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METALLOGENETIC SYSTEMS ASSOCIATED WITH GRANITOID MAGMATISM IN THE AMAZONIAN CRATON: AN OVERVIEW OF THE PRESENT LEVEL OF UNDERSTANDING AND EXPLORATION SIGNIFICANCE

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The Amazonian Craton hosts world-class metallogenic provinces with a wide range of styles of primary precious, rare, base metal and placer deposits. This paper provides a synthesis of the geologic database, with regard to granitoid magmatic suites, spatio temporal distribution, tectonic settings and the nature of selected mineral deposits. The Archean Carajás Province: comprises granitoids (3.07-2.84 Ga) formed in a magmatic arc and syn-collisional setting, post-orogenic (2.74-2.70 Ga) (A₂), anorogenic (A₁-type) granites and anorogenic granites (1.88 Ga). Fe-oxide Cu-Au (IOCG) deposits were synchronous or later than bimodal magmatism (2.74-2.70 Ga), which reflects transition from an arc crust extension to a rift setting. U-Au IOCG, emplaced in shallow-crustal levels, Sn-W, and Au-EGP deposits are coeval with 1.88 Ga A₁-type Nb-Y-Sn-U-enriched granites. The Tapajós-Parima Mineral Province: includes a low-grade meta-volcanosedimentary sequence (2.01 Ga), tonalites to granites (2.0-1.87 Ga), two calc-alkaline volcanic sequences (2.0-1.95 Ga - 1.89-1.87 Ga) and A-type rhyolites and granites (1.88 Ga). The calc-alkaline volcanic rocks host epithermal Au and base metal mineralization, whereas Cu-Au and Cu-Mo±Au porphyry-type mineralization is associated to sub-volcanic felsic rocks, formed in two continental magmatic arcs related to an accretionary event, resulting from an Andean-type northwards subduction. The Alta Floresta Gold Province: consists of Paleoproterozoic plutono-volcanic sequences (1.98-1.75 Ga), generated in continental arc settings. Disseminated and vein-type Au ± Cu and Au+ base metal deposits are hosted by calc - alkaline I - type granitic intrusions (1.98 Ga, 1.90 Ga and 1.87 Ga) and quartz - feldspar porphyries (1.77 Ga). Timing of the gold deposits has been constrained between 1.79 Ga and 1.78 Ga and linked to post-collisional Juruena arc felsic magmatism (e.g., Paranaíta and Colider suites). The Transamazonas Province: corresponds to an N-S-trending orogenic belt consolidated during the Transamazonian cycle (2.26-1.95 Ga), comprising the Lourenço, Amapá, Carecuru, Bacajá and Santana do Araguaia tectonic domains. They show a protracted tectonic evolution, and are host to the pre- syn- and post-orogenic to anorogenic granitic magmatism. Gold mineralization associated to magmatic events is still unclear. Greisen and pegmatite Sn-Nb-Ta deposits are related to 1.84 to 1.75 Ga late-orogenic to anorogenic A-type granites. The Pitinga Tin Province: the Madeira Sn-Nb-Ta-F deposit, Sn-greissens and Sn-episyenites are associated to A-type granites of the Madeira Suite (1.84-1.82 Ga), which occur within a cauldron complex (Iricoumé Group). The A-type magmatism evolved from a post-collisional extensional, towards a within-plate setting. The magmatic-hydrothermal processes (400 °C to 100° C) resulted in: a- albization and formation of disseminated cryolite, b- pyrochlore columbitization, and c- formation of a massive cryolite deposit in the core of the Madeira deposit. The Rondônia Tin Province: rare-metal (Ta,Nb,Be,Zr,REE+Y) and Sn-W mineralization is associated to the São Lourenço-Caripunas (1.31-1.30 Ga), related to the post-collisional stage of the Rondônia San Ignácio Province (1.56-1.30 Ga) and to the Santa Clara (1.08-1.07 Ga) and Younger Granites of Rondônia (0.99-0.97 Ga) A-type granite intrusive suites, both linked to the evolution of the Sunsás-Aguapeí Province (1.20-0.95 Ga). Rare-metal polymetallic deposits are associated to late - stage peraluminous granites, mainly as greisen, quartz- vein, and pegmatite types.

Keywords: Amazonian Craton, granitoids, precious, rare and base-metals.