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Comparison of Sr-Nd isotope data from southern Africa and Dronning Maud Land, Antarctica.

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A recently proposed mega-nappe model for the Neoproterozoic-Cambrian-age Kuunga Orogeny involves collision between N. and S. Gondwana. S.Gondwana is interpreted to have comprised southern Africa (the Kalahari Craton and parts of adjacent metamorphic belts eg. the Barue and Nampula Complexes of the Mozambique Belt), western Dronning Maud Land (WDML), Antarctica (the Grunehogna Craton and Maud Belt) and Sri Lanka (the Vijayan Complex). N. Gondwana is inferred to have comprised parts of south central Africa, Sri Lanka, Madagascar and India (the Tanzanian Craton and parts of adjacent metamorphic belts including the Xixano Complex of Cabo Degado Complex, the Highlands and Wanni Complexes in Sri Lanka, Central Dronning Maud Land,Sør Rondane and Lutzo Holm Bukta areas in Antarctica).

Differences in published geochronological data from the metamorphic belts of the areas are fundamental to defining the various components of the mega-nappe model. Comparison of published and unpublished Sr and Nd radiogenic isotope data, calculated at 500Ma from the basement gneisses of the mega-nappe component areas, show broad differences between the areas from N and S Gondwana. Neoproterozoic to Cambrian-age granitoids which intrude the various areas mostly mirror their host country rocks suggesting localised anatexis without significant juvenile input. Sr and Nd isotope data from some of these intrusions suggest that they were sourced in the footwall but intrude the hanging wall of the mega-nappe.

The Sr-Nd data from N Gondwana correlated areas dominantly show marginally negative, less evolved εNd characteristics but similar, positive, wide ranged εSr characteristics compared to S. Gondwana correlated areas. Comparison of the Sr-Nd isotopic provinces show broad similarities with geophysical domains defined by recently published aeromagnetic and gravity data from Antarctica. The data are evaluated in terms of the implications for the mega-nappe model and Kuunga Orogeny. Nd-Sr data from Sri Lanka suggest that the Vijayan and Wanni Complexes are correlatable with gneisses of the Nampula Terrane whereas Nd-Sr data from Sør Rondane show similarities with the Xixano and Monapo Complexes of Mozambique.

Nd-Sr data from the Barue and Nampula Complexes of Mozambique are similar to the W. Sverdrupfjella and E. Sverdrupfjella respectively. Nd-Sr data from the Maud Province of WDML show differences between W and E Sverdrupfjella with data from Gjelsvikfjella plotting in both fields. These data suggest Gjelsvikfjella is possibly a complex terrain. The data from Sverdrupfjella possibly indicate a geological boundary at depth suggesting the west is underlain by older Archaean-age crust and the east by

Mesoproterozoic crust. These correlations are consistent with those inferred for the mega-nappe overthrust model.

The Nd-Sr data for the ~500Ma granites in WDML and Mozambique overlap those for the basement rocks in the areas suggesting that the granites are partial melts of their host rocks with no significant juvenile input being recognisable.