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Geodynamics of the Pannonian basin system: a new synthesis

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This contribution presents a new synthesis for the formation and evolution of the Pannonian basin system and its tectonic environment. The past decade has witnessed a spectacular progress in collection of observational data and their interpretation in the Pannonian basin and the neighbouring Alpine, Carpathian and Dinaric mountain belts. Structural and seismic sections of different scales, seismic tomography and magnetotelluric, gravity and geothermal data are also used in order to determine the different deformational styles and to compile the new crustal and lithospheric thickness maps of the Pannonian basin and the surrounding fold-and-thrust belts. The development of the Pannonian basin shows many similarities to that of other backarc basins of the Mediterranean. The main features and processes related to its evolution are as follow: (a) superposition of former orogenic terranes; (b) gravitational instability and detachment of overthickenned lithospheric mantle; (c) tectonic extrusion towards a "free boundary" (e.g. land-locked oceanic basin); (d) slab roll-back (lower plate) and extensional collapse (upper plate); (e) final and progressive break-off of the subvertical slab along the orogenic arc. As a conclusion, continental collision and backarc basin evolution is discussed as one single, coherent dynamic process, with the principle driving force of minimising the potential and deformational energy in belts of continental plate convergence.