

PETROLOGY, GEOCHEMISTRY AND U-PB GEOCHRONOLOGY OF MAFIC AND ULTRAMAFIC ROCKS OF NW GUYANA, GUIANA SHIELD, SOUTH AMERICA

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The Guiana Shield covers 900,000 km² and is one of the least explored areas in the world [1]. We are studying mafic and ultramafic rocks of NW Guyana (Fig. 1), part of the Guiana Shield, to better characterize them including determining the number of distinct events, their mantle sources, differentiation histories and to assess which belong to LIPs, and which can be linked to coeval units in the formerly adjacent West African craton. One magmatic group (consisting mostly of fresh unmetamorphosed dolerite) is linked to the 1790 Ma Avanavero LIP. The remaining samples, named Matthews Ridge (MR) group, have been metamorphosed to a low-grade, greenschist facies. The geochemical results show that the samples concentrate in the fields of andesitic basalt and basaltic compositions, and have a tholeiitic affinity. Their SiO₂ content ranges from 39 to 54 wt% which support the presence of mafic and ultramafic rocks in the area. For the Avanavero group, the chondrite-normalized diagram for the Rare Earth Elements (REE) displays a slight enrichment in the light-REE relative to the heavy-REE; the MR samples, have a flat pattern, meaning that there is almost no difference in the concentration of light and heavy REE. However, two main groups are formed when binary diagrams are used, Matthews Ridge unit 1A (low-MgO) and Matthews Ridge unit 1B (high-MgO), with the possibility of subgroups within them. Analysis of zircon and baddeleyite grains from 4 samples collected by FQM (First Quantum Minerals) have ages of 2097±39 Ma. (MSWD=1.7); 2125±25 Ma. (MSWD=0.14); 2157±40 Ma. (MSWD=1.3) and 2238±81 Ma. (MSWD=0.13). The ages show that these samples are not part of the Avanavero LIP [2]. This project will contribute to the global understanding of LIP events, and benefit future studies involving paleogeographic reconstructions as more information about the LIP events in the Guiana Shield are added to the world LIP database.

[1] Kroonenberg S.B, de Roever E.W.F., Fraga L.M., Reis N.J., Faraco M.T., Lafon J.M., Cordani U.G., Wong T.E. (2016), Netherlands Journal of Geoscience, Suriname 95, 491–522.

[2] Reis, N.J., Teixeira, W., Hamilton, M.A., Bispo-Santos, F., Almeida, M.E. & D'Agrella-Filho, M.S. (2013), Lithos 174: 175–195.

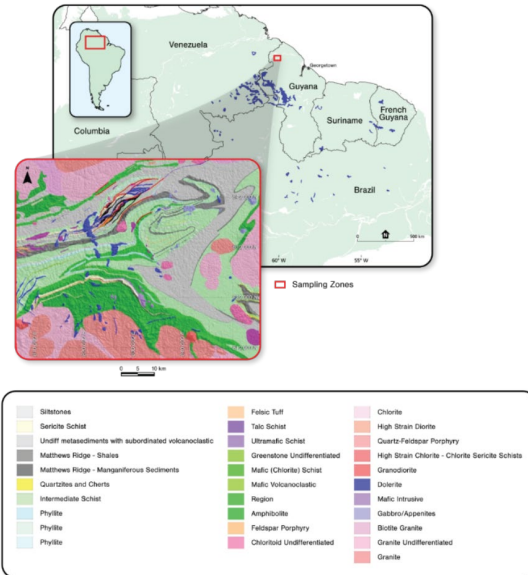


Fig.1. Simplified geological map of the Guiana Shield, compiled after various sources. Modified from Kroonenberg et. al., 2016. Sampling zone map was provided by FQM.