

2004 Denver Annual Meeting (November 7–10, 2004)

Paper No. 195-5

Presentation Time: 9:00 AM-9:15 AM

GEOCHEMISTRY OF BLUESCHIST-ECLOGITE FACIES ROCKS ON THE ISLAND OF SYROS, CYCLADES, GREECE

[SCHUMACHER, John C.](#)¹, CHENEY, John T.², KEPLER, Stacy², GITAH, Njoki W.², and BRADY, John B.³, (1) Dept. of Earth Sciences, Univ of Bristol, Wills Memorial Bldg, Bristol, BS8 1RJ, j.c.schumacher@bristol.ac.uk, (2) Department of Geology, Amherst College, Amherst, MA 01002, (3) Department of Geology, Smith College, Northampton, MA 01063

Syros island is part of the Attic-Cycladic blueschist belt, and mineral assemblages indicate peak metamorphic conditions of at least 15-16 kbar and 500°C. The island consists mainly of (I) fault-bounded packages of blueschist/eclogite-facies mafic rocks with minor serpentinite, (II) intercalated marble and packages of mainly glaucophane-schists, retrograde greenschists, and minor white-mica schists, quartzites and Mn-cherts and (III) the fault-bounded Vari feldspar gneiss. Marble in (II) contains calcite pseudomorphs after aragonite. At the southern end of the island in (II), the high-P assemblages show a more extensive greenschist overprint; marbles are nearly absent and the abundance of felsic bulk compositions increases. The mafic rocks (I) 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 glaucophane-rich rocks. Based on textures, mineralogy and field relations, previous workers have interpreted the mafic rocks as metabasalt and metagabbros. We obtained whole-rock XRF and INAA analyses for a wide range of bulk compositions and textures. On a TAS diagram, mafic rocks (I) 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 mafic rocks and new analyses of eclogites have positive Eu anomalies, consistent with their interpretation as metamorphosed gabbro cumulates. Most felsic rocks (epidote-bearing mica-schists, quartz-mica schists with lawsonite pseudomorphs, retrograde albite schists) have negative Eu anomalies. The REEs patterns of the felsic rocks associated with the metagabbros (I) have negative Eu anomalies, LREE and HREE concentrations of about 50-100 times chondrite and are consistent with residual melts formed from the gabbros. Many white mica schists from (II) have negative Eu anomalies, show LREE enriched patterns and flat HREE patterns at 10-50 times chondrite. Low CIA values of most of the felsic rocks suggest little weathering occurred, and the presence of abundant epidote is more consistent with a feldspar-rich (magmatic) protolith, rather than a metapelitic one for the mica schists.

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