**Interpretation of magnetic anomalies due to multiple dikes in the municipalities of Castro and Piraí do Sul/PR**

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# Abstract

The region of Castro and Piraí do Sul is located in the central north of the state of Paraná, in the geological context of the Açungui Supergroup, the Itaiacoca Group, the Três Córregos and Cunhaporanga Granite Suites, the Castro Group, the Ediacaran Granitoids, the Arco de Ponta Grossa, and of alluvial deposits. Among the many geological structures that are found in the region, diabase dikes stand out. They are important for understanding the genetic, past endogenous processes, in addition to being valuable markers of the tectonic environment. In a broader context, dikes are structures of tabular format, which are discordant in relation to the structure of the host rock and can have different compositions, being outcrops or sub-outcrops. For the study and characterization of these bodies, geophysics plays a fundamental role since different formations and geological conditions generate different physical properties and their contrast are of paramount importance for the investigation of these formations in the subsurface. We applied inversion methods with low computational cost to magnetometric data in the region of Castro and Piraí do Sul, obtaining their main parameters. This research aims to help understanding the impact of dikes on water productivity through drilled water wells. To investigate and map large structures in the target area, we have employed airbone magnetic data form the Aerogeophysical Survey Paraná-Santa Catarina carried out by the Geological Survey of Brazil, with North-South flight lines direction, flight height of 100 meters, and spacing between lines of 500 meters. We have selected four subareas with little anthropic interference to carry out the ground geophysical survey and produce magnetic profiles with higher resolution. A base magnetometer and a mobile magnetometer were used to perform data corrections such as magnetic field variations. From the aeromagnetic data we have generated maps of the total field anomaly using bidirectional interpolation with 125 m grid spacing, in addition to a map of its analytic signal amplitude. On the other hand, the ground magnetic profiles were employed to calculate the dikes’ parameters (most importantly, their depths). We compared these estimates with Euler deconvolution and investigated the accuracy of the inversion assuming the models of wide and thin dikes. This work was supported by Araucária Foundation-Brazil PI 08/2020 PIN 2020141000001 and CAPES(Finance Code 001).