



The northwest termination of the West Cycladic Detachment System in Central Attica

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The Attic-Cycladic complex (Central Aegean, Greece) is a significant tectonic domain with a geologic history of Eocene-Oligocene high-pressure metamorphism and Oligo-Miocene greenschist facies overprint during slab roll-back and crustal extension. Despite the fact that the geology of the Cycladic islands portion of the complex has been extensively studied, the structural continuation of the unit to the Attic peninsula remains enigmatic, leaving open an opportunity for pioneering research into the Cenozoic history of the northern Aegean. Exploratory mapping conducted on and nearby Mt. Hymittos, central Attic peninsula, identified a local Attican tectonostratigraphy characterized by three tectonic packages consisting of variably intercalated marbles and schists. Field observations, mineral assemblages and deformation mechanisms suggests the tectonic packages decrease in metamorphic grade from upper greenschist facies in the stratigraphically lowest package to sub- greenschist facies in the stratigraphically highest package. The structurally lowest package consists of the Pirnari dolomitic marbles, overlying the Vari schist, a composite of metamorphosed calc-siliciclastic and volcanic rocks. Vari calc-schists have Qz-Ms-Cal-Ap peak mineral assemblages whereas the metavolcanics exhibit a Qz-Ms-Kfs-Pl assemblage. The Qz-rich rocks of this tectonic package display extensive subgrain rotation deformation mechanisms in quartz, suggestive of upper-greenschist to lower-amphibolite facies conditions. The schistose lithotype of the middle package is the dark-gray Kessariani calc-schist, with a Qz-Bt-Ms-Cal-Cld mineral assemblage, suggesting relatively higher pressure, upper greenschist facies metamorphism. The Kessariani schist is bound above and below by calcitic marble mylonites defined as the Upper and Lower Marble, respectively. The uppermost tectonostratigraphic package comprises the low-grade massive calcitic marble and pale brown calc-phyllites of the Alepovouni Unit, the latter possessing a Ms-Qz-Cal mineralogy, indicative of sub-greenschist to lower greenschist facies conditions. Alepovouni marbles and phyllites are finer grained than the structurally lower tectonic packages, with microstructures exhibiting lower temperature deformation mechanisms. Mineralogical and microstructural evidence suggests the uppermost tectonic package experienced the lowest grades of metamorphism. The three tectonic packages are separated by a pair of low-angle, ductile-brittle detachments with a top-to-S/SW sense of shear, determined from flanking folds, sigmoids, stair-stepping of strain shadows on porphyroclasts, and SCC' fabrics in schists. In some instances, the cataclastic portions of the detachments are overprinted by hydrothermal alteration and calcite vein development, yet no intrusive bodies have been identified. Considering the low-angle of the structures, and the presence of mylonites, ductile-brittle relationships, and cataclasites; significant displacement has likely occurred in order to accommodate the degree of exhumation required to expose this range of crustal conditions. Metamorphic grade and styles of deformation suggest that the low-angle structures are part of a major, crustal-scale extensional complex. Preliminary zircon (U-Th)/He dating of Kessariani schists suggests that exhumation along the uppermost structure occurred during the late Miocene (Seman, 2016). These structures may be mechanically linked to similar structures in Lavrion and represent a northward continuation and probable termination of the West Cycladic Detachment System.