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Gravity Field Analysis and a preliminary three-dimensional Density Model of Central Europe based on the CELEBRATION Seismic Experiment.

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The Carpathian Mountains and the Pannonian Basin, one of the youngest features in Central Europe, are the result of Mesozoic/Cenozoic plate interactions during the convergence of the European and African Plates (e.g. Kováč 2000). The Carpathians extend over a distance of almost 1500 km and curve through an arc of $\sim 250^{\circ}$. They are surrounded by Eastern Alps, Bohemian Massif, European Platform, Moesian Platform and the Pannonian Basin. Due to a complicated tectonic evolution and a complex lithospheric structure, this region has been a subject to numerous geological and geophysical experiments already in the past. Recently, many refraction seismic experiments, such as POLONAISE 97, CELEBRATION 2000, ALP 2002, SUDETES 2003 and BOHEMIA teleseismic experiment, were conducted here. Two-dimensional (2-D) density models were developed based on the integrated modelling (Dérerová et al., 2006) and three-dimensional (3-D) density models were constructed for the area of Poland (Grabowska et al., 1998) and Pannonian Basin (Szafián and Horváth, 2006). However, a 3-D density model focusing on the Western Carpathians that includes partly also their surrounding units, has not yet been constructed. Therefore, our aim is to develop such a model, combining all the available information based on the older and more recent geological and geophysical results, particularly the CELEBRATION 2000 (Central European Lithospheric Experiment Based on Refraction, 2000) seismic experiment. For the simultaneous 3-D forward modelling of the Bouguer gravity and

magnetic anomalies, we apply the Interactive Gravity and Magnetic Application System (IGMAS) (e.g. Götze, 1976, Schmidt and Götze, 1999). Moreover, an analysis of the potential field data using regularized Euler deconvolution (Pašteka and Richter, 2002), Curvature analysis (Roberts, 2001) and field separation (regional and residual) is performed. The CELEBRATION 2000 seismic experiment results supplement previous works and 2-D density modelling (Bielik et al., 2004 and references therein, Dérerová et al., 2006), taken as initial data for our 3-D modelling. The previous works include information about the Moho depth, depth of the lithosphere/asthenosphere boundary, and additionally also estimates on the thickness of the sedimentary infill and its gravity effect in the Carpatho-Pannonian region (Makarenko et al., 2002; Bielik et al., 2005). Also these results enable us to identify different components (regional and local) of the gravity field, which is essential for the 3-D modelling in order to localize the lithospheric density inhomogeneities. Together with the geological and petrological information, the new 3-D density model should, according to our recent knowledge, well represent and bring more insights into the crustal and upper mantle structures of Central Europe.