

AEROGEPHYSICAL ANOMALIES OVER SERRA DA CANGALHA (SdC) IMPACT STRUCTURE, BRAZIL.

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Introduction: SdC is a complex impact structure ~13 km in diameter with a central uplift of ~5.8 km in diameter [1]. It was formed in undisturbed Phanerozoic sedimentary rocks of the Parnaíba Basin, northeastern Brazil. Inside SdC there are four stratigraphic units, namely the Longá, Piauí, Poti and Pedra de Fogo formations, from the lowermost to the uppermost unit. The Longá Fm. comprises dark shales of the Devonian/ Lower Carboniferous representing the oldest rocks exposed in the central uplift. The other three units comprise basically by sandstones.

Data and results: We used relatively high-resolution aeromagnetic and aerogammaspectrometric data, acquired using a flight line spacing of 500 m and flight height of 100 m. This portion of the Parnaíba Basin exhibits a conspicuous NE-SW magnetic anomaly related to crystalline basement. The regional magnetic field the same directional trend and it was partially removed by filtering the data, revealing a 15 nT residual magnetic anomaly over the crater still oriented towards NE-SW. We then applied the analytic signal method in order to position the anomaly over the source. The result revealed an anomaly coinciding with the area of occurrence of the the Longá Fm. in the middle of the central uplift, together with other anomalies that can be related to the NW boundary of the central uplift. The Euler deconvolution method [2] was applied to the analytical signal results and showed 1000-1500 m deep sources under the central uplift possibly related to basement rocks. Gammaspectrometric data provided interesting results related to lithologic/mineralogic characteristics of exposed rocks. The K channel marked anomalies with high values (0.5%) related to all vertical ridges within the central uplift, as well as the boundary and center of the central uplift, whereas the Th channel marked the topographic contrast that defines the annular basin (4 ppm) and the rim (20 ppm). The U channel shows very well defined boundaries related to the central uplift and rim (3 ppm). A ternary map is presented in the Fig.1.

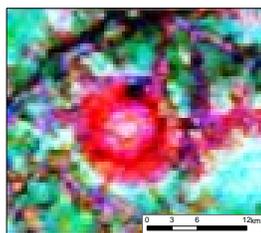


Fig. 1- Ternary aerogammaspectrometric map (RGB = K,Th,U channels, respectively).

Conclusions: An uncharacteristic high concentration of radioelements is observed mainly into the central uplift. This high concentration might be explained by the absorption of the radioelements by clay minerals and/or their combination with iron oxides, increasing the concentration on the surface. Indeed, high amounts of iron oxides are observed in thin-sections of rocks from the collar and in breccias from the central depression. These conspicuous anomalies suggest that the radioelements were remobilized and combined with oxides and clays, possibly as a result of the circulation of hydrothermal fluids in later stages of the cratering process.

References: [1] Kenkmann T. et al. 2010. Abstract #1237. 41st Lunar & Planetary Science Conference. [2] Thompson D.T. 1982. *Geophysics* 47, 31–37.