Please ensure that your abstract fits into one column on one page and complies with the *Instructions to Authors* available from the Abstract Submission web page.

Geochemistry of Devolatilization (and Exhumation) in W. Alps HP and UHP Metasedimentary Suites

G. BEBOUT[1,2], P. AGARD[3], R. KING[1,2] AND E. NAKAMURA[2]

[1]Earth & Environmental Sciences, Lehigh University, Bethlehem, PA 18015, USA. (geb0@lehigh.edu)
[2]The Pheasant Memorial Laboratory, Institute for Study of the Earth's Interior, Okayama University at Misasa, Tottori-ken, 682-0193, JAPAN.
[3]Laboratoire de Tectonique, Universite PM Curie, Paris Cedex 5, FRANCE

Abstract

Subduction-zone metamorphic rocks are notorious for their superposition of prograde mineral assemblages and exhumation-related assemblages. We have undertaken a whole-rock-EPMA-SIMS analysis of records of prograde devolatilization and exhumation in metasedimentary suites in the W. Alps, Italy (Schistes Lustres, Cottian Alps, SL; coesite-bearing Lago di Cignana, LDC). Together, the suites represent peak conditions of 1.5 to 2.9 GPa, 300-625˚C; however, prograde histories in the higher-grade SL and at LDC are highly obscured by overprinting during underplating and exhumation (Reinecke, 1998; Agard et al., 2002). In the lower-grade SL, heterogeneity in mica trace element content (B, Li, Be, Cs, Ba, Sr; by SIMS) exists at sub-mm scales, not obviously related to mica texture or grain size. In the high-grade SL and at LDC, multiple coarse-grained mica generations (at LDC, some paragonitic) have different trace element contents and, in one LDC sample, white-mica inclusions in garnet contrast in trace/major element chemistry with matrix micas. Other than in B contents, white-mica does not *obviously* vary systematically in trace element contents across grade, with any prograde variation variably obscured by exhumation. Low-grade SL contains very minor fine-grained tourmaline with $\delta^{11}B_{SRM951}$ ranging widely from –10 to +15‰; some higher-grade SL contains abundant, coarse-grained tourmaline with $\delta^{11}B$ of –12 to –1‰ consistent with B derivation from devolatilizing lower- $\delta^{11}B$ micas, perhaps during initial underplating and exhumation. Tourmaline in siliceous LDC rocks preserves distinct generations of low-$\delta^{11}B$, high-Mg tourmaline attributable to UHP metamorphism and high-$\delta^{11}B$, lower-Mg tourmaline attributed to exhumation (Bebout and Nakamura, 2003). Highly overprinted more pelitic LDC rocks contain texturally late-stage, zoned tourmaline with $\delta^{11}B$ of –7 to +1‰ similar to that in high-grade SL, compatible with a late-stage origin of B from devolatilizing white-micas.

References

Agard, P., Monie, P., Jolivet, L., and Goffe, B. (2002), *J. Meta. Geol.* **20**, 599-618.
Bebout, G., and Nakamura, E. (2003), *Geol.* **31**, 407-410.
Reinecke, T. (1998), *Lithos* **42**, 147-189.