Penetrative shearing in the southern part of Kapatnik pluton: possible tectonic implications

Постмагматични проникващи структури в южните части на Капатнишкия плутон: възможен тектонски сценарий

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As a result of the new geological mapping a significant advance has been made to delineate the different in age metamorphic complexes in Southern Bulgaria (Sarov, 2012). Well-known as a boundary area between three impressive mountains now the area of Razlog graben is starting to be recognized as a place of juxtaposition of three completely different metamorphic units: Variscan Ograzhden-Verstiskos complex (OVC) and two Alpine units (Rhodope type metamorphics) with contrasting characteristics – Pirin-Pangaion and Sidironero-Mesta. This territory is also densely penetrated by Tertiary granitoids. Some of them (e.g. North Pirin pluton) are clearly post-kinematic, whereas others (like some bodies from the Rila-Rhodope batholith) are foliated and can provide important tectonic and timing constraints.

The Kapatnik pluton is a large granitoid body that is regarded as a part of the Rila-Rhodope batholith (Valkov et al., 1989). It consists of medium- to coarse-grained granites that often contain K-feldspar megacrysts up to 2–3 cm long. Milovanov et al. (2010) reported U-Pb LA-ICPMS zircon data from the south-western tip of the pluton that are constraining the age of emplacement as Tertiary (56–62 Ma). The contacts of the pluton display contrastingly different features: 1) To the north the pluton is cut by an younger intrusion of equigranular biotite granite (Mechi Vrah body of Valkov et al., 1989). Judging from previous maps and own field data from the valley of Blagoevgradska Bistritsa river, the Mechi Vrah granites are completely post-kinematic. 2) To the west the contact with Troskovo amphibolites (OVC) is traced along a regional-scale low-angle extensional zone (Osenovo fault of Milovanov et al., 2009a). 3) To the east the granitoids are juxtaposed against the extremely retrogressed metamorphites from OVC or Eocene sediments. This is the Bachevo fault zone, recently interpreted as a part of Ribnovo normal fault system (Georgiev et al., 2010). 4) To the south, the Kapatnik granites display complex kilometer-scale interfingered relations with a suite of high-grade migmatitic gneisses, amphibolites and marbles. Structural data also suggest that at least a part of the emplacement of granitic dykes was syn- to late-synkinematic to the main fabric of the host. To the moment there are no geochronological data for these metamorphics, but it is generally assumed that this piece of basement has a Rhodopian affinity (most probably part of Sidironero-Mesta unit -SMU).

There is no doubt that the Kapatnik granites are intrusive into SMU rocks: numerous meter to kilometer scale granitic dykes are emplaced conformably to foliation of SMU and also stopped blocks and screens from the host are found into the main body of the granite (e.g. Valkov et al., 1989). Almost invariably the granitic dykes and the whole southern margin of the Kapatnik pluton are penetratively foliated. The foliation is concordant to the margin of the pluton and penetrative foliation in the host rocks. It dips shallowly (20–35°) northward (i.e. toward pluton’s interior). To the north of Predela pass the lineation is poorly expressed, but NW of Razlog the SE margin of the pluton and the associated dykes in the host rocks display pronounced N–S trending stretching lineation defined by stretched quartz grains and aligned biotite. In this part the coarse grained granites display C-S fabric that points to penetrative top-to-the south shearing.

Three main conclusions can be drawn from this study: 1) Unlike other well-studied contacts of the Rila-Rhodope batholith, west of Razlog the contact with the host rocks is not marked by an extensional shear zone. 2) Relations of the Tertiary Kapatnik pluton with the host rocks along the southern contact indicate that they are of Rhodopean affinity. In contrast the contacts of the pluton with OVC metamorphics are everywhere marked by brittle faults. 3) Most probably penetrative fabric in the Kapatnik pluton is a result of Tertiary shearing in the hanging wall of the Nestos
shear zone. The NW tip of this major structure seems to be cropping out just south of Bansko. Interestingly, such a possibility was very recently completely disregarded (Milovanov et al., 2009b).

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References


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