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A different stratigraphic approach to date and reconstruct the Karpatian and Badenian seas in Central Europe

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The Paratethys sea region in Central Europe experienced many paleogeographic changes during the Early-Middle Miocene. The interplay between tectonics, basin infill and eustatic sea level variations caused the existence of different marine transgressions. In many localities marine sediments of the Early Miocene ‘Karpatian’ stage are discordantly covered by marine deposits of the Middle Miocene ‘Badenian’ stage.

Distinguishing and precise dating of the different marine deposits has always been a challenge. Two difficulties are the scarcity of reliable age constraints and the fact that the regional time scale is partly based on endemic fauna and regional sea level variations that cannot be compared directly to the global record. Therefore, foraminifers and nannoplankton species are being widely used for correlation to the global time scale (e.g. Hohenegger et al., 2009; Coric et al., 2009). Most Central Paratethys research is using the biostratigraphic scheme of the Atlantic Ocean to date the successions (e.g. NN-zones). The ages of these bio-events can differ over 0.5 Myrs from those in the recently revised Mediterranean biostratigraphic schemes (e.g. MNN-zones) by Iaccarino et al. (2011) and Di Stefano et al. (2011). Here, we use the Mediterranean schemes to re-date the classic Paratethys successions of the Central Paratethys basins. This alternative approach reveals a remarkable change in Central European sea configuration.

The Karpatian sea stretched from the North Alpine Foreland Basin (S. Germany and Switzerland) to the Styrian and Vienna basins and was most likely connected to the Mediterranean via the Rhone Valley (Berger et al., 2005). Around 16.2 Ma the sea retreated westward. During a period of ~ 1 Myr (16.2 to 15.2 Ma) almost no marine sediments are present in the Central Paratethys, which is related to the ‘Styrian’ tectonic reconfiguration. Subsequently the Badenian transgression occurred through a connection via the Transtethyan corridor in Slovenia and covered Central Europe from the south (Croatian basins) to the north-west (Austrian Molasse and Vienna basins) and east (Transylvanian basin). Meanwhile, the Western Paratethys region remained continental.

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