PALEOGEOGRAPHIC CHANGES OF THE WESTERN CARPATHIAN PALEOGENE BASINS IN TIME OF PARATETHYAN SEPARATION

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Abstract: Paleogene plate-tectonic reorganisation of the Carpatho-Pannonian realm during the Alpine orogenesis is mirored in sedimentary history of the basins and changes in paleogeography and environmets. Paleogeography of the Carpathian basins changed markedly in the beginning of the Paratethys (early Oligocene). Their isolation is indicated by stagnant regime, low tide influence, appearance of endemic fauna, widespread of anoxia and formation of manganese deposits. Differential records of isolation and Tethyan/Boreal influences allow to reconstruct a pre-extrusion system of the Carpatho-Pannonian basins within the early Paratethys.

Key words: Western Carpathians, Late Eocene – Early Oligocene, Paratethys, semi-isolation

The Early Paleogene history of the Western Carpathians and Transdanubian Range basins dokuments their position in wider circum-Mediteranean realm during this time. The initial transgression in the Central Western Carpathian Paleogene Basins (CCPB) corresponds well with the Middle Eocene transgression in the Mediteranean Tethys. Development of carbonate ramps in this time indicates a dominant role of the sea-level fluctuations over the regional tectonic control. The Lutetian – Bartonian fauna of the CCPB are not substantially different to those in the Transdanubian Range (North Hungarian Paleogene Buda Basin - NHPB) and Dinaric – North Italian basins, considering the nummulitids (*N. brongiarti, N. puschi, N. perforatus, N. fabianii,* etc.) orthophragminids (*Discocyclina augustae*), molluscs (Pectinacea), corals, etc. These simmilarities provide also an evidence for a much more southern paleogeographical position of the CCPB, which occurred in distal influence of the Mediteranean Tethys warm-water deposition regime, untill the early Priabonian.

The Paleogene paleogeography changed drastically at the end of the Eocene, when the microplate reorganization led to separation of basins. Water mass isolation and development

of new marine belt at the southern margin of the European platform is expresed in evolution of the Paratethys realm.

The isolation of the Paratethys resulted from progressive rise of the collisional orogene belts in the Alpine – Dinaric – Balkan internids (Báldi 1984). Late Eocene – Early Oligocene uplift in the Dinarides, which became a landmass barier, is recorded by terestrial and fluviatile-lacustrine deposits (Tari & Pamić 1998). At that time, the Alpine collision come to the Pyrenean phase, which is considered to be a main orogenic phase in the Alps (Trümpy 1980). Alpine foreland basin lose the connection with the Tethys, recorded by the appearance of the endemic fauna in the Shöneck Formation (Steininger & Wessely 2000).

The Alpine collision induced a large-scale continental escape of the Carpatho-Pannonian terranes. Accordingly, the evolution of the orogene belts and escape tectonics seems to be responsible for the isolation of the Western Carpathian basins. The first isolation in the CCPB is already indicated by zoogeographical separation of the Spiš partial basin, where the nummulitids are lacking and mollusc fauna, decapods and rare echinoids indicate an affinity to the Transylvanian Basin and Caucasus – Aral area (Volfová 1962). Endemic fauna of Solenovian-type molluscs (*Janschinella?*) and cerites (*Tympanotonus*) is also known from the Paleogene sediments of the Hron valley Depression (Volfová 1964). In the CCPB, there were no the Tethyan species of Oligocene larger foraminifera found.

During the Early Oligocene, the Paratethys survived in anoxic regime as a whole, including the Hungarian Paleogene Buda Basin (lower Tard Clays), Slovenian Basin (Meleta schists), Central- and Outer Carpathian basins (Menilite shales), Austrian foreland basin ("Fischschiefer"), Transylvanian Basin (Ileada Shale), etc. On the other hand, the rich Spiratella fauna of the Hungarian Paleogene Buda Basin (Tard Clay) provide an evidence of cold-water influence of the North Sea, documenting communication with the Boreal bioprovince.

Nevertheless, some basins of the Central Paratetys renewed a connection with the Tethys, which is evidenced by the Oligocene coral-reef limestones, larger foraminifers (e.g. *Nummulites vascus*) and molluscs in the Slovenian and Hungarian Paleogene Basins.

At the end of the Oligocene (Early Miocene), the Hungarian Paleogene Buda Basin was detached from the Slovenian basin and emplaced to the Intra-Carpathian area along the Insubric – Balaton and Mid-Hungarian Lineaments (Nagymarosy 1990, Contos et al. 1992). The Mid Hungarian line is considered to be a major displacement zone, junctaposing the basins of orginal distant appurtenance. Beside above mentioned separation of the Dinaride – Pannonian basins it is the case of the Hungarian Paleogene Buda Basin and Transylvanian

Basin, which despite of their present close location differ each other in sedimentary successions and benthic fauna.

