

Zr-rutile thermometry of mélange rocks from Syros, Greece; Stone, J.S., Harmon, N., Biela, K., Walters, J.B., Cruz-Uribe, A.M., Marschall, H.R.; Geological Society of America Abstracts with Programs. Vol. 51, No. 1, ISSN 0016-7592, doi: 10.1130/abs/2019NE-328241.

During subduction, material from the slab and overlying mantle is eroded and incorporated into the mélange zone at the slab-mantle interface. In the mélange multiple generations of reaction interfaces develop as high-grade blocks are mechanically and metasomatically digested in an environment of changing pressure (P), temperature (T), and chemical (X) regimes. The extent to which different lithologies share the same *P-T-X* histories is largely unknown. Here we present Zr-in-rutile temperatures for four rock types (metabasaltic and metagabbroic eclogites, a metasomatic garnet-omphacite-chlorite fels, and a volcaniclastic metasediment) from Syros, Greece, to examine whether different lithologies and reaction rinds record similar *P-T* conditions.

Zirconium concentrations in rutile were determined by LA-ICP-QQQ-MS using an NWR193<sup>UC</sup> excimer laser ablation system coupled with an Agilent 8900 mass spectrometer at the University of Maine MAGIC Laboratory. Concentrations were determined relative to the R10 rutile reference material. Zirconium concentrations in rutile in all four samples range from 41 to 87  $\mu\text{g/g}$ . In unaltered rocks, textural observations suggest rutile represents part of the peak metamorphic assemblage; therefore, Zr-in-rutile temperatures were calculated at the peak pressure of 2 GPa reported for Syros. Zr-in-rutile temperatures for each sample, expressed as averages  $\pm$  2 s.d. for multiple grains in each rock, are 580 °C  $\pm$  14 (metagabbro), 570 °C  $\pm$  11 (garnet-omphacite-chlorite fels), 560 °C  $\pm$  13 (metasediment), and 540 °C  $\pm$  6 (metabasalt). Our results suggest that unaltered high-grade blocks of differing lithology record similar peak temperature conditions. In the metasomatic fels, relict pre-metasomatic rutile is replaced by ilmenite and likely records earlier T conditions; however, neocrystallization of omphacite + garnet with ilmenite suggests blocks were incorporated into the mélange in the eclogite facies.