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TITLE

Electrical crustal structure of Alta Floresta Gold Province eastern sector, SW Amazon Craton, Brazil

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ABSTRACT

In this paper we present the results of an investigation on the electric crustal structures depicted by a magnetotelluric (MT) transect cutting through the easternmost sector of the Alta Floresta Gold Province, in the SW Amazon Craton, Brazil. The MT dataset was acquired along a 200 km NNE-SSW transect encompassing 35 broadband and 12 long-period stations, covering a period range of approximately 10^{-4} to 10^{4} s. We adopted a data processing scheme based on robust estimators over the electromagnetic cross-spectra for combined single and remote reference stations in order to estimate horizontal and vertical transfer functions. The dataset was inverted using a 3-D MT based minimum structure algorithm, considering the data dimensionality, directionality analysis and the irregular station distribution. A set of inversions considering different model parameters have been performed to achieve a model with robust main features and to test the stability of the obtained solutions. A resolution study was also proposed in order to evaluate the average depth of model sensitivity. The electrical structures depicted can improve the understanding of the ancient tectonic features encrypted at the cratonic stable crust, contributing to elucidate the mechanisms that might have controlled its ore genesis. Conductors in the mid-crust correlate with shallow mafic enclave-rich granitic and foliated volcanic facies outcrops, linking the geoelectric anomalies to a possible mid-crustal source correlated to the Statherian magmatism, which is believed to be the main pulse related to gold metallogenesis at this province.

Key words: Electric crustal structures; South American Platform; Amazon Craton; Alta Floresta Gold Province; Statherian magmatism; 3-D MT inversion.

Highlights

- Magnetotelluric investigation on a gold province at SW Amazon Craton;
- Three-dimensional inversion of magnetotelluric data;
- Magnetotelluric imaging of ancient tectonic features at a stable crust.

1. INTRODUCTION