

Neotectonic structural development of the Polish segment of the Outer Carpathians: an overview of structural, geomorphological, break-out and palaeomagnetic data

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Different pieces of structural evidence imply that during the Late Neogene times structural development of the Polish segment of the Outer Carpathians was controlled by normal faulting. This interpretation is corroborated by geomorphic data indicative of *en block* uplift in the western part of the belt. However, there is no unequivocal evidence to decide whether the faulting was due to successive phases of alternating N-S and E-W extension or owing to one or more phases of heteroaxial extension. Moreover, the geomorphic data from the medial and eastern parts of the belt suggest the occurrence of compressional stress regime during Pliocene times. It follows that during the Late Neogene the stress arrangement could have been differentiated depending on time and the position in the belt.

The data available for Quaternary times show an apparent contradiction. On one hand, different pieces of geomorphic evidence imply compressional stress arrangement, with σ_1 oriented roughly perpendicular to the belt. This interpretation is compatible with the present-day orientation of the S_{Hmax} inferred from the breakout

analysis and from focal solutions of the Krynica earthquakes. On the other hand, Quaternary normal faulting within the intramontane basins and in localised narrow zones of frontal parts of nappes and larger slices points to extensional stress arrangement. This contradiction can be explained by a concept of normal faulting restricted to the gradually steepening frontal parts of nappes and large slices, whose shortening has been induced by the Recent relaxation of remnant horizontal stresses, accumulated during the Neogene thrusting. These processes were probably not uniform, as shown by differentiated rates of erosional dissection of Quaternary straths in individual geomorphic units within different Quaternary stages. Another, although not contradictory explanation, lies in the general isostatic post-orogenic uplift, being overprinted by coeval relaxation of remnant horizontal motions within the flysch cover.

We conclude that the Quaternary stress pattern within the Polish segment of the Outer Carpathians has been differentiated depending on depth, position in the belt, and time.

Ophiolites of the Main Vardar basin: the Ophiolitic complex of Ždraljica (Central Serbia) as an example

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The ophiolitic complex of Ždraljica (OCŽ), covering an area of about 30 km², is situated in Central Serbia, around 150 km² south of Belgrade. It was emplaced during the Middle Jurassic closure of the Main Vardar Ocean. At present, it belongs to the eastern branch of the Vardar Zone Composite Terrane – VZCT (Karamata et al., 1994), directly juxtaposed to the Serbo-Macedonian Massif.

The Ždraljica ophiolitic complex is predominantly built of a NMORB-affinity rock assemblage composed of

basalts (as pillow-lavas, coherent lava flows and primary and redeposited hyaloclastites), diabases (represented by individual dykes or dyke swarms as well as occurrences of massive diabases or ophitic gabbros), gabbros (massive and cumulitic), serpentinized peridotites and rare plagiogranites. This assemblage is intruded by dioritoids and granitoids of VA-affinity.

The tholeiitic basalt-diabase-gabbro complex of Ždraljica originated by melting of a depleted mantle source of