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BRIEF NOTE ON NEOGENE VOLCANISM in KEMALPAŞA–TORBALI BASIN (İZMİR)

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This study was made in order to introduce Neogene volcanics the first time, which its presence has not been mentioned in previous investigations (Akdeniz et al., 1986; İnci, 1991; Kaya et al., 2007; Sözbilir et al., 2011), in Kemalpaşa–Torbalı basin corresponding to Torbalı section of the Akhisar Depression (Kaya, 1979; 1981) and to state their K/Ar ages (Figure 1).

Kemalpaşa group (Sözbilir et al., 2011) consisting of lower-middle Miocene deposits of Kemalpaşa–Torbalı basin from bottom to top is formed by Kesmedağı formation (Akdeniz et al., 1986), deposited in alluvial fan delta, Vişneli Formation (Sözbilir et al., 2011) which is made up of alluvial-fluvial deposits and by lacustrine Gökyaka formation (Göktaş, 2012) which has lateral equivalence (Figure 2). In upper parts of the Kesmedağı formation which reflects early-early middle Miocene sedimentation, the fauna of small mammal belonging to MN4 biozone (17-18 Ma: Steininger, 1999) was described (Kaya et al., 2007). Vişneli and Gökyaka formations overlying with a probable unconformity represent the middle Miocene sedimentation. Extrabasinal felsic tuff interlayers take place in upper parts of the lacustrine shale sequence (Aşağıvişneli member: Göktaş, 2012) which was distinguished in Gökyaka formation. 13.8±0.1 my Ar^{40}/Ar^{39} age was taken from those tuffs which are in ash fall facies (Sözbilir et al., 2011). Intrabasin Miocene volcanism represented by small lava extrusions from different origins is formed by Yukarıkızılca volcanic which was distinguished in middle Miocene deposit of the Kesmedağı formation and by Korucuk volcanic which intruded into Gökyaka formation (Göktaş, 2012).

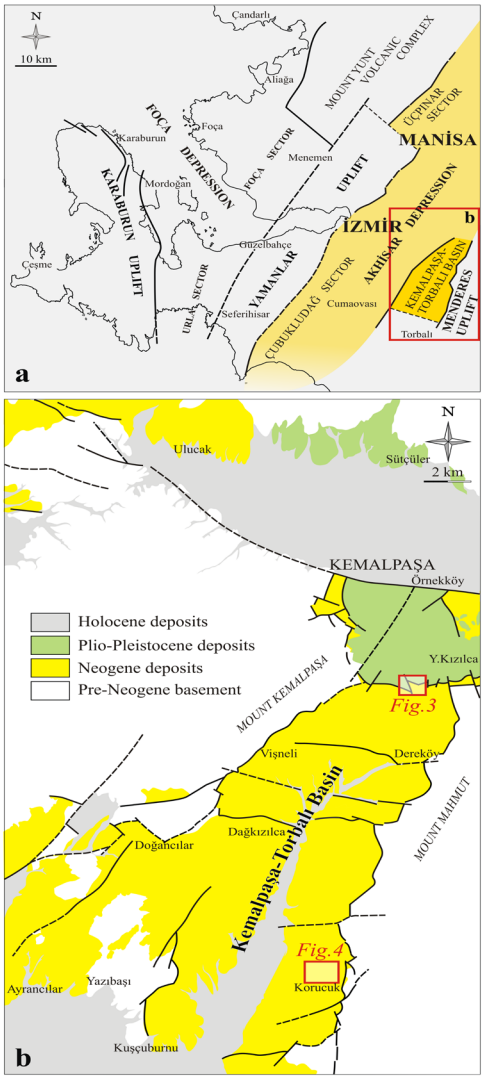

Figure 1- a) Tectonic setting of the Kemalpaşa-Torbalı basin in the Akhisar depression (modified after Kaya, 1979, 1981), b) Location map of investigated areas.

