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Gravity-based models of the northern Moesian Plate

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The paper deals with the lowest gravity low on the Romanian territory, unexpectedly located in front and not above the isostatic root of South Carpathians, the highest mountains in Romania. Previous gravity models attempted to explain the extreme Bouguer anomaly by assigning an unusual low density to the Palaeozoic cover of the Moesian Platform overlain by the Getic Depression sediments. A possible strong macroporosity of the carbonate formations of the platform cover was suggested to justify the mass deficit revealed in the modelling. With this paper three new interpretative lines crossing the above mentioned gravity low were added in order to bring new details and, eventually, new facts providing a better explanation to that phenomenon. To avoid side effects and need for residual anomalies computation, the input geological models created to initialize gravity modelling were extended at their both ends. Strong constraints were offered by seismic data from oil industry, especially while constructing appropriate input models for the modelling process. A thorough analysis on the rock density, based on core samples from boreholes located along the interpretative lines was performed to help modelling. In depth variation of this parameter for various geological formations was taken into consideration while constructing the gravity models. It is worth mentioning that measured densities for the Eocene and Oligocene formations suggested that these stratigraphic units might produce a density contrast no deeper than10 km only. Moreover, density data available for the Palaeozoic formations of the Moesian boundary of the depression showed a decrease for the deepest samples. Therefore if such a decrease is valid for the area of the Getic Depression too, the presence of the mass deficit revealed by the gravity model might represent the sediment fill of a Palaeozoic depression located underneath the Getic Depression. That was especially the case for the central interpretative line, were the lowest gravity val-

ues were registered. On the overall, it should be stressed that the maximum resolution of the gravity modelling in the Getic Depression would allow revealing structures with dimensions typical for the Getic or Danubian sectors, down to a depth of 10 - 12 km. Such a modelling resolution is to be expected provided the density contrast between target structures and the surrounding geology is 0.1 t/m3 or more. However, some speculative attempts in revealing the architecture of the Moho and lithosphere boundaries in the area were also performed. The obtained models revealed an asymmetry in the lithosphere buckling, by outlining a considerable depression located somewhere, in front of the South Carpathians. That might be the effect of the lithosphere expelled by the Black Sea opening and further continued by the NW push provided by active displacement of the Arabian Plate that transforms in a westward displacement along the southern right transpressive boundary of the Moesian Plate. Acknowledgements. The research was supported by the Romanian Authority for Science and Research grant CEEX-MENER no. 732/2006.