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The 1273 Ma Taraira mafic dyke swarm, northwestern Amazonia: tentative reconstruction with the Central Scandinavian Dolerite Group LIP of Baltica

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The Amazonian Craton is key to assessing Laurentia-Amazonia-Baltica interactions through the Paleoproterozoic Nuna-Rodinia supercontinent cycles. Mafic dyke swarms can be dated using U-Pb geochronology and provide paleomagnetic poles for supercontinent reconstructions. However, such data are scarce for the Mesoproterozoic and limited to the Guaporé Shield.

This study presents a new precise U-Pb ID-TIMS age for a NW-trending undeformed mafic dyke suite in Colombia (northwestern Guiana Shield). The Taraira mafic dyke swarm comprises medium-grained pigeonite dolerites about 20 m wide. Two baddeleyite laths from a Taraira dolerite were dated at the University of Toronto and give an age of 1273 ± 8 Ma. Aeromagnetic data for eastern Colombia suggest a dense NW-SE trending Taraira dyke swarm. No swarm has been identified on the Brazilian mafic dyke swarm map, though individual dykes have been mapped in Brazil near Taraira. Thermomagnetic experiments (Curie-balance) indicate that the Taraira dykes retain Natural Remanent Magnetization carried by pseudo-single domain magnetite.

A compelling age match is considered with the ca. 1270 Ma Central Scandinavian Dolerite Group LIP of Baltica suggesting a reconstruction between NW Amazonia and southern Baltica as supported by the Taraira dykes trending to the presumed CSDG plume center. This reconstruction would match the SAMBA-like ancestry for Amazonia within Nuna as opposed to an Amazonia-Baltica collision. However, our proposed close fit between NW Amazonia and southern Baltica must explain the intervening ca. 1.0-0.95 Ga Putumayo orogen - often interpreted as a result of continent-continent collision - as intracratonic or brought into its current position by subsequent strike-slip displacement.

Colombian Amazonia bimodal magmatism and mafic dykes testify to intraplate rifting episodes between ca. 1300 – 970 Ma. We speculate that emplacement of the Taraira swarm and coeval MacKenzie dykes in Laurentia and the CSDG in Baltica reflects the rupture of Nuna followed by Baltica-Amazonia collision driving the Putumayo orogeny. A new Mesoproterozoic paleomagnetic pole for Amazonia would allow for corroboration of this hypothesis and the assumption that Amazonia behaved as a single tectonic block during the Mesoproterozoic. Therefore, additional sampling of the Taraira swarm is required as follow-up on preliminary paleomagnetic analyses performed in this study.