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Topography of the Pannonian basin: a key to understand basin evolution

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The Pannonian basin represents a back-arc basin on a thin continental crust. Extension of Alpine orogenic terranes took place in the Middle Miocene with a crustal stretching factor of β=1.1 to 2.2, and an order of magnitude larger attenuation of the mantle litosphere. This thin and hot lithosphere has been rheologically very weak and sensitive for changes of intraplate stress. The Pliocene through Quaternary neotectonic activity of the Pannonian basin is a consequence of transition of the regional stress field from extensional to compressional. Present topography of the basin represents the surface manifestation of deep tectonic processes with a remarkable overprint of fluvial and eolian erosion and sedimentation. Large-scale features include tectonic uplift and accelerated subsidence together with the development of strike-slip fault systems. Medium- to small-scale features are folds of the basin-fill sedimentary rocks and pop-up of the former basin-floor strata.To arrive at a better understanding of neotectonic processes and surface evolution, a set of representative seismic profiles has been constructed throughout the basin. A new method of interpretation included the retro-deformation of neotectonic features and quantification of uplift, subsidence, erosion and re-sedimentation rates. This resolved quite a few former problems of the subsidence and sedimentation anomalies during basin formation, and led to a better understanding of considerable surface mass transport processes during the Quaternary.