GEOPHYSICAL SIGNATURE OF SERRA DA CANGALHA IMPACT CRATER, BRAZIL.

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A geophysical signature of Serra da Cangalha impact crater located in the southwestern region of the Parnaiba Basin, Brazil, is presented. This signature was established by an integration of magnetotelluric (MT) sounding data (2-D inversions and 3-D forward modeling) and aeromagnetic data (location and depth of magnetic sources in the crater by Euler deconvolution method). The MT survey was carried along three radial profiles trending NW-SE, ENE-WSW and NNE-SSW across the crater. For MT sites located further away from the centre of the crater, isotropic MT responses were observed, suggesting a 1D conductivity distribution in the subsurface in the frequency range of 100 to 10 Hz. For sites located in the vicinity of the inner ring of the crater, anisotropic responses were observed in the same frequency range. A 2D resistivity inversion of MT data [1] reveals a four-layer model for the three profiles, representing a thin resistive layer underlain by a conductive layer, a weathered basement and a resistive crystalline basement. The depth to top of the basement is estimated to be about 1.2 km in good agreement with information available for nearby wells . The structure is interpreted to have a diameter of about 13 km with a central uplift of the basement. However, in view of the circular geometry of the crater, we carried out a 3D forward modeling computation to supplement the derived 2D model. The 3D resistivity forward model [1], fitting the MT responses by trial-and-error , shows a significant reduction in the basement resistivity around the center of the crater, probably caused by the impact-induced fracturing of the subsurface. The solutions obtained by Euler deconvolution of aeromagnetic data have shown magnetic sources which can be related to the impact structure whose depths varies between 0.8 to 2.5 km. The circular geometry of the crater is well delineated. Also, the downward continuation of the aeromagnetic data showed clearly at 1.1 km depth a magnetic anomaly related to an uplifted basement most probably due to meteorite impact.

Reference: [1] Rodi W and Mackie R.L. 2001. *Geophysics* 66 : 174-187.