

New information on the geochemistry of Neoproterozoic Sanukitoids from Eastern Dharwar Craton, Southern India; implications to regional tectonics.

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The Eastern Dharwar Craton (EDC) is considered to have accreted during the late Neoproterozoic (2.7-2.5 Ga). The craton comprises a series of arcuate NNW-SSE greenstone belts separated by plutons of high-K granites, (locally with sanukitoid affinities) and migmatite gneiss. The EDC has also been perceived as a Neoproterozoic ultra-hot orogen accreted to an older craton the Western Dharwar craton. Sanukitoids are high-Mg granitoids with geochemical characters similar to certain high-Mg andesites in Phanerozoic convergent margin settings as well as intermediate components of Archean tonalite-trondhjemite-granodiorite (TTG). They are enriched in both compatible (eg., Mg, Ni and Cr) and incompatible (eg., Ba, Sr, K and LREE) elements. Their genesis is ascribed to a two-stage process: enrichment of mantle wedge peridotite by fluids, melts or sediments from a subducting oceanic slab followed by partial melting of the metasomatised wedge in a thermal event at the terminal stage of subduction. Their transitional characters are not only compositional but also chronological, as they become increasingly abundant around the Archean-Proterozoic boundary which is marked by a geodynamic transition towards a plate tectonics and Wilson-cycle processes.

Examples of low-Ti sanukitoids from the EDC have been documented in previous studies[1][2] that proposed a genetic model involving melting of a metasomatised peridotite mantle wedge. Here we report new geochemical data on sanukitoids from the eastern and northeastern margins of the EDC. Our samples are drawn from around Peechera-Mallaram villages, of Telangana State. Notably, some of our samples show higher TiO₂ than those described earlier[2]. We interpret their geochemistry in terms of a mantle source in the stability field of garnet (>45 km depth) in a Neoproterozoic subduction setting.

[1] H. Martin, J. F. Moyen, and R. Rapp, “The sanukitoid series : Magmatism at the Archean-Proterozoic transition The sanukitoid series : magmatism at the Archean – Proterozoic transition,” vol. 100, no. December 2013, pp. 15–33, 2010.

[2] O. Laurent, R. Doucelance, H. Martin, and J. F. Moyen, “Differentiation of the late-Archaean sanukitoid series and some implications for crustal growth: Insights from geochemical modelling on the Bulai pluton, Central Limpopo Belt, South Africa,” *Precambrian Res.*, vol. 227, pp. 186–203, 2013.