From the beginning of the Rupelian, the Transylvanian basin was rather in connection with the Eastern Paratethys, considering an immigrations of molluscs (*Lenticorbula sokolovi*, *L. helmerseni*), evaporitic and lagoonal-lacustrine deposition, oolithic irostones like those from the Majkopian basin (Popov & Stolyarov 1996) and even the migrants of the Asian mammals (Baciu & Hartenberger 2001). Paleogeographic influence of the Eastern Paratethys in the Transylvanian Basin proved not only its more separate position with respect to Hungarian Paleogene Buda and Slovenian basins, but also the similar position with the CCPB on the eastern margin of the moving Alcapa and Tisza-Dacia microplates in the Late Oligocene.

Western Carpathian Paleogene basins also difer in the character of their isolation from the north to the south. Northern basins were more closed and impoverished in the Oligocene microfauna. Contratry of this, the basins south of the Low Tatra highland were more opened to the North Hungarian Paleogene Buda Basin, providing a high abundance of the Lower Oligocene microfauna like this in the Kiscell Clay. The sediments of Buda-type facies are known from the Hron river valley (e.g. near Ľubietová – Zlinská et al. 2001), from beneath the Central-Slovakian Neovolcanites (e.g. nummulitid limestones with *N. discorbinus* in the Ostrá Lúka borehole – Gross 1978) and even from the central part of the Veporicum (claystones with Globigerina-rich fauna - Soták in prep.). Toward to the south, there is a nearshore zone of the NHPB basin in the Štúrovo, Lučenec and Rimavská kotlina depressions, which came closer to the Mediterranean (e.g. dwarf plankton, lepidocyclinids, miogypsinids, tide-influenced deposition).

The North Pannonian (NPPB) and the Central-Carpathian (CCPB) Paleogene basins differ markedly, exhibiting no a direct paleogeographical correspondence between them due to the Western Carpathian orogene belt tectonics and rotation of separate crustal and lithosphaeric fragments in the Alcapa domain since the Late Oligocene to Early Miocene (Vass et al. 1996).

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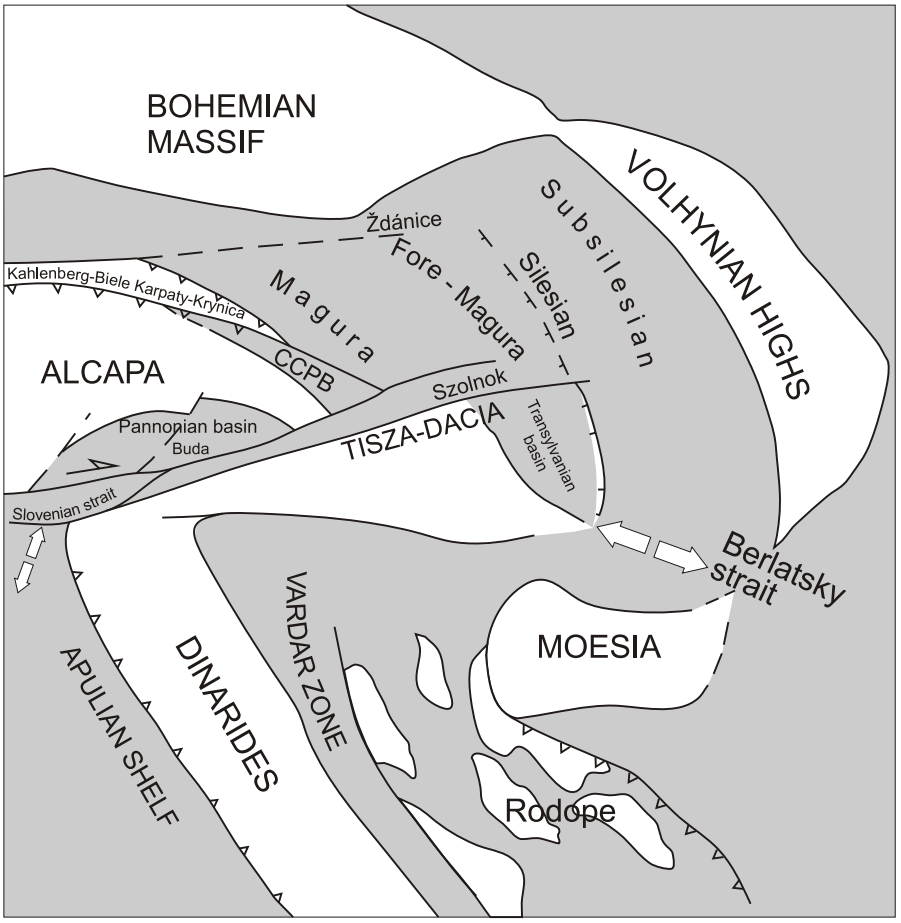
Fig. 1 Palinspastic reconstruction of the Carpatho-Pannonian basins in the Early Oligocene paleogeography of the Paratethys (modified after Csontos et al. 1992, Nagymarosy & Baldi-Beke 1993, Rögl 1998, Potfaj 1998, Steininger & Wessely 2000, Popov 2001, etc.)



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