

ELECTROMAGNETIC METHODOLOGY ON SEISMIC HAZARD ASSESSMENT

Dumitru STANICA[1]; Maria Stanica[2]

[1] Institute of Geodynamics, Bucharest; [2] Institute of Geodynamics of the Romanian Academy

www.geodin.ro/~prezentare

By means of this paper, we have tried to reveal a relationship between the possible changes in the crust and upper mantle structure, on the hand, and electromagnetic parameter having an invariant character (B_{zn}) in the absence of the seismic activity, on the other hand. Under these circumstances, we used the data carried out by electromagnetic-monitoring at Tulnici and Provita geodynamic observatories placed in the surrounding area of Vrancea zone, for long periods - so that these data may be correlated with significant seismic events (M is greater than 4,5) occurred in the active Vrancea zone. In the investigated area, our interest is focused on the Vrancea zone, which is located within the arcuate portion of Eastern Carpathians, because it is particularly a complex seismic-active zone of continental convergence, where more tectonic units are in contact: Intra-Alpine and Moesian subplates, and the East European plate. Here, an important role is played by the so-called Vrancea slab a lithospheric relic slab detached from the East European Plate, considered to be the main seismogenic volume in the area. All the characteristics concerning the structure and the geometry of this slab were assessed mainly through the analysis of 3-D magnetotelluric tomographic imaging and tensor impedance polar diagrams constructed for a large scale of frequencies corresponding to intermediate-depth intervals (70-150 Km). The orientation of the major axes of the diagrams records a counterclockwise rotation with depth, hence suggesting that the slab underwent some torsion. In this paper it is to highlight an up-dated geodynamic model at subcrustal level and, also, an analysis of the electromagnetic monitoring data and the seismic events for the last three years, so that a coherent relationship between these to be emphasized. The methodology presented in this paper concerning the anomalous behaviour of the electromagnetic parameters was established according to the geotectonic features of the Vrancea zo. Subsequently, a specific approach regarding the normalized functions B_{zn} and R_{on} , selected complying with temporal invariability criterion for a 2D geoelectric structure in non-seismic condition, taking into consideration just their daily mean distribution versus intermediate depth seismic events recorded simultaneously, was elaborated. The changes of electrical conductivity occurred pre-, co- and post-earthquake, as a sequence of geophysical processes developed into and in the close vicinity of the Vrancea! seismogenic volume, could be detected by means of the peculiar features of the B_{zn} and R_{on} parameters taken throughout the frequency range 10⁻² - 4.10⁻³ Hz.