield within the early supercontinental reconstructions

Radhakrishna, T., Tomson, J.K.² and Chandra, R.³

¹Earth System Science Organisation-National Centre for Earth Science Studies, Trivandrum 695011, India, email: radhakrishna.t@nic.in

²Earth System Science Organisation-National Centre for Earth Science Studies, Trivandrum 695011, India.

³Centre of Excellence in Geology, Bundelkhand University, Jhansi, 284128, India.

The Palaeoproterozoic Eon is an important interval of crustal growth in Earth's history and many geological interpretations in recent years have been focused to derive crustal configurations that define early supercontinental reconstructions. Palaeomagnetic results, in the absence of sea floor magnetic anomaly data, provide essential quantitative assessment; the results in combination with high precision geochronology become a powerful tool to test the geodynamic reconstructions. Mafic igneous units have become potential targets for these studies all over the world. The Indian shield also comprises a few oldest cratonic elements (Dharwar, Bastar, Singbhum, Bundelkhand, Aravalli) and their positions with respect to each other is important for the understanding of the early supercontinental reconstructions. These cratons in India are characterised by significant mafic igneous activity manifested in the form of profuse mafic dyke emplacements and subordinate quantities of lava flows/sills. We have carried out extensive palaeomagnetic studies on these igneous units and present in detail for a general discussion of Palaeoproterozoic igneous activity in India. The results are compared with all earlier published data in India and are integrated with recently-published high-precision ages to provide a comprehensive account of Palaeoproterozoic igneous activity in India. The analysis consolidates palaeomagnetic poles for six age divisions between 2.45 and 1.85 Ga with robust statistical criteria. Close palaeomagnetic comparisons are demonstrated during the Palaeoproterozoic between the Dharwar-Bastar-Bundelkhand cratons in India to place the age for orogenic activity along the central Indian tectonic zone at >2.45 Ga. Between 2.45 and 2.37 Ga, the Indian shield was situated at higher latitudes similar to the Yilgarn craton of Australia. It was subsequently located near the equator at 2.22, 2.18, 1.99 and 1.86 Ga. Thus, an India-Australia connection is supported during these times. We Tested and evaluated the tectonic linkages outlined by various continental reconstructions ("Sclavia", "Superia", "Zimvaalbara" "Columbia) that are based on geological correlations for this interval and highlight many inconsistencies.

