

VRANCEA ZONE GEODYNAMICS AND THE EXPLANATION OF THE EARTH-QUAKES MECHANISM

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The electromagnetic data supplied by approaching the deep structure of the Carpathians Arc Bend - where the Vrancea zone is placed, and surrounded zones, necessary for understanding the correlation between the structure and the geodynamics of this area, represent the essence of this paper. By revealing how the propagation of the electromagnetic field depending on the various particularities of the deep structure is influenced, and establishing a relationship between all of them, some geophysical evidences of the triggering mechanisms for the main intermediate-depth earthquakes located in the active Vrancea zone are emphasized. This paper is focused on the relationship between earthquakes and a relic lithospheric slab that is considered to be the main seismogenic volume in the area. The structural peculiarities and the geometric properties of the relic slab were assessed mainly through the analysis of 3-D magnetotelluric tomographic imaging and impedance polar diagrams. This information also reveals that the relic slab is experiencing a counterclockwise torsion that might be generated by surrounding asthenospheric currents. Briefly, the results of our work suggest that the seismic behavior of the active Vrancea zone may be related to brittle deformation processes induced by geodynamic torsion of the relic lithospheric slab, having an evident connection with the geodynamics of the surrounding area. The hypocenters of the intermediate-depth seismic events recorded in the area are concentrated within a seismogenic body having approximately a parallelepipedic form, which is about 80 km long and 40 km wide and extends to a depth of about 180 km. According to the seismic historical catalog, 18 earthquakes with magnitude higher than 6.5, occurred in the area with a periodicity of three to seven times per century.