CALC-SILICATE MARBLES OF SYROS, GREECE

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Syros is a small island located in the Aegean Sea and is part of the Cyclades archipelago. The Cyclades are located in the central portion of the Attic-Cycladic metamorphic complex, a crystalline metamorphic belt that extends from Attica, Greece to the Menderes Massif in Turkey. The Cycladic islands have undergone at least two periods of metamorphism. A Cretaceous high-pressure blueschist facies event occurred around 80 Ma (Bröcker and Enders, 1999; Cheney et al., 2000). A Miocene greenschist partial overprint occurred at 19-25 Ma (Schliestedt et al., 1987). Eocene Rb/Sr and K/Ar mineral ages (40-45 Ma) were found by Altherr et al. (1979), but the meaning of these ages is not certain. Bröcker and Enders (1999) also report Paleocene zircon growth on the adjacent island of Tinos at 61-63 Ma, which they attribute to another metamorphic event.

The rocks on Syros include repeated sequences of northerly-dipping marbles, calcareous schists, and metamorphosed mafic rocks. Marbles occur in numerous locations on the island in layers up to 400m thick (Maluski, 1987). Fossil evidence (Schumacher, personal communication) indicates the marble protoliths are Mississippian in age. In many places, the marbles are principally calcite, but contain pervasive columnar structures believed to be pseudomorphs of aragonite. Individual columns vary considerably in size, may be up to 8 cm in length and 1-2 mm across, and are typically oriented perpendicular to bedding. Marble matrix conglomerate or breccia layers were observed that contain rounded clasts of various rocks, including eclogite, blueschist, and marble. Minerals observed in the impure marbles include: calcite, quartz, phengite, glaucophane, garnet, epidote, omphacite, dolomite, and titanite. Dolomite, where present, is commonly found in clusters of fine-grained (20-150 μ m across) crystals, much smaller than the calcite crystals (0.5-1 mm). These mineral assemblages and the existence of aragonite pseudomorphs are consistent with metamorphic conditions of 15 kb and 500°C proposed for Syros (Okrusch and Bröcker, 1990). Mineral composition data are being gathered to further constrain metamorphic history as part of a Keck Geology Consortium research project.

Northeastern Section - 36th Annual Meeting (March 12-14, 2001)

Session No. 7--Booth# 26 <u>Undergraduate Research I (Sponsored by Geology Division, Council on Undergraduate Research)</u> (Posters) Sheraton Burlington: Lake Champlain Exhibition Hall 8:30 AM-12:00 PM, Monday, March 12, 2001

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