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Exploration Model for Base and Precious Metals in the Eastern Gavião Block, São Francisco Craton, NE Brazil: Geochemical and Tectonic Constraints

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The whole-rock geochemical study of Neoarchean volcanic belts, emplaced in Paleoproterozoic large-scale tectonic lineaments, can provide models for exploration programs in the eastern Gavião Block (São Francisco Craton, Brazil), which is bordered by the north-south trend Contendas-Jacobina lineament (CJL), along with approximately 200 km. The Mundo Novo greenstone belt (MNGB) is hosted in the northern CJL and is composed in the middle unit by metabasalts that feature a vector from the MORB-OIB array to the volcanic arc array in the Nb/Yb-Th/Yb diagram, with a pattern from Calc-Alkalic Basalts (CAB) to Island Arc Tholeiitic basalts and N-MORB in the ternary diagram of the Th-Hf-Nb system. Low Zr values and Zr/Y and Ta/Yb ratios indicate an oceanic arc provenance for the MNGB, based on discrimination diagrams of Zr-Zr/Y and Ta/Yb-Th/Yb. The Contendas-Mirante belt (CMB) is hosted in the southern CJL and is composed in the lower unit by metabasalts and basaltic metandesites that are grouped in the volcanic arc array in the Nb/Yb-Th/Yb diagram and do not overlap the MORB-OIB array. These rocks are strictly plotted in the CAB field in the Th-Hf-Nb ternary diagram. High Ta/Yb values also suggest an active continental margin provenance for the CMB, based on Ta/Yb-Th/Yb diagram. The coexistence of oceanic and continental volcanic belts in distinct parts of the CJL indicates different orogenic patterns. The oceanic provenance of the MNGB suggests an accretionary event was predominant in the northern CJL, although a collisional event occurred in the southern CJL, in which the CMB would represent a continental margin setting, with the oceanic crust completely consumed. These different settings are important guides for base and precious metals exploration in the eastern Gavião Block, indicating important potential for gold in the CMB and southern CJL, and the main potential for base metals in the MNGB and northern CJL.