

Publication

Alpine thermal events in the central SerboMacedonian Massif (southeastern Serbia)

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The Serbo-Macedonian Massif (SMM) represents a crystalline belt situated between the two diverging branches of the Eastern Mediterranean Alpine orogenic system, the northeast-vergent Carpatho-Balkanides and the southwest-vergent Dinarides and the Hellenides. We have applied fission-track analysis on apatites and zircons, coupled with structural field observations in order to reveal the low-temperature evolution of the SMM. Additionally, the age and geochemistry of the Palaeogene igneous rocks (i.e. Surdulica granodiorite and dacitic volcanic rocks) were determined by the LA-ICPMS U–Pb geochronology of zircons and geochemical analysis of main and trace elements in whole-rock samples. Three major cooling stages have been distinguished from the late Early Cretaceous to the Oligocene. The first stage represents rapid cooling through the partial annealing zones of zircon and apatite (300–60 °C) during the late Early to early Late Cretaceous (ca. 110–ca. 90 Ma). It is related to a post-orogenic extension following the regional nappe-stacking event in the Early Cretaceous. Middle to late Eocene (ca. 48–ca. 39 Ma) cooling is related to the formation of the Crnook–Osogovo–Lisets extensional dome and its exhumation along low-angle normal faults. The third event is related to regional cooling following the late Eocene magmatic pulse. During this pulse, the areas surrounding the Surdulica granodiorite (36 ± 1 Ma) and the slightly younger volcanic bodies (ca. 35 Ma) have reached temperatures higher than the apatite closure temperature (120 °C) but lower than ca. 250 °C. The geochemistry of the igneous samples reveals late- to post-orogenic tectonic setting during magma generation.

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