# ISOTOPIC AND GEOCHRONOLOGICAL CONSTRAINTS ON THE AGE AND EVOLUTION OF PRECAMBRIAN ROCKS IN SRI LANKA

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Ion microprobe dating of single zircons from high-grade metasediments of the Highland Group reveals the presence of detrital grains that have preserved premetamorphic ages between 2.4 and 3.2 Ga. Major Pb-loss shown by these zircons at = 1100 Ma ago is postulated to reflect high-grade metamorphism, followed by new zircon growth = 550 Ma ago.

The Highland metasediments have strongly negative eNd (T) values ranging from-8 to -18 at 1.1 Ga. These values correspond to model ages (depleted mantle-DM) of 2-3 Ga. They are consistent with the detrital zircon ages and prove derivation of these clastic rocks from an ancient continental source terrain, perhaps typified by the Archaean to early Proterozoic southern Indian shield or another Gondwana terrain that was adjacent to Sri Lanka at that time. Amphibolite-grade orthogneisses from the Eastern Vijayan Complex, in contrast, have significantly higher eNd (T) values of -1 to +7 that correspond to DM-model ages of 1-1.8 Ga and suggest derivation of these rocks from a geochemically primitive source. These data also support the suggestion that the melting event(s) producing the Eastern Vijayan gneisses are younger than the Highland Group rocks and that the Vijayan granitoids represent juvenile additions to the crust. They also rule out derivation of the Vijayan assemblage, through retrogression and metasomatism, from the Highland Group gneisses or that the Vijayan represents a basement to the Highland and Southwest Group supracrustal sequences.

In-situ granulitisation in granitoid gneisses infolded in the Highland Group rocks near Kurunegala is developed in small-scale shearzones associated with the regional F3-fabric. These zones form an interconnected network of fluid pathways along which $CO_2$-streaming and dehydration transformed the gneisses into charnockite, an apparently isochemical process with no depletion in incompatible trace elements. Conventional U-Pb zircon data for these insitu charnockites and the neighbouring "normal" orthogneisses do not yield unambiguous results. The orthogneisses have a poorly defined apparent age of intrusion of $768 \pm 100$ Ma while the charnockite zircons record an upper Concordia intercept age of $746 \pm 25$ Ma that we provisionally interpret as the time of in-situ granulitisation. In view of the large errors in the above ages we cannot separate the intrusive from the metamorphic event, and we provisionally suggest that the two occured shortly after each other. The "normal" othogneisses and charnockites also reflect significant Pb-loss and new zircon growth some 500-560 Ma ago that we relate to widespread H2O- and sulfide-rich retrogression and that is also defined by a nearconcordant zircon age of $564 \pm 10$ Ma for retrograded charnockite near Polonnaruwa in NE Sri Lanka. If our interpretations are correct there may have been two high-grade metamorphic events in the Highland rocks, one at =1100Ma and of regional extent, and one at =750 Ma. of more local nature and associated with the in-situ dehydration process.

A granite post-dating the main regional tectonic fabric as well as major shearzones at the south coast of Sri Lanka has a concordant zircon age of $558 \pm 5$ Ma. The intrusion of this rock is probably genetically associated with the retrogression event whose regional significance is also underlined by numerous published K-Ar and Rb-Sr mineral ages. These ages and a major granulite event at =720 Ma are also recognized in eastern Africa and suggest that Sri Lanka formed part of the extensive Pan-African network of mobile belts in upper Proterozoic time and may have been attached to the African continent at that time.