New geological and geochronological data of granititic and metamorphic rocks from SW Bulgaria, sheetsBerovo (K-34-82-G) and Kresna (K-34-83-W) of the new geological map 1:50 000

Milovanov P.[1], Petrov I.[2], Marinova A.[4], Ilieva E. [5], Peytcheva I.[2,3], von Quadt A.[3] and Pristavova S.[5]

[1]*Geology and Geophysics Research Institute, 1505 Sofia, Bulgaria, 23 Sitnyakovo blvd*
[2]*Bulgarian Academy of science, Geological Institute, 1113 Sofia, Bulgaria, 24 g. Bonchev str., ivan.p.petrov@gmail.com*
[3]*IGP, ETH-Zurich, Switzerland; quadt@erdw.ethz.ch; peytcheva@erdw.ethz.ch*
[4]*Sofia University "St. KlimentOhridski", 1504 Sofia, Bulgaria, 15 Tsar Osvoboditel blvd*
[5]*University of Mining andGgeology "St. Ivan Rilski", Sofia, Bulgaria, Student city, Hristo Botev str., e4ence@gmail.com; spristavova@abv.bg*

The distinction of geological units in metamorphic terrains is usually complicated by the tectonic overprint of the rocks.The magmatic age of the protoliths and the timing of metamorphism is very helpful for their correlation. We present new field and U-Pb zircon age data for several metamorphic rocks and cross-cutting granitoids from a region in SW Bulgaria (Ograzhden, Maleshevska and Pirin Mountains). They crop out in the area of sheets Berovo (K-34-82-G) and Kresna (K-34-83-W) of the new Bulgarian geological map 1:50000. Age analyses were performed at IGP, ETH-Zurich as part of a collaborative work between the Research Institute "Geology and Geophysics" Corporation and ETH-Zurich during the new geological mapping of Southern Bulgaria.

Generally, the Late Alpine frame of the Maleshevo-Ograzhden and Pirin mountains in SW Bulgaria is well known, but their pre-Alpine evolution is still ambiguous.Two samples of the metamorphic basement in Maleshevo-OgrazhdenMountains represent the weekly deformed Rakovo granite(metagranite) from the Struma Unit (P787) and the gneiss-schist (P709a) from the Ograzhden Unit. The metagranite P787 is dated at 543.5±3.9 Ma by ID-TIMS U-Pb zircon analyses. In the same range are also the majority of the in-situ LA-ICP-MS data. This age is in agreement with published data for other granitoid and gabbro bodies of Struma Unit in the range 540-560 Ma.

The zircons of the gneiss-schist P709 reveal solid-state recrystallized cores (usually with still preserved magmatic oscillatory zoning) and metamorphic rims. Both, the cores and the rims are dated by the in-situ LA-ICP-MS method. The detritic zircons of the cores are older than 600 Ma with ages of 620-740, 900-1100 and up to ≈2400 Ma. These ages give evidence for a possible Gondvana-derived source of the resedimented zircons. The metamorphic rims yielded Variscan ages at around 330-340 Ma (mean $^{206}Pb/^{238}U$ age 338 ± 22 Ma, 95% conf.). The data infer a Carboniferous high-grade metamorphism of the Ograzhden Unit.

During our field work we observed xenolites of turmaline-garnet schists in the metagranitoids of the Ograzhden Unit. Geochemical analyses of the Budiltsi metagranitoids define them as peraluminous calk-alkaline granites and granodiorites and thus,, we can consider both as a S-type source.

The cross-cutting magmatic rocks of the Krupnik pluton were dated using the accessory minerals zircons, xenotimes and monazites. Zircons and xenotimes yield a magmatic U-Pb age of 32.99±0.39 Ma. The monazites show a small lead-loss and show ages betwen 30 and 22 Ma, which can be interpreted as a result of a long-term hydrothermal resetting along the Strimon fault.

In the Pirin Mountain only the Kapatnik pluton was sampled for U-Pb dating. Conventional and LA-ICP-MS analyses yield Palaeocene ages 56-62 Ma. The mean $^{206}Pb/^{238}U$ value defines an age of 60.7±1.7 Ma, but the majority of zircons with ages ≥ 60 Ma are slightly discordant. Consequently, the most probable time of granitoid formation is 56-58 Ma.