

Tectonic evolution of Karwar and Coorg blocks, southern India

C, Ishwar-kumar^{1*} ; K, Sajeev¹ ; B.F, Windley² ; M, Satish-kumar³ ; T, Hokada⁴ ; K, Horie⁴ ; T, Itaya⁵

¹Centre for Earth Sciences, Indian Institute of Science, Bangalore 560 012, India, ²Department of Geology, University of Leicester, Leicester LE1 7RH, UK, ³Department of Geology, Niigata University, 2-8050, Ikarashi, Nishi-ku, Niigata 950-2181, Japan, ⁴National Institute of Polar Research, 10-3 Midori-cho, Tachikawa, Tokyo190-8518, Japan, ⁵Institute of Natural Sciences, Okayama University of Science, 1-1 Ridai-cho, Kita-ku, Okayama 700-0

The Karwar and Coorg blocks in western India are important terranes in the point of paleogeographic study of India and Madagascar. The c. 1300 Ma Kumta suture separates the Karwar and Dharwar blocks within the western Dharwar craton of India (Ishwar-Kumar et al., 2013a). The major rock types are quartz phengite schist, chlorite schist, fuchsite schist, garnet biotite schist etc. Isochemical phase diagram estimates of the quartz phengite schist suggest peak metamorphic *P-T* conditions were c. 18 kbar and 550° C. Towards the east of the suture Sirsi shelf contains weakly deformed sedimentary rocks, unconformable on high-grade gneisses of the Dharwar craton. The Karwar block to the west of the Kumta suture is mainly composed of undeformed tonalite-trondhjemite-granodiorite (TTG) with minor enclaves of amphibolite cut by later granites. Whole-rock major and trace element data suggest that the TTGs were derived from a volcanic arc, and that the granites have within-plate signatures. Amphibolites have a chemical composition comparable to basalts to basaltic andesites with MORB signatures. The TTGs from Karwar block shows a U-Pb zircon magmatic ages of ca. 3200 Ma (Ishwar-Kumar et al., 2013a). The K-Ar biotite age from the TTGs (1746 Ma and 1796 Ma) and amphibolite (ca. 1697 Ma) represents late-stage c. 1700 Ma uplift event of both TTGs and amphibolites. The Coorg block, which is about 100 km south of Karwar block, contains mainly granulite grade rocks (Chetty et al., 2012; Ishwar-Kumar et al., 2013b; Santosh et al., 2014). Major rocks types are charnockite, mafic granulites, hornblende-biotite gneiss, garnet-hornblende gabbro, anorthosite and granite. The Coorg (Mercara) suture which separates the Coorg block from the Dharwar craton to the east contains garnet-kyanite-sillimanite gneiss, mylonitic gneiss, calc-silicate granulite, mafic granulite, granite and syenite. Pseudosection calculations indicate that the constituent calc-silicate granulite and mafic granulite were re-equilibrated under high-pressure conditions of 15-20 kbar at a temperature of 800-900° C (Ishwar-Kumar et al., 2013b). Santosh et al. (2014) recorded a metamorphic age of c. 1200 Ma from metapelites from the Coorg (Mercara) suture zone. Integration of our structural, geological and geochronological results integrated with published data suggests the presence of a 1300-1200 Ma paleosubduction zone in western India. We propose that the Kumta and Coorg sutures are an eastern extension in western India of the northern and southern parts of the Betsimisaraka suture of north-eastern Madagascar.

Keywords: Karwar block, Coorg block, Kumta suture, Dharwar craton, Southern India, India-Madagascar