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Neogene palaeogeography and basin evolution of the Western Carpathians, Northern Pannonian domain and adjoining areas

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Abstract

The data on the Neogene geodynamics, palaeogeography, and basin evolution of the Western Carpathians, Northern Pannonian domain and adjoining areas (ALCAPA Mega-unit) are summarized, re-evaluated, supplemented, and newly interpreted. The proposed concept is illustrated by a series of palinspastic and palaeotopographic maps. The Miocene development of the Outer Carpathians reflects the vanishing subduction of the residual oceanic and/or thinned continental crust. A compression perpendicular to the front of the orogenic system led to the closing of residual flysch troughs and to accretionary wedge growth, as well as to the development of a foredeep on the margin of the European Platform. Docking of the Outer Western Carpathians accretionary wedge, together with the Central Western Carpathians and Northern Pannonian domain, was accompanied by stretching of the overriding microplate. An orogen parallel and perpendicular extension was associated with the opening and subsidence of the Early and Middle Miocene hinterland (back-arc) basin system that compensated counter-clockwise rotations of the individual crustal fragments of ALCAPA. The Late Miocene development relates to the opening of the Pannonian Basin System. This process was coupled with common stretching of both ALCAPA and Tisza-Dacia Mega-units due to the pull exerted by subduction rollback in front of the Eastern Carpathians. The filling up of the hinterland basin system was associated with thermal subsidence and was followed by the Pliocene tectonic inversion and consequent erosion of the basin system margins.

Key words: Neogene, geodynamics, ALCAPA Mega-unit, structural data, palaeomagnetic data, palinspastic reconstruction, palaeotopographic models