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Hydrology and Earth System Sciences Discussions

Interactive comment on "Nonlinear estimation of aquifer parameters from surficial resistivity measurements" *by* K. P. Singh

Anonymous Referee #3

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The paper deals with the analysis of the relationship between hydraulic permeability and electrical resisitivity representing one of the more intriguing scientific problems of a new and emerging discipline: the so-called hydrogeophysics. There are a wide spectra of unsolved questions regarding both theorethical and experimental aspects, then the papers about this topic are welcomed.

However this paper is affected by significant drawbacks and it is not suitable for publication. Taking into account the relevance of the study problem, I strongly encourage the author to improve the quality of the work and to resubmit the paper.

The main drawback of this paper is the absence of a robust experimental approach, the use of Vertical Electrical Sounding is dated and cannot be proposed as an operative tool for studying the complex spatial pattern of hydraulic permeability and transmissivity. No accurate information about the geophysical data measured is given and it is

not possible to check their quality. The electrode spacing, the type of resistivity curves and the method used for data interpretation, the mean investigation depth and other field parameters are not specified in the text. Furthermore no accurate information about the pumping test used to correlate the geophysical and hydraulic measurements is given, as a consequence any critical evaluations and discussion about the maps displayed on fig.5 and 6 can be done. Finally, the paper is not well focused to the interpretation of experimental data measured in the OUC test site and presents a too generic discussion of the results obtained in other test sites.

General comments

The abstract is not informative of the original contribute of the work.

The theoretical aspects are too simplified, the complexity of K-rho relationship requires great attention. The basic assumptions and the limits of the approach methodology must be clearly discussed.

The state-of-the-art is partially described, more than 50% of references quoted in the paper are dated (publication year before 1990).

The geological and hydrogeological setting of the investigated area have been not described.

Specific comments

The Fig.1 is not necessary and can be found in all the text of applied geophysics.

The English form must be revised.

There are some typewriter errors (i.e. pag 924 condtions,)

The term b in the formula 7 is not specified

The reference list must be revised (i.e. Jupp and Vozoff citation has been included two times in the list)

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Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 917, 2005.