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New constraints on the mechanism for the formation of the Pannonian basin

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The epoch making cooperation with the MIT group (especially Wiki Royden) in the 1980's on the Pannonian basin arrived at two main conclusions: i) modest to medium value of synrift crustal extension was accompanied by dramatic attenuation of the mantle lithosphere, and ii) subduction and rollback of the Alpine Tethys controlled the extrusion of Alcapa and Tisza-Dacia terranes into the Carpathian embayment. These early results already went beyond a thermomechanical model and suggested the importance of dynamic influences exerted by upper mantle flows.

Recent results of SKS anisotropy determinations (Kovács et al. 2012) has been interpreted in terms of a west-east directed flow sub-parallel with the main strike of the Eastern Alps at the western and central part of the basin, and a toroidal flow around the subducted Carpathian slab more towards the east. Horváth and Faccenna (2011) have put forward the idea that inflow of upper mantle material into the Pannonian basin was derived from the sub-Adriatic lithosphere via the northern Dinaric slab window since the late Oligocene, when rollback of oceanic lithosphere commenced on the western and eastern side of Adria.

The importance of Dinaric subduction in the evolution of the Pannonian basin has been spectacularly demonstrated recently by the recognition of a number of metamorphic core complexes in the Sava-zone, which were exhumed during the synrift phase of the Pannonian basin (e.g. Ustaszewski et al. 2010, Matenco et al. 2012). Inside the basin the Sava zone represents a complex transfer fault system between the Alcapa and Tisza-Dacia terranes. High quality seismic sections will be presented with new interpretation to show the complicated structural features and the massive volcanism interpreted in terms of leaky transforms. The seismic sections will also show new time constraint for the postrift fill of the basin, which shed new light on the dramatically anomalous subsidence and uplift pattern during the late Miocene to Present history of the Pannonian basin.