Geophysical Research Abstracts,
Vol. 10, EGU2008-A-04191, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-04191
EGU General Assembly 2008

Thermochronometric constraints on extensional metamorphic dome formation in the western Cyclades, Aegean region

D.A. Schneider (1), B. Grasemann (2), M. Heizler (3), H. Vogel (4), Ch. Iglseder (2)
ACCEL Team

(1) Earth Sciences, Univ of Ottawa, Ottawa K1N 6N5, Canada, (2) Structural Processes Group, Univ of Vienna, Vienna 1090, Austria, (3) NMBGMR, New Mexico Tech, Socorro 87801, USA (4) Geological Sciences, Ohio Univ, Athens 45701, USA (david.schneider@uottawa.ca)

The Attic-Cycladic massif, part of the Alpine orogen in the eastern Mediterranean, is located southeast of the Greek mainland and trends parallel to the Hellenic volcanic arc. Miocene exhumation of metamorphic and plutonic rocks is due to widespread extension associated with low-angle detachment faulting probably related to a southward retreat of the Hellenic subduction zone and associated rotation of back-arc crustal blocks. Project ACCEL (Aegean Core Complexes along an Extended Lithosphere) has collected an extensive modern structural dataset for the islands of Kea, Kithnos, and Serifos of the western Cycladic archipelago. On all three islands, crustal-scale, low-angle frictional-viscous shear zones have been identified and record strikingly consistent SSW-directed extensional kinematics together with a WNE-ESE shortening component. The geology of Kea is dominated by highly-strained, greenschist-facies schists, calc-silicates and marbles; a major, 100's m thick ultramylonitic marble zone defines this northern island as a structural dome. White mica Ar-Ar thermochronometry performed on variably deformed units from different structural levels yield consistent Early Miocene (15-20 Ma) cooling ages across the entire island. Other pervasively deformed shallow crustal regions of the Cyclades (Tinos and Andros; b-type domes of Jolivet et al. 2004) also record similar Early Miocene cooling. Comparable geology and structure is exposed on Serifos although locally deformed under amphibolite-facies conditions and intruded in the south by a Late Miocene granodiorite. A ma-

jor high strain zone that is present on the island is localized along an earlier (Late Eocene?) orthogneiss. White micas from mylonites and gneisses along this shear zone and from rocks in the southern portion of the island yield Late Miocene (8-9 Ma) cooling ages, whereas greenschist-facies units in northern Serifos that are dominated by a different structural record of several phases of folding yield Oligocene (30-34 Ma) mica Ar-Ar cooling ages. Oligocene ages are similarly reported from Evvia and Sifnos, which are noted for their occurrences of the Cycladic Blueschist Unit. We interpret the Late Miocene cooling ages to represent the timing of extension and exhumation during metamorphic core complex genesis, which is coeval with the timing of exhumation the other Cycladic a-type metamorphic domes (Naxos and Paros) that represent deeper parts of the Hellenic accretionary complex. Exhumation of the Cycladic metamorphic domes in general was accommodated along interfering and sequentially developed syn- and antithetic extensional detachment zones. Although south-directed extension is recognized elsewhere along the Attic-Cycladic massif, the striking consistency of the kinematics within the western Cyclades is uncharacteristic, and our new age data suggest regional unroofing was relatively protracted.