

## Eocene high-pressure metamorphism to Miocene retrogression of a metamorphic core complex: Naxos, Cyclades, Greece

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In this study, we report new microfabrics, pressure–temperature estimates and <sup>40</sup>Ar/<sup>39</sup>Ar ages from a high-pressure (HP) metamorphism to low-temperature retrogression and deformation of Naxos in Cyclades, in the Aegean Sea. Most metapelitic rocks contain two generations of white mica, high-Si phengites crystallized during HP metamorphism and low-Si white mica, formed during a subsequent retrogressive overprint. <sup>40</sup>Ar/<sup>39</sup>Ar dating of five white mica samples yielded ages of approximately 51–40 Ma, with a mean at 45 Ma for the peak pressure conditions and approximately 35–29 Ma for the retrogressive greenschist-facies overprint. We have found a variable retrogressive deformation within the Naxos metamorphic core complex (MCC), which even pervasively affected significant portions of the migmatite-grade metamorphic core as well as the remnant high-pressure areas of the MCC, where retrogression led to a pervasive formation of new fabrics at greenschist facies metamorphic conditions during the brittle-ductile transition. Within a continuum of retrogression, <sup>40</sup>Ar/<sup>39</sup>Ar white mica dating allowed us to deduce three retrogressive ages at 16.52±0.39 Ma (within the Naxos MCC), 12.6±0.28 Ma (Moutsounas detachment shear zone on the eastern boundary of the Naxos MCC), and 10.43±0.44 Ma to 8.40±0.76 Ma (last ductile activity along the Naxos-Paros shear zone to the north of the Naxos MCC). A further stage of retrogression at 12–11 Ma occurred along distinct low-angle normal faults within the Middle Miocene Naxos Granite (Cao *et al.*, 2017). The Middle-Late Miocene retrogression events are also reflected by a similarly aged tectonic collapse basin in the hanging wall unit above the detachment. The wide temporal range of retrogression within the Naxos MCC coincides in age with a retrogressive deformation within other MCCs of the Aegean Sea. We interpret the long temporal range of retrogression to reflect outward, southwestward retreat of the subduction and sequential activation of major detachment zones.

### REFERENCES

Cao, S., Neubauer, F., Bernroider, M., Genser, J., Liu, J., Friedl, G. 2017. Low-grade retrogression of a high-temperature metamorphic core complex: Naxos, Cyclades, Greece. *GSA Bulletin* 129 (1–2), 93–117 (doi: <https://doi.org/10.1130/B31502.1>).