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Constructing a chronostratigraphy for the Miocene Dinaride Lake System

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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 (DLS). The long-lived DLS was a vast lacustrine environment. It occupied multiple tectonic depressions within the Dinaride mountain chain, located between the Central Paratethys and early Mediterranean Sea. The often very thick lacustrine deposits in the NW-SE striking Dinaride Basins provide an excellent opportunity to study the impressive mollusk radiation the lakes have experienced. These richly preserved mollusks are generally endemic, originating from autochthonous speciation and radiation events. This impedes straightforward biostratigraphic correlation with regions outside the DLS, thereby requiring magnetostratigraphic, cyclostratigraphic and radiometric dating techniques.

An absolute timescale and good correlations between the different basins are essential in order to allow the interpretation of speciation and radiation rates as well as evolutionary modes. In addition, good inter-correlation of the stratigraphy of a multitude of Dinarid Basins will provide better insight in the space-time evolution of the Neogene DLS and its relation to the nearby Paratethys and proto-Mediterranean regions.

Our working hypothesis is the existence of two main lacustrine phases in the DLS. The first phase may coincide with the Late Otnnangian Paratethys Restriction Event, for which the endemic lake-mollusks can be traced as far as the Bakony Hills in Central Hungary. The second phase, tentatively dated as Middle Miocene, was restricted to the Dinaride tectonic units. The Dinaride land mass had at that time become smaller, because its former northern share became part of the Pannonian Basin System after a

marine transgression in the uppermost Lower Miocene.

Beside a recently composed magnetostratigraphy for sections from both the Sinj and Pag Basin in Croatia, a short overview of our current and imminent research activities will be presented. These involve processing of numerous volcanic ash layers from all over the Dinarids, including the Apulian Microplate in the south, and the southern margin of the Pannonian Basin System in the north. In addition to 40Ar/39Ar dating of these ash layers, paleomagnetic investigations will be conducted in several basins in Bosnia and Herzegovina (e.g. the Livno-Duvno Basin, Gacko Basin, Sarajevo-Zenica Basin and Tuzla Basin). The combination of both 40Ar/39Ar and paleomagnetic results will provide good regional stratigraphic control and a solid base for the first reliable Dinaride Lake System Chronology.

The investigation represents a partial result of the Austrian FWF Project P18519-B17: Mollusk Evolution of the Neogene Dinaride Lake System.