

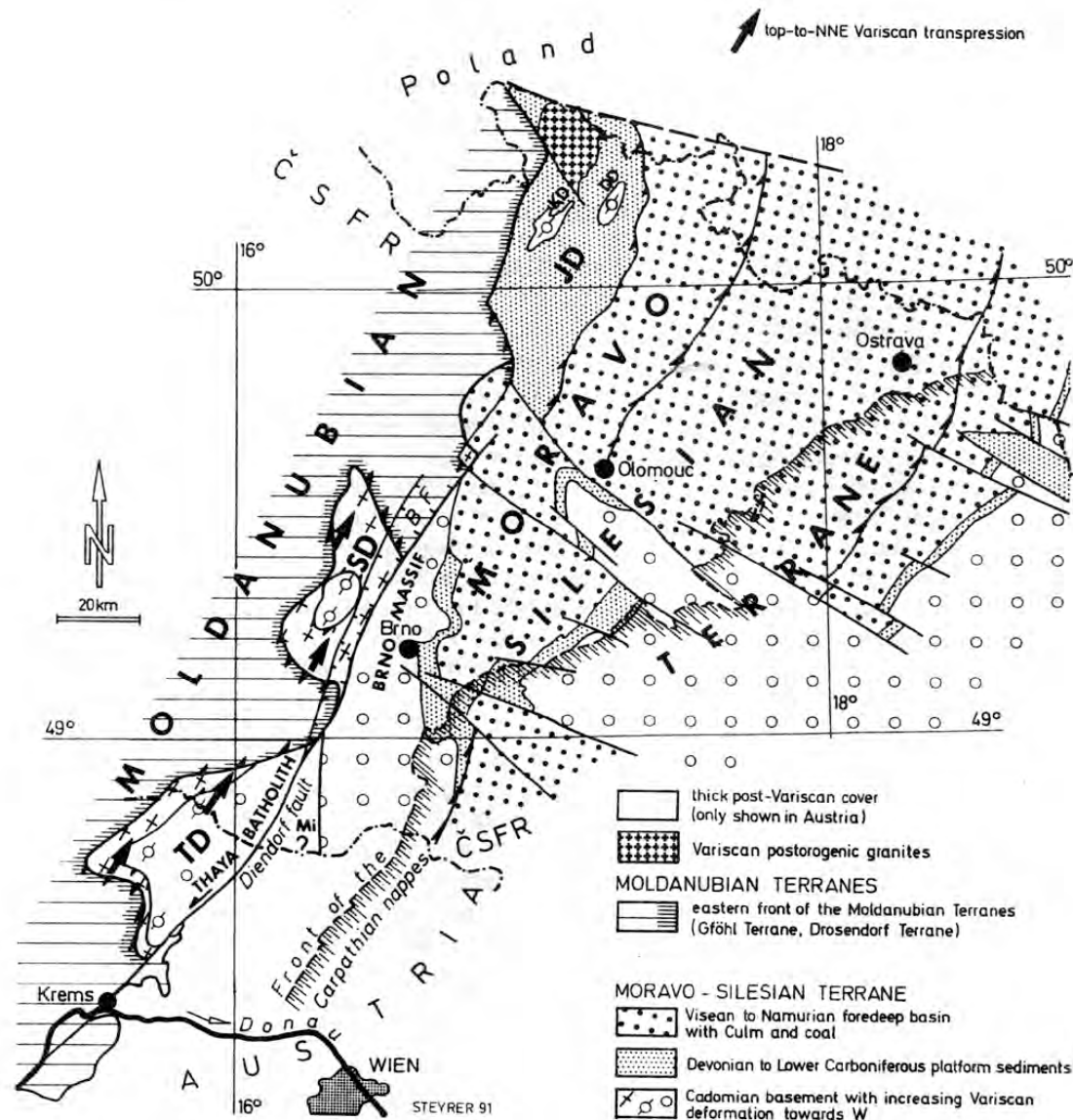


The Origin of the Amethyst vein of Maissau (Austria)

