PT, like Grójec fault. Several seismic lines clearly show typical flower structures developed within the Mesozoic section along this fault that prove its strike-slip character. Late Cretaceous inversion of the PT influenced also area located relatively close to present-day Carpathian front. Within the Nida Trough several reverse faults were identified. Thickness variations of Cretaceous deposits across the fault plane prove their Early Cretaceous extensional activity. These faults were inverted during Late Cretaceous inversion of the PT, and reactivated in compressional regime during Miocene Carpathian collision. Remnants of similar faults associated with PT inversion and Małopolska Massif uplift can be observed in E Polish Carpathian foredeep basin. These faults were re-activated as normal faults during Miocene flexural extension of the foreland plate.

Factors controlling progressive deformation of heterogeneous lithosphere: example from Western Capathians

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The object of this study is the Cretaceous deformation of continental lithosphere strongly reworked during Variscan orogeny and subsequently modified by Early Mesozoic rifting. The continental crust of the northern part of the studied area is composed of high-grade crystalline complexes marked by presence of voluminous plutonism thrust to the south over medium grade metasediments during Variscan orogeny. In the south occurs low grade to anchimetamorphic early Palaeozoic Gemer basin overlying pre-Cambrian basement. Variscan inversion of this basin is associated with overthrusting of high grade complex to the south, development of inverted metamorphic zonation and southwards vanishing deformation gradient. This complex orogenic structure is rifted during early Mesozoic extensional period that is responsible for opening of Meliata oceanic domain to the south and heterogeneous thinning of continental lithosphere to the north. This mechanisms produced large scale lithospheric Vepor segment separated from main European continental Tatric domain by Mesozoic Fatric basin.

The closing of the Meliata oceanic domain is connected with progressive indentation and heterogeneous deformation of above described lithospheric structure. We first recognise northward Upper Jurassic thrusting of subduction related melange, blue schist metamorphics and low grade meta-sediments of accretionary wedge over underlying basement without its reworking.

Onset of Cretaceous continental collision is marked by southward continental underthrusting of Fatric lithosphere below Vepor lithospheric segment, inversion of Fatric basin and beginning of imbrication of strong Proterozoic crust in front of southern indenter. These processes generated décollement of Mesozoic sequences their transportation to the north and building of complex nappe pile on the European Tatric platform. Southward underthrusting of buoyant Fatric and Lower Fatric domains generates vertical shortening of Vepor Variscan crust manifested by development of greenschist facies mylonitic extensional fabric. Northward imbrication of Proterozoic crust produces positive cleavage fan within low grade meta-sediments of the Gemer basin. The closure of Fatric basin in the north and significant shortening of southern Gemer basin result in effective transmission of stress from northern European platform and southern indenter across intermediate Veporic domain. This stage is manifested by compressional deformation of all lithospheric units marked by development of heterogeneous shear zones within more or less isotropic basement rocks and complex folding of more anisotropic sequences. This deformation is largerly transpressive due to obliquity between movement of southern indenter with respect to the boundary of European platform. This transpression is responsible for development of strain partitioning leading to origin of wrench dominated shear zones parallel to the collisional margin and to important pure shear shortening of rest of the basement.

This evolution is supported by rheological modelling which defines starting mechanical conditions at the onset of collision by means of yields strength envelopes and integrated lithospheric strength profiles. The progressive oblique indentation and deformation pattern in weak Gemer basin are further modelled using modified England's thin viscous sheet model by Ježek et al.