Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09922, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09922
EGU General Assembly 2008

Metasomatism in the Hochwart peridotite (Ulten Zone, Italy): a natural window into the processes affecting crust-mantle interaction at subduction zones

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The Ulten Zone (UZ) of the Italian Eastern Alps is interpreted to represent an exhumed portion of a slab of continental crust subducted during the Variscan orogeny. Challenging topics regarding the UZ peridotites are metasomatism and crust-mantle interactions. We investigated a well-preserved contact between the peridotite lens and host gneisses where peculiar metasomatic contact rocks occur, located on the northern side of the Hochwart mount. The country rocks are stromatic gneisses consisting mainly of quartz, K-feldspar, garnet, kyanite, biotite and muscovite. The ultramafic body consists of a hectometric garnet-peridotite and harzburgite lens. The reaction rim records an order of metasomatic zoning formed by phlogopite-rich to tremolite-anthophyllite-talc-rich rocks from the host gneiss towards the peridotite. In some cases, the ultramafics fade into the gneisses developing lenses of serpentine and talc in association with chlorite, and trondhjemitic pods. Trondhjemite dikes with pegmatoid texture also cut the peridotite. Phlogopite aggregates (phlogopitite) with accessory zircon, Cl-apatite and tourmaline and phlogopite-hornblende aggregates also occur.

The combination of mineral chemistry and mass balance constrains the gains and losses of elements during metasomatism. The reaction zones formation involved extensive addition from the fluid into the peridotite of H_2O, K_2O, LILEs and halogens, whereas MgO, CaO and Al_2O_3were removed from the peridotite. The reaction be-

tween mantle and gneissic rocks was triggered by considerable fluid circulation, causing crystallisation of mainly phlogopite, anthophyllite and talc, and release of a trondhjemitic residual melt.

Metasomatism responsible for the formation of reaction zones, which should coincide with the time of incorporation of peridotites within the crust occurred within the T range of 650˚-800˚C with maximum pressure of 1.2 GPa and postdates migmatization of crustal rocks.We highlight that the chemical composition of fluids in collisional settings can be substantially modified by metasomatic reactions occurring at the slab-mantle interface and observations outlined by this study can be extended to similar occurrences in other subduction zone settings.