



Mineralogy and petrography of metagabbros and metapyroxenites from NW Tinos Island, Cyclades, Greece

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Tinos Island, located at the Cyclades island complex in the central Aegean Sea, is dominated by three major tectonometamorphic units that are separated by low angle normal faults. The uppermost unit consists of varying lithological sequences from Permian to Tertiary metasediments and Mesozoic ophiolitic relics, metamorphosed under greenschist facies. This study refers to blocks of metabasic rocks that were found, ca. 4km north of the Marlas village, in the NW part of Tinos Island and are enclosed in the greenschist unit. The blocks have irregular or ellipsoidal shapes and reach a length of about 20m and a mean thickness of approximately 10m. Two major lithologies were discriminated: banded metagabbros and metapyroxenites. The metagabbros are mainly characterized by alternation of dark-green and white bands. The dark-coloured zones consist of stubbyprismatic olive-green crystals with a mean length of about 1cm, while the light-colored zones are dominated by the presence of a whitish matrix and usually are wider than the mafic zones. A few green-colored prismatic crystals float in this leucocratic matrix, and seem to have a systematic orientation that tends to be parallel to the schistosity of the surrounding greenschists. The metapyroxenites are fewer than the metagabbros and consist of stubbyprismatic green-colored crystals set in minor matrix of green-greyish color. In some cases, especially along the contact of the metapyroxenites with the metagabbros, the crystals follow a systematic orientation which is parallel to the general schistosity of the greenschists, which consist of typical mineralogical assemblages of metabasic rocks that have been metamorphosed under greenschist facies: albite, chlorite, epidote, actinolite and white mica predominate, while biotite, titanite, rutile, calcite and hematite are the main accessory phases. Detailed microscopic investigation revealed that the mafic minerals in both lithologies are typical pleochroic pyroxenes that have been replaced in their rims and along cleavage plains by amphiboles, mainly hornblende. Especially in the metagabbros, a second stage of replacement was observed and is related to the alteration of hornblende into actinolite or even tremolite. Moreover, the light-colored bands consist mainly of saussuritized plagioclase, mainly albite and few floating amphibole crystals, as well as minor amounts of epidote, chlorite, rutile, titanite, biotite and opaque minerals. The metapyroxenites consist of pseudomorphs of hornblende or pargasite after former pyroxenes, mainly of augitic composition. In most of the times, the replacement is complete but there are cases where xenomorphic laths of the former pyroxene are found as inclusion in the amphiboles. Albite, epidote, chlorite and titanite were found in very minor amounts, along with opaque minerals. The initial magmatic texture has been preserved to a significant extent, despite the fact that many prismatic minerals seem to be oriented and thus give the rock a metamorphic fabric.