



Conditions of deformation and metamorphism on Skopelos island (Greece): implications for the Cretaceous-Paleogene tectonics of the Pelagonian zone

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We investigate subduction-exhumation processes on the Northern Sporades islands related to successive episodes of ocean-continent and continent-continent convergence through integrating multi-scale structural analysis, metamorphic petrology, and white mica Ar/Ar dating. Two major, progressive phases of ductile deformation are documented which are related to distinct episodes of tectonic burial and exhumation of the Pelagonian continental margin which was facing the Neotethys/Vardar ocean. Review of existing datasets from neighboring regions show that both deformation phases can be correlated along strike up to the Dinarides. The first phase of tectonic burial and exhumation (D1) is characterized by NW-SE tectonic transport, greenschist facies metamorphism, and Early Cretaceous (~105-135Ma) Ar/Ar white mica single fusion ages. D1 is correlated with the initial closure of the Vardar ocean by top-W to NW ophiolite obduction and the short-term underthrusting of the Pelagonian margin below the oceanic upper plate. Underthrusting was followed by exhumation and the deposition of Late Cretaceous – Paleogene sediments. The second phase of burial and exhumation (D2) is characterized by NE-SW tectonic transport, greenschist to blueschist facies metamorphism, and latest Cretaceous-Early Eocene Ar/Ar white mica ages of mylonitic fabrics. Top-SW kinematics are largely correlated with the tectonic burial of the Pelagonian zone below the Eurasian continent (Rhodope), while top-NE kinematics with subsequent extensional exhumation. D2 fabrics and structural contacts on Skopelos record P-T conditions that are consistent with shallow tectonic processes. We propose that the formations of Skopelos were incorporated in an accretionary wedge that formed above the subducting Pelagonian basement during Paleogene times.