



Magnetotelluric evidences of metal rich fluid pathways in the Tapajós Mineral Province

Raphael Teixeira Correa*^{1 2}, Roberta Mary Vidotti², Sérgio Luiz Fontes³, Marcelo Lacerda Vásquez¹ and Jaime Estevão Scandola¹, ¹Serviço Geológico do Brasil – CPRM, ²Universidade de Brasília, ³Observatório Nacional

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Abstract

The Tapajós Mineral Province (TMP) is a relevant gold producer in Brazil, for producing at least 750 t in the last decades. Its evolution is related to ocean-continent orogenies from 2.1 to 1.87 Ga. The tectonic setting is still controversial since there are no high pressure and low-temperature terrains; neither classic fold and thrust belts are mapped. We propose to address the electrical structure of the TMP through magnetotelluric (MT) data. A 160 km profile MT field survey was conducted in the known Gold dirty road (Transgarimpeira). Resistivity images of the crust have been used to map crustal-scale discontinuities related to fossil fluid flows. We present the first electrical model for the lithosphere of TMP. We identified a major thrust fault juxtaposing two distinct crustal levels. Moreover, we mapped fluid pathways on the MT resistivity model with noticeable correlation with gold mineral deposits. A deep conductor around 12 km in the crust may be the evidence of past bulky melt volume. The MT data have provided relevant constraints to misunderstood structures presented on surface and magnetic data. It has also proved to be valued on detecting fluid pathways relevant for unraveling new mineral deposits.