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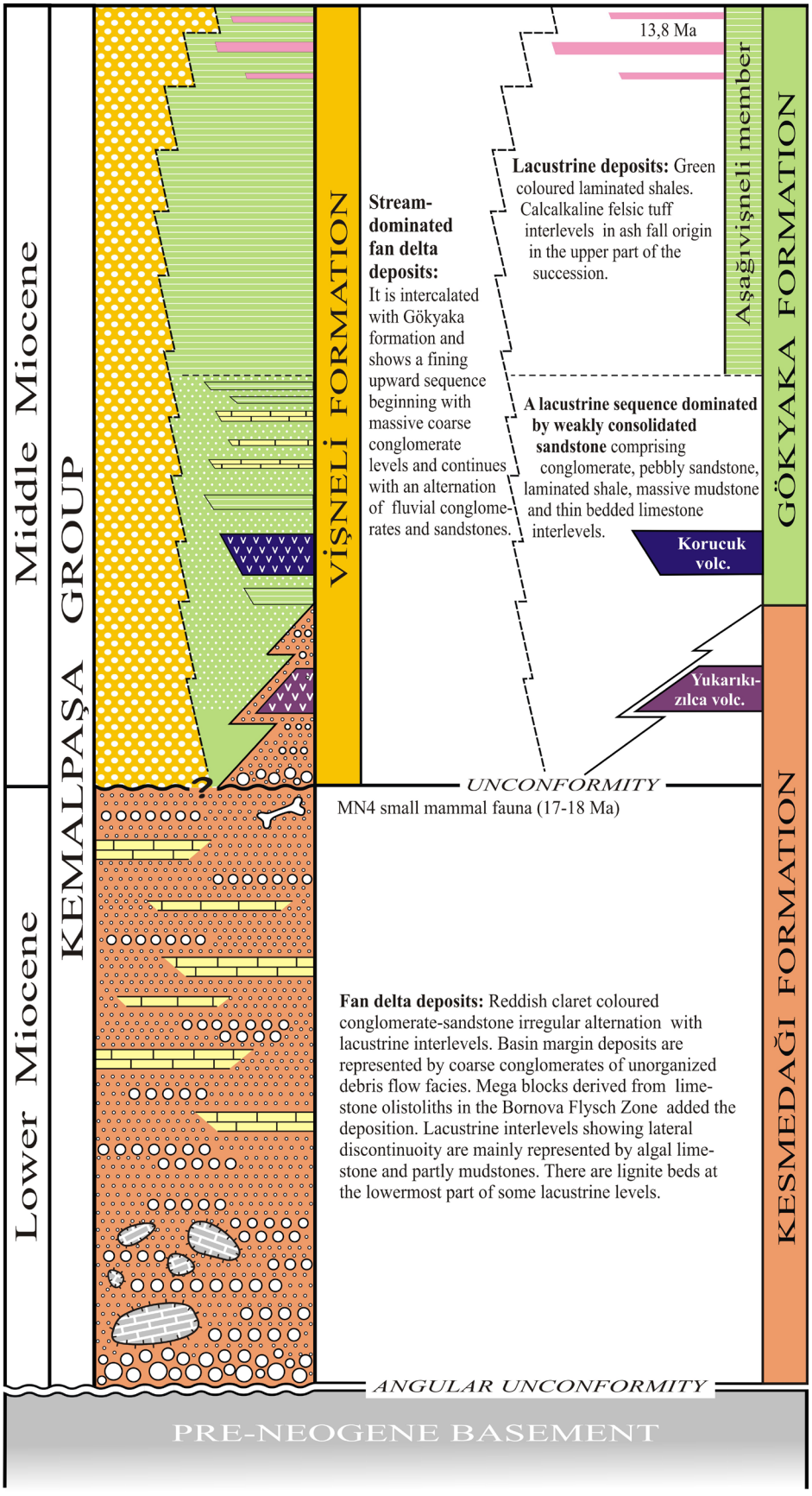

Figure 2- Generalized stratigraphy of the Kemalpaşa group litho-units (Modified after Sözbilir et al., 2011 and Göktaş, 2012).

