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Blueschists and eclogites from southern Sifnos (Cyclades, Greece)

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Eclogite/blueschist facies rocks from northern Sifnos (Cyclades) are well known and have been described by many authors. A small occurrence of similar rocks in the south-west of Sifnos has been investigated and is compared to other occurrences in terms of their mineral assemblages, chemistry, petrography and structural position.
The tectono-metamorphic evolution on Sifnos is characterized by a regional blueschist / eclogite facies metamorphism (M1) during the Eocene, followed by a regional Oligo–Miocene medium pressure overprint (M2). The investigated rocks from the Fikiada Bay area formed during M1 but were overprinted by a brittle / ductile M2 event.
The high-pressure rock assemblage of Fikiada bay represents a sequence of metabasites, metaacidites, and metasediments with a foliation-parallel compositional layering. Rootless isoclinal folding of the regional foliation is common with fold axes trending roughly NW-SE; hinges are overprinted by later axial foliation planes. The foliation is well developed and mostly dips to N to E, the main pervasive stretching lineation is shallow and plunging to NE. Grt- rich dark blueschists, bearing eclogite-boudins of some dm size, alternate with lighter Qtz-rich Grt-bearing, cm to m thick layers.
Massive, very coarse grained Ep+Chl+Ab -rich gneisses form layers with up to 3 m thickness. Metasediments comprise light Cal-rich gneisses as well as metapelites and quartzites.
These lithologies are overlain by highly strained calcite marbles bearing boudins of Dol-marble. Foliation, stretching lineation and isoclinal folds show the same orientation as in the silicates.
The blueschists show the characteristic assemblage Gln + Grt + Ep + Ab + Phg + Pg +Qtz (+Cal) + Mag. Inclusions in large poikiloblastic Grt reveal an earlier compositional layering: Domains with conserved foam microstructures of Qtz and domains of massive Grt including relics of Jd (XNa = 0.9), Ctd, Ep, Rt and Mag. Gln shows a zonal pattern with Mg-rich cores to ferro-glaucophane and crossite- richer rims. Ep is zoned too with decreasing Fe from core to rim, while Grt-poikiloblasts are nearly homogeneous in composition.
Eclogitic assemblages consist of Grt + Omp + Ep + Phg + Gln $\pm$ Qtz.
A greenschist-facies overprint accompanied by Fe- and CO2- rich fluids is mostly evident along shear bands of variable thickness from thin section to outcrop scale. It is best documented by the growth of syntectonic Ab+Chl neoblasts.
Metabasite layers intercalated with the marble show a pervasive greenschist-facies overprint with extensive, neoblastic growth of Chl an Ab. Early Ep remains unaffected, but Gln and Grt are preserved only as relics.
Petrography and mineral chemistry of southern Sifnos HP-rocks comply with the occurrence in northern Sifnos (e.g. comprehensive description by Schliestedt 1986)

References:
Schliestedt, M., 1986. Eclogite-blueschist relationships as evidenced by mineral equilibria in the high-pressure rocks of Sifnos (Cycladic islands), Greece. Journal of Petrology, 27,1437–1459

Mineral abbreviations after Kretz, 1983: Symbols for rock-forming minerals. American Mineralogist, 68, 277-279