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Disruption of a high-pressure unit during exhumation: petrology and geochronology within the Cycladic Blueschist Unit (Thera, Ios and Naxos islands, Greece)

ALEXANDRE PEILLOD[1], CLIFFORD G. C. PATTEN[1], KIRSTEN DRUEPPEL[2], ARATZ BERANOAGUIRRE[3], ARMIN ZEH[2], DOMINIK GUDELIUS[4], SIMON HECTOR[1], JAROSLAW MAJKA[5], BARBARA I KLEINE[6], ANDREAS KARLSSON[7], AXEL GERDES[8] AND JOCHEN KOLB[1]

[1]Institute for Applied Geosciences, KIT
[2]Karlsruhe Institute of Technology
[3]FIERCE (Frankfurt Isotope & Element Research Center), Goethe University Frankfurt am Main
[4]Eberhard-Karls-Universität Tübingen
[5]Mineralogy Petrology and Tectonics, Uppsala University
[6]GeoZentrum Nordbayern, Friedrich-Alexander-Universität Erlangen-Nürnberg
[7]Swedish Museum of Natural History
[8]Goethe-Universität Frankfurt, Institut für Geowissenschaften

Presenting Author: alexandre.peillod@gmail.com

Reconstructing the original geometry of a high-pressure unit is challenging. While a single nappe is subducted and exhumed, nappe-internal thrusts may disrupt it. Multiple approaches were used to determine the detailed P-T loop of the Middle-CBU nappe of the Cycladic Blueschist Unit (Hellenide subduction orogen, Greece) in Thera (Santorini) and Ios such as U-Pb garnet geochronology coupled with Zr-in-rutile thermometry, quartz-in-garnet elastic barometry, average P-T and phase equilibrium thermodynamic modelling.

The results of this approach reveal that the Middle-CBU nappe in Thera (Santorini), Ios and Naxos was subducted as a coherent continental fragment at a subduction rate of ~2.1 km/my and a heating rate of ~12°C/my. Prograde and peak HP metamorphism occurs at *c.* 55 and *c.* 40 Ma respectively. Along Thera, Ios and Naxos, prograde and peak P-T conditions increase from sub-blueschist to upper blueschist facies metamorphism. Subsequently, the sequence was disrupted by one or several thrust faults during its exhumation. The Middle-CBU nappe at Naxos was thrust onto the Ios sequence during the Oligocene at *c.* 30 Ma. This imbrication is revealed by different exhumation rates of ~6 km/My for the Middle-CBU nappe at Naxos and of ~3 km/My for the one at Ios. The Middle-CBU nappe at Thera, Ios and S-Naxos was exhumed to upper crustal levels, whereas N-Naxos was exhumed to the lower crust leading to thermal relaxation following tectonic accretion. This indicates that thermal relaxation following tectonic accretion in the Cyclades controlled the thermal evolution of the evolving Cycladic orogen during a tectonically quiet period before lithospheric extension.