

Contrasting granulite terrains of Peninsular India and Sri Lanka

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Recent isotopic studies of the high-grade Precambrian shield of Peninsular India and Sri Lanka demonstrate the existence of granulite terrains of differing ages and contrasting isotopic characteristics. The new results suggest that this extensive high-grade shield actually represents a tectonic amalgamation of unrelated high-grade terrains.

The *ca.* 2.5 Ga terrain of the Nilgiri and Biligirirangan Hills is dominated by orthogneisses displaying calc-alkaline chemical affinities and low Sr initial ratios (0.702-0.704) (Buhl 1987; Peucat *et al.* 1989; Raith *et al.* 1990). High-grade metamorphism was coeval with, or occurred shortly after, crust formation and the accompanying losses of Th and U produced unradiogenic, present-day Pb isotope ratios that are widely regarded as characteristic of bulk lower continental crust.

Radiometric studies of granulites from the northern sections of the Eastern Ghats (EG) and from the Highland Southwestern Complex (HSWC) of central Sri Lanka indicate metamorphism occurred some 1100 Ma (Aftalion *et al.* 1988; Paul *et al.* 1990) and 550-600 Ma ago (Hözl *et al.* 1988; Baur *et al.* 1991) respectively. In both terrains, charnockitic rocks are associated with abundant garnet-sillimanite gneisses ('khondalites') and other metasediments. Nd model age data indicate derivation of the EG and HSWC granulites, as well as those of the Nilgiri-Biligirirangan region, from late Archaean protoliths. The EG and HSWC units, however, display high and variable Sr initials after correction back to their respective metamorphic ages. Limited data for the EG yield values in the range 0.71-0.72, whereas the HSWC units yield apparent metamorphic initials ranging from 0.71-0.99. Both the EG and HSWC units have present-day radiogenic Pb ratios that are more typical of upper, rather than lower crustal rocks. The Pb isotopic characteristics are not the result of non-depletion of Th and U, but reflect an extended time-interval between crust formation and high-grade metamorphism (*ca.* 1.5 Ga for the EG and *ca.* 2 Ga for the HSWC) with high U/Pb and Th/Pb.

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