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# Integrated interpretation of new gravity and magnetic data of the Cerro do Jarau impact structure, southern Brazil.

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The Cerro do Jarau structure was formed in Mesozoic volcano-sedimentary rocks of the Paraná Basin, Brazil. The overall structure is approximately circular, having a diameter of ∼13 km. Crests of silicified sandstones forming a semi-ring of elevated hills are found in the central-northern part of the structure, a feature that is not observed anywhere neither inside nor in the vicinities of the structure. The origin of such structure has been debated for decades. The two main hypotheses used to explain its formation are endogenous tectonic processes or an impact event. In spite of not having enough evidence that fully supports either hypothesis, a recently identified set of macroscopic and microscopic features point towards an impact origin. In the present work, new ground gravity and magnetic data of the Cerro do Jarau structure and an integrated geological interpretation are presented, aiming at providing more parameters to support or to reject the impact hypothesis. The collected data are irregularly distributed over the study area. The data were acquired using a gravimeter with a resolution of 0.001 mGal and a magnetometer with resolution of 0.01 nT. Horizontal and vertical spatial coordinates with precision in the range of 0.5 to 1 m were obtained after applying differential corrections to the acquired DGPS data. Standard Bouguer and free-air corrections were applied to the gravity data. Theoretical acceleration of gravity at each station was calculated using the WGS84 reference ellipsoid. A regional component was estimated by a polynomial trend surface. Both the theoretical acceleration and the regional component were removed from total Bouguer anomalies. Diurnal variations of the Earth's magnetic field were monitored and removed, along with a regional component, from total magnetic data. Both residual Bouguer anomalies and residual magnetic anomalies show an oriented NE-SW feature in the central-northern portion of the structure. Such feature is not commonly associated with impact structures and may possibly be related to an igneous intrusion generated as a result of a post-impact fault reactivation at local scale. However, the gravity anomaly in the central portion and the positive circular anomaly around it are commonly found on impact craters. On the other hand, it is difficult to associate gravity or magnetic anomalies with the edges of the structure, a characteristic that is also observed in other basaltic impact structures in Brazil. This may be related to different levels of post-impact fracturing or to the local silicification of sandstones. To improve interpretation, 3D geological models will be constructed in the future based on inversions of this set of geophysical data.