Dinarides and in the Transdanubian Central Range. Simple heat balance calculation shows that the background conductive heat flux in the Transdanubian Central Range is the same as in its surroundings. The large scale groundwater flow occuring in the porous Neogene/Quaternary sediments does not alter the regional heat flow significantly.

Rapid Neogene sedimentation decreased the surface heat flow in the Pannonian basin. After correction the average background heat flow in the Pannonian basin increases to 100-110 mW/m^2.

The Pannonian basin is characterized by thin lithosphere and crust. In the surrounding region the lithosphere is thick and the Moho is deep. The overall correlation between the heat flow distribution and lithospheric structure is good. It was shown that the Neogene subsidence and high heat flow of the Pannonian basin can be explained by stretching of the lithosphere. However, the high post-rift subsidence rate and high present day heat flow can be explained only by assuming higher stretching of the mantle than the crust. This assumption means that extra heat was added to the lithosphere during basin evolution, thus deeper mantle processes were also involved in the formation of the basin. This assumption is supported by the widespread Neogene volcanism all over the basin. Better understanding of the nature of this mantle process requires more tectonic, geochemical/petrological and modelling investigations.

Kinematics of retreating subduction in the Carpathians

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The regional pattern of contraction directions and the evolution of the strain field from Paleogene to Neogene times enabled a stepwise reconstruction of the plate motions and the migration path of the Carpathian collision front. Brittle deformation structures in the Romanian Carpathians indicate three tectonic events related to major plate motions:

(1) Holocene to Pleistocene general E-W extension, N-S contraction in the Carpathian arc and local ESE-WNW contraction in the Vrancea area are related to the late roll-back stage and breakoff of the subducted slab in the bend area. The recent vertical position of the subducted slab below the Vrancea area of the Eastern Carpathians represents the final roll-back stage of a small fragment of oceanic lithosphere, formerly situated between the Moesian and East European plates.

(2) Pliocene to Middle Miocene fan-shaped orientations of contraction directions were caused by right-lateral oblique convergence in the Southern Carpathians, frontal convergence in the southern Eastern Carpathians and left-lateral convergence in the northern Eastern Carpathians. Kinematic axes and resultant vectors of displacement along the Carpathian arc and the Apuseni Mountains help to reconstruct the retreating subduction. The ages and locations of the eruption centers of the andesitic volcanic chain along the Carpathian arc in the overriding plate and the thrust directions are used as markers to reconstruct the roll-back area of the subducted slab between the Moesian and East European plates.

(3) Middle Miocene to Paleogene NE to ENE contraction caused right-lateral curved strike slip faults. The Carpathian nappes were thrust around the Moesian Plate during Paleogene and Early Neogene times and intruded into a small oceanic embayment between the Moesian and European plates. The suspected Jurassic oceanic crust was formed between the Moesian and European plates as the Penninic-Pieniny-Magura oceanic basins opened up. During Paleogene times, the Carpathian thrust-fold belt prograded from south to north.

The double-loop of the Carpathian fold and thrust belt was formed in Late Neogene times as a result of the eastward escaping Tisza-Dacia block, due to NE directed convergence of the Adriatic plate and the retreating subduction of an oceanic embayment between the Moesian and European plates.

Structural correlation between the Northern Calcareous Alps (Austria) and the Transdanubian Central Range (Hungary)

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In the East Alpine-Pannonian transitional area significant amount of syn-rift extension occurred during the Middle Miocene. In this recently defined Raba River extensional corridor a metamorphic core complex-style extensional period was shortly followed by and partly overlapped with a wide rift-style one. Based on the correlation of Eoalpine (Cretaceous) structural markers, about 80 km of ENE-WSW-directed extension can be documented for the Karpatian metamorphic core complex-style extension. The magnitude of Badenian wide-rift-style extension in a NW-SE direction is less constrained, but it is on the order of tens of