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Geochemistry of granitoid sheets found in HU Sverdrupfjella, Western Dronning Maud Land, East Antarctica

Burger, E.P. [1], Grantham, G.H.[2], Roberts, R.J.[1], and le Roux P[3].

1 Department of Geology, University of Pretoria. Pretoria, South Africa.
emuburger@gmail.com
2 Department of Geology, University of Johannesburg, Johannesburg, South Africa.
3 Department of Geological Sciences, University of Cape Town, Cape Town, South Africa.

HU Sverdrupfjella is a mountain range in Western Dronning Maud Land (between 72º S, 73º S and 00º 35' W, 01º 45' E) that has been subject to at least two orogenic events. This range is composed predominantly of gneisses, but also includes various intrusions. This study aims to use a subset of these intrusions in order to study the past orogenic events. The geochemistry of relatively thin granitoid sheets that are common in HU Sverdrupfjella will be presented here.

The granitoids in this study are grouped into 4 phases (designated P0-P3). The oldest P0 phase comprises sub-horizontal folded sheets with axial planar foliations and was only observed at the RootsHorga nunatak. The P1 granitoids are pegmatitic, white in colour and predominantly composed of quartz and feldspar in approximately equal proportions, with some biotite occurring as large books. The P1 pegmatites are generally metaluminous, and chondrite-normalized REE plots show enrichment in LREEs and a pronounced positive Eu anomaly. The P1 phase is crosscut by the P2 and P3 phases and has suffered some deformation, but displays no planar fabric.

The P2 phase, first defined as Dalmatian Granite by Grantham *et al,* 1991 [1], are typically granitic, and show little deformation. Field observations show that these granites are syn-tectonic and intruded under brittle conditions. The P2 granites are pink in colour and include some mafic minerals. The composition of the P2 phase is quartz, k-feldspar, some plagioclase, mica (biotite and some muscovite), and the rocks show limited alteration in thin section. P2 granites are typically peraluminous. Chondrite-normalized REE plots show enriched LREE content, and most samples have weak negative Eu anomalies.

The P3 veins are typically pegmatitic, but have variable grain size (ranging from medium-grained to several cm long grains). P3 pegmatites are generally pink in colour, but pale (white) P3s have been observed at some localities. P3's are composed of quartz, feldspar, biotite, muscovite and some mafic accessory minerals. The single sample of P3 analysed is peraluminous, enriched in LREE and has a positive Eu anomaly. The P3 intrusions are younger than other phases, according to field relationships and have a similar appearance (when grain sizes are similar) to P2. P3's are so similar to P2's that they can safely be considered late and pegmatitic Dalmatian Granites.

Isotope data show that the P1s have higher $^{143}Nd/^{144}Nd$ ratios than the P2 and P3 phases; indicating a different sources for the different phases. Provisional dating indicates that there may be a gap of 40 m.y. or more between the P1 and later phases, possibly indicating that the granites are related to two entirely separate events.

References:

[1] Grantham, G. H. *et al.* (1991) *Antarctic Science*. 3:197-204