

Tectonic evolution of the Fruška Gora (NW Serbia) and implications for the late stage inversion of the Pannonian Basin

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Indentation of Adria microplate during latest Miocene to Quaternary times created contraction and transcurrent movements distributed in the Dinarides Mountains and along its margin with the adjacent Pannonian Basin. Fruška Gora of northern Serbia is one of the few areas along the southern margin of the Pannonian Basin where the kinematic effects of this late-stage inversion can be studied. These mountains are located along the Sava-Vardar Suture Zone as an isolated inselberg surrounded by Neogene deposits of the Pannonian Basin, exposing metamorphic rocks, Mesozoic ophiolites and sediments belonging to the Dinarides units.

Our field kinematic study demonstrate that deformation structures are related to several Oligocene - Miocene extensional and latest Miocene - Quaternary contractional deformation events. These events took place during the differential rotational stages experienced by Fruška Gora. This has created a gradual change in strike from N-S to E-W of three successive normal faulting episodes (Oligocene-Early Miocene, Early Miocene and Middle-Late Miocene), subsequently inverted by contractional deformation.

This latter deformation took place during the continuous latest Miocene - Quaternary Adria indentation and was accompanied by yet another 40 degrees counter clockwise rotation of the entire Fruška Gora. Almost all resulting contractional structures reactivate the pre-existing Oligocene - Miocene normal faults. This is reflected in the present-day morphology of Fruška Gora that has a large-scale flower-type of structural geometry formed during dextral transpression, as demonstrated by field kinematics and seismic interpretations.

This overall geometry is significantly different when compared with other areas situated more westwards in a similar structural position in the Dinarides at their contact with the Pannonian Basin, such as Medvednica Mountains or Sava-Drava transpressional systems. The variation in offsets along the strike of the orogen demonstrate that the indentation into the Pannonian basin significantly decrease eastwards towards Fruška Gora, likely accommodating a large-scale variation in indentation mechanics across and along the Dinarides.