



HYDROGEOPHYSICS APPLIED TO GROUNDWATER LEVEL VARIATION ANALYSIS IN AN AREA OF CERRADO BIOME IN CHAPADA DOS VEADEIROS REGION, GOIÁS

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This paper was prepared for presentation during the 18th International Congress of the Brazilian Geophysical Society held in Rio de Janeiro, Brazil, 16-19 October 2023.

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Abstract

Cerrado's campo sujo areas have been one of the main focuses of anthropic occupation in the Chapada dos Veadeiros region, Brazil's Central Plateau, as they are easily accessible flattened areas with less dense vegetation. They are usually associated with wetlands representing excellent water reservoirs and groundwater recharge zones. The environmental characterization and analysis of water level variation are essential to investigate the impacts of human occupation. Hydrogeophysics represents one of the main subsurface research tools due to its easy application and efficiency in identifying the water level, with emphasis on Ground-penetrating radar (GPR), and electrical resistivity tomography (ERT). An analysis of GPR sections with 200, 400, and 900 MHz frequency antennas associated with the resistivity model was carried out to identify structures, and map the groundwater level. The overlapping data compose a hydrogeophysical model with good correlation to direct measurements of water level in a monitoring well, and soil horizons mapped in a trench. The GPR proved to be efficient in mapping the water level, mainly about to the survey with a 400 MHz antenna, shown as a horizontal reflector associated with attenuation portions of the reflection signal, registering in profile the lowering of the water level from 1.68 m in May to 3.35 m in August. The resistivity model showed a good correlation with the variations between the mapped soil horizons. The analysis shows that constructing a hydrogeophysical model is an excellent alternative for identifying the water level, and characterizing the shallow subsurface by applying non-invasive techniques. The study area represents a preserved area of campo sujo, and the research data can be used for comparison with future surveys, in addition to representing a base hydrogeophysics methodology that showed promising results for the physiographic characteristics of the area, which can be replicated in regions of similar geoenvironmental aspects.

Keywords: hydrogeophysics; aquifer; groundwater; GPR; DC resistivity; savanna