

Neo-Alpine evolution of the Inner Western Carpathians controlled by strike-slip faulting and block rotations

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Neo-Alpine tectonic evolution of the Carpathians has been described in many, more or less similar geodynamic models. All of them are constrained by knowledge concerning migration of active orogene front in time and space (from the west towards the east; Jiříček, 1979) as a result of oblique collision after the subduction of quasi-oceanic crust (Doglioni et al., 1991). Morpho-structure of the Western Carpathians was formed at the beginning of gradual occupation of foreland embayment by orogene – by units consolidated during the Meso-Alpine processes. From paleogeographic restorations follows that the Inner Carpathians, disintegrated to several segments were during the Neo-Alpine evolution removed to a long distances and even rotated. The Western Carpathians crustal segments invasion into the foreland embayment created by weak crust was driven by processes of its subduction and controlled by strike-slip tectonics, volcanic activity and block rotations. While in the front of north to east propagating Inner Western Carpathians were sediments of the Magura basin scabbled to an accretionary wedge, the rigid crust of the Inner Carpathians was broken to independently moving blocks allowing to fill oceanic embayment of complex shape. Herein the attention is focused to the evolution of the western, Slovakian part of Carpathians. The kinematic model of Inner Western Carpathians propagation is proposed, using as an important block boundaries known map-scale faults, shear zones respectively, where the dominant role play strike-slips (Marko et al., 2014). The Neo-Alpine evolution is described by succession of several tectonic events. Their dating (in time span ca 22 Ma – recent) is based on superposition of structures, e.g. fault offsets, taking into account geochronological and other relevant data as well. The best documented are the latest stages of tectonic evolution, when the blocks were close to their recent position. Description of the Early stages of tectonic evolution faces to usual palinspastic problems with correct restoration of position of structures and terranes in current geographic coordinates. Magnitudes of block movements use to be in geodynamic models only roughly estimated. In herein submitted model, as a criterion to measure exact magnitude of shift and shape of movement trajectory of eastwardly extruding crustal segment was applied a concept of migration of volcanic products. It is expected, that all volcanic apparatuses (Vepor, Poľana, Javorie, Štiavnica) had the the same source, fixed and deep seated magmatic chamber (hot spot). This approach led to calculation of 85 km east-north-eastward shift of the Inner Western Carpathians crustal segment during the Badenian-Sarmatian. A model of strike-slip controlled eastward extrusion of the Western Carpathians crustal segment explains different tectonic style of the western and eastern part of the Pieniny Klippen Belt, isostatic unbalance

of the Vienna basin, origin and situation of external core mountains belt, Neo-Alpine passivity of the Muráň fault and more.

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