

## GEOLOGY, PETROGRAPHY AND GEOCHEMISTRY OF ANDESITES AT THE EASTERN END OF KÜÇÜK MENDERES GRABEN (BAŞOVA-KIRAZ/İZMİR)

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**ABSTRACT.**- The studied area is located in the eastern end of Küçük Menderes Graben. The basement consists of Menderes Massif metamorphic rocks. These are cut by young volcanics cropped out in the NE, E and SE of Kiraz, around Başova, Karaburç and Yenişehir villages in order. The volcanic rocks outcrop on a line in NE-SW trend as small exposures. The pink and grey coloured volcanic rocks around Başova and Karaburç villages are andesitic in composition with hypocrySTALLINE-porphyrific to hyaloplitic texture. The phenocrysts are andesine, hornblende, pyroxene, biotite, quartz and opaque minerals and the groundmass is glassy and microlitic. Around Yenişehir area, the volcanic rocks are dark grey and greenish grey in color and include plagioclase and pyroxene phenocrysts. While the main felsic mineral of the hypocrySTALLINE-porphyrific volcanic rocks is plagioclase, the main mafic is pyroxene involving in a microlitic groundmass. However the microlites do not show a clear alignment, but some of them surround the phenocrysts. The volcanic rocks are highly enriched in LIL elements and moderately enriched in HFSE elements. One of the sample from Başova area has yielded  $Ar^{40}/Ar^{39}$  age of  $14.7 \pm 0.1$  Ma. Another sample about 12 km to the SW, near Yenişehir has dated as  $14.3 \pm 0.1$  Ma. This sub-alkaline and calc-alkaline volcanism is represented by lavas, dikes and pyroclastics in the region. These volcanic rocks in nearly same ages and exposing in close localities to each other, have been considered to be the products of the same igneous activity because their geochemical affinities.

**Key words:** West Anatolia, Küçük Menderes Graben, Volcanism, Sub-alkaline, Calcalkaline, Middle-Miocene.

### INTRODUCTION

Geochemical character of the volcanic products from Late Eocene (Ercan et al., 1995) to the recent times (Richardson-Bunbury, 1996) in the western Anatolia, vary from acidic to basic (Ercan et al., 1985; Yılmaz, 1990).

Volcanism in western Anatolia is considered to be a product of lithospheric thickening in the region as dependant of the orogenic activities (Şengör, 1980; Şengör and Dewey, 1980; Şengör and Yılmaz, 1981; Şengör et al., 1984; Gülen, 1990; Aldanmaz et al., 2000).

However, the relationship of the geochemical properties of the Late Cenozoic volcanism of western Anatolia with the timing and tectonic evolution of the region is controversial.

Some researchers suggest that western Anatolia is under the effect of a N-S trended com-

pression during Late Oligocene-Middle Miocene time, and magmatism commences with continental crust thickening which it causes fractional melting in the depths; compressional tectonic regime ends by the appearing of the WNW-ESE trended extensional regime and NE-SW trended weakened zones; these zones accomodates generally continental crust originated calcalkaline and some hybrid intracontinental volcanics. The thickness of the lithosphere decreases due to the N-S trend extensional regime commenced by Middle-Late Miocene and mantle derived alkaline magmatism together with E-W trended graben formation dominates the region from the latest Late Miocene-Pliocene to the Recent (Keller, 1969; Borsi et al., 1972; Keller and Villari, 1972; Özgenç, 1978; Dewey and Şengör, 1979; Sunder, 1979; Ercan, 1981, 1982 ve 1987; Şengör and Yılmaz, 1981; Ercan and Öztunalı, 1982; Ercan et al., 1984, 1985 and 1996; Yılmaz, 1989, 1990, 1997 and 2000; Savaşçın, 1990; Savaşçın and Güleç, 1990; Güleç, 1991; Yılmaz et al., 1994, 2000 and 2001).

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