



Complete structural analysis of the Upper plate of Attica metamorphic core complex (Sub-Pelagonian Zone, Internal Hellenides, Central Greece)

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Two structural plates compose the Miocene Cordillera-type core complex of Attica, separated by a km-scale detachment fault (Diamantopoulos 2005, Diamantopoulos 2006). The Upper Plate contains rocks of the Sub-Pelagonian Zone and the Neogene basin of Athens. The Lower Plate includes Neogene basins developed onto Late Cenozoic a-type metamorphic domes. This work analyzes the geometry and the kinematic path of flow of rock masses of the Sub-Pelagonian rocks from the northern parts of Penteli mountain up to the Gulf of Alkyonides. The UP comprises Permo-Triassic rocks, Triassic-Jurassic carbonates and Late Jurassic melange, Mesozoic serpentinites containing Fe-Ni rocks, occurrences of carbonates and radiolarites, Cretaceous limestones as well as Paleocene flysch. A 3D structural analysis in all the scales concludes that: a) Multiple steep- and low-angle cataclastic shear zones define the boundaries among distinctive Permo-Triassic rocks, among Triassic-Jurassic rocks and Permo-Triassic rocks, among Permo-Triassic rocks and Triassic-Jurassic rocks, among Triassic-Jurassic rocks and serpentinites, among serpentinites and Triassic-Jurassic rocks, among Triassic-Jurassic rocks and Jurassic mélange, among Jurassic mélange and Triassic-Jurassic rocks, among Triassic-Jurassic rocks and Jurassic radiolarites, among Cretaceous and Triassic-Jurassic rocks, among Triassic-Jurassic rocks and Fe-Ni rocks, among Cretaceous and Fe-Ni rocks, among Paleocene and Triassic-Jurassic rocks, among Paleocene and Permo-Triassic rocks as well as among Cretaceous and Paleocene rocks, b) Apparent omissions of intermediate lithologies throughout the entire nappe stack observed in multiple locations suggest intense non-coaxial thinning, c) A remarkable contrast in the distributed strain between the distinctive lithologies is well-recognized, dependent by the rheological and mechanical character of the rocks, d) Thrust-like geometries and macroscopic repetitions between competent and incompetent rocks constitute 2nd order structural features resulting by non-coaxial strain, e) Cataclastic rocks dominate along the boundaries of the involved rocks as well as in footwall and hangingwall rocks, forming a complicated mix of sedimentary, volcanic, serpentinic and carbonate protolith rocks, f) Geometric analysis and description of asymmetric structures proves that a prominent non-coaxial strain toward north-northwest prevails, producing a heterogeneous cataclastic fabric in the rocks, g) Quantitative and qualitative analysis of asymmetric structures among Triassic-Jurassic rocks and Permo-Triassic rocks determined that two strain domains are formed in the footwalls, including structures of different strain state, h) Field evaluation of the structural geology and the tectonics connote the conjugate character of the cataclastic zones, causing almost complete decomposition of the pre-existed geometries. Deformation of the Paleocene flysch sediments by the inferred non-coaxial strain field indicates a post-Paleocene age of the observed geometry. Multi-directed steep-angle faults in Alpine and Neogene rocks cut the former shear zones and define elongated post-Early Miocene basins, ascribed to post-Late Miocene faulting activity. Combined these data of structural geology, we connote that brittle decomposition of the UP, late-stage exhumation of the ductile-deformed lithologies towards the upper rigid crust and the formation of Athens basin progressed during Neogene.

Diamantopoulos A., 2005. A cardinal problem of the kinematic path of Internal Hellenides (Pelagonian Cordillera, Northern Central Greece): Field evidences from Askion and eastern Vernon mountain ranges. IESCA 2005, iZMIR-Turkey, Book Abstracts, page 32.

Diamantopoulos A., 2006. Late-orogenic stretching of the Upper Plate of Attica metamorphic core complex (Internal Hellenides, Central Greece): Field evidences from Parnis, Pastra and Kitheron mountains. International Conference on Neogene Magmatism of the Central Aegean

and Adjacent areas, Book Abstracts, pp. 29.