

## The Amphiolite Layers In The Cumulate Gabbros, (Northern-Turkey)

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The Early-Middle Jurassic SSZ type dismembered ophiolite sequence, which is remnants of the Tethyan oceanic lithosphere, crop out in the accretionary complex around Tokat-Çamlıbel region (Northern Turkey). The main lithology of the ophiolite sequence are cumulate gabbros, isotropic gabbros and basalts. The amphibolite layers, which their thickness are up to 2 m, are observed in the cumulate gabbros. In this study, we aim to discuss a possible formation mechanism of the amphibolitic rocks in the cumulate gabbros, based on the field, mineralogical, geochemical and geochronological data.

The cumulate gabbros (olivine-gabbro, gabbro-norite and gabbro) have generally well developed magmatic layers and they show cumulate texture. They are cross cut by pegmatite gabbros, dolerites and plagiogranite dikes. In terms of the mechanism of formation, the amphibolite layers in the cumulate gabbros are different from dolerite, pegmatite gabbro and plagiogranite dikes crosscutting the cumulate gabbros. Although the cumulate gabbros, the mafic and felsic dikes have not undergone any metamorphism (except the hydrothermal metamorphism), the amphibolite layers show well developed foliation and banded structure. Moreover, field and petrographic observations showed that the amphibolitic rocks were highly subjected to shearing. The amphibolitic rocks are mainly composed of magnesio-hornblende + plagioclase (andesine),  $\pm$  biotite and opaque minerals and they exhibit nematoblastic texture. The amphibolite layers in the cumulate gabbros are crosscut by the plagiogranite dikes. The plagiogranites consist mainly of quartz, plagioclase, biotite and opaque minerals and they show granular texture. Undulose extinction and sub-grain formation in quartz minerals indicate to the presence of deformation phase affecting the plagiogranite dikes.

LA-ICP-MS dating on zircon from plagiogranite dikes which is cross-cutting of the amphibolite layers, yielded Middle Jurassic ages.  $^{40}\text{Ar}/^{39}\text{Ar}$  dating of amphiboles from the amphibolite yielded a cooling age of  $166.5 \pm 7.4$  Ma ( $2\sigma$ ) (Middle Jurassic). Metamorphic temperature of the amphibolites was calculated as  $688 \pm 12$  °C for about 0.2 Gpa.

Transform faults boundaries and the other fractures in the oceanic crust can be appropriate places for the dikes injection and circulation of hydrothermal fluids. Accordingly the amphibolite layers in the cumulate gabbros were probably occurred by the activity of these faults.

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