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Geochemistry and SIMS U-Pb zircon geochronology of the Vijayan anatectic melts of eastern Sri Lanka

Ng, S.W.-P.¹, Whitehouse, M.P.², Tam, T.P.-Y.^{1,3}, Denyszyn, S.W.⁴, Jayasingha, P.⁵ and Chang, S.-C.¹

¹Department of Earth Sciences, The University of Hong Kong, Pok Fu Lam Road, Hong Kong (Email: waipanng@hku.hk)

²Swedish Museum of Natural History, and Nordic Center for Earth Evolution, Box 50007, SE-104 05 Stockholm, Sweden

³Earth System Science Programme, Faculty of Science, The Chinese University of Hong Kong, Sha Tin, New Territories, Hong Kong

⁴School of Earth and Environment and Centre for Exploration Targeting, University of Western Australia, 35 Stirling Highway, Perth, WA 6009, Australia

⁵National Building Research Organization, 99/1, Jawatta Road, Colombo 05, Sri Lanka

Sri Lanka comprises three roughly north-south trending lithotectonic complexes, from west to east the Highland Complex, the Wannu Complex, and the Vijayan Complex. They are made up of amphibolite- to granulite-facies metamorphic rocks. The origin of these complexes is not well-established, and correlations can be tested by comparing their geochemistry, age, and isotope signatures with other well-known tectonic units. Timing, geochemistry and pressure-temperature (*P-T*) conditions of the western metamorphic complexes have been previously studied, and reported by numerous workers as summarized in Santosh et al. [1]. The Highland Complex has been interpreted as a stable fragment of the Columbian supercontinent, while it is suggested that the Wannu Complex is a volcanic arc terrane accreted while in proximity to the terranes of East Africa [2][3]. Meanwhile, the origin of the Vijayan Complex is still mysterious. Geological research on this part of Sri Lanka has been hindered by civil war. Although geochronological and geochemical data of the metamorphic basement are now available [4], these data are not sufficient to reveal its origin. This poster reviews data obtained by previous workers, and provides new preliminary geochemical data as well as SIMS U-Pb zircon ages, suggesting that the geochemistry and age signatures of the anatectic melt generated during Vijayan Complex metamorphism may be more meaningful than previously thought.

The associated granitic anatectic melts are biotite- and hornblende-bearing. The mineral assemblage is typical for I-type granite in a broad sense. This association is supported by geochemical and positive Nd isotopic data. However, two series of anatectic melts are identified in our samples from the Vijayan Complex. One is the ordinary metaluminous to weakly peraluminous I-type granite or granodiorite, which are dated within the widely reported age range of 1100-1050 Ma [4]. The other one is solely metaluminous granodiorite, which has a higher high field strength elements (HFSE) content. Some of these latter granodiorites contain zircons that include a significant 550 Ma age population, which could be related to metamorphism associated with the Pan-African orogeny. Our preliminary SIMS U-Pb zircon ages suggest some of these granodioritic bodies in the southern Vijayan Complex also indicate a protolith age of 790 Ma, which has not been thoroughly discussed in previous literature. Apparently, these bodies are restricted to the controversial Highland-Vijayan mixing zone of the western Vijayan Complex. Similar results have been obtained for the Wannu Complex and potentially related terranes in East Africa. Continuing research on these melts might redefine the boundary of the Vijayan Complex,

provide further clues to the origin of the Vijayan Complex, and refine its relationship with the Highland Complex.

References:

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