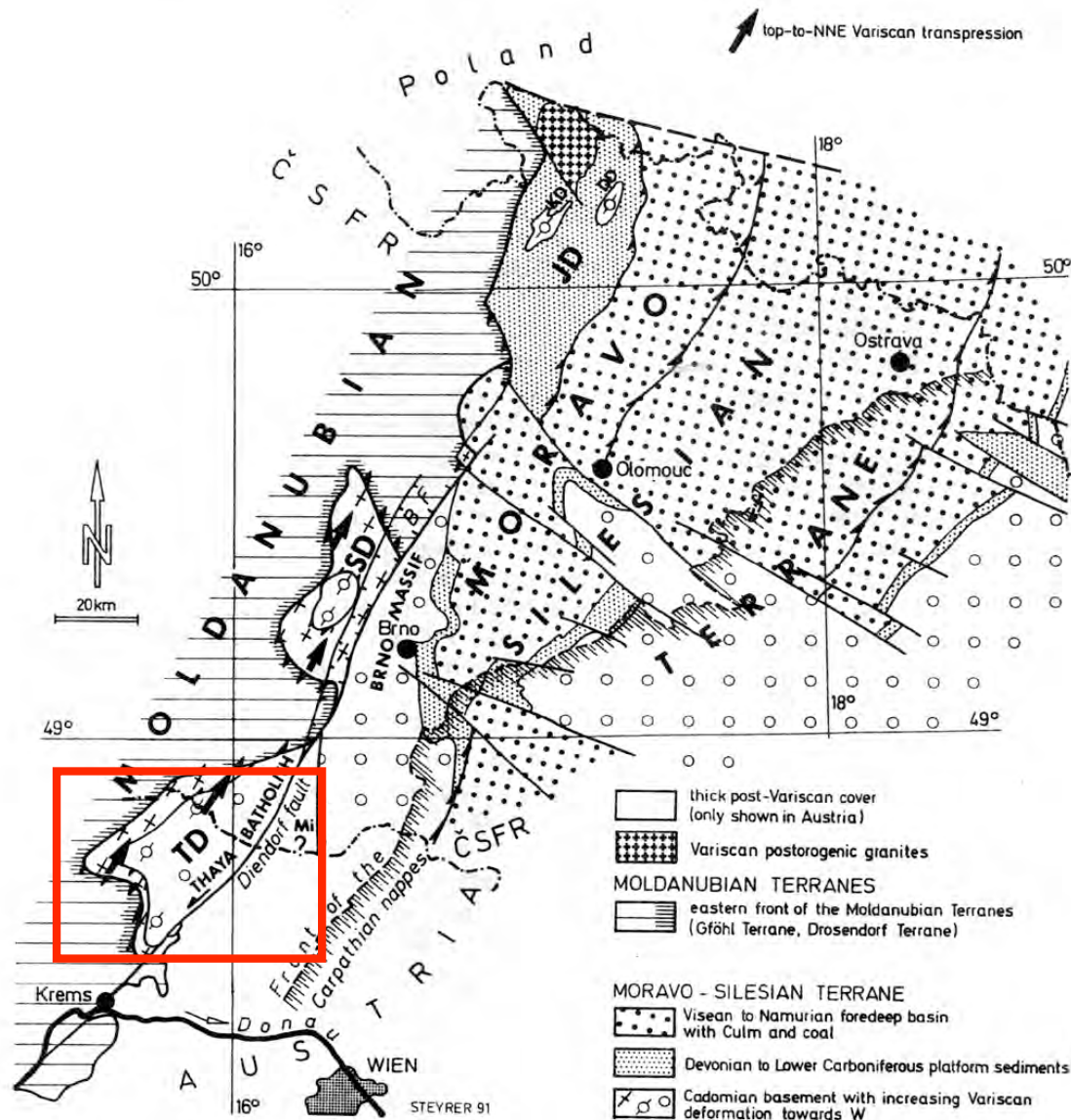
Christoph J. Piribauer, Ronald J. Bakker, Oskar A. R. Thalhammer

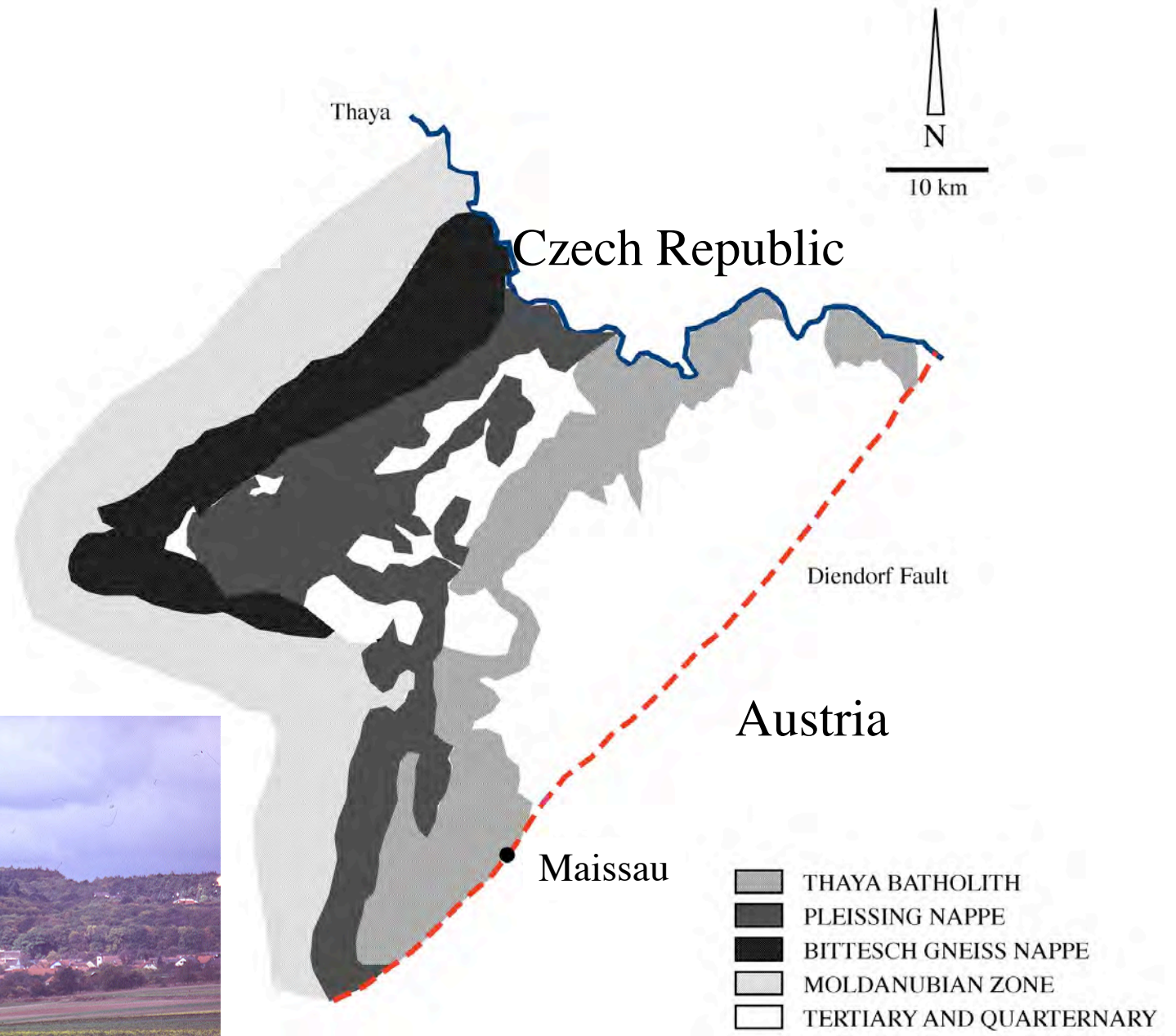
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Geological Overview



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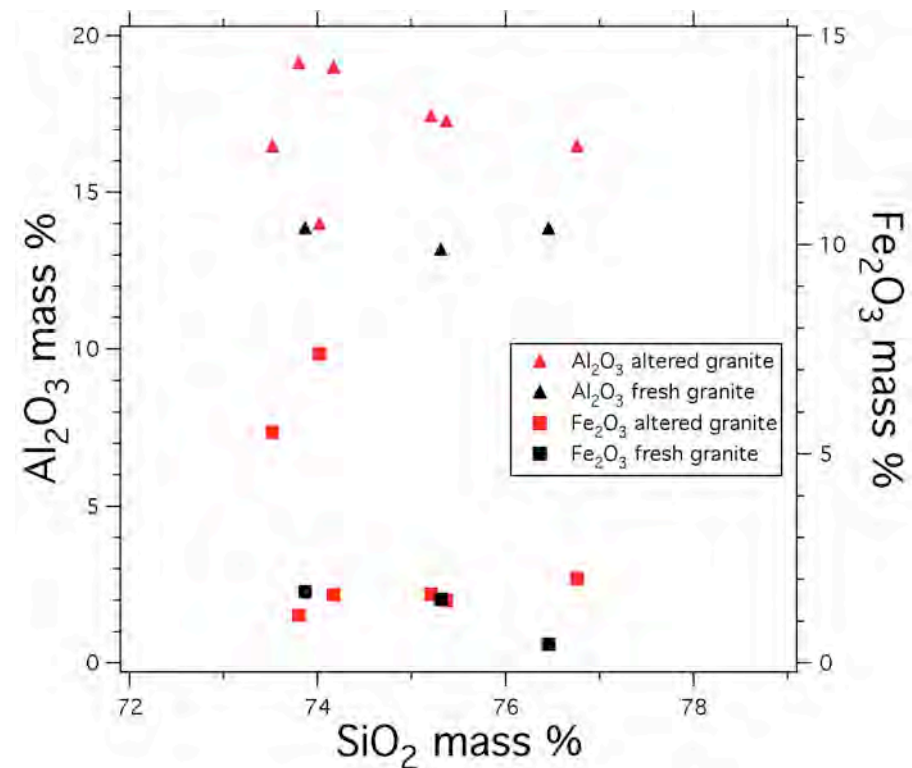
- Thaya Batholith (deepest structural unit of the Moravian Zone)
- U-Pb age: 576 ± 6 Ma (Friedl et al, 2004)
- Representing I-type plutons from the active northern Gondwana margin

A photograph of a hydrothermal vent, likely a black smoker, with a large black question mark overlaid on the image. The vent is a dark, mineral-rich structure with a porous, crystalline texture. It is surrounded by a cloudy, greyish-blue fluid. The background is a dark, rocky surface with some mineral deposits.

1) Formation Time

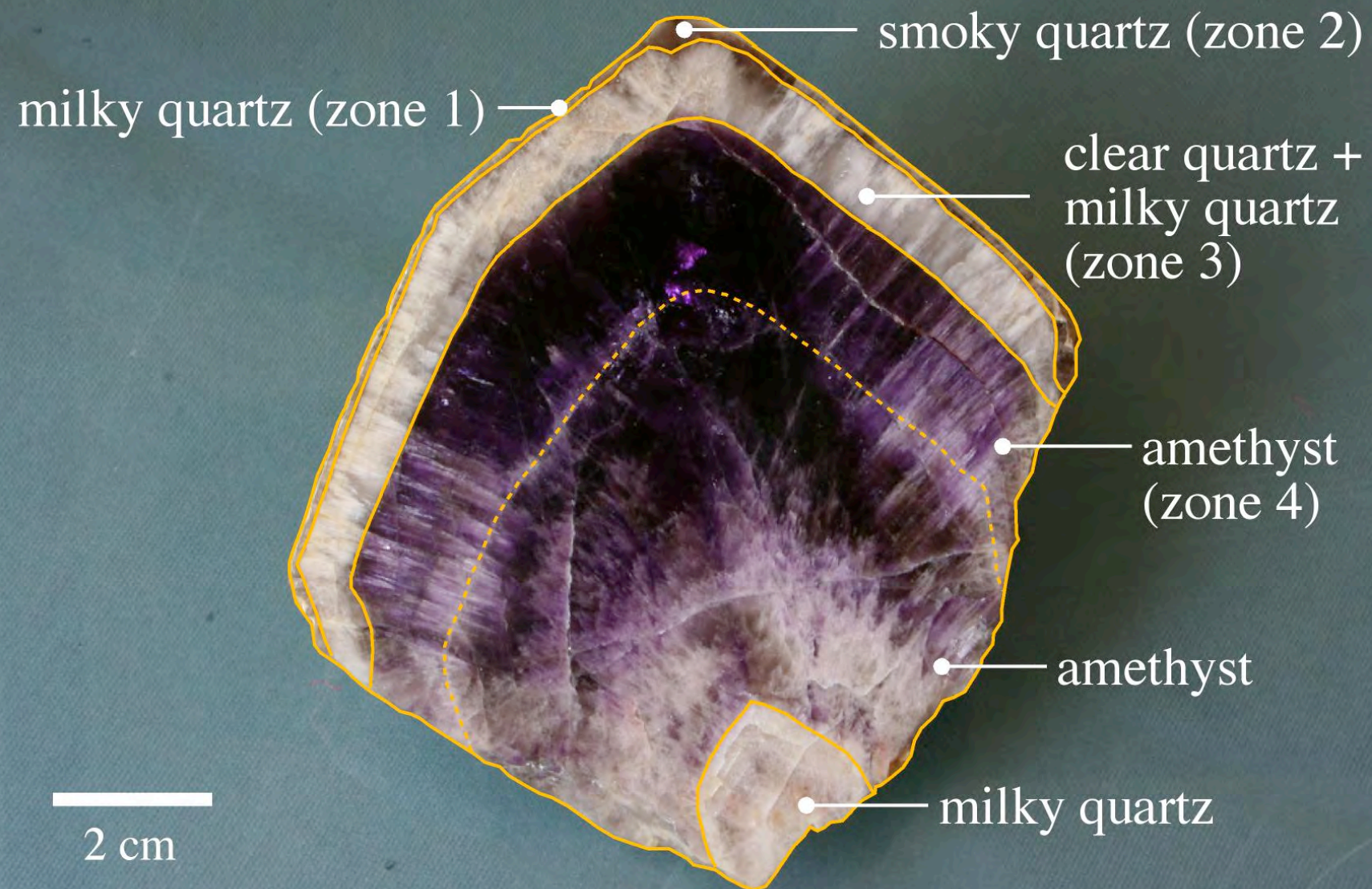
2) Alteration zone & Granite

- Chemical investigations of the alteration zone for the identification of the mineralogy and the main element distribution towards the amethyst vein

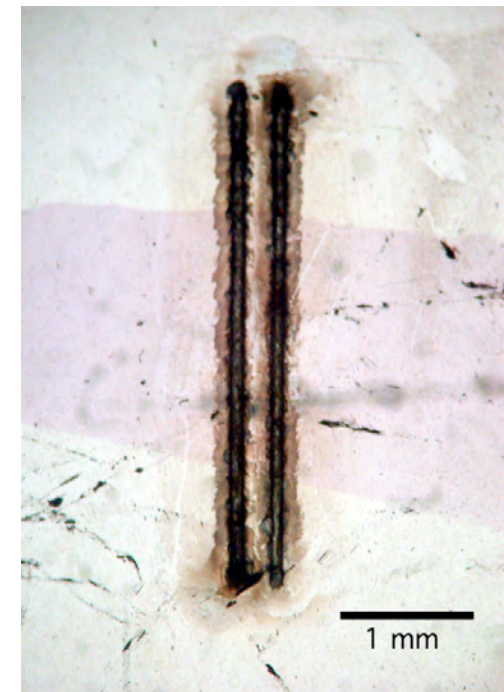
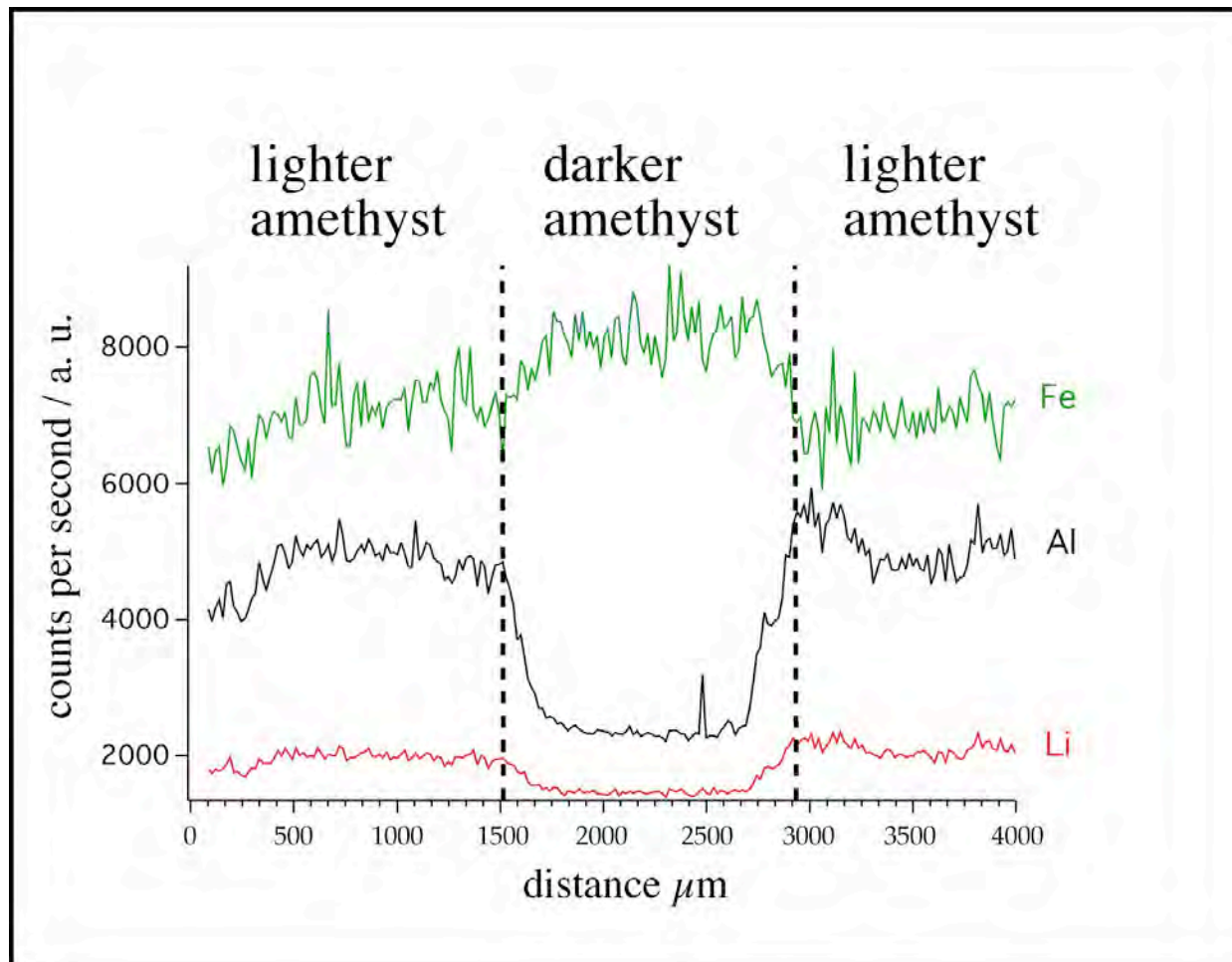


3) Varieties of quartz within the Amethyst vein

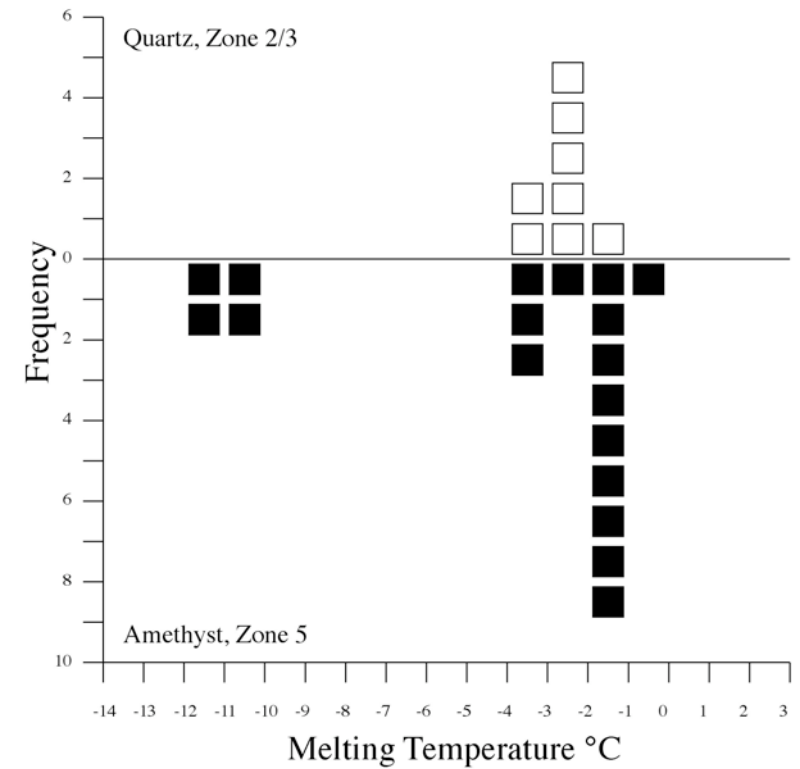
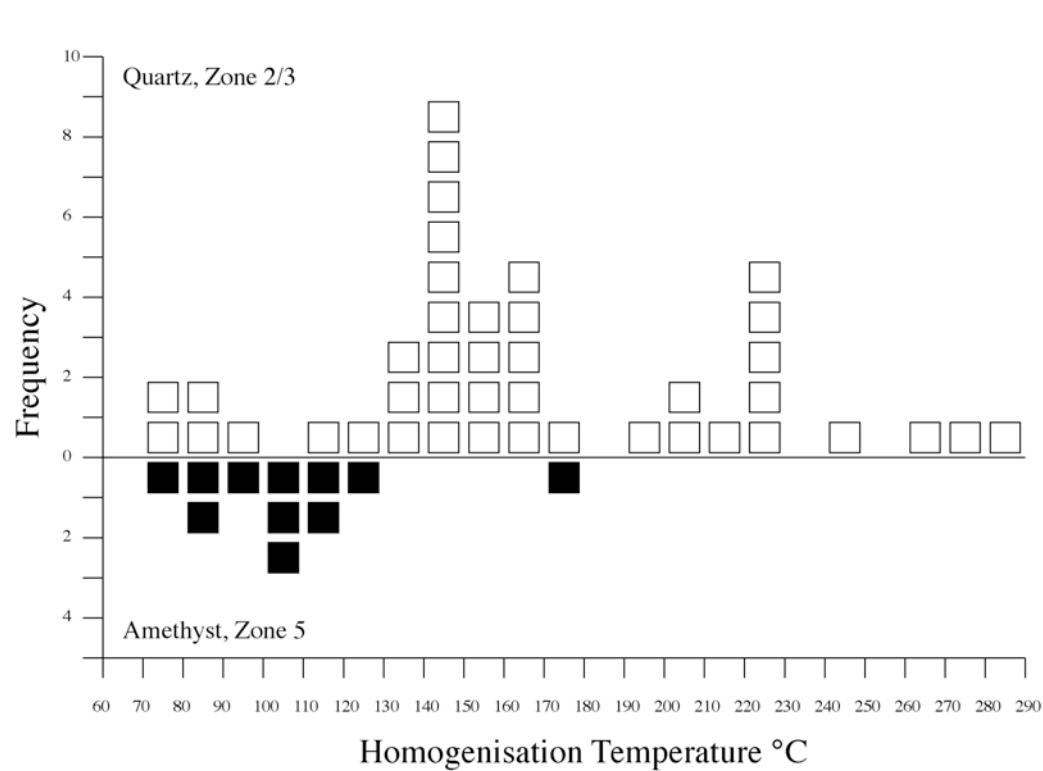
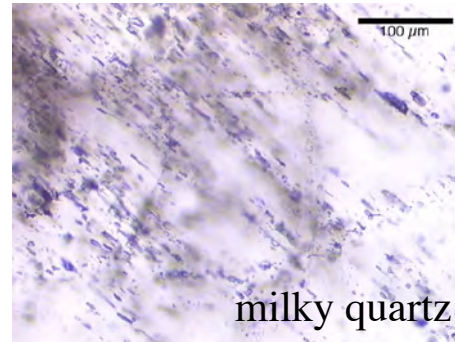
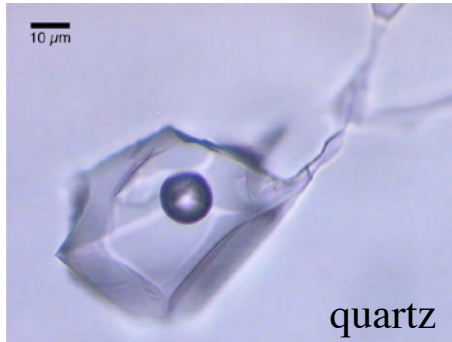
- Appearance of: amethyst, clear quartz, smoky quartz, milky quartz and partly Morion
- Differences because of
 - Chemical differences
 - Different formation conditions



3.1) Chemical investigations within the amethyst with LA - ICP - MS

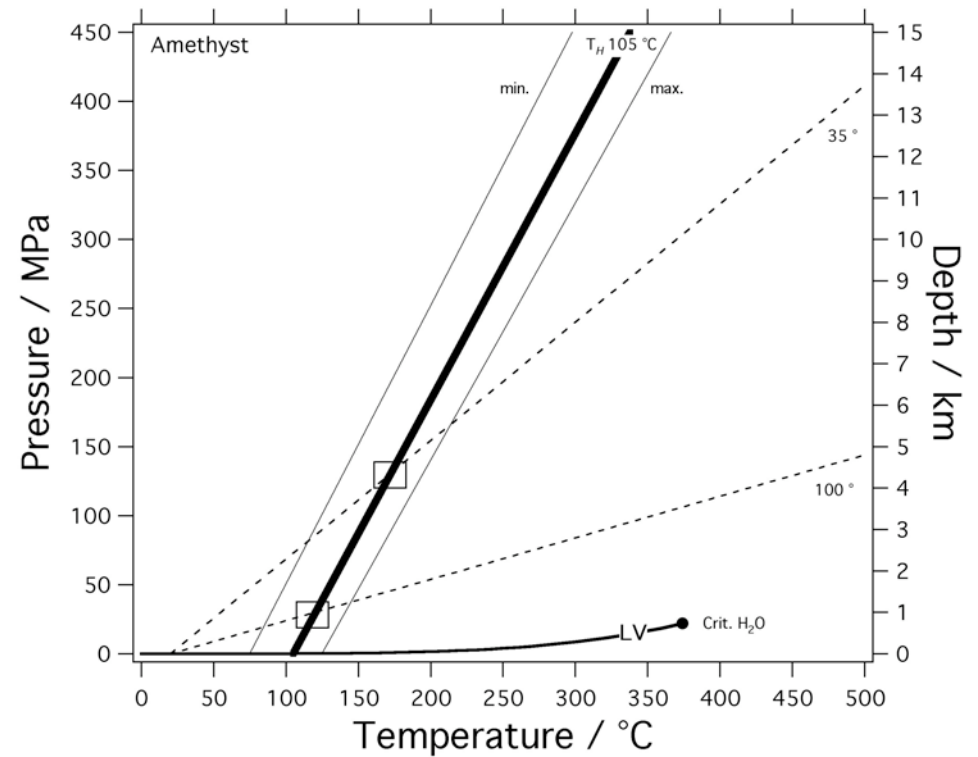
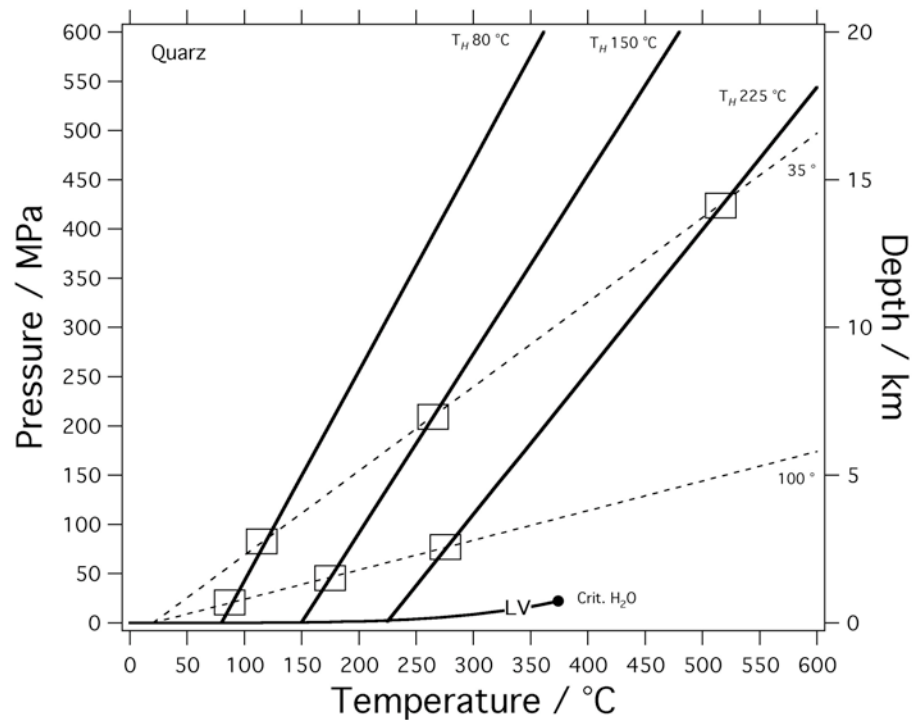


3.2) Fluid Inclusions

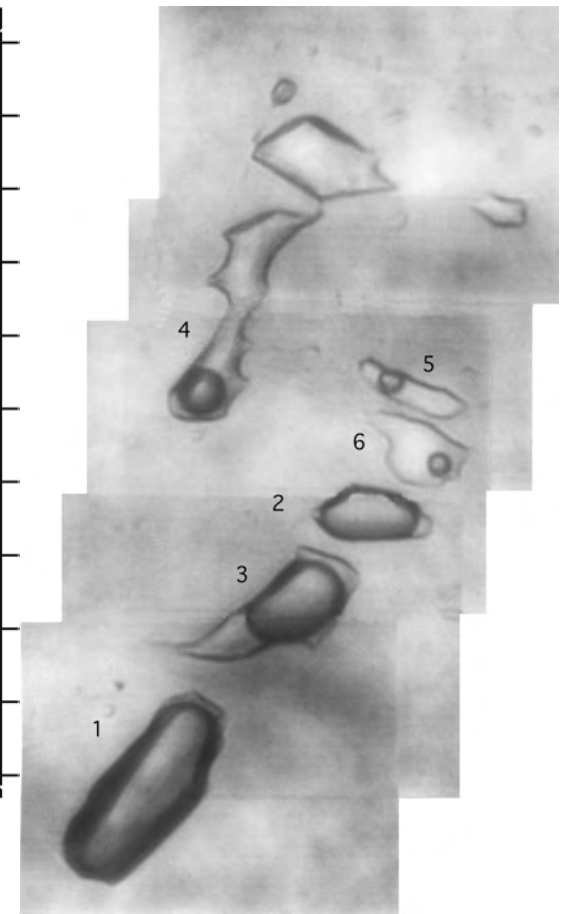
