EXTENDED ABSTRACTS BOOK

(ORAL AND POSTER PRESENTATIONS)

55th Meeting and Technical Exhibition, Stavanger, Norway, 7 - 11 June 1993

EAEG BUSINESS OFFICE

Laan van Vollenhove 3039
PO Box 298
3700 AG Zeist
The Netherlands

Telephone : +31 (0)3404 56997
Telefax : +31 (0)3404 62640

P134 GEOELECTRICAL SOUNDING FOR HANDLING HYDROGEOLOGICAL PROBLEMS OM COASTAL FLYSCH TERRAIN

T.D. PAPADOPOULOS, J.F. LOUIS and J.D. ALEXOPOULOS
University of Athens, Geophysics-Geothermy div., Panepistimiopolis, 15784 Athens, Greece

Extensive ground water exploitation near coastal areas may impose serious problems on the water supplying of the existing boreholes. The estimation of the potential of water bearing formations as well as the safety measures to be applied for water-supply and irrigation control, are the main tasks of field hydrogeologist and moreover in areas where low hydraulic gradients dominate.
In this paper, the authors deal with some hydrogeological problems encountered in the coastal area of Trizina in eastern Peloponessus, Greece. A geoelectrical survey was conducted in flysch subterrain to delineate in detail the shape of the salt-fresh water interface. Moreover the tectonic structure of the inland part of the basin was examined based on maps showing the lateral distribution of true resistivity.

Geology

The broad area of Trizina (Fig. 1) is seated on Cretaceous flysch which is characterised by a series of alterations of sandstones and siltstones intercalated by limestone bodies of limited extent. The thickness of the series increases eastward. Quaternary deposits overlain flysch terrain present variable thickness and at places exceed 150 meters. The main aquifer horizons are developed in this formation and the management of the subsurface water is controlled by the flysch terrain.

Geoelectrical data acquisition and processing.

Thirty seven Schlumberger soundings (Louis and Papadopoulos, 1986) were carried out in a 27 sq. km area, using a maximum current base of 930 m. The majority of the sounding curves reflects the presence of four geoelectric layers of the QH and HK types. The sounding data were interpreted using 1-D resistivity inversion programs, developed by Zohdy (1989). This powerful interpretation method allow to obtain a multilayer step-function model for each sounding making thus an easy matter to construct maps of contoured resistivity at different depths.

Results

In figures 2,3 and 4 are shown the true resistivity distributions for -50, -100 and -150 metres depth. It is observed a clear inland deepening of the salt - fresh water interface and an absence of a low resistivity zone for a depth greater than -150 metres. The low resistivity zone observed inland is governed by the presence of a local high permeable formation which favours the development of a local aquifer.
Finally an isopach map (see figure 5) of the overburden was constructed to show up the tectonic structure of flysch terrain which governs the water management of the basin.

References

Louis, J. & Papadopoulos, T., 1986. Report on a geophysical survey in Trizinia valley. Ministry of Agriculture, Athens.
Zohdy, A.A.R., 1989. A new method for the automatic interpretation of Schlumberger and Wenner sounding curves. Geophysics, 54, pp 245 - 253.

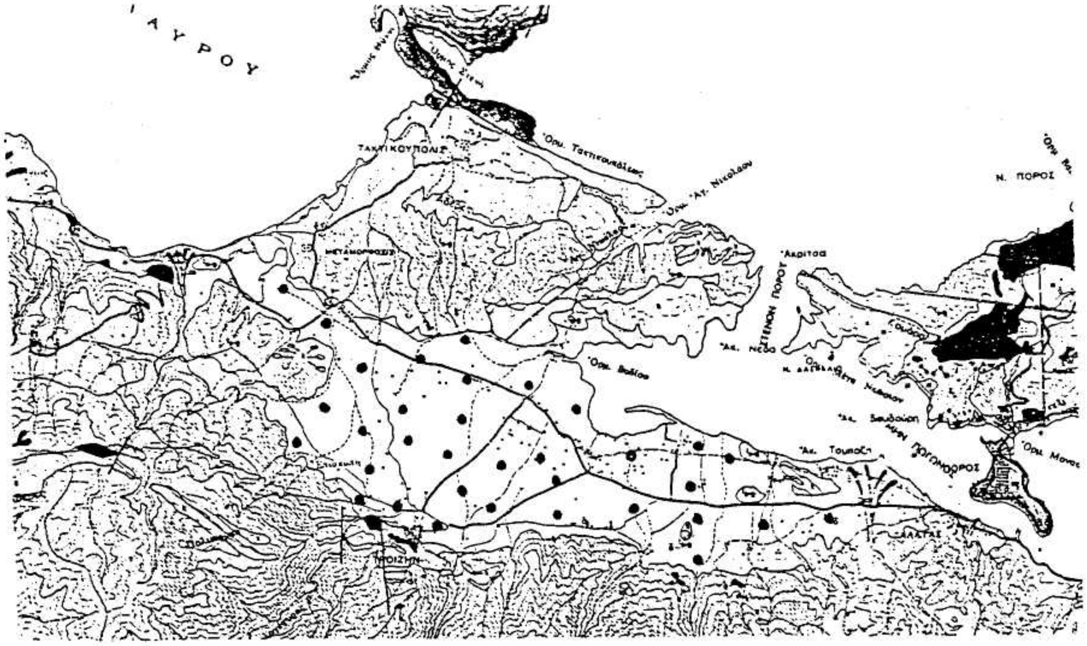
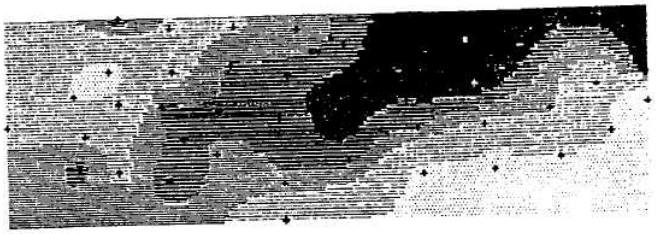


Figure 1. Location map

Figure 2. True resistivity distribution at depth -50 m.

Figure 3. True resistivity distribution at depth -100 m.



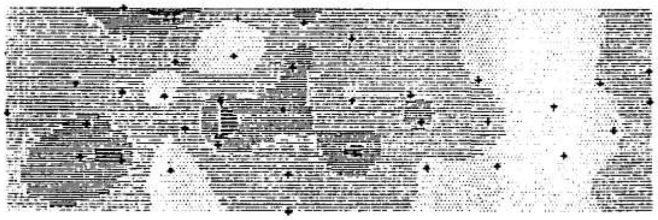


Figure 4. True resistivity distribution at depth -150 m.

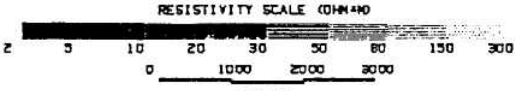
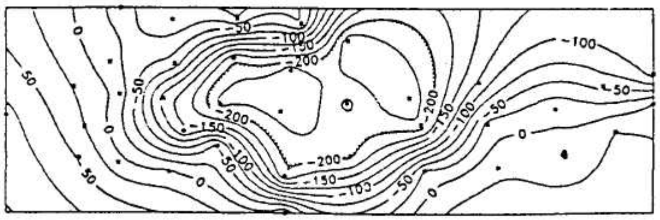


Figure 5. Relief of the Flysch basement.



SCALES 1:100.000