



GEOLOGICAL-GEOPHYSICAL ANALYSIS IN THE EAST PORTION OF CATAS ALTAS - MG APPLIED TO MINERAL PROSPECTION OF ULTRAMAFIC ROCKS - STEATITE

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Abstract

This study consists of a geological-geophysical analysis as a tool for the exploration of ultramafic targets as ore bodies used for ornamental purposes. The studied area comprises 181 km² long and the main geological attribute is a central N-S aligned structured ridge called Serra do Pinho, located at the eastern portion of Catas Altas, Minas Gerais. The rock units present in the region are related to the stratigraphic sequence proposed for the Quadrilátero Ferrífero (QF), located in the SE portion of the São Francisco Craton, although some authors consider the lithologies belonging to the lower portion of the Espinhaço Supergroup and also different positions in the QF sequence. The basement is defined as part of the Santa Bárbara Complex, with orthogneisses type TTG. Above this unit are the rocks of the Nova Lima Group, Rio das Velhas Supergroup, with a compositional variation of metamorphic rocks such as tholeiitic meta-mafic and meta-ultramafic, komatiitic metabasalt, felsic metavolcanic, chemical-exhaling formations, BIF's and a variety of schist. The sequence of siliciclastic rocks, composed of quartzites and polymitic metaconglomerate belongs to the Maquiné Group, at the top of the Rios das Velhas Supergroup. Through available geological data (field campaign and bibliographic references) integrated with qualitative and quantitative analysis by the Magnetometric Method, it is possible to evaluate the potential of mineral deposits of economic interest. This database was worked with the Oasis Montaj Software to generate geophysical maps and the subsequent integration in a GIS environment (database provided by CODEMIG). Thematic maps of magnetometry were made, that aims to investigate the small variations in the intensity of the magnetic field of the earth based on the variation of the magnetic amplitude, which is associated with the magnetic susceptibility of the minerals. Through Euler deconvolution (3D) performed by Euler 1.00 Software, E-W profiles were drawn for later interpolation that allowed to observe the geometry of the ore bodies with a 3D view. It was observed that the median anomalies in the Analytical Signal Amplitude (ASA) map coincide with the location of possible ore bodies, in this case the steatite. Popularly known as soapstone, steatite is a metamorphic rock that forms under low temperatures and pressures, by hydrating protolite of peridotitic composition. Its main component is talc, which can also occur chlorite, serpentine, magnesite, antigorite, enstatite and, subordinately, quartz, magnetite, or pyrite. If the steatite is polarized, the magnetic response shows anomalous signals. The ultramafic bodies have an approximately sigmoidal external aspect (pods), whose asymmetry reflects the kinematics of deformation, and have a clear foliation at the edges. The outcropping bodies in the area have schist rocks with variable talc, chlorite, magnetite, and pyrite content. Some steatite bodies have already been economically exploited for ornamental purposes and the region still has mining and processing activities for this mineral asset. Further mineral research is proposed to the area, such as a drilling program to check the depth of the bodies and to analyze if the rocks characteristics allow then to be economic viable. Geophysics presents itself as an efficient tool to aid Mineral Research works.

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