



Provenance of metasediments and Miocene exhumation history of the Lavrion Peninsula, South Attica, Greece: a combined structural, (U-Th)/He, and detrital zircon U-Pb study.

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Within the Hellenides of Greece, Attica and Evvia lie at the extreme northwestern limit of the highly attenuated Attic-Cycladic Crystalline Complex and the relatively unextended Pelagonian realm. In this area, three different portions of the greater nappe stack of Greece are exposed: the Sub-Pelagonian nappe, the Cycladic Blueschist Unit (CBU) and the so-called Basal Unit, the para-autochthonous nappe to the CBU. The Basal Unit is defined by exposures of the Alymyropotamos Unit on Evvia Island. In Attica, the distinction between Basal Unit and CBU is not so clear due to similar histories of blueschist facies metamorphism and greenschist retrogression for both units. Based on the large amount of marbles exposed in Attica relative to CBU exposed in the Cyclades, much of Attica has previously been assigned to the Basal Unit.

Detailed mapping in Lavrion peninsula (south Attica) has called into question the old association of many of these marbles with the Basal Unit. The dominant structure is a sub-horizontal detachment, the South Attic Detachment (SAD), which juxtaposes lower plate mylonitic to ultramylonitic rocks of the Kamariza Unit against the upper plate Lavrion Unit. The detachment marks a significant change in the structural inventory between upper and lower plate rocks. The Kamariza Unit exhibits an early stage mylonitic foliation with a NNE-SSW stretching lineation. On the other hand the main foliation in Lavrion Unit is a compressional crenulation cleavage with an ENE-WSW to NE-SW stretching and/or intersection lineation. Along the detachment both units and especially the hanging wall rocks are overprinted by late-stage cataclastic deformation. Numerous kinematic indicators reveal top-to the SSW sense of shear for the SAD, thus linking it kinematically with the Western Cycladic Detachment System (WCDS).

Detrital zircon U-Pb geochronology was used in order to constrain provenance and depositional age for the clastic metasediments from both the footwall and the hanging wall of the SAD. For the Kamariza Unit data show Panafrican and Triassic input and reveal the maximum depositional age to be Triassic. The Lavrion Unit metasandstones exhibit a much wider range of detrital zircons and maximum depositional ages cluster in the late Jurassic to Cretaceous.

Newly acquired (U-Th)/He data from the lower plate Kamariza Unit constrains late-stage brittle deformation on the SAD at 6-9 Ma, similar to data along strike of the WCDS on the islands of Kea and Serifos. Additionally, the Lavrion Unit record zircon (U-Th)/He ages in the middle Miocene, (16-12 Ma), similar to ages reported for the island of Kythnos. This data suggests two major episodes of exhumation along strike of the WCDS.