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A Geochemistry Of The Straumsnutane Lavas (Jutulstraumen Group) In Western Dronning Maud Land, Antarctica And The Espungabera Lavas (Mkondo Group) In Central Mozambique: Evidence For Comagmatic And Continental Emplacement.

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The Straumsnutane lavas overlie the sedimentary platform sequence of the Ahlmannryggen Group in western Dronning Maud, Antarctica while the Espungabera lavas overlie that of the Umkondo group in Mozambique. The volcanic units are thought to be in the same stratigraphic position in both localities, and are believed to form part of a ~1100 Ma Umkondo Igneous Province in southern Africa. This study presents a comprehensive geochemical survey of these lavas, and will contribute to a better understanding of the ~1100 Ma Umkondo Igneous Province in southern Africa and Antarctica.

Geochemical data of the Straumsnutane lavas were compared with the data obtained from Espungabera lavas. Radiogenic isotope data for both lavas were also obtained. Both these lavas are very fine grained, moderately weathered and slightly to moderately amygdaloidal. These lavas are dominantly basaltic andesites, basalts, minor basaltic trachyandesites and trachyandesites. The petrographic studies indicate that the Straumsnutane lavas are dominated by clinopyroxenes, Fe-Ti Oxides and plagioclase which show some degree of sericitization from moderate to severe. Metamorphic mineral assemblages indicate greenschist facies conditions, followed by prehnite-pumpellyite facies conditions on a retrograde path for both the Straumsnutane lavas and the Espungabera lavas.

Very close trace element ratios values of Nb/U and La/Yb for both the lavas suggest a cogenetic origin. The REE data for Straumsnutane and Espungabera lavas have comparable LREE and HREE distributions and slopes, with both being characterised by weak negative Eu anomalies. Also similar between Straumsnutane and Espungabera lavas is negative Nb anomaly and enrichment in large ion lithophile elements (LILEs). The $^{87}\text{Sr}/^{86}\text{Sr}$ isotopic data calculated at 1100Ma and negative ϵNd values (-2.83 to -3.49) for the Espungabera lavas suggest contamination by continental crust during their genesis. The $^{87}\text{Sr}/^{86}\text{Sr}$ vs $^{143}\text{Nd}/^{144}\text{Nd}$ isotopic modelling calculated at 1105Ma shows that both lavas may have been formed from mixing of a MORB-like source and with about 5% of older crust. The similarities seen in major, trace elements and rare earth element geochemistry indicate that the Espungabera and the low Ti Straumsnutane lavas have the same magmatic origin and emplacement in a continental environment. $^{87}\text{Sr}/^{86}\text{Sr}$ and $^{143}\text{Nd}/^{144}\text{Nd}$ isotope analyses conclude that the lavas suggest contamination by continental

crust during their genesis. The craton-based tholeiitic Umkondo Igneous Province is broadly co-eval with tonalitic calc-alkaline and granitic gneisses in the Nampula and Maud Terranes in Mozambique and Antarctica respectively, immediately east of the Kalahari Craton in a reconstructed Gondwana. These data can be interpreted to indicate that the Espungabera and Straumnsnutane lavas form part of a back-arc complex, west of a volcanic arc/subduction zone along the eastern margin of the Kalahari Craton at ~1100Ma.

