The total surface of the exposed pillow lava on both banks of the Stavnja rivulet exceeds several square km. The pillow lava pile is made of m-dm sized pillows rounded, semirounde, squeezed, contorted, green, red and gray in colour.

The foundation of the pile are lobs, partly disintegrated, turning into hyaloclastite breccias and pink peperites, within the inter-pillow space. The carbonate part of peperite contains Triassic index conodont fauna Paragondollela excelsa, Paragondollela foliata foliate, Paragondollela foliate inclinata, Nurella sp., CAI 6½, what appropriates to the Langobardian. The basalt was extruded into soft, unconsolidated sediments, of the Triassic rifting basin, and there are still no evidences of the oceanic crust which developed afterwards in Jurassic time.

Passive seismic experiment at the contact of the Dinarides and Pannonian Basin (ALPASS-DIPS) – deployment and characteristic receiver functions

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A group of active source seismic surveys have been performed in central Europe (CELEBRATION 2000, SUDETES 2003 and ALP 2002), covering wide area between Baltic and Adriatic sea. The main aim of these surveys was to determine more precisely the structure of the Earth's crust and upper mantle. Due to great problems related to shot-points, active seismic surveys have been more and more replaced by passive seismic experiments. The ALPASS-DIPS (Alpine Lithosphere and Upper Mantel PASsive Seismic Monitoring-DInarides-Pannonian Segment) is a continuation of the active ALP 2002 project, which covers a wide area of NW Dinarides, transition zone towards the Pannonian basin, and SW part of the Pannonian basin. Most of the temporary seismic stations, which are denominated Cro_01 to Cro_12, were deployed along the profile Alp07 permitting comparison and amendment of the active and passive seismic methods. Profile Alp07 stretches from Istra to the Drava river at Hungarian–Croatian border in a WSW–ENE direction. It is oriented approximately perpendicular to the Dinarides and the main faults in the Adriatic region. It stretches from the edge of the Adriatic microplate through the northern part of the Dinarides. The profile also crosses a wide ophiolite zone, which is divided into the narrow Dinaridic ophiolite zone and much wider Sava-Vardar zone, and terminates at eastern part of the Tisia block in the Pannonian basin.

Seismic modelling, both inverse and forward, was performed on the data gathered along Alp07 profile. The velocity model shows that the Moho depth is the greatest in the area of the Dinarides, reaching about 40 km and is shallowest (20–30 km) in the Pannonian basin. On the basis of seismic modelling, as well as gravity modelling, three types of crust were defined along the profile: the Dinaridic and the Pannonian crusts that are separated by a wide Transition zone. The Dinaridic crust is two-layered, while the Pannonian crust can be seen as a unique layer characterized by low seismic velocities and densities.

The data recorded within passive seismic project ALPASS-DIPS were processed using P-receiver function method, based on converted P-to-S phase. Analysis of receiver functions shows three types of seismograms: Dinaridic, Transitional and Pannonian. Pannonian type can be represented with data analysed at station CBP4M which belongs to the Pannonian crust. Transitional type can be seen at station Cro_07 because it is located in a Transition zone, while Dinaridic type can be observed at station Cro_03, and belongs to Dinaridic crust. Three major litospheric discontinuities can be defined at the Dinaridic type and the Transitional type, while the Pannonian type reveals only two discontinuities. To validate these results, receiver function modelling was performed. The main velocity contrast under the station Cro_03 is at the 42 km depth, which can be interpreted as Mohorovičić discontinuity. The upper crust is characterised by rather low velocities, but good agreement of the calculated and observed receiver functions could be obtained only with high-velocity layer at a depth between 3 and 5 km. The existence of high-velocity layer in the upper crust at the south-

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