



Cenozoic Evolution of the West Cycladic Detachment System

Christoph Iglseder (1,2), Bernhard Grasemann (1,2), Dave A. Schneider (3), Carley A. Senkowski (3), and Dani Stöckli (4)

(1) University of Vienna, Department for Geodynamic and Sedimentology, Althanstrasse 14, 1090 Vienna, Austria (christoph.iglseder@univie.ac.at, +43 1 4277 9534), (2) University of Vienna, Structural Processes Group, (3) University of Ottawa, Department of Earth Sciences, Ottawa K1N 6N5, Canada, (4) University of Kansas, Department of Geology, 120 Lindley Hall, 1475 Jayhawk Boulevard, Lawrence, KS 66045-7613, United States

Extension in the Aegean led to the formation of metamorphic core complexes and domes, with multistage extensional detachments cutting rocks of the Attic-Cycladic Crystalline at different structural and lithostratigraphic levels. Four kinematic provenances are here distinguished in the Cycladic extensional detachment system: (1) The North (Andros-Ikaria) and (2) Central (Naxos-Paros) Cycladic Detachment Systems, showing top N/NE sense of shear; (3) the South Cycladic Detachment System (Ios-Amorgos), part of the South Cycladic Shear Zone, with evidence for two opposite kinematic domains, an older top S/SE and a younger top N/NW sense of shear. In contrast, the newly documented (4) West Cycladic Detachment System (Sifnos-Lavrion) is dominated by a top SW/SSW sense of shear. Low-angled extensional detachments nucleated in the ductile regime and show progressive overprinting by ductile-brittle and then brittle deformation processes on Kea, Kythnos and Serifos. On Sifnos, an older top NE and brittle-ductile younger event, with top SW kinematics has been documented. In comparison, on the Greek mainland in Attica, top SW/SSW sense of shear allows the regional structure to be expanded. At both Lavrion in Attica and Serifos, the extensional detachments were intruded by syn-tectonic Late Miocene granodiorites. Cenozoic extension in the Western Cyclades is suggested to begin in the Eocene, with early S-type granite intrusion on Serifos at 43-37 Ma (U-Pb zircon). This is supported by Eocene/Early Oligocene Rb/Sr and Ar/Ar (cooling) ages of hanging-wall schists and marbles. Similar cooling ages, (post-) dating high-pressure/low-temperature metamorphism, have been described from Sifnos. During the Oligocene/Miocene, a decrease in greenschist-facies ages has been determined on the Serifos-Kythnos-Kea transect. Similar ages of greenschist-facies metamorphism have also been found on Sifnos. Initial stages of the Serifos granodiorite intrusion, coeval with initiation of the main Serifos metamorphic core complex, gave Mid-Miocene ages of ca. 15-11 Ma (U/Pb, Rb/Sr, and Ar/Ar); these ages are also found as Ar/Ar white mica ages on Kea and supported by similar He-ages from hanging-wall rocks above the low-angled detachment on Serifos. This event continued since the Late Miocene with another pulse of granodiorite and the formation of ductile extensional shear zones and brittle-ductile/brittle low-angle normal faults. In this contribution, we show the significance of extension with top SW/SSW sense of shear, adapting the tectonic model for the Cycladic region.