ABSTRACT

Paleogeographic reconstructions of Gondwanaland suggest India and Madagascar were contiguous during the Late Neoproterozoic and the Early Palaeozoic time. If parts of the two landmasses shared coherent evolutionary history before the Cenozoic break-up of the Gondwanaland, the crustal domains and the domain-limiting shear zones that pre-date the lithospheric dismemberment should be traceable across the present coastlines of the two landmasses. The pressuretemperature-deformation-time history of the Precambrian crystalline rocks along the western coast of India is poorly constrained, and this impedes an appropriate correlation with the crystalline rocks in Madagascar. Mesoscopic structures, shear zone kinematics, metamorphic P-T-t paths and monazite chemical age determinations are reported along the 430 km long corridor from Phonda and Kagaragod along the western (Konkan) coast of India. The data are integrated to evolve tectonic models for the evolution of the Western Dharwar Craton, WDC (India) and the bounding ductile shear zones, e.g. the South Maharashtra Shear Zone (SSZ) in the north and the Sulya-Manjeshwar Shear Zone (SMSZ) in the south and their possible extension within Madagascar.

The significant findings include: (a) correlation between Mesoarchean and Late Neoarchean lithodemic units in the WDC and in Madagascar; (b) discovering the WNW-trending Paleo/Mesoproterozoic accretion zone (SSZ) that limits the northern margin of the WDC ~ 550 km south of its assumed location in India; (c) the SSZ continues westward into Madagascar as buried suture zone; (d) based on the monazite chronology and retrieved counter clock wise P-T path in the accretion zone, it is suggested that the Central Indian Tectonic Zone and the Trans North China Orogen were not continuous within the Columbia Supercontinent invoked by some workers; (e) discovering the Early Paleoproterozoic WNW-trending transpressional orogenic belt (SMSZ) marking the zone of accretion between the WDC and the Southern Granulite Terrain, SGT; (f) the WDC-SGT accretion zone marked by northward decrease in deformation strain and temperature presumably is continuous with the zone of accretion between the Antongil and the Antananarivo Blocks, Madagascar.

The influence of fluid-driven process of advection transport of monazitecompatible elements in dissolution, growth and preservation of greenschist/ amphibolite facies polychronous monazite is discussed.

Key words: Meso/Neoarchean Western Dharwar Craton; Neoarchean-Paleoproterozoic accretion shear zone; growth of polychronous monazite; U-Th-total Pb monazite dating; Madagascar-India correlation; TNCO-CITZ correlation