



Petrological and geochemical study of Eastern Varnountas dolerites (Florina, W. Macedonia, Greece)

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Dolerites from Eastern Varnountas (Florina, W. Macedonia, Greece) are studied. They intrude the Carboniferous Varnountas plutonic complex, consisting mainly of granite, granodiorite, monzonite and quartz monzonite, as well as the metamorphic basement, consisting of ortho- and paragneisses and schists. The studied rock-samples show characteristic ophitic texture. The rock-forming minerals are plagioclase, clinopyroxene and olivine. Secondary minerals are amphibole, chlorite, epidote and spinel whereas titanite and rutile occur as accessory minerals.

The olivine Fo-content ranges from 51 to 85, with big variations between core and rim at the same sample, and decreases with the increase of SiO₂ of the rocks. Clinopyroxene is augite; its En-content ranges from 40 to 53 and remains constant with the increase of SiO₂ of the rocks. The An-content of plagioclase composition ranges from An₅₇ to An₆₈, increasing with the increase of SiO₂ of the rocks.

XRF and ICP-MS-LA techniques were used for the whole-rock analysis for major and trace elements respectively. Their SiO₂ content ranges from 46.8 to 49.4 wt% and the MgO from 7.6 to 11.4 wt%.

The whole-rock geochemistry indicates two different groups of samples; one group (LT-HK) having low TiO₂ (0.78-0.90 wt%) and high K₂O (0.77-2.00 wt%) and another (HT-LK) with high TiO₂ (1.02-1.34 wt%) and low K₂O (0.13-0.32 wt%).

The REE patterns show LREE enrichment. LREE/HREE is low ranging from 1.1 to 1.8 apart the more evolved sample L-18 (LT-HK group) having 6.0. LaCN ranges from 14.3 to 27.9 apart again of sample L-18 with LaCN=63.5. The ΣREE is lower in the LT-HK group ranging from 32.70 to 33.93 ppm (L-18=101.28 ppm), relative to the HT-LK group (42.96 to 61.24 ppm). The Eu anomaly ranges from 0.92 to 1.19 without differences between the two groups. According to the classification diagrams the samples belong to the volcanic arc tholeiitic basalts.

The enrichment of REE combined with the low LREE/HREE ratio indicates that the studied dolerites originate in a fertile sp-lherzolite. The LT-HK group is the product of 23% partial melting of it and the HT-LK group of 17%. The Cr-Y diagram implies that the two groups evolved through independent fractional crystallization processes. The comparison of the dolerites with the more basic samples of the Varnountas plutonic complex with similar SiO₂ content, shows that the latter are ~20 times richer in La (LaCN=260-580) with LREE/HREE ratio ranging from 18 to 22, indicating that a common origin is not possible.