Thermal and rheological structure and evolution of the lithosphere — clues of tectonic interactions in the Carpatho–Pannonian area

Crisan Demetrescu[1], M. Andreescu[1], G. Polonic[1] & M. Ene[1]

[1]*Institute of Geodynamics, 19-21 J.L. Calderon, R-70201, Bucharest-37, Romania*

The temperature field of the lithosphere and, consequently, the mechanical state, in particular its rheology, are strongly dependent on the past or ongoing tectonic processes involving the entire lithosphere or parts of it. The paper presents the rheological consequences of tectonic processes for areas in the Carpathian system. It is shown that the pre-Miocene subduction of an oceanic lithosphere followed by a Miocene continental collision leading to the Moldavidic tectogeneses responsible for the present day structure of the Eastern Carpathians is a major thermal event, creating a characteristic temperature field of the lithosphere, persistent for a few tens of million years, with certain volumes in which intermediate-depth earthquakes can occur. The thermal and rheological structure is discussed in connection with the seismic structure as revealed by tomographic studies of the area. The extension of the Pannonian lithosphere since the Badenian, and the complex evolution of the Transylvanian Basin since the Senonian are discussed as well.