

THE 1.88 GA UATUMÃ EVENT: PALEO GEOGRAPHY AND POSSIBLE TRUE POLAR WANDER DURING THE PALEOPROTEROZOIC

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ABSTRACT: The Uatumã event is a Silicic Large Igneous Province (SLIP) that has covered about 1.500.000 km² of the Amazonian craton at ca. 1880 – 1850 Ma, during the amalgamation of the first supercontinent Columbia/Nuna. We obtained new paleomagnetic and geochronological data for coeval felsic and mafic dikes in the Carajás Province (SW of the Amazonian craton). Paleomagnetic investigations include AF, LTD, and thermal demagnetizations. We isolated two primary characteristic remanent magnetizations (ChRMs): (1) CA1 in felsic and mafic dike swarms associated to the volcanic Santa Rosa Formation (1880 Ma U-Pb on zircons and apatites) and (2) CA2 in well-dated felsic dikes of the Velho Guilherme Suite (1855 Ma U-Pb on zircons and apatites). CA2 is also observed as secondary component in the Archean host rocks. The remanent magnetization of the felsic dikes is carried by Pseudo-single domain (PSD) magnetite and hematite. Petrological investigations confirm that this hematite is syn- to post magmatic derived from hydrothermal fluids. A Mesozoic remagnetization was also revealed in the Carajás dike swarms associated to the Central Atlantic Magmatic Province (CAMP). The primary origin of these components is supported by positive baked contact tests. The large angular distance between CA1 and CA2, the two new grand mean robust paleomagnetic poles ($Q > 6$ according the reliability criteria of Van der Voo) for the Amazonian craton implies high plate velocities, which are not consistent with modern plate tectonics. A positive field reversal test and global database compilations suggest the presence of a dipolar field, validating the Geocentric Axial Dipole (GAD) hypothesis in Paleoproterozoic times. A similar discrepancy between 1880 and 1860 Ma poles was also observed in different cratons (Slave, Superior, Fennoscandia, Kalahari, India...). To explain these differences a true polar wander (TPW) event is suggested, which is supported by paleomagnetic reconstructions at ~1880 and ~1860 Ma, and also by geological evidences. Amalgamation of supercontinent may cause the formation of superplume and thermal insulation which can disturb mass distribution in mantle and alter the inertial gravity tensor of the Earth. This TPW event could be the consequence of the whole reorganization of the mantle convection following the so-called global magmatic shutdown (2450 – 2200 Ma).

KEYWORDS: AMAZONIAN CRATON, PALEOMAGNETISM, TRUE POLAR WANDER.