

Mineral Prospectivity of Mafic-Ultramafic Intrusions in the Juazeiro-Petrolina Region, Northern São Francisco Craton, Brazil

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The region near the northern boundary of the São Francisco Craton is well known for the occurrence of Ni-Cu deposits associated with mafic-ultramafic (M-UM) intrusions, such as the Caboclo dos Mangueiros and Curaçá Valley bodies. This study presents a multidisciplinary evaluation of M-UM bodies near Petrolina and Juazeiro, spatially associated with high-grade metamorphic terranes, where previous studies by CBPM revealed prospective scenarios for gold and sulfide mineralization. Airborne magnetic data delineate anomalous trends coherent with M-UM rocks, while remote sensing data reveal structural features that coincide with these anomalies. Over saprolite, two zones with intermediate radiometric amplitudes were identified; the northern anomaly is Th-enriched, whereas the remaining anomalies display broadly similar radiometric signatures. Preliminary geochemical analyses (n=3) of mafic outcrops indicate major element ranges of MgO (2.54–5.8%) and CaO (1.39–9.44%), with compatible elements reaching up to 140 ppm Ni, 43 ppm Co, 60 ppm Cu, and 350 ppm Cr. Remote sensing products highlight extensive occurrences of Fe-oxide and Fe-hydroxide alteration, particularly in the southern and northwestern sectors. In the southern sector, Fe-oxide dominance spatially coincides with metasedimentary sequences; however, field observations by the Geological Survey of Brazil also indicate significant M-UM bodies associated with Fe-oxide-enriched magnetic anomalies. Despite the low base metal tenors in surface samples, previous reports indicate zones with disseminated to massive sulfide (15–50%), with chemical analyses reaching ~2,800 ppm Cu and 1.2% Ni. Areas combining high Th and Fe³⁺ signatures may indicate the presence of goethite, which is a well-established metal host in lateritic deposits, suggesting a possible potential for supergene enrichment or the surface expression of sulfides deposits.