Geophysical prospecting for water in a semi-arid region: Parnaíba Sedimentary Basin, north-eastern Brazil.

CORREIA FILHO, F.L. Geological Survey of Brazil – CPRM, Teresina, Brazil

When field work began in 1997 to find and evaluate potential water-bearing structures along the south-eastern border of the Parnaíba Sedimentary Basin, in the semi-arid region of the State of Piauí, north-eastern Brazil, it was found necessary to use non-conventional geophysical tools to confirm geological structures. These non-conventional geophysical tools included the magnetoteluric and transient electromagnetic methods. Geoelectrostratigraphic mapping of sub-surface structures was carried out along six sections across the basin margin, generating electrical resistivity sections x depth that represent the electrical properties of the sedimentary formations and the crystalline rocks of the study area. Data interpretation in the light of geology and aeromagnetic data revealed graben-like structures along the margin of the basin that extend approximately 150km from the towns of Caracol to São João do Piauí. The confirmation of these structures, filled by pre-Silurian sediments of low resistivity, will increase considerably the groundwater potential of the semiarid region around the basin currently plagued by chronic public health problems caused mainly by water-born parasitic sickness, related to inadequate water supply.