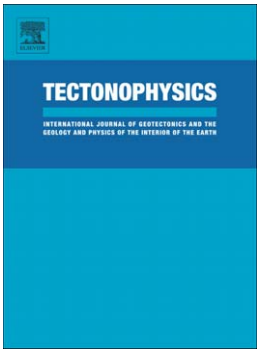

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Structure and provenance of Late Cretaceous – Miocene sediments located near the NE Dinarides margin: inferences from kinematics of orogenic building and subsequent extensional collapse

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Abstract

The NE part of the Dinarides Mountain chain, located near their junction with the Carpatho-Balkanides, is an area where sedimentary basins associated with the Neotethys subduction and collision are still exposed. We performed a provenance study, based on detrital fission track thermochronology combined with zircon U-Pb magmatic geochronology, and existing studies of kinematics and exhumation. Our study shows rapid sedimentation in the trench and forearc basin overlying the upper European tectonic plate. A number of latest Cretaceous − Early Paleocene igneous provenance ages show a dominant magmatic source area, derived from a Late Cretaceous subduction-related arc. This arc shed short time lag sediments in the forearc and the trench system, possibly associated with focused exhumation in the Serbo-Macedonian margin. This was followed by burial of the trench sediments and a novel stage of Middle − Late Eocene exhumation driven by continued continental collision that had larger effects than previously thought. The collision was followed by Late Oligocene – Miocene exhumation of the former lower Adriatic plate along extensional detachments that reactivated the inherited collisional contact along the entire Dinarides margin. This event re-distributed sediments at short distances in the neighboring Miocene basins. Our study demonstrates that the Dinarides orogenic system is characterized by short lag times between exhumation and re-deposition, whereas the upper tectonic plate is significantly exhumed only during the final stages of collision. Such an exhumation pattern is not directly obvious from observing the overall geometry of the orogen.

Keywords: low-exhumation orogens, orogenic-driven extension, detrital thermochronology, provenance, Dinarides