



Changing Seas in Central Europe: updated chronostratigraphy and paleogeographic maps for the Carpathians – Dinarides – Pannonian region during the Miocene

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During the Lower-Middle Miocene, the majority of the Carpathians-Dinarides-Pannonian territory was occupied by the Paratethys Sea and its surrounding brackish/lake systems. The water bodies hosted a large endemic population of flora and fauna and were sensitive recorders of environmental changes. The infill of the sedimentary basins was largely affected by tectonic developments (e.g., Pannonian back-arc extension and mountain uplift), but also depended on the degree of connectivity to the neighboring Mediterranean and proto-Black Sea.

Correlation of Paratethys sediments on a large scale is usually tricky because a many local formation names exist, which are difficult to trace across borders. Moreover, the use of a regional timescale, mostly based on regional biostratigraphic assemblages and partly tuned to global eustacy (after Haq et al., 1988) complicates correlation to the global timescale. A reliable chronostratigraphic record of Paratethys sediments is crucial to get a grasp on the interplay between basins and orogens. It is also essential to improve paleogeographic reconstructions of the dynamic Carpathians-Dinarides-Pannonian region. These issues can be ‘tackled’ by working together with numerous scientists from different countries and disciplines such as integrated bio-magnetostratigraphy, radioisotopic dating and structural geology.

This work is an overview of the main (age) results and take home messages derived from a four-year PhD research focusing on integrated chronostratigraphy and paleogeography of ‘Changing Seas’ in Central Europe during the Miocene (Sant et al., 2017). We address, amongst others, the final sea retreat from the North Alpine foreland Basin, the ‘syn-rift’ infill of a Dinaric and a Serbian lake basin (Sarajevo-Zenica and Popovac), the age of the Langhian marine transgression in the Pannonian basin and Carpathian foredeeps, and provide for the first time a magnetostratigraphic correlation for Late Miocene sediments in Lake Pannon.

The new results were combined with an extensive literature review in order to create updated paleogeographic maps for several time slices in the Miocene in Central Europe. Connecting present-day sediment distribution maps to a detailed tectonic model in the GPlates software allowed us to reconstruct the paleoposition of tectonic blocks and the extent of basins, making the maps more realistic. The updated chronostratigraphy and paleogeographic maps give insight into the positions of gateways controlling the paleoenvironmental evolution of the Paratethys system and allow discrimination between eustatically and tectonically-driven events.

Haq, B.U., Hardenbol, J., Vail, P.R., 1988. Mesozoic and Cenozoic chronostratigraphy and cycles of sea level changes., in: Wilgus, C.K. (Ed.), *Sea-Level Changes - an Integrated Approach*. Society of Economic Paleontologists and Mineralogists, Special Publications 42., pp. 71–108.

Sant, K., V. Palcu, D., Mandic, O., Krijgsman, W., 2017. Changing seas in the Early–Middle Miocene of Central Europe: a Mediterranean approach to Paratethyan stratigraphy. *Terra Nov.* 29, 273–281. doi:10.1111/ter.12273