Geophysical Research Abstracts
Vol. 16, EGU2014-4674, 2014
EGU General Assembly 2014

P-T-deformation conditions during 2 GPa of decompression of an eclogite-bearing shear zone, Western Gneiss Region, Norway

Donna Whitney (1), Roxanne Renedo (1), William Nachlas (1), Christian Teyssier (1), Sandra Piazolo (2), Stacia Gordon (3), and Haakon Fossen (4)

(1) University of Minnesota, Earth Sciences, Minneapolis, United States (dwhitney@umn.edu), (2) Macquarie University, Earth and Planetary Sciences, Sydney, Australia, (3) University of Nevada, Geological Sciences, Reno, United States, (4) University of Bergen, Earth Science, Bergen, Norway

The Salt shear zone in the southern ultrahigh-pressure domain of the Western Gneiss Region (WGR), Norway, preserves a suite of fabrics that developed during decompression of the WGR from ultrahigh-pressure conditions to mid-crustal levels. In the shear zone, mylonitic quartzofeldspathic gneiss contains a meters-scale, coesite-bearing eclogite layer that that has a foliation and lineation concordant with fabrics in the host gneiss. Ti-in-quartz thermobarometry predicts T > 750 °C at P = 2.8 GPa for the rutile-bearing eclogite, which contains homogeneous Ti concentrations in quartz. Quartz fabrics in the eclogite developed by activation of the high-temperature prism <c> slip near the coesite-quartz transition. Omphacite fabrics developed at the same conditions as those in coexisting quartz and are consistent with a plane strain to constrictional deformation regime.

Ti concentrations in quartz in the host gneiss are more heterogeneous than those in eclogite quartz, but are overall higher than in eclogite quartz, indicating a lower pressure of Ti equilibration in the gneiss. Metamorphic assemblages and mineral fabrics in the gneiss likely equilibrated during deformation at crustal levels (<1 GPa). Ti-in-quartz thermobarometry of the titanite-bearing gneiss predicts equilibration T < 650 °C at P = 1 GPa. The mylonitic gneiss records mixed (prism and rhomb) <a> slip in quartz and plagioclase recrystallization during decreasing pressure resulted in reverse zoning (Na-rich cores, Ca-rich rims).

Integrated microfabric and thermobarometric results from eclogite and gneiss in the Salt mylonite zone document a P-T-deformation path over nearly 2 GPa of decompression, from ultrahigh-pressure to amphibolite facies, and suggest that constrictional fabrics likely generated by transtension strain were produced over this wide range of pressure conditions during exhumation of the ultrahigh-pressure terrain.