

Exhumation rates calculation on the Carpathians fold and thrust belt from thermochronology database inversion.

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The Carpathians are a fold and thrust belt of the Alpine orogeny. They were built during the Oligocene and Miocene, diachronously from North-West to South-East. The construction of the belt was largely contemporaneous with the foreland basin development (Roure et al., 1993). An axial transport system prograded from NW to SE in the foreland, finally also supplying sediments to the Black Sea (de Leeuw et al., 2020).

At first sight, the thermochronology data published for this belt do not reflect the diachronicity visible in the tectonic structures and sedimentology (Sanders et al., 1999; Merten et al., 2010). In our ongoing source to sink project, we aim to link the construction and erosion of the Carpathians with sediment transfer and deposition in the foreland basin. The evolution of depocentres in the latter is reconstructed using a Move (Petex) 3D model integrating geological maps, cross sections and field observations. To calculate exhumation, we use a new method to invert the thermochronology data of the whole chain with Pecube (Braun et al., 2012). By running inversions on data sets per nappe, the tectonic complexity of the Carpathians is kept and the spatial correlation bias plaguing previous whole-chain inversions is overcome (Schilgen et al., 2018).

In this presentation we will showcase this approach and provide exhumation rate estimates from the Carpathians, which we then correlate with eroded sediment volumes from the belt over time. The 3D model of the Carpathian Foreland Basin allow us to track sediment depocenter and retrace sediment flows during its evolution. We conclude with an outlook on the overall project of modelling of the belt and basin in TISC (Garcias-Castelliano et al., 2002), to obtain insights on the influence of slab pull and slab detachment on foreland development.

Mots-Clés : Carpathians, thermochronology, source to sink, foreland basin, 3D modelling