# The East Carpathians: transition from a coupled to an uncoupled orogen

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During the Tertiary tectonic events the East Carpathians undergone major shortening to collisional events leading to the formation of a non-cillindrical orogenic wedge. The non-cillindricity of the orogenic wedge is mostly influenced by the mechanical and geometrical properties of the underthrusted foreland, namelly between the East-European/Scythian (TTZ) and the Moesian blocks.

During its Alpine evolution the Moesian platform suffered major deformations leding to thinning and young thermal characteristics. During the Paleogene to Sarmatian the right-lateral displacement of the Inner Carpathians with respect to the Moesian foreland lead to orogen–parallel extension to transtension. The opening of the Early Miocene transtensional basin in the Getic depression/Moesian platform led to up to 5 km of Lower Burdigalian sediments, while the other platform areas were characterised by nondeposition and/or errosion. Contactional features affecting during this time span the East Carpathians are charecterised by a largely cillindricity of the orogenic wedge suggesting similar characteristics of the distal parts of the East-European and Moesian blocks.

This picture changed substantially when, in the late Sarmatian (latest Miocene) the East Carpathians thrust belt reached the East European platform. This not only imposed a change in the style of thrusting in the East Carpathians but caused some significant changes in the mechanical properties of the system. Indeed, from this moment the entire Carpathian system and its foreland begins behaving as single block with similar stress field being documented from both the Intra- and Outer Carpathian units. However, major changes in deformation geometries are related to lateral variations of the lithospheric characteristics of the thrusted platforms entering the subduction zone.

The most advanced East Carpathians nappes (central sectors) reached the East European block north of the Trotus valley. The introduction into the system of lithospheric block with up to 50 km thick crust and very thick lithosphere imposed changes on thrusting geometries. The most important was the onset of substantial uplift in the rear part of the wedge, associated with the activation of regional backthrusts in the internal part of the orogen, and further in the Transylvania basin. The whole northern East Carparthians foreland and orogenic wedge were coupled and responded to two major deformational features. First, the orogenic wedge was tight up to the foreland blocking the nappes andvancement. Secondly, the coupled crust--matle rheological characteristics of the East-European/Schythian block generated large wavelength deformation, leading to a "normal" type of foredeep basin.

South of the Trotus fault, in the regions where the Moesian platform develops, similar deformational structures are also found but in a much more external position (i.e., Tarcau and Subcarpathian nappes). This part of the system orogenic wedge – foreland platform undergone minor internal shortening as a response to an uncoupled crust – mantle rheological characteristics of the Moesian platform. As a result, short wavelength deformation takes place at the contact and in between the foreland basin leading to an "abnormal" type of foredeep basin

The southern part of the East Carpathians and its foreland have Tertiary structural characteristics more similar to the South Carpathians foreland (Getic Depression) due to the large scale curvature of the orogenic belt and to the involvement of the Moesian plate into subduction. As a result, two types of coupled-uncoupled regimes developed in the Romanian Carpathians allowing for large scale lateral transitions and non-cillindricity of the chain.