Late-stage fluid infiltration in the Zermatt-Saas ophiolite zone

E. BLOCH[1*], L. BAUMGARTNER[1], B. PUTLITZ[1], AND A.-S. BOUVIER[1]

[1] Institute of Earth Sciences, University of Lausanne, CH-1015 Lausanne, Switzerland

The upper Täsch valley (Western Alps, Switzerland) hosts eclogite-facies rocks that are part the Zermatt-Saas ophiolite zone. Included among these rocks are eclogitized pillow basalts, which have been partially retrogressed by greenschist-facies metamorphism. The overprinting mineral assemblage is characterized by chlorite, epidote, albite and barroisite/tremolite, though surviving garnet cores within chlorite pseudomorphs are common. Here we present SIMS analyses from greenschist-facies albite in the selvages of nearly monomineralic albite veins. These veins vary in thickness from ~20 mm to 2 m. They cut through the eclogites during or soon after a backfolding event [1], resulting in a greenshcist mineral assemblage in the selvages.

We have sampled two profiles within a reaction halo adjacent to a ~30 cm thick albite vein. The reaction halo has distinct inner and outer zones; the outer zone contains fine-grained symplectite, in which albite is up to several tens of microns in length and is diablastically intergrown with barroisite/tremolite. The zone closer to the vein contains poikiloblastic albite crystals that are up to ~5 mm in diameter. There is no significant change in mineralogy between the two zones, and the chemical compositions of albite are identical ($\sim An_{02}$) throughout the entire reaction halo. Mass balance calculations (after [2]) indicate no significant mass transport of major elements throughout the entire reaction halo, in agreement with conclusions reached by [1]. Therefore, no albitization occurred despite the blastesis of albite crystals, and the changes in crystal size are mainly due to fluid-induced recrystallization.

Initial SIMS oxygen isotope data from albites within the two zones are clearly distinct from one another. Albites in symplectites from the outer zone are homogenous, with an average $\delta^{18}O$ value of ca. 9.9 ‰. Within the recrystallized inner zone, $\delta^{18}O$ values from poikiloblastic albites are heterogeneous, ranging from 6.4 to 9.5 ‰, even within a single crystal. Two important implications of this observation are (1) the fluids that formed the albite veins were not locally derived; (2) the fluids were isotopically light. A possible fluid source could be dehydration of serpentinites during the barrovian metamorphic event.

[1] Mueller (1989) *Ph.D. Thesis*, University of Basel. [2] Baumgartner & Olsen (1995) *Econ. Geol.* **90**, 1261-1270.