1. Yukarıkızılca Volcanic

Bluish gray, altered lavas observed in reddish brown conglomerate-sandstone dominant sequence of the Kesmedağı formation were first defined by Göktaş (2012). At approximately 2.5 km SW of Yukarıkızılca village the lava mass distinguished around Karamolgediği Hill crop out in the section which was offset by strike slip and/or oblique slip faults of the detachment fault of Gediz Graben (Figure 3). Porphyry textured lavas of which its phenocrystal content is represented by plagioclase, amphibole, biotite, pyroxene and quartz were named as "andesite". Sheeted plagioclase phenocrysts show polysynthetic twinning and zoning. Some crystals display the characteristics of sieve and glomeroporphyritic textures. Some of amphibole phenocrysts have glomeroporphyritic texture, twinning and zoning. Sheetlike, anhedral ortho/clinopyroxene phenocrysts are occasionally observed in glomeroporphyritic texture. Quartz crystals are large, fractured and embayed. Within completely crystallized groundmass plagioclase, biotite microliths and opaque minerals are observed.

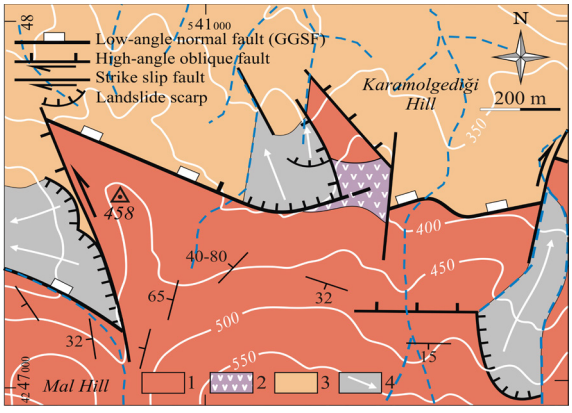

Figure 3- Geological map of the Yukarıkızılca volcanics and surrounding area (Göktaş, 2012). 1) Kesmedağı formation, 2) Yukarıkızılca volcanics, 3) Kızılca formation, 4) Landslide. GGSF: Gediz Graben Detachment Fault.

2. Korucuk Volcanic

The unit consisting rocks of mafic lava was first defined by Göktaş (2012) and distinguished as map unit. The main outcrop of the lava extrusion which is supposed to be deposited synchronous with the sedimentation in poor consolidated and massive sandstone sequence of the Gökyaka formation is around Yatan Hill in northeast of Korucuk village (Figure 4).

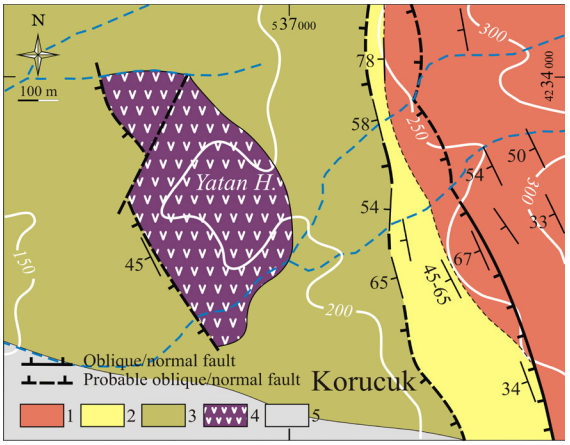

Figure 4- Geological map of the Korucuk volcanics and surrounding area (Göktaş, 2012). 1) Kesmedağı formation, 2) Kireçdere member, 3) Gökyaka formation, 4) Korucuk volcanics, 5) Alluvial fan deposits (Holocene).

Blackish, dark gray colored lava mass is extremely fractured in outer zones, with highly vesicular and altered. Porphyry textured lavas which their phenocrystal contents are represented by olivine, biotite and pyroxene were named as "olivine basalt". Euhedral-subhedral olivines which form glomeroporphyritic texture with each other and other phenocrysts have partly or fully turned into magnesium and iron carbonates starting from edges and fractures. Euhedral-subhedral clinopyroxenes are glomeroporphyritic in texture and display twining and zoning occasionally. Biotites and amphiboles which had transformed from clinopyroxene have become opaque starting from edges and cleavages. Fully crystallized groundmass material is formed by plagioclase microliths, microcrystals of biotite and pyroxene and opaque minerals. Quartz xenocrytals which are intensely observed in samples and have sizes larger than 5 mm reflect the magma mixing. As most of them were subjected to magmatic corrosion, embayed quartz crystals were surrounded by microliths and microcrystals of clinopyroxene.

3. Major Element Geochemistry

Major element composite of the Yukarıkızılca volcanic (Table 1) was assessed in TAS diagram which was suggested by Le Bas et al. (1986). Lava sample located between regions of andesite-dacite and sub alkaline section is "calc-alkaline" according to Irvine and Baragar (1971) (Figure 5a).

Korucuk volcanic falls into trachydacite region in TAS diagram of Le Bas et al. (1986) in which major

Table 1- Major element contents of Yukarıkızılca and Korucuk volcanics (%)

Sample	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	Cr_2O_3	LOI
Yukarıkızılca	60.74	16.12	5.42	2.83	5.44	2.73	2.31	0.77	0.37	0.09	0.003	2.8
Korucuk	60.18	12.61	4.60	4.28	4.56	2.11	6.27	1.28	0.77	0.08	0.029	2.8

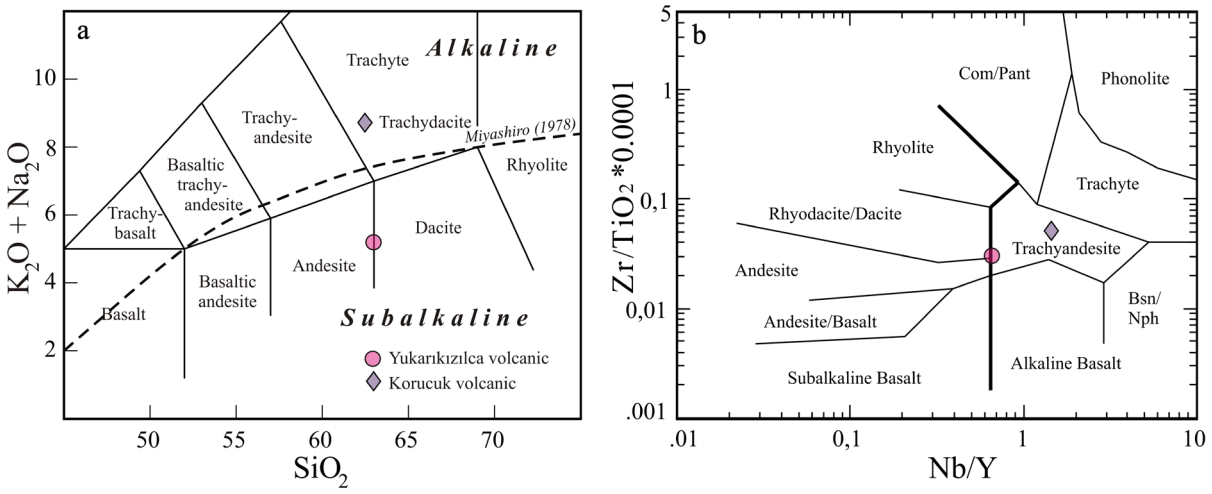

Figure 5- (a) TAS (Le Bas et al., 1986) and (b) Zr/TiO2 versus Nb/Y (Winchester and Floyd, 1977) diagrams of Yukarıkızılca and Korucuk volcanics.

element composite is assessed (Table 1) (Figure 5a). It was evaluated that this diagram gave confusing result, due to SiO_2 content (60.18%), which was oxidised by quartz xenocrytstals that had been gained by the magma mixing. In Winchester and Floyd 1977 nomenclature diagram based on stable elements (Zr: 650.0, Nb: 29.6, Y:20.2 ppm; TiO_2: %1.28), Korucuk volcanic plotted on trachyandesite region (Figure 5b) is ultrapotassic (K_2O>3%, MgO>3%, K_2O/Na_2O>2%; Foley et al.,1987) and could be named as latite.

4. Geochronology

K/Ar ages of Yukarıkızılca and Korucuk volcanics were detected as 15,6±0.6 Ma and 15,0±0,4 Ma (Table 2). Radiometric ages reflect that the intrabasin volcanism which is in similar ages activated in middle Miocene though they have different characters.

Table 2- Results of radiometric analyses of the samples taken from Yukarıkızılca and Korucuk volcanics.

Sample	Material	(%)K	$^{40}Ar_{rad(nl/g)}$	(%)$^{40}Ar_{air}$	Age (Ma)
Yukarıkızılca	%30 K-spar, %70 plagioclase	1.48	0.886	89.4	15.6±0.6
Korucuk	Biotite	7.63	4.380	62.0	15.0±0.4

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