

AIRBORNE GEOPHYSICS APPLIED TO MINERAL EXPLORATION AND GEOLOGICAL MAPPING IN CARAJÁS MINING PROVINCE, PA, BRAZIL.

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Although the Carajás Mining Province contains a number of world class deposits of Fe, Mn, Cu, Au and Ni, it remains widely unexplored. Recent discoveries of Fe-Cu-Au-U-REE deposits have triggered a competitive surge of mineral exploration. In this context, airborne geophysical data are critical since they are cost-effective in assessing large areas and focusing follow up in otherwise limited outcrop and difficult to access rainforest terrain. Joint interpretation of airborne geophysical high resolution datasets (250m line spacing) was carried out in an area of 900km². The geology comprises Archean meta-vulcanosedimentary sequence (Grão-Pará Group), overlaid by discordant Archean siliciclastic rocks(Águas Claras Formation). Both are cut by Proterozoic anorogenic granite and minor gabbroic intrusives of unknown age. NW-SE transcurrent faulting caused strong deformation. Sandstones of Águas Claras Formation host a set of Cu-Au mineralized quartz veins in NE-SW faults, where supergene gold enrichment occurred. Gamma-ray data draped over digital elevation model enabled detailed subdivision of lithological units and regolith, despite vegetation cover. Phase and amplitude of simple and enhanced analytical signals of magnetic intensity provided information on magnetic sources and on geological structures, including recognition of pervasive NE-SW faulting cutting the anorogenic granite. Electromagnetics, though spoiled by conductive cover, also helped on further characterization of lithological units. GIS integration allowed Potassium plus uranium enriched zones spatially related to magnetic bodies and NE-SW faulting to be identified. These zones display similar geophysical signatures to those of the Águas Claras and other Fe-Cu-Au-U-REE deposits elsewhere in the province.