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ELECTRICAL IMAGING SURVEY ACROSS ACTIVE FAULTS: EXAMPLES FROM THE TYRNAVOS BASIN, GREECE

An electrical imaging survey was carried out in the tectonically active Tyrnavos Basin, located in the northern sector of the Larissa Plain (Eastern Thessaly, Greece). The principal aims of this research were to test the efficiency of this relatively new geoelectrical technique, when applied to the recognition and the geometrical characterisation of active normal faults, and to improve the actual tectonic knowledge of the investigated area. Therefore, we carried out several tests performing electrical imaging across morphotectonic scarps or fault traces of the main tectonic structures bordering the Tyrnavos Basin (Fig. 1), whose Late Quaternary tectonic activity is well documented by previous structural, stratigraphic, morphotectonic and palaeoseismological researches (Caputo et al., 1994).

Numerous ERT with different electrode spacing (from 2 up to 50 m) and depth of investigation (from 0.5 to 120 m) were performed with a dipole-dipole array using a multielectrode system, with 32 electrodes equally spaced along a straight line, for data acquisition (Giano et al., 2000). The automatic 2D inversion of apparent resistivity data was performed using the algorithm proposed by Loke and Barker (1996). Fig. 2 shows electrical images carried out across the central segment of the Tyrnavos Fault, at locality Damasi.

The dense data coverage, the very fast data acquisition (if compared to other geophysical investigation techniques) and, especially, the good correlation between ERT and the other geologically based information clearly indicate that this technique is
a powerful and relatively low-costs method in order to localise faults and, particularly, to determine the degree of activity of such tectonic features, by characterising the geometry and different ‘electrical’ stratigraphy occurring in the two opposing blocks.

Fig. 2 - Electrical images carried out across the central segment of the Tyrnavos Fault at locality Damasi. For location see Fig. 1. a) and b) show the two images oriented N10° E and performed 15 m apart. Electrode spacing is 2 m; elevations in m a.s.l., resistivity in ohm · m. The similarity of the two images is straightforward. c) N-S oriented geological profile. 1) crystalline limestone (Triassic); 2) conglomerates (Middle?-Upper Pleistocene); 3) alluvial deposits (Holocene).

REFERENCES