



The Fanos granite: structure, emplacement and geodynamic significance (Eastern Axios/Vardar Zone, Northern Greece)

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The Fanos granite occurs in the Peonia Subzone of the Eastern Axios-Vardar Zone in Northern Greece. It is a Late Jurassic (158 ± 1 Ma), N-S trending granite, intruding the Mesozoic back-arc Gevgheuli ophiolitic complex (Peonia Subzone). It is composed of three main rock types namely aplitic granite, granite and microgranite evolved by fractional crystallization. At the eastern contact of the Fanos granite with the host ophiolitic rocks the initial intrusion character of the granitic bodies is well preserved. On the other hand, the western contact is overprinted by a few meters thick, westward-vergent semiductile thrust zone, probably of Late Jurassic-Early Cretaceous age. For the better understanding of the geotectonic evolution of the broader area, the Fanos granite is compared with the Mid-Late Jurassic Kastaneri volcano-sedimentary formation allocated on the eastern part of the Paikon Massif, on which the Guevgeuli ophiolites were obducted. In our study we address three major topics: a) the origin of the Fanos granite, b) the geochemical correlation between Fanos granite and Kastaneri formation and c) the relationship of the granite with the remnants of an oceanic island-arc or an active continental margin geotectonic setting situated in the Neotethys (=Axios/Vardar ocean). The collected rock samples are granites, aplitic granites, microgranites, rhyolites, quartz diorites, migmatites and amphibolites. These samples were analysed by X-ray fluorescence for major and trace elements. The granite shows peraluminous characteristics, high-K calc-alkaline affinities and I-type features. The Sr initial isotopic ratios of the granite range between 0.70519 and 0.70559, while the Nd initial isotopic ratios range between 0.51236 and 0.51239, reflecting EM-I (Enriched Mantle-I) component. The trace element patterns along with the isotopic composition of the rocks indicate absence of continental crustal material contamination. Moreover, the geochemical data imply a common origin between the Fanos granite and the Kastaneri formation. Taking into account our structural and geochemical data along with the existing isotopic and geotectonic data of the broader Axios/Vardar Zone, we suggest that the studied granitic rocks were formed during an intraoceanic-subduction within the Neotethys ocean, approximately at the same time with the amphibolite sole formation, rather than during the evolution of an active continental margin. In the Late Jurassic, a general westward ophiolite obduction on the Pelagonian continental margin, resulted to the thrusting of the Fanos granite together with the obducted ophiolites.