



Late Miocene detachment faulting and crustal extension in SE Attica (Greece).

Spyridon Lekkas, Emmanuel Skourtsos, Konstantinos Soukis, Haralambos Kranis, Stylianos Lozios, Apostolos Alexopoulos, and Petros Koutsovitis

University of Athens, Faculty of Geology and Geoenvironment, Athens, Greece (soukis@geol.uoa.gr)

SE Attica (Lavrion area) is located at the northwestern part of the Attic-Cycladic metamorphic core complex. It largely consists of rocks that experienced HP/LT metamorphism during Late Cretaceous - Tertiary subduction and were later exhumed during post-orogenic extension in the Miocene.

The dominant structure in SE Attica, observed for several tens of km², is a sub-horizontal, crustal-scale detachment fault that juxtaposes the two primary tectono-stratigraphic units. The footwall of the detachment comprises the Kamariza Unit, which includes marbles and intercalated schists with greenschist facies mineral assemblages. The Lavrion Unit, situated in the hanging wall, is composed of a mélange-type formation containing metamorphosed basic and ultrabasic rocks (Lavrion Schists) and is underlain by the massive to thick-bedded, white Lavrion Marbles. These marbles were formerly assigned to the Kamariza Unit, but detailed mapping reveals that they are situated in the hanging wall. The basic and ultra-basic lithologies of the Lavrion Unit preserve HP/LT mineral assemblages that are partially overprinted by the greenschist facies event.

The detachment fault is marked by the mylonitic deformation of the footwall rocks superposed on pre-existing structures and fabrics and the formation of a marble ultra-mylonite several decameters thick. It exhibits a NNE-SSW stretching lineation and top-to-SSW sense of shear. Away from the detachment, axial plane schistosity and ENE-WSW stretching and/or crenulation lineations can be observed both in the hanging wall and footwall rocks. These structures were developed in a greenschist facies ductile shear zone that is responsible for nearly complete overprinting of HP mineral assemblages. Movement along the detachment continued into the brittle regime with deformation accommodated along high- and low-angle normal faults. At this stage, a structurally higher detachment developed along the contact of Lavrion Schists and Lavrion Marbles, as indicated by the cataclastic deformation on both formations. In the Late Miocene, a relatively undeformed granite (10-8 Ma) intruded the Kamariza Unit, indicating that the detachment was still active during the ?Middle - Late Miocene.

On Berzekos hill, a klippe that tectonically overlies the Lavrion Schists, exposes unmetamorphosed upper-plate rocks that may be associated with the Sub-Pelagonian unit.

Recent studies in the neighbouring islands of Makronisos and Kea have reported a mylonitic to cataclastic low-angle normal fault with a top-to-SSW sense of shear; this is considered to be part of the West Cycladic Detachment System. Since the footwall of this detachment exposes Cycladic Blueschist Unit, the Kamariza Unit of SE Attica may comprise retrograded Cycladic Blueschist Unit.