# Geochemical evidence for a Neoproterozoic magmatic continental margin in Sri Lanka—relevance for the Rodinia–Gondwana supercontinent cycle

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**Abstract**

Zircon ages of Neoproterozoic crustal blocks in Sri Lanka indicate crystallization and metamorphism contemporaneously with the development of the supercontinent Rodinia as well as the early amalgamation of Gondwana, respectively [Asian J. Earth Sci., in press and references therein]. In this context, the geodynamic significance of the ca. 890 Ma mafic Kandy Complex is enigmatic, as it may represent a magmatic arc during the final assembly of Rodinia as well as a rifting-related complex belonging to its dispersal or even early assembly of Gondwana. Here we interpret geochemical and Nd isotopic data of the Kandy Complex as evidence for its former tectonic setting and its role in the development of the Rodinia–Gondwana supercontinent cycle.

A representative sample suite of the Kandy Complex comprises amphibolites, metagabbros, and metadiorites. Some of the samples show relicts of primary magmatic layering. Initial $\varepsilon_{Nd}$ values of −2.8 to +1.3 are interpreted as evidence for melting of a heterogeneous, and ultimately depleted mantle, overprinted by subducted old crustal material. Combined chemical and Nd isotopic data show that the crustal signatures were inherited from the mantle rather than by melt contamination at crustal levels. The samples show enrichment of light rare-earth elements, negative Nb-, and positive Pb-anomalies. These characteristics are similar to those found in modern arcs containing a subducted sedimentary component. The evidence suggests that the Kandy Complex represents a deep crustal level of a magmatic arc. Isotopic as well as geochronological data suggest magmatism over a period of ca. 50 Ma [Asian J. Earth Sci. in press] by repeated rejuvenation of an Andean-type continental margin. The Sm–Nd isotopic systematics indicate that the Kandy Complex represents an integral part of the ca. 1.1–0.75 Ga Wanni Complex in NW Sri Lanka, and that it evolved separately from the presently juxtaposed metasedimentary Highland Complex.


*Keywords:* Rodinia; Gondwana; Sri Lanka; Magmatic arc; Trace elements; Nd isotopes