

Variscan and Alpine warm fluids in Val d'Aran, Central Pyrenees

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The Bossòst metamorphic dome, in Val d'Aran, Central Pyrenees, may hold footprints of the different fluids that have circulated since ancient times. This part of the Pyrennes contains Zn-Pb mineralizations in Cambro-Ordovician rocks, within a sequence from Cambrian to Carboniferous ages which were affected by the Variscan and Alpine orogenies.

Four main types of chlorite have been identified based on their morphology. Formation temperatures were calculated using $Fe_T/Fe+Mg$ ratios and Al content geothermometers [1, 2]. The paleotemperatures obtained cluster around 4 values, at 250, 310, 375 and 400°C and around 260, 350, 380 and 410 °C, respectively (Fig.1).

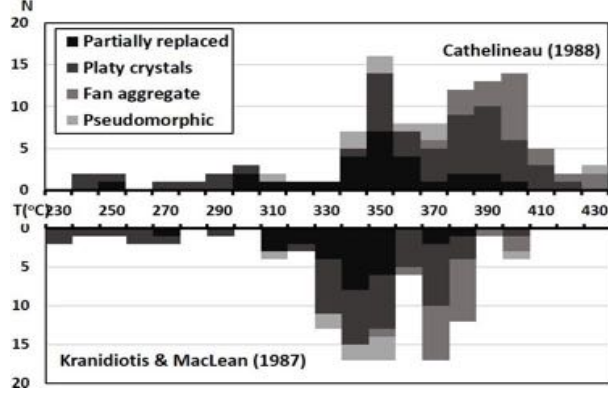


Fig. 1. Histogram of chlorite paleotemperatures calculated according to [1] and [2] geothermometers.

Vein quartz crystals contain two groups of fluid inclusions (FI): 1) coexisting triphasic (halite saturated) and biphasic (CO₂-bearing) consistent with the presence of metamorphic fluids at $T > 300^\circ\text{C}$, related to the remobilization of the Zn-Pb ores; 2) biphasic FI with homogenization temperatures between 150 and 250°C related to fluid circulation during the Alpine orogeny.

The two independent geothermometers reflect the different events of fluid circulation that occurred in the area. The relationship between fluid compositions and age of the structures will lead to better understanding fluid circulation at different crustal levels and metal recycling.

[1] Kranidiotis & MacLean (1987) *Econ. Geology* **82**, 1898-1911. [2] Cathelineau (1988) *Clay Minerals* **23**, 471-485.