

# COMBINED RESISTIVITY AND ELECTROMAGNETIC INVESTIGATIONS FOR GROUNDWATER IN THE PRECAMBRIAN AREA OF SEMI-ARID PARAÍBA.

by

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**ABSTRACTS** -- Aquifers in Precambrian areas are relatively deep (15 - 50m) and normally occur in fractured zones. Such zones can often be identified in aerial photographs, but their precise location on the ground is almost impossible by visual means. Because of the small size of these aquifers their exact location is necessary for well drilling.

Resistivity profiling by tradition is performed for detecting fractured zones. The study described in this paper shows that this can be done faster, cheaper and more accurately by electromagnetic (EM) methods. The results obtained with a two-frequency horizontal-loop EM (HLEM) system has been satisfactory in a selected area near Patos, Paraíba.

## INTRODUCTION

In the Precambrian regions of the Northeast of Brazil, particularly, in the state of Paraíba, water is scarce. There are few shallow aluvial aquifers and, in the majority, crystalline aquifers (fractured zones in the crystalline rocks) which are hard to detect.

Hydrogeologists usually rely on traditional geophysical resistivity methods. In 1986, test surveys were carried out in a Precambrian area near Patos, Paraíba, to investigate the potential of EM techniques for groundwater prospecting. The results obtained by these techniques were compared with resistivity profiles to determine their usefulness for this type of terrain. Similiar measurements in a Precambrian area of Upper Volta (W-Africa) were described by Palacky (1981).

The studies were initiated with several radial Schlumberger soundings (RVES) at different sites of the selected area to find out the general orientation of the fractured zones which were not visible in aerial photographs.

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