Post-tectonic granitoid magmatism in the Natal-Maud-Mozambique Provinces

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Grenville-age provinces around the Archean Kalahari Craton have contributed to hypotheses that they were part of the locus of the assembly of Rodinia (Dalziel 1991). We carried out ion microprobe (SHRIMP) U-Pb zircon dating on Late Mesoproterozoic post-tectonic A-type granitic intrusions from Natal Province in South Africa, Dronning Maud Land (DML) in Antarctica, and Nampula Province in Mozambique in order to constrain the termination of the Grenville age granulite event in these areas. Zircons from ten granitoid intrusions analyzed in this study yield overall 1100-1040 Ma age range, which confirm widespread Grenville-age A-type granitic magmatism in these regions. No older inherited zircon grains were seen, consistent with the interpretation that these granitoid intrusions were formed through juvenile magmatism (Grantham et al., 2001). In the Natal region, mean 207Pb/206Pb ages apparently decrease from north (1100-1090 Ma at Nthilimbitwa Pluton) to south (1060 Ma from Mvoti and Glendale Plutons to 1040 Ma from Kwalembe and Ntilbankulu Plutons). The sample from Sverdrupfjella, Antarctica has ~1093Ma old zircons, and also shows a ~530Ma metamorphic rim whereas none of the Natal samples show any younger overgrowths. Three samples from Nampula Province in Mozambique suggest 1091-1074 Ma magmatic crystallization ages. The limited metamorphic age data available from country rocks to the intrusions suggest that the intrusions have been generated and emplaced syn- or post-metamorphic. Our data, therefore, can constrain the termination of high-grade metamorphism to be no younger than 1040 Ma. The available chronological data of the post-tectonic mainly A-type granitoides show a crude spatial-age relationship with the younger ages <~1060Ma being restricted to the southern and western margins of the Kalahari Craton (southern Natal and Namaqualand) whereas the older ages >1060Ma are restricted to the eastern margin (Mozambique, Antarctica and northern Natal) of the Kalahari Craton.

