Triassic magmatism along the Eurasian margin of the Palaeotethys: U-Pb zircon age constraints from the western part of the Sakar-Strandzha Zone, Bulgaria

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In the Aegean sector of the Alpine orogen of the Eastern Mediterranean, the Sakar-Strandzha Zone (SSZ) represents a major tectonic unit that straddles the territories of Bulgaria and Turkey. The westernmost part of the SSZ in Bulgaria includes the area along the Maritsa river valley and the St. Iliya Heights, both connected through several small outcrop areas under the Cenozoic sedimentary cover. In Bulgaria, the Triassic felsic magmatism along the Maritsa river valley was inferred by Chatalov (1961) on the basis of the stratigraphy, but only a single U-Pb zircon age revealed Early Triassic (ca. 249 Ma) felsic magmatism in the SSZ of Turkey (Aysal et al., 2018). Here, we constrain the timing of Triassic magmatism using U-Pb LA-ICP-MS zircon geochronology of felsic magmatic bodies in the western part of the SSZ in Bulgaria.

A sample from a (meta) rhyolite body yielded a concordant age of 237.8 ± 3.4 Ma, which confirmed a crystallization likely concomitant with the deposition of the Triassic clastic rocks in the northern Maritsa river valley. To the east along the valley, a leucocratic granite body located south of the Permian Sakar batholith (ca. 295-296 Ma, Bonev et al., 2019), yielded a concordant age of 242.1 ± 1.8 Ma for the crystallization, having crosscutting relationships with the high-grade metamorphic basement. A leucocratic and K-feldspar porphyric meta-granite bodies yielded concordant ages of 243.3 ± 5.8 Ma and 240.6 ± 2.3 Ma, respectively, for the crystallization within the so-called Harmanli block to the south along the valley. At St. Iliya Heights a sample from the Prochorovo Formation (meta) rhyolite body yielded a concordant age of 245.4 ± 1.5 Ma for the crystallization, which implies an Early Triassic age of the clastic rocks with which it inter-fingers. In the area between the Maritsa river valley and the St. Iliya Heights at the village of Svetlina a leucocratic meta-granite body yielded a concordant age of 229.6 ± 2.4 Ma. The concordantly dated zircons that yielded Triassic ages of the igneous/meta-igneous protoliths all have Th/U ratios compatible with the magmatic process. The major elements of the dated samples reveal calc-alkaline to high-K-alkaline peraluminous felsic compositions similar to the adjacent Late Carboniferous-Permian igneous/meta-igneous rocks of the SSZ.

The U-Pb zircon ages reveal Early-Middle Triassic magmatic phase (ca. 245-230 Ma) in the western SSZ of Bulgaria. These age data provide a regional-scale temporal link for the Triassic magmatism.
extending to the easternmost extremity of the SSZ in Turkey. The Triassic continental type felsic magmatism in the western SSZ is interpreted to result from the ongoing Paleotethyan subduction under the Eurasian plate, which magmatism follows the development of a Late Carboniferous-Permian continental magmatic arc of the SSZ (Bonev et al., 2019).

References


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