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## How many fluids are related to O Barquero? (NW Galicia, Spain). Quartz vein formation?: Fluid inclusion data

## ¿Cuántos fluidos están implicados en O Barquero? (NW Galicia, España). ¿Cuál es el origen del filón de cuarzo?. Datos de inclusiones fluidas

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In the NW Spain, economically important quartz veins are found. Some of them (as O Barquero vein) are currently mined for quartz which is used in ferroalloys. In other veins, quartz is related to ore-mineral (sulphides) precipitation. Both types have been studied from different points of view (Crabiflosse et al., 1989; Adaro, 1991; Boiron et al., 1996). The O Barquero quartz vein is the most important of the area. It is located in the NW of Galicia north of the village of Tellado (Lugo Province) running north-south through the village of Porto do Barquero (A Couruña Province). It has a length of 10km with a thickness up to 50m in many places. The vein contains a huge volume of almost pure quartz producing up to 250.000 tons annually. It is related to a set of N150-170E trending fractures that put in contact a two-mica granite to the east with precambrian and ordovician rocks to the west. The aim of this study is to characterize, using microthermometrical methods, the chemistry and temperature of the fluids during quartz precipitation.

The O Barquero quartz vein is well exposed in a quarry developed at the north end of the vein, allowing a systematic sampling over a length of 1100m. Five E-W sampling transects have been also carried out. Thin sections of the samples were studied for a petrographic characterization previously to the microthermometric measurements. Fluid

inclusions have sizes from 5 to 120 $\mu$ m (average 20 $\mu$ m) and are biphasic at room temperature. First melting temperatures (Te below  $-55^{\circ}\text{C}$ ) show that trapped fluids belong to the  $\text{H}_2\text{O-NaCl-CaCl}_2$  system.

Mixing evidences between a high salinity (up to 10 wt. % NaCl eq.) and high temperature ( $300^{\circ}\text{C}$ ) fluid and a lower salinity (3.5 wt. % NaCl eq.) and lower temperature ( $150^{\circ}\text{C}$ ) fluid have been recognized in places of the vein where conjugate fractures are present (Fig. 1A and B). Fluids rising from these fractures flowed along the footwall towards the north and south of the O Barquero vein. Quartz precipitation from the footwall to the center of the vein was caused only by the low salinity-low temperature fluid. Mixing has not been recognized during this event.

Early quartz contains inclusions that underwent two thermal events, a first one with Th around  $150^{\circ}\text{C}$  and a second at higher temperature (around  $350^{\circ}\text{C}$ ). Although thermal reequilibration in quartz requires a severe overheating (Lacazette, 1990), the constant salinity but spread Th distribution trend for some inclusions (Fig. 1C) seems to indicate the feasibility of this phenomenon. As fluid inclusion size appears to have a strong influence on the probability of reequilibration of fluid inclusions (Bodnar et al., 1989), an statistic treatment of size and Th data was done, showing that no simple correlation exists between size and Th.

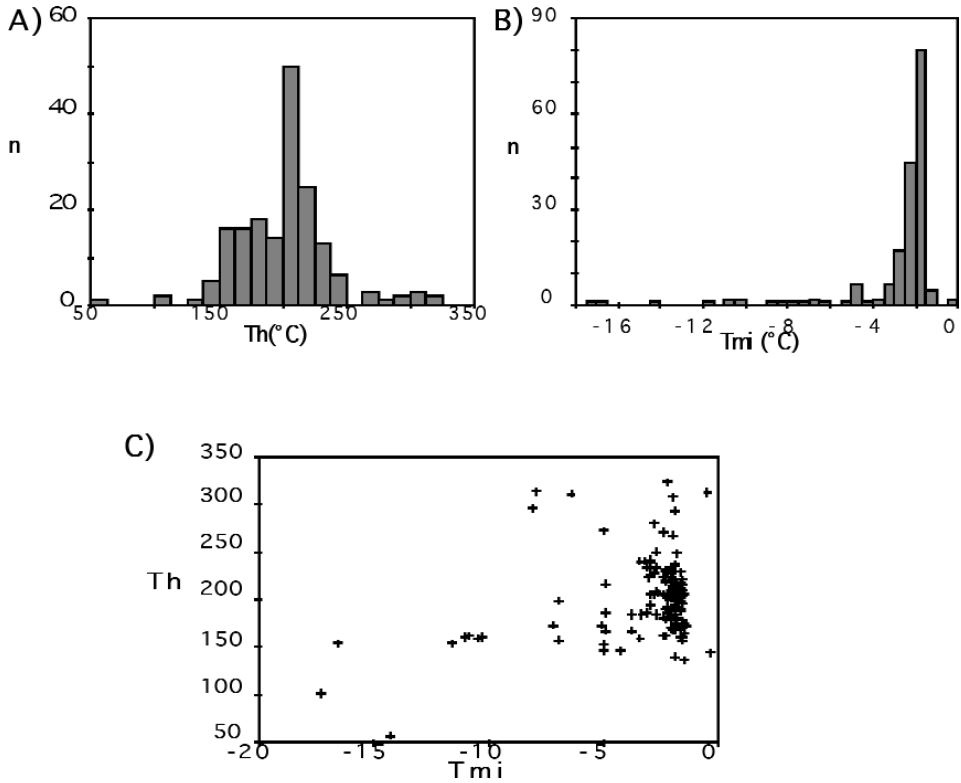


Figure 1.-

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