



Volcanic facieses and mineral chemistry of Tertiary alkaline volcanic rocks in the eastern Pontides, NE Turkey

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The eastern Pontides (NE Turkey) represent a paleo-island arc formed during subduction of Tethyan oceanic crust from Jurassic to Cretaceous time. On the basis of lithological and petrochemical differences of Tertiary volcanics, two volcanic sub-provinces are identified, a northern alkaline and a southern calc-alkaline one (Arslan et al., 1997; Arslan & Aliyazıçıoğlu, 2001; Temizel & Arslan, 2008, 2009). Furthermore, Tertiary volcanics in the north are subdivided as Trabzon Group and Tonya Group (Arslan et al., 1997).

The studied Tertiary aged volcanics of Trabzon-Giresun areas in the north of the eastern Pontides were divided, on the basis of the volcanic facieses; as pyroclastics, subvolcanics and lava flows. Furthermore, volcanic chemo-stratigraphy analyses reveal three suites: (1) basalt, trachy-basalt and basaltic trachy-andesite (BTB) suite including basaltic dikes and sills, basaltic lavas, pillow lavas and basaltic breccias, (2) trachyte and trachy-andesite (TT) suite containing andesitic dikes and domes, trachytic dikes, (3) basanite-tephrite (BT) suite containing foid bearing brecciated lavas and foid bearing breccias.

Petrographically, the studied volcanics exhibit evidences of disequilibrium crystallization such as oscillatory zoning, sieve texture and corrosion in plagioclase phenocrysts, zoning and inclusions in clinopyroxene phenocrysts. Based on mineral chemistry data as well as optical observations, the common mineral phases in all suites are clinopyroxene, plagioclase and Fe-Ti oxides. Clinopyroxenes are named as augite in composition from $Wo_{39}En_{44}Fs_{20}$ to $Wo_{44}En_{47}Fs_{9}$ with Mg number 0.59-0.81 and diopside in composition from $Wo_{45}En_{33}Fs_{22}$ to $Wo_{50}En_{37}Fs_{13}$ with Mg number 0.60-0.91. Feldspars generally exhibit wide range of compositions from sanidine to albite or anorthite with weak normal and reverse compositional zoning. Fe-Ti oxides are generally described as magnetite and titanomagnetite. Olivines with Fo_{68-92} in composition are observed only in the BTB suite rocks. Hornblendes which are classified as pargasite owing to their higher $Al^{(VI)}$ atomic ratio than Fe^{3+} with Mg numbers ranging from 0.92 to 0.96 are observed only in the BT suite rocks. The foid minerals in the BT suite rocks are classified as analcime, possibly derived from leucite.

Volatile enrichment and silica saturation of primary magma(s) as well as possible polybaric evolutionary paths of each suite may be responsible for the mineral chemistry and related chemo-stratigraphy of the Tertiary alkaline volcanics in NE Turkey.

References

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