FROM THE RESULTS OF THE OTKA PROJECT "NON-CONVENTIONAL GEOELECTRIC ARRAYS, K49604"

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In frames of a Hungarian National Scientific Research Fund project (No K49604), we systematically investigated all published surface geoelectric arrays, since a part of them are out of use, even completely forgotten. Even in case of these latter ones we were optimistic in their potential renaissance, due to the rapid advance in geophysical knowledge and technical development. Therefore at first we collected all surface geophysical arrays, ever used in geophysical exploration. We presented all of them in a standard way, and we classified them. This collection proved to be the basis of still on-going inter-comparisons. We revealed the original motivation of their design, and studied, whether some of these strategies can be incorporated in today's multi-electrode environment. Then we produced parameter sensitivity maps for all possible arrays, by using a new analytical approach. Parameter sensitivity maps for non-linear and focussed arrays had never been presented before. Through examples (mainly for null-arrays, one of the focal points of our project) we presented, how these maps can be applied. Then another characterizing parameter, the depth of investigation was studied. The so-called depth of investigation characteristics (DIC) was computed for all the 30 arrays, where it exists, both in terms of Roy and Apparao (1971) and Edwards (1977). We carried out various comparisons, and revealed a complex relation among vertical resolution, depth of investigation and noise. We showed, how the depth of investigation is constrained by the noise level. Therefore the maximal (theoretical) depths of investigation for 6 arrays were studied at various noise levels. Besides some further theoretical studies, our further work will concentrate on measurements. The general characterisation of so many geoelectric array provides a better knowledge about the arrays, and it will be hopefully useful also for other teams to select always the optimal arrays in their field problem.

geoelectric, array, depth of investigation

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