São Félix do Xingu's Hydrothermal Gold and Base Metals Mineralization: Using Aerogeophysical Data to Find High Favourable Prospective Areas

Bruna de Freitas, Caetano Juliani
University of Sao Paulo, Sao Paulo, SP, Brazil

The São Félix do Xingu (SFX) region is located in the Amazonian Craton, Brazil. Geologically, the region is in the east part of the Central Amazonian Province, close to the west boundary of the Archean Carajás Mineral Province, and it is considered a promising area for epithermal and porphyry gold and base metals mineralization. The SFX region is mainly composed of andesites to rhyolites (ca. 2.0–1.88 Ga), usually undeformed and affected only by very low grade metamorphism. These units are considered part of the significant Uatumã magmatic event, constituted of several events of intermediate to felsic magmatism generated in continental magmatic arcs, with a final orogenic event (ca 1.87 Ga). These events include volcanic, volcanoclastic, and plutonic intrusive rocks and clastic sedimentary sequences. Several Au-Ag high-, intermediate-, and low-sulfidation and Au-Cu-(Mo) porphyry mineralizations have been recognized in these units along more than 600 km from the Tapajós Province to SFX region, encouraging, therefore, research of this important area.

However, the region has insufficient geological detail and a limited database for its high prospective potential. The use of aerogeophysical techniques for areas of difficult access, emphasizing mineral prospecting, has increased its application over time. Through predictive techniques, using gamma-spectrometric and magnetometric data, it was possible to develop favourability maps for exploratory targets. Applying ratios between channels and grid analysis CET techniques, with the integration of geological and structural data, regions of high favourability were highlighted.

The result shows that both methodologies effectively identified promising regions for mineral prospecting. Areas with potential mainly for Au, Cu, Fe, and Sn were defined based on the correlation between the magnetic data, where zones of significant discontinuities can host mineralization, and between the gamma-spectrometric data, characterizing regions of interest based on geostatistic and the study of regions with anomalous concentrations of potassium, uranium, and thorium.