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Towards a chronostratigraphy for the Miocene Dinarid Lake System: New 40Ar/39Ar ages and expanded magnetostratigraphic dating

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The long-lived Dinarid Lake Sustem (DLS) was a vast lacustrine environment. It occupied multiple tectonic depressions within the Dinarid mountain chain, located between the Central Paratethys and early Mediterranean Sea. While the richly preserved mollusks of the Dinarid Basins provide an impressive example of mollusk radiation, the strictly endemic character of these mollusks inhibits straightforward biostratigraphic correlation with regions outside the DLS. Consequently, application of magnetostratigraphic, cyclostratigraphic and radiometric dating techniques is indispensable. While the geodynamic evolution and paleogeographic history of the region are currently still prone to speculation, an absolute timescale and good correlations between the different basins will provide better insight in the space-time evolution of the Neogene DLS and the timing and mechanism of basin formation in an overall transpressive tectonic environment. Moreover, they are essential for the interpretation of mollusk speciation and radiation rates as well as evolutionary modes.

We employ magnetostratigraphic and cyclostratigraphic techniques, in combination

with radiometric dating, to construct the first absolute chronology for the Early to Middle Miocene Dinaride Lake System. We present ten new and essential 40Ar/39Ar ages which enable us to construct a rough regional chronostratigraphy for the DLS. All ages were obtained from tuffitic layers, volcanic ashes and benthonites which intercalate with the lake system sediments. Since the age dates come from various basins across the region they give a broad perspective on the spacio-temporal development of the system. In addition, the new 40Ar/39Ar data provide tie points for the magnetostratigraphic correlation of the polarity pattern of the Sinj Basin. The low amount of reversals indicates a high sedimentation rate and suggests that the phase of basin formation has been short.

Our investigation represents a partial result of the Austrian FWF Project P18519-B17: Mollusk Evolution of the Neogene Dinaride Lake System. This work represents a major step in the construction of a chronostratigraphy for the DLS, but elaborate fine tuning is still indispensable. Therefore we will continue our efforts and try to increase the number of 40Ar/39Ar dates and magnetostratigraphically correlatable sections substantially in the nearby future.