Tectono-sedimentary evolution of the junction area between the Western and Eastern Carpathian nappe systems (Ukrainian Carpathians)

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The Carpathians contain the remains of the Western Tethys, the main of which are: continental/microcontinental fragments (Alkapa and Tisza-Dacia terranes) of the Tethys Ocean, now located in the Central (Inner) Carpathians, and (palaeo)accretionary prisms, building mainly the Outer Carpathians.

The Ukrainian Carpathians occupy the junction where the Western Carpathian and Eastern Carpathian nappe systems converged. In the presented work, author try to reconstruct the tectono-sedimentary evolution of the Eastern and Western Carpathian nappe systems in the junction area on the basis of own and published geomapping works, stratigraphic, sedimentological and structural research using existing restorations (see van Hinsbergen *et al*., 2020 and references therein).

The Central Western Carpathian nappes (part of the Alcapa Terrane) are not exposed in Ukraine and probably buried under Neogene Transcarpathian Depression. The Central Eastern Carpathian nappes (part of the Tisza-Dacia Terraine) are represented in Ukraine by the Marmarosh thick-skinned basement nappes, that were formed in the Early Cretaceous time and overlapped by the latest Early Cretaceous–Paleogene post-nappe sedimentary cover. Between the Central Eastern and Central Western Carpathian nappe systems, the Pieniny Klippen Belt suture zone and Monastyrets Nappe filled with Paleogene flysch are developed.

The structure of the junction between the Outer Eastern and Outer Western Carpathian nappe systems is more complicated. In Ukraine, the Outer Carpathians are made up of a several stacked nappes filled with Cretaceous–Neogene, mainly flysch sediments uprooted from their original substratum.

In the Eastern Carpathian segment of Tethys at the Late Jurassic and/or Early Cretaceous, Ceahlau-Severin ocean (called Fore-Marmarosh one in Ukraine) was opened between the Dacia continental block (part of the Tisza-Dacia Terrane) and the Eurasian continent (van Hinsbergen *et al.*, 2020 and references therein), that suggested by rift oceanic and continental basalts occurring under the Cretaceous flysch of the Outer Eastern Carpathian. Sinking of the Dacia (micro)continent into a subduction zone existed in the Neotethys ocean and inclined to the west (van Hinsbergen et al., 2020), could have caused the east-directed thrusting of the thick-skinned Marmarosh Nappes towards the Ceahlau-Severin ocean. Ahead the Marmarosh nappe pile, the Eastern Carpathian Internal flysch thin-skinned nappes such as the Kamyanyi Potik, Rahiv, Burkut, Krasnoshora, Svydovets and Chornohora ones were formed. Coarsening upward and regular younging of the stratigraphic successions from inner to outer nappes suggest their attribution to the accretionary wedge growed in the Early Cretaceous–Paleogene time due to the subduction of the Outer Carpathian flysch basin basement under the Marmarosh pile.

In the Western Carpathian segment, the Pieniny Klippen Belt accretionary wedge began to rise in the Late Cretaceous due to subduction of the Penninic oceanic domain under the Central Western Carpathians (part of the Alcapa Terrane) accompanied by detaching and grouping together originally very distant lithofacies (Plašienka, 2018 and references therein). The Western Carpathian Internal flysch nappes such as the Magura and Dukla units were attached to the Fore-Alcapa prism during the Middle Eocene–Oligocene, accordantly to outward shifting and uplifting of the trench-like Magura and Krosno lithofacies during this time.

Closuring of the Monastyrets "between-terrainian" flysch basin at the late Eocene suggests the collision of the Alcapa and Tisza–Dacia terranes at the turn the Eocene and Oligocene. As a result, the Fore-Alcapa and Fore-Tisza-Dacia wedges were incorporated within an amalgamated internal wedge system that limited from the SW the Outer Carpathian basin. This unificated Menilite–Krosno basin was gradually uplifted and its deposits were subsequently thrusted as the external Silesian, Skyba and Boryslav-Pokyttya nappes onto the Miocene Carpathian Foredeep.

Sedimentological and structural data suggest northeastward shift/migration of the wedge front–trench/foredeep–forebulge during Carpathian evolution. In addition, the junction of the Eastern and Western Carpathian accretionary wedges is complicated by strike-sleep movements.

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