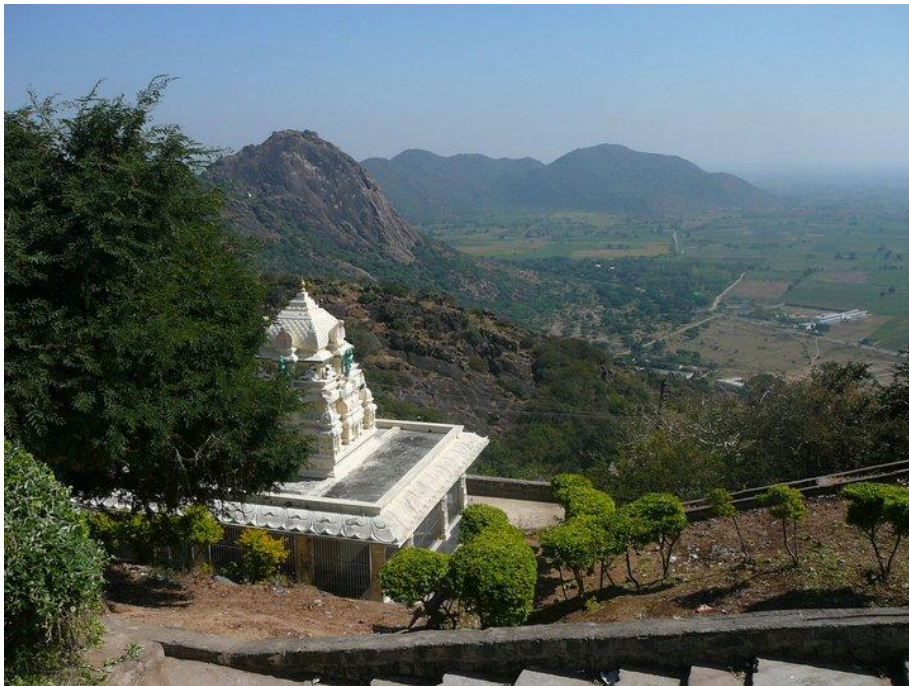




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The tectonic evolution of the Ongole Domain, India: A metamorphic and geochronological approach



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ABSTRACT

The Ongole Domain, situated in the southern Eastern Ghats Belt, exposes an assemblage of granulite facies metasedimentary and metaigneous rocks that preserve fundamental evidence for the Paleoproterozoic-Mesoproterozoic reconstruction of the supercontinent Nuna. LA-ICP-MS detrital zircon data from metasedimentary rocks constrain the timing of deposition for the sedimentary precursors, to between *ca.* 1850-1750 Ma. Lu-Hf isotopic data from detrital zircons provide a wide range of ϵ_{Hf} values between -18 and +10, and T_{DM} of *ca.* 3.2- 2.6 Ga. The Mesoarchean to Paleoproterozoic detrital components display geochemical similarities with the Napier Complex, the North Australian Craton and to a lesser extent, the North China Craton. U-Pb zircon and monazite geochronology have identified three episodes of metamorphism in the Ongole Domain; at *ca.* 1750, 1640 and 1590 Ma. Peak *P-T* estimates of 900 - 910°C and 9 - 9.2 kbar are calculated for metamorphism associated with collisional orogenesis, between *ca.* 1640-1590 Ma. Ti-in-zircon thermometry independently constrains the UHT conditions, yielding estimates of $935 \pm 55^\circ\text{C}$. U-Pb geochronology and trace element analysis of zircon grains from metaigneous rocks confirm syn-tectonic magmatism occurred in the Ongole Domain between *ca.* 1640-1570 Ma. The results provide support for paleogeographic reconstructions that link the southern Eastern Ghats Belt and East Antarctica during the late Paleoproterozoic.

Keywords: Ongole Domain, Eastern Ghats Belt, Nuna, zircon, monazite, pseudosections, Lu-Hf isotopes, Rare Earth Elements, Ti-in-zircon thermometry, UHT metamorphism