

REVEALING EFFECTS MODULATED BY EXTERNAL SOURCE BY USING MAGNETOTELLURIC MONITORING

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Recently, magnetotellurics (MT) have been used in the context of continuous monitoring of seismic active areas [1], in order to detect anomalous temporal patterns in the MT transfer function connected to earthquakes. In fact, because of its large investigation depth, the MT method could detect deep resistivity variations in the subsoil at seismogenic depths, due to modifications of the local stress field. Several physical models show that such variations are mainly connected to deep fluid motions, which, furthermore, are considered to be responsible of the generation of anomalous electromagnetic signals. To study the temporal stability of the MT transfer functions, since 2003 a MT monitoring network has been installed by I.M.A.A. C.N.R. in the Agri Valley (Southern Italy). In particular, the data measured at station Tramutola, located in proximity of the fault which generated one of the biggest earthquakes in the southern Italy ($M_w=7.0$, 16 December 1857), were analysed. These data are of very good quality because the site is unaffected by possible sources of electromagnetic noise. During the observation period no strong earthquakes occurred and no earthquake-related effects were observed in the data; nevertheless, the analysis of resistivity time series, by means advanced statistical techniques like the Detrended Fluctuation Analysis [2] and the spectral analysis, has revealed a periodic fluctuation at about 27 days in the period range [10-150s], which are supposed to be mainly linked to oscillations of the magnetotelluric source described by means of the use of geomagnetic indexes.

References:

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