A possible model of accelerated dehydration by fluid migration in deformed amphibolite associated with Oeyama Ophiolite

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In subduction zones, miscible fluids commonly would act as metasomatism agent [1]. A petrographic metasomatic model [2] for deformed amphibolite along 50m in the melange of Oeyama Ophiolite member shows continuous compositional change for parent's amphibole grains. For this model, fluid interaction was investigated in order to explain to the crystallization of secondary minerals and alterations of amphibole. The block (mono-mineralic amphibolite together with zoisite vein) that is prospected as the protolith [2] was newly found at the edge of outcrops. This field and petrographic study for vein which are assumed to have precipitated in the surroundings of porphyroclastic parent's minerals would contribute to show the whole process of metasomatism as a case of the evolution of crustal fluid.

In the petrography, some clino-zoisite and zoisite at the initial deformation stage in the vein may be the products of replacement amphibole as those size and shape are similar with fractured amphibole grain and those distributions are mostly connected. The most oligoclase precipitated at later stage doesn't have chemical heterogeneity, and some oligoclase are associated with hydro-fracturing amphibole and zoisite. Some textures seem to show the dissolving of the parent minerals.

Considering these crystallization by some fluid migration during the deformation process, the compositional evolution of the fluid must be required. The huge infiltration of Al (at early stage) and Na (at later stage) during deformation must have been changed by some coupled dissolution and precipitation process together with the reaction of amphibole along the vein.

If dissolution and replacement are key processes, and associated with this major crystallization of anhydrous-minerals during this metasomatism, the chemical system of initial amphibolite would be dehydrated.

This model for fluid interaction is concordant with the last metasomatic model based on spatial compositional trend of amphibole[2].

[1] Manning, C. E., (2004), *EPSL*, **223**, 1-16 [2] Akai, R (2010) *Goldschmidt conference*.

Geocehmical and genetic features of polymetallic Pb-Zn-Cu-Au-Ag deposits of Gümüşhane, Turkey

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The deposits occur as veins and lenses within dolomitic limestones nearer mainly to its upper contact with the overlying flysh. The main ore zone is 400 m long along E-W direction, 100 to 150 m wide along N-S direction and has a thichness of 1 to 17 m. The recent exploration activities and feasibility studies indicate an estimated reserve of 1,815,000 tons at 1.81 g/ton Au, 77.11 g /ton Ag, 0.6 %Cu, 5% Zn and 3% Pb. The ore zones are mainly in the form of massive shoots with sporadic pockets of sphalerite and galena, and to alesser extent, as Cu enriched lenses with chalcopyrite, Bi and Te-enriched sulphosalts, and luzonite as well as rare altaite. These minerals are also enriched in Au and Ag.

The deposition of ore occurs within voids in monolithic carbonate breccias, which is, in turn, probably related to rifting. The preferential occurence of the ore in brecciated zones, the presence of ore lenses nearer the upper contact of the Berdiga Limestone with the Upper Cretaceous flysch and along the lower contact of the flysch, as well as the weak mineralisation within units underlying the limestone point towards an epigenetic origin, despite the widespread mode of occurrence in the form of massive lenses. The presence of similar deposits in the vicinity may indicate a joint origin connected with the Eocene magmatic activity, widespread in the region, denoting that the overlying flysch unit may have behaved as a cover unit. Fluid inclusion research suggests epithermal conditions with low salinities (<8,5wt%NaCl eq.) and low to moderate temperatures (130-370 ºC; X=240 ºC). The sulphur contents of sphalerite, galena, pyrite and chalcopyrite were determined to be magmatic in origin, with near $\delta^{34}S$ values ranging from -2‰ to +3‰. Mineral pairs found to be in isotopic equilibrium support epithermal conditions. The Eocene magmatics in the close vicinity of the mineralised areas are likley to be responsible for the formation of such epithermal systems.