



## **Re-establishing the connection between Central and Eastern Paratethys: incision of the Danube in the Iron Gates**

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How do base level variations, intraplate stress and flexural isostasy interact at influencing erosion and sedimentation in the final stages of foreland evolution? Specifically, how did they control the (dis)connections within the Paratethys realm? In this contribution we combine a compilation of data from the N-S segment of the South Carpathians (Romanian-Serbian border region) and the adjacent basins in a quantitative numerical model of the interaction between uplift in an orogen, river incision and basin deposition in the aftermath of continental collision.

Within the domain of Paratethys, the intermittent connectivity between its Central (Pannonian Basin) and Eastern (Dacic Basin, Romania) parts has been proven from paleontologic evidence in both basins. The Danube currently crosses the South Carpathians in its deeply incised gorges between Serbia and Romania, a region which was a gateway between the Pannonian and Dacic Basins until the Sarmatian. The connection was lost at that time as the orogen was uplifted as a result of the collision in the East and South Carpathians. However, intermittent influxes of Pannonian fauna through an unknown gateway into the Dacic Basin have been recorded in the Meotian and Pontian.

Two contrasting mechanisms have traditionally been proposed to explain the incision of the Danube in its gorges in the South Carpathians, focusing on the morphology of the feature: downwearing of an antecedent stream, and capture of the upstream Pannonian drainage. Integrating constraints on the late stage infill and subsidence of both

the Dacic and the Pannonian Basin, and on the uplift of the South Carpathians, we use numerical modeling to distinguish between the scenarios. We address the relative influence of different factors that would influence the capture, across an elevated barrier, of a basin at approximately equal elevation. These comprise upstream and downstream base level changes and the geometry of the barrier. A specific question is, whether the Pontian water level drop in the Dacic Basin, possibly related to the Messinian Salinity Crisis, could have triggered the incision of the Danube and as such the (fluvial) reconnection between the two Paratethys realms.

Our results underline the large influence of base level variations in both Paratethys basins (Pannonian and Dacic) and the need to distinguish between the effects of tectonics, (climate driven) base level changes and piracy.