Synchronous Eocene deformation recorded on either side of a major Miocene thrust bounding the Almyropotamos tectonic window in Evia, Greece

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Southern Evia in Greece exposes an inverted high pressure-low temperature (HP-LT) metamorphic sequence that has been loosely correlated with the Cycladic Blueschist Unit (CBU). On the island, the CBU is divided into the metavolcanic and ophiolitic Ochi Nappe and predominantly metacarbonate Styra Nappe. A lower-grade unit, the Almyropotamos Nappe, is exposed in the core of a N-S trending antiform and comprises Eocene platform carbonates overlain by metaflysch. The Almyropotamos Nappe occupies a tectonic window defined by the Evia Thrust, a brittle-ductile fault zone that emplaced the Ochi and Styra nappes atop the Almyropotamos Nappe. New multiple single-grain white mica total fusion ⁴⁰Ar/³⁹Ar ages indicate that deformation occurred along the Evia Thrust at 25-23 Ma. White mica ⁴⁰Ar/³⁹Ar data on either side of the tectonic window record Eocene dates between 40 and 32 Ma, consistent with previously published ⁴⁰Ar/³⁹Ar dates and a single Rb-Sr age of c. 30 Ma. These ages broadly coincide with estimates for the timing of NE-directed thrusting of the Ochi Nappe over the Styra Nappe. Strain associated with thrusting localized as cylindrical folds in Styra marbles, with fold axes parallel to the stretching lineation and a clear strain gradient increasing toward the upper contact with the Ochi Nappe. The most prominent structures in the Ochi Nappe are a strong L-S fabric defined by acicular blue amphibole and type-3 refold structures with fold axes trending parallel to the NE-SW oriented stretching lineation. Whereas the Ochi Nappe and Styra Nappe locally preserve peak blueschist facies mineral assemblages, all three units commonly display evidence only for retrogressed initial HP-LT assemblages in the form of ferroglaucophane inclusions in albite porphyroblasts. Isochemical phase diagrams calculated in the Na₂O-CaO-K₂O-FeO-MgO-Al₂O₃-SiO₂-H₂O-TiO₂±O₂ system support minimum peak metamorphic conditions of 12.5 ± 1.5 kbar and 465 ± 75 °C for an Ochi Nappe blueschist, and 6.0 ± 0.5 kbar and 315 ± 15 °C for an albite mica schist from the Evia Thrust. Peak P-T conditions for the Ochi Nappe support a metamorphic history more closely resembling that of the Lower Cycladic Blueschist Nappe, indicating that the entire section of the CBU exposed on Evia lies below the Trans-Cycladic Thrust. The Early Miocene ages from the Evia
Thrust overlap with the proposed timing for the initiation of bivergent greenschist facies extension in the Cyclades. The remainder of the region, including high-strain corridors within individual nappes such as the Almyropotamos Thrust, uniformly records Eocene deformation ages. The similarity in $^{40}\text{Ar}/^{39}\text{Ar}$ ages across the tectonic window contrasts with age relationships observed in similar tectonic packages on Lavrion, and suggests that regional scale deformation persisted until the Late Eocene before strain became localized in brittle-ductile corridors by the Early Miocene.