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STRESS AND DEFORMATION OF EARTH CRUST IN BULGARIAN TERRITORY AND SURROUNDINGS

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For understanding the complex tectonic pattern of Bulgaria, the tectonic evolution of the area between the Carpathian mountain to the north, Black Sea to the east, Adriatic Sea to the west, and Ionian basins to the south (central Balkan region) has to be considered. This region is very interesting for studding the kinematics and dynamics of plates interaction because of the variety of different tectonic processes.

The present scientific communication contains generalized information on the focal mechanisms results of collection, processing and analysis of more than 400 seismic events for Bulgarian territory and adjacent lands. Around half of available focal mechanisms are determined by the author, using method of P-wave first motion polarities. Most of the events are with small to moderate magnitudes – 2.5 to 4.5 for Bulgaria (only one with Mw=5.7 and two historical earthquakes with M=6.8 and 7.0), and stronger events for surrounding countries – up to 7.4.

All available beach balls are separated on nine different seismic zones, with special attention on the seismicity, different faults and fault systems. The frequency distribution of P- and T-axes utilizing available events was constructed in every zone, to correlate the geometry of the principle stress axes and fault orientations. The local stress tensor derived from the inversion of P- and T-axes of the fault plane solutions in every zone was determined by the Gephart and Forsyth method and the minimum sum of misfit rotation was calculated.

The released strain is computed from the moment tensors of the focal mechanisms according to the relation of the Kostrov. In general, obtained mean strain tensors of deformation shows some agreements with the calculated mean stresses. Several local misfits and the whole geodynamic situation are analyzed according to some present tectonic hypothesis. Based on analysis of the current seismicity, stress and strain in the territory of Bulgaria, some ongoing geodynamic processes in the central Balkans are presented.

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