

Paper No. 105-0

GEOCHEMISTRY AND METAMORPHISM OF BLUESCHIST/ECLOGITE FACIES ROCKS ON THE ISLAND OF SYROS, CYCLADES, GREECE

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Syros is part of the Attic-Cycladic blueschist belt. Many of its rocks contain high-P mineral assemblages indicating 15-16 kbar and 500°C. The two main marbles, some of which contain Mississippian fossils, are partly dolomitic, contain abundant calcite pseudomorphs after aragonite (Dixon, 1969), and are intercalated with the glaucophane (Glau)-schists, retrograde greenschists, and minor quartzites and Mn-cherts. Discrete, fault-bounded packages of blueschist/eclogite-facies mafic rocks with minor serpentinite are also present. In general, the mafic rocks have a variety of textures and modes, but most are either fine-grained, blueschists with a well-developed fabric (S approx.=L) or coarse-grained (>1 cm), massive omphacite- or Glau-rich rocks. Based on textures, mineralogy and field relations, previous workers (Dixon and Ridley, 1987) have interpreted the mafic rocks as meta-basalt and metagabbros. We obtained whole-rock XRF and INAA analyses for fine- and coarse-grained mafic and felsic rocks and some mica-rich samples. The chemical index of alteration (CIA) for most samples is less than 0.5, suggesting very minor weathering. Most samples are diopside normative, and the corundum normative samples have less than 3% corundum. On a TAS diagram, mafic rocks span the basalt - basaltic andesite - trachy-basalt - basaltic trachy-andesite fields. REE patterns generally fall between 10-100 times chondrite and show flat to moderately LREE-enriched patterns. Coarse-grained rocks have positive Eu anomalies, consistent with their interpretation by other investigators as fractionally crystallized gabbros. The low CIA-values suggest that the mica-schist precursors lacked significant clay material. The presence of abundant epidote (Zo) is consistent with a feldspar-rich (magmatic) protolith for the schists. Actual reaction pathways are more complex, but magmatic and high-pressure phase components of the schists can be related by: (1) $\text{Bio} + \text{An} + \text{Ab} + \text{H}_2\text{O} = \text{Celadonite} + \text{Mus} + \text{Zo} + \text{Glau} + \text{Qz}$; (2) $\text{An} + \text{Ab} + \text{H}_2\text{O} = \text{Paragonite} + \text{Zo} + \text{Qz}$; and (3) $\text{An} + \text{Orthoclase} + \text{H}_2\text{O} = \text{Mus} + \text{Zo} + \text{Qz}$. Syros appears to represent a mixture of ocean-floor magmatic rocks and island arc volcanics (immature volcano-clastic material interspersed with shallow water carbonates) that were juxtaposed during subduction.

[GSA Annual Meeting, November 5-8, 2001](#)
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Session No. 105

[Metamorphic Petrology II](#)

Hynes Convention Center: Ballroom A

8:00 AM-12:00 PM, Wednesday, November 7, 2001

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