RHYACIAN TO EARLY OROSIRIAN TECTONIC EVOLUTION OF THE GUYANA SHIELD, NORTHERN AMAZONIAN CRATON

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ABSTRACT: In the Guyana Shield a vast Early to Mesorhyacian granite-greenstone terrain extends along its entire northeast border between two Achaean domains: the NE-SW-trending Imataca Complex (IC), to northwest; and the NW-SE-trending Amapá Block (AB) to southeast. An evolution within Island arc settings or, near the Achaean domains, as continental magmatic arcs has been envisaged for the granite-greenstone belts. This evolution reflects the approaching of two Archean paleoplates, now incorporated in the Amazonian and West-African Cratons and possibly also in the Baltic Shield. The assembly of the granite-greenstone terrain with the AB and other Achaean nucleus further south (Carajás block in the Brazil-Central Shield) occurred during the Late Rhyacian. The 2.10-2.08 Ga high-grade metamorphism with clockwise P-T-t path described for the AB records the Late Rhyacian collisional event. 2.06-2.04 Ga post-collisional magmatism and migmatization also occurred in the AB. Along the northeast border of the shield, the amalgamation of island arcs occurred without significant crustal thickening. However, as proposed by many authors, the prolonged oblique convergence associated with remarkable sinistral shear zones led to the opening and closing of pull-apart-basins and to the development of (anticlockwise) ultra-high temperature metamorphism in the NE-SW-trending Bakhuis Belt at 2.07-2.05 Ga.The continuity of the oblique approximation of the paleoplates and possibly the docking of some unknown terrane led to a shift in the stress field in inner regions of the “Amazonia” plate and to the development of new oceans and 2.04-2.02 Ga magmatic arcs, installed at the margins of recently built Rhyacian continents. Granitoid complexes of the Trairão and Anauá units represent these magmatic arcs and the high-grade supracrustal rocks of the Caurane-Coeroene Belt (CCB) reflect the associated orogenic basins. The CCB is a sinuous NW-SE/NE-SW/NW-SE structure in the central part of the shield that approximately limits to south the preserved Rhyacian terrain. The assembly of Achaean and Rhyacian crustal fragments with the 2.04-2.02 Ga magmatic arcs occurred during the Early Orosirian collisional event at 2.02-2.00 Ga and is recorded in the IC, in the northwest border of the shield, and in the CCB. In the IC Achaean protoliths were intensely reworked and high-grade metamorphism with clockwise P-T-t path and peak conditions at around 2.02 Ga has been characterized. For the CCB a major tectono-thermal event of ca. 2.00 Ga has been proposed. After the Early Orosirian collisional event, an important 1.98-1.96 Ga post-collisional magmatism, consisting of volcanic rocks and granitoids with high-K calc-alkaline and A-type signatures took place mainly to the north of the CCB, forming the Orocaima Igneous Belt (OIB). Situated to south of the CCB, the Rio Urubu Igneous (Metamorphic?) Belt (RUIB) encompasses mainly 1.96-1.93 Ga A-type and high-K calc-alkaline granitoids and charnockite bodies showing complex structural pattern. Lens of granulites also occur in the RUIB, interpreted as reflecting the concentration of syn-kinematically emplaced plutons during post-collisional transpression south of the CCB. Available data for the Guyana Shield indicates that two collisional events at around 2.10-2.08 Ga and 2.02-2.00 Ga led to the amalgamation of this part of the Columbia paleocontinent.

KEYWORDS: GUYANA SHIELD; TECTONIC EVOLUTION; LATE RHYACIAN-EARLY OROSIRIAN