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Evolutionary History of the 550 Ma Southern Granulite Terrain, South of the Palghat-Cauvery Shear Zone, Southern India: Implications for the Assembly/Breakup of Eastern Gondwana

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Dharwar craton of southern India is successively surrounded by granulite grade belts of the 2500 Ma Coorg-BR Hills-Niligiris-Shevaroys-Madras tract; the 1000 Ma Eastern Ghats Belt and the 550 Ma old Southern Granulite terrain (SGT) occurring well south of the Palghat-Cauvery shear zone.

The focus of the present note is on the 550 Ma old granulite terrain, which is bounded in the north by the lineament running from Karur-Kadavur-Kodaikanal-Anaimalai and which hosts the Oddanchtram and the Kadavur anorthosite bodies. The 550 Ma old terrain includes the Kodaikanal, Madurai, Nagercoil and the Kerala Khondalite Belt (KKB) as all these blocks have witnessed a common 550 Ma dominant granulite grade event. Lithologies of these blocks are the same. The terrain is essentially a charnockitic terrain constituting the high hill ranges of Kodaikanal, Cardomum, Varushanad and Nagercoil almost at the tip of southern India. Supracrustal lithologies are mg rich pelites, containing several pockets of sapphirine bearing pelites (Sriramguru et al., 2002; Raith et al., 1997) with rather abundant carbonates reminiscent of continental marginal basin affinities. Carbonate lithlogies are often wollastonite bearing and their temperature of formation is around 870° - 1000° C (Francis Anto et al., 1999; Satish Kumar et al., 2000). Protolith ages are not older than 2900-2600 Ma and the dominant granulite event is around 550 Ma (Bartlett et al., 1998; Bhaskar Rao et al., 2003; Santosh et al 2003) though there are clusters of 1200 Ma and 800 Ma. It is now being increasingly accepted that this terrain has been accreted onto the Dharwar craton via the 2500 Ma old granulite belt; the age of accretion is uncertain but should be >1100 Ma (Bhaskar Rao et al., 2003; Santosh et al, 2003).

The 550 Ma SGT is dissected by numerous shears and lineaments, which host high temperature intrusions such as the massif anorthosite, syenite alkali granite bodies and a lone carbonatite-alkali pyoxenite association located at the southern extremity of the N20°E trending Kambam fault. The carbonatite body shows reset ages of 550 Ma by Sm-Nd; Rb-Sr and CHIME method, similar in many ways to the Eppwala carbonatite body of Sri Lanka (Weerakoon et al.2001; Anil Kumar et al., in preparation) (CHIME data was provided by Dr Suzuki).

The note will be concentrating on the areas around Kambam lineament, which acts as a divide between N40°W trending Cardomum hills and the N20°E to N-S to N 40°W Varushanad hills which define a broad fold closure. Kambam fault is again important as it connects as it were the N 60°E trending Kodaikanal ranges and the N 40°W trending

Achankovil-Tambraparani shear zones, south of which lies the KKB (Janardhan, 1999; Janardhan et al., 2002). Finally, attempts will be made to connect the position of the 550 Ma old SGT in the context of eastern Gondwana, to Madagascar (Janardhan and Srikarni, 2002) and to Lutzo-Holm Bay via Sri Lanka.

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