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Seismic study of the west Carpathian upper mantle reflector - based on CELEBRATION'2000 data

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New seismic models of the crustal structure in the West Carpathians, obtained from CELEBRATION'2000 dataset, revealed a prominent inclined reflecting discontinuity in the uppermost mantle. It is located at 40-70 km depth and dips to the north. It is well constrained thanks to the large amplitude of the reflections, observed on several profiles (CEL01, CEL04 and CEL05) and therefore can be modelled with high confidence. Moreover, the phases originating at the reflector are correlated also on several off-line recordings. The dip of the reflector is opposite to the generally accepted direction of the Carpathian subduction and therefore it is not likely to represent an image of the subducted lithosphere. It may be interpreted as a shear zone or set of shear zones, originated in a compressional stress regime during collision of the continental lithospheric plates. In this study, all available traveltime data were used for 3-D positioning of the reflector using seismic inversion. Also, the synthetic seismograms for the reflected phase were calculated using 2-D full waveform modelling, in order to evaluate the magnitude and the sign of the Vp contrast, the scale of the inhomogeneity at the discontinuity, and to attempt to obtain information about its fine structure.