Multidisciplinary interpretation of gravity field in the Western Carpathians and the Bohemian Massif junction

M. Bielik
Geophysical Institute of the Slovak Academy of Sciences[1]

J. Vozár
Geological Institute of the Slovak Academy of Sciences[2]

J. Šantavý
Capital Invest, o.c.p., a.s.[3]

A b s t r a c t : In our study we are interested in regional research of a deep geological structure and dynamics of the lithosphere in the Western Carpathians and the Bohemian Massif junction. The research is based on multidisciplinary interpretation of gravity field. This interpretation was made along two transects, 3T and 6HR. The deep structure of the contact zone is characterized by small 2-3 km deepening of the Moho discontinuity. Despite the interpreted partial crust thickening we do not register significant crustal root in the investigated area. It is probable, that the deep structure of the contact zone of the Bohemian Massif and the Western Carpathians was influenced mainly by transpressional deformations that run along sinistral deep-seated fault (Záhorie fault, Mur-Mürz-Leitha fault). The fault has flower structure and it is a dominant seismic and seismologic feature of this contact zone. On the basis of macroseismically observed earthquakes epicenter distributions it is the most notable and significant tectonic lineament in the Western Carpathians. The deep contact of both colliding plates is very steep, almost vertical. The most essential source of the Carpathian gravity minimum of the western segment of the Western Carpathians is light low-density Tertiary deposits of the Vienna basin with depth up to 6.5 km and the deposits of the outer Western Carpathian Flysch, that dip in the direction towards the Klippen Belt to depth up to 15-18 km. Also another deep structures have certain but lower influence on this gravity anomaly low. They are represented by the gravity effect of the upper crust of the Bohemian Massif and 2-3 km crust thickening.

Key words: multidisciplinary 2D gravity interpretation, lithosphere, Western Carpathians and Bohemian Massif junction

[1]Dúbravská cesta 9, 842 28 Bratislava, Slovak Republic; e-mail: geofmiro@savba.sk
[2]Dúbravská cesta 9, 842 26 Bratislava, Slovak Republic; e-mail: geoljovo@savba.sk
[3]Poľná 1, 811 08 Bratislava, Slovak Republic