western end of Alp07 profile was already indicated in the P-wave velocity model obtained within active seismic experiment. The modelling revealed that under the station Cro_07 upper crust is characterised with low velocities and a strong velocity contrast at the mid-crustal boundary, resulting in high amplitude of the second peak. In the Pannonian part of the profile, modelling confirmed that crust can be considered as single layered. Pannonian type model with sedimentary layer and one-layered crust can fit very well the observed data, and based on active seismic data analysis, it corresponds very well with the unique-layer interpretation of Pannonian crust.

Geophysical models at the contact of the Dinarides and Pannonian basin

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Available gravity data, along with the new seismic data gathered from 2002, enabled developing of geophysical models of crust and upper mantle at the contact of the Dinarides and south-western part of the Pannonian basin. The study area is located in the boundary zone of the Adriatic microplate as part of the African plate and Pannonian segment as part of the European plate. Seismic data are available from two large international projects: wide-angle refraction and reflection experiment ALP 2002 – Seismic Exploration of the Alpine Lithosphere, and passive seismic experiment ALPASS-DIPS (Alpine Lithosphere and Upper Mantel PASsive Seismic Monitoring-DInarides-Pannonian Segment). Basic exploration was carried out on the profile Alp07 stretching from the edge of Adriatic microplate (Istra) through the northern part of the Dinarides, crossing wide ophiolite zone (Dinaridic ophiolite zone and Sava-Vardar zone) and terminating in the Pannonian basin at the eastern part of the Tisia block. Direction of this 300 km long profile is almost perpendicular to the Dinarides.

Velocity model was obtained from the active-source seismic data by inversion tomography and forward modelling using ray tracing method. Based on the velocity model, 2-D gravity modelling was performed on the profile, in order to determine lithosphere densities. The data gathered during passive seismic experiment were analysed by receiver function method and used to define velocity discontinuities in the crust and upper mantle. Since the profile Alp07 is located in the marginal part of the Dinarides, gravity modelling enabled extension of the study area to the central part of the Dinarides. Five gravity profiles were set up southeast from the Alp07 profile, covering the area of Croatia, Bosnia and Herzegovina and southern parts of Hungary. Structural units defined on the Alp07 profile on the basis of both models, velocity and density, can be followed in wider area. Calibrated densities, defined on the Alp07, enabled more precise gravity modelling on the other profiles. Density models show the greatest thickness of crust under the Dinarides, and thinning of the crust towards the Pannonian basin. Two-layered crust is observed under the Dinarides, as well as in the marginal part of the SW Pannonian basin, but under the Pannonian basin, crust can be considered as single-layered. Whereas the structure covered by the profiles is two-dimensional, the obtained results enabled the construction of structural map of the Moho and its three-dimensional image. It shows the greatest depth of the Mohorovičić discontinuity in the Dinarides root. In the NW part of the study area the depth is about 40 km, and increases to the SE where it reaches about 46 km. The subsidence of the Moho is particularly marked on the north side of the Dinarides at the contact with the Pannonian basin, where, based on structure geometry, subduction is assumed. The shallowest Mohorovičić discontinuity is located in the NE part of the study area (the Pannonian basin) at depth less than 20 km.

Structural Moho map of the area can be very helpful in planning future seismic experiments in the area. Density calibration was carried out on the profile Alp07, which is located at the edge of the contact, and structural map has been made assuming there are no lateral changes in densities. However, if stronger lateral changes are present, it can lead to significant changes in gravity model. The depth of interfaces, especially Mohorovičić discontinuity, as well as position of structural units can be modified. Therefore it is necessary to set at least one profile across the central part of the contact of the Adriatic microplate and Pannonian segment. The future step will be setting a profile with dense deployment of broadband seismic stations, especially in the area of expected subduction. The data will be interpreted by high-resolution migration techniques to map interfaces and to obtain a physical evidence of the subduction. High-resolution migration techniques use scattered teleseismic waves. Waves are represented by a diffracted wavefield, backprojected to depth. Because the diffracted wavefield is caused by small scale-length perturbations, the position and depth of these smaller subsurface units can be easily estimated.

Structural data from Skupniów Upłaz Mountain (Tatra Mts., Poland)

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The study area was situated along Skupniów Upłaz Mountain in the larger Tatra Mts, southern Poland. An investigation was carried out in Inter Carpathians, in Kriżna Unit. The limestone and dolomites of anisian and ladinian built this mountain. Beds of limestone and dolomite form a homocline in study area. A dominant orientation of strike and dip has value 110/42N. There are found many small-scale tectonics structures in this area. There were distinguished two groups of stylolitic seams, the en echelon fractures, five sets of fractures and three sets of normal faults. These structures served to reconstruct structural evolution of this small region. Firstly, when beds were in horizontal position, there was a vertical stress, which caused a lithostatic stylolitic seam. Afterwards, the tectonics stylolitic seams, the en echelon fractures and the hybrid fractures were formed before folding, when beds were in horizontal position. The tectonics stylolitic seams are formed after lithostatic stylolitic seams were created, when a horizontal stress was oriented N-S. The en echelon fractures were formed after tectonics stylolitic seams. The right-slip en echelon fractures and the sinistral en echelon fractures were found in study area. A stress orientation was impossible to define, because the en echelon fractures were irregular orientation after rotation to horizontal position. A system of hybrid fractures was formed, when a stress was oriented W-E. This system is composed of a set of fractures number IV and a set of fractures of number V. These sets are complementary. A dominant orientation of set of fractures number IV has value 77/55S. A dominant orientation of set of fractures number V has value 118/51S. Thirdly, there were took place a folding and Kriżna Unit was made. The reverse faults were found in study area. Unfortunately, they have a varied orientation and they couldn’t create a set, so there is no information about a stress orientation during this stage. A rotation uplift of Tatra Mts. took place after folding. After this event a set of normal fault and a set of fractures number III was formed together, when a stress was oriented ENE-WSW. An orientation of set of normal faults has values 162-173/80-90N. A dominant orientation of set of fractures number III has value 166/80N. In the end, a system of normal faults and a system of fractures was formed, when a stress was oriented WNW-ESE. An orientation of system of normal faults has values 9-45/70-80N and S. A system of fractures is composed of a set of fractures number I and a set of number II. A dominant orientation of set of fractures number I has value 20/88N. A dominant orientation of set of fractures number II has value 37/80S.