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Rift Related Arc Volcanism During Liassic Time in the Southern Zone of Eastern Pontide Arc, NE Turkey

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Introduction and Geological Setting

The eastern Pontide magmatic arc is divided into southern and northern zones coinciding to different part of the stretched and tectonically denuded arc (Bektas et al., 1987). As an magmatic arc, the eastern Pontide is characterised by Liassic, Upper Cretaceous and Eocene magmatism (Arslan et al., 1997). Each zone has different tectono-magmatic evolution in the Mesozoic time. Mesozoic volcanism is classified into two cycles as Liassic and Cretaceous. The northern zone is represented by voluminous bimodal (basaltic and dacitic) volcanism whereas basic volcanics in the southern zone. From the north to south, there is differences in volcanic stratigraphy, petrography and geochemistry. In the southern zone basic Liassic, andesitic and dacitic Cretaceous, basaltic and andesitic Eocene volcanics developed.

The basement in the southern zone is pre-Permo-Carboniferous aged Pulur Massif which contain greenschist, micaschist, para-amphibolite schist, ortho-amphibolite, gneiss, marble, quartzite and intruding granitoid. Liassic aged Hamurkesen Formation overlying unconformably the massif begins with Dikmetas conglomerate and continues with volcano-sedimentary rocks containing tuff, sandstone and basaltic andesite-andesite, all of which are cut by diabase dykes. Malm-Lower Cretaceous aged Hozbirikyayla Formation overlies conformably Hamurkesen Formation and contains limestone and sandy limestone. Campanian aged Sarihan Granitoid cuts all these lithologies (Aslan, 1998).

Stratigraphy and Petrography

Liassic aged Hamurkesen Formation is widespread with a thickness of about 1500 meters in the region. The unit at the base begins with conglomerate (50-60 meters) containing fine-medium grained clasts of the basement rocks. The conglomerate level is overlain conformably by volcano-sedimentary rocks, consisting of lithic crystal-crystal tuff (~400 m.), tuff and sandstone alternations (~350 m.), basaltic andesite-andesite (~300 m.), vitric tuff (~50 m.), sandy limestone with cross-cutting 3-5 m. thick diabase dykes (~400 m.) from bottom to top. The Liassic volcanic rocks is dominated by pyroclastics and lesser basaltic andesite-andesite. Furthermore, the volcano-sedimentary unit show vertical and lateral transitions within the formation, characterising a general future of rift-basins in the region (Görür et al., 1983).

Tuffs contain abundant plagioclase (oligoclase An10-12, andesite An32-46), lesser pyroxene (mainly uralitic), hornblende, opaque oxides, secondary sericite, calcite, chlorite, devitrified glass. Besides, rock fragments are made of basic rocks and limestone in the lithic tuff. Basaltic andesite-andesite have microlitic and microlitic porphyric textures and rarely altered. Plagioclase (An26-43) are mainly andesine and lesser oligoclase in composition. Some phenocrysts show oscillatory zoning and some altered into calcite and clay. They may also contain apatite inclusions. As mafic mineral augite and hornblende are present. Augite is euhedral to subhedral and mainly show uralitization.

Geochemistry and Petrogenesis

Basaltic andesite-andesites based on major and trace element analyses contents 44-50% SiO_2, 0.42-1% TiO_2, 13-17% Al_2O_3, 9-13% FeOt, 5-9% MgO, 7-9% CaO, 3-4% Na_2O, 1-2% K_2O and Mg-numbers between 49 and 59. The rocks are calc-alkaline in composition and comparable with general geochemical characteristics of volcanic arc lavas. In variation diagrams, TiO_2, FeOt, MgO and CaO decrease whereas Pb, Rb, Ba, La, Th and Y increase with increasing SiO_2. Generally geochemical variations suggest plagioclase and augite fractionation in the evolution of the rocks. In MORB-normalised trace element patterns, Sr, Ba, K and Th show enrichment but Cr, P and Ti depletion.

Liassic time in the southern zone of the Eastern Pontide is characterised sedimentary rocks accompanied with volcanics of basaltic andesite-andesite and their tuffs. Extensional tectonic regime at the beginning of Liassic brought rifting in the southern zone of eastern Pontide. Furthermore, block faulting related to this rifting developed horst-graben structures (Bektas et al., 1997). As a result of rifting, Liassic units show transitions even in short distance in the region. Besides, cross-cutting diabase dykes occurred as a result of extensional regime. Conclusively, volcanism in the Liassic occurred within an extensional regime possibly related to rifting immediately prior to subduction of the Neotethyan oceanic crust, producing island-arc-type calcalkaline volcanics (and intrusives) in the Upper Cretaceous.

Arslan M, Tüysüz N, Sadettin K & Kurt H, *Chemie der Erde*, **57**, 157-187, (1997).

Aslan Z, *Karadeniz Technical Univ. Ph. D. thesis*, **(unpublished)**, 222pp, (1998).

Bektas O, Van A & Boynukalin S, *TJK Bulletin*, **30/2**, 9-19, (1987).

Bektas O, Aslan Z, Köprübasi N & Arslan M, *Çukurova University 20th year Geology Symp. Abstracts*, 123-124, (1997).

Görür N, Sengör AMC, Akkök R & Yilmaz Y, *TJK Bulletin*, **26**, 11-19, (1983).