

**Architecture and evolution of the Central Eastern Ghats province:
Araku-Paderu-Visakhapatnam.**



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Abstract

The Eastern Ghats Mobile Belt (EGMB) is a Proterozoic granulite belt extending along the east coast of peninsular India. The EGMB exposes a deep crustal section through a composite orogenic belt that once formed part of the Proterozoic mobile belt system within East Antarctica and East India. A widely distributed megacrystic granitoid suite comprising charnockites and granites forms an important litho-unit of the Central Eastern Ghats (CEG). New U-Pb Laser Ablation Inductively Coupled Mass Spectrometry (LA-ICPMS) ages from zircons and monazite are reported in this study for two megacrystic granitoids, two charnockites and a megacrystic orthogneiss from the Araku-Paderu-Vadaddi region of the CEG. Samples yielded zircon age clusters at ~1000 Ma for cores and ~950 Ma for both cores and metamorphic rims. Monazites from a megacrystic granitoid recorded an age of 949 ± 12 Ma. Zircon rims from one megacrystic granitoid collected proximal to the Narsipatnam Shear Zone yielded metamorphic ages of ~850 Ma, ~750 Ma and ~550 Ma.

LA-Multicollector-ICPMS analysis of Lu/Hf isotopes in zircon reveals negative ϵ_{Hf} values for all samples indicating crustal contamination of the source melts. Hf model ages indicate crustal residence times of between 1.98 and 2.5 Ga.

Geochemical discrimination plots of these megacrystic granitoids suggest an S-type nature and a post-collisional, within plate granite petrogenesis. The new ages presented for the Central Eastern Ghats Belt in this study are similar to published ages for the Rayner Complex and the Mawson Coast of Eastern Antarctica. These similar ages lend support to the proposition that these areas were complimentary parts of an extensive orogenic belt formed during the Grenvillean Orogeny around 1 Ga. The Central Eastern Ghats Belt also shows evidence of a localised Pan-African overprint proximal to the Narsipatnam Shear Zone.

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