

MINERAL ASSEMBLAGES OF HIGH-PRESSURE, QUARTZ-MICA SCHISTS FROM SYROS, CYCLADES, GREECE

Dan O. Breecker
Amherst College
Amherst, MA 01002
dobreecker@amherst.edu

The island of Syros lies within the blueschist belt of the Attico-Cycladic metamorphic complex. The island is underlain by alternating, north dipping marbles, metapelites and acidic metavolcanics, which may be repeated in a greatly thickened sequence of stacked thrust sheets. Metabasite localities dot the island and a mélange zone exists to the north. Recent studies suggest that the island was metamorphosed under blueschist facies conditions at approximately 80 Ma, during the Alpine orogeny (Cheney et al., 2000; Bröcker and Enders, 1999). There is also local evidence of a greenschist overprint, widely accepted to be a late Oligocene/early Miocene event.

This study concerns the mineral assemblages of samples from an island-wide set of quartz-mica schists localities. In most samples, three texturally distinct assemblages have been recognized. The matrix (blueschist facies) assemblage in these rocks contains quartz + white mica + glaucophane + garnet +/- chlorite +/- chloritoid +/- jadeite +/- epidote. A retrograde (greenschist facies) assemblage partially overprints the matrix assemblage with the minerals albite, chlorite, and/or biotite. Clinopyroxene inclusions in garnet suggest a pre-blueschist, eclogite facies assemblage, which is defined on the nearby island of Sifnos by the stability of jadeite + quartz and omphacite + garnet (Lister and Raouzaïos, 1996). Chemical analysis and the study of textures and reactions on a NFM projection from quartz, zoisite and paragonite onto the plane NaAlO_2 - FeAl_2O_4 - MgAl_2O_4 are used to assess the causes of mineral assemblage variation within each facies. Particular attention is given to the breakdown of jadeite-chloritoid, which occurs in the inclusion assemblage but not in the matrix assemblage. In addition, the reactions albite = jadeite + quartz and paragonite = jadeite + kyanite + quartz are used respectively as minimum and maximum constraints on pressure. Fe/Mg partitioning between garnet and phengite and between chlorite and chloritoid is also used to estimate temperatures experienced by these rocks.