Geophysical Research Abstracts, Vol. 8, 04290, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04290

Surface vs. Moho topography and the core complex mode of extension in the Pannonian basin

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Lateral extrusion of overthickened orogenic wedge from the Alpine collision zone towards the Carpathian embayment was accompanied by extensional collapse of the ALCAPA and Tisza-Dacia crustal flakes during the Early and Middle Miocene. The overall stretching factor amounted to 1.4-1.6, but locally much larger extension took place as is shown by the development of a few metamorphic core complexes. These rocks of deeper crustal origin are now situated either at the periphery or the central part of the Pannonian basin. Those in peripheral position, like the Rechnitz-Wechsel and Pohorje-Kozjak complexes, are exposed in the easternmost Alps, but plunge towards the basin and their large parts are covered by 1 to 2 km thick post-rift strata according to seismic and borehole data. Those in central position, like the Algyõ and Körös metamorphic series, uplifted to the surface after the Early to Middle Miocene unroofing and then subsided to a depth of 2 to 3 km. They constitute relative basement highs below the sedimentary cover and are particularly well known, because the metamorphic rocks are strongly fractured and trap economic amount of hydrocarbon reserves. Due to extensive deep seismic profiling and gravity modelling in the Pannonian basin and surrounding mountain belts, the Moho discontinuity can be reliably mapped in the region. Below the core complexes at the basin periphery, the Moho surface is gradually becoming shallower from the high mountains towards the low altitude basin interior with a gradient of about 7-8 km over a distance of 100 km. In the plane central Pannonian basin, where the crust is thin, the Moho surface exhibits 1 to 3 km undulations, in concert with the large-scale topography of the bottom of the basin. In conclusion, the tilted and undulating nature of the Moho discontinuity observed in

the Alpine-Pannonian system is in disagreement with the widely accepted idea of flat Moho, fluid lower crust and intracrustal isostatic compensation below metamorphic core complexes.