

Electroresistivity applied to groundwater investigation in the Brazilian Amazon region

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Geophysical methods for groundwater investigations, specifically electroresistivity, have been used by the CPRM throughout Brazil for over two decades. Recently, these methods were used in surveys of the urban areas of Jacareacanga and Novo Progresso in southwestern of Pará.

The surveys were carried out using a dipole-dipole array and a spacing of 50m between the pairs of current and power electrodes, set to reach six geoelectric levels.

The data obtained were used to generate pseudo-sections and contour maps of the levels investigated for subsequent interpretation.

The survey amounted to 5960 line-metres of sections at Jacareacanga, where an elongate zone trending NW-SE was interpreted to pass through the middle of the town. This zone is considered to have the greatest potential for groundwater at depths over 50m. Geological data revealed the presence of fracture systems along this trend, which support the geophysical interpretation.

At Nova Progresso, the survey amounted to 16 150 line-metres in which an elongate zone of very low resistivity was detected. This zone trends NNE-SSW across the town, and has the potential for large aquifers below a depth of 70m. The general orientation of the zone is compatible with the attitude of faults and fractures observed on the ground.

The results obtained show a close relationship between the general orientation of zones of lowest resistivity with the bedrock structure, indicating that it is the structural pattern that controls groundwater resource distribution in the areas.