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Middle Miocene events in the peripheral basins of Central Paratethys (Central Europe): inferences from Tuzla and Lopare basins

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The Central Paratethys Sea occupied the transition between the Alps, Dinarides and Carpathian mountains during Oligocene to Miocene times. However, its spatial and temporal evolution, i.e. southward expansion, subsequent salinity crisis, and governing mechanisms are poorly constrained. Here, we employ radiometric dating to construct the Middle Miocene absolute chronology of the evolution of the successions developed along the southwestern margin of the Central Paratethys flanking the NE Dinarides (NE Bosnia and Herzegovina) and governing mechanisms. We present three U-Pb zircon ages acquired by LA-ICP-MS from volcanic ash layers sampled in Tuzla marginal marine basin (two layers) and neighboring lacustrine Lopare Basin (one layer). Zircon grains from the lowermost ash of the playa lake in Lopare Basin yielded a U-Pb age of 15.143 ± 0.094 Ma. This indicates that despite the warm and humid global climate, the Lopare Basin and many lakes in the internal part of the Dinarides hosting similar salina-type successions recorded regional arid climatic conditions during Middle Miocene. Furthermore, this age implies synchronicity of arid with humid lakes (e.g., Sinj, Gacko) developed in the internal and external Dinarides, respectively which are orographically controlled. The U-Pb zircon age of the middle ash layer (14.12 ± 0.077 Ma) places new constraints on the marine flooding in the Tuzla Basin, i.e. along the southwestern margin of the Central Paratethys. Considering age data from previous studies the new age implies south-southeastward marine expansion of the Central Paratethys over a period of 3-4 Myrs, along the N, NE-ward flanks of the Dinarides. The demise of the Dinarides affected by the rift climax in the neighbouring Pannonian Basin and associated block rotations provided a space for the S/SE-ward marine expansion. Deposition of the uppermost ash layer sampled at the top of marine salt succession in Tuzla Basin is constrained by a U-Pb zircon age of 13.88 ± 0.11 Ma. This indicates that Salinity Crisis in Badenian was affecting the entire Central Paratethys coevally. Therefore, we correlate the evaporitic event in the Tuzla basin with the sea-level fall controlled by the global climatic Mi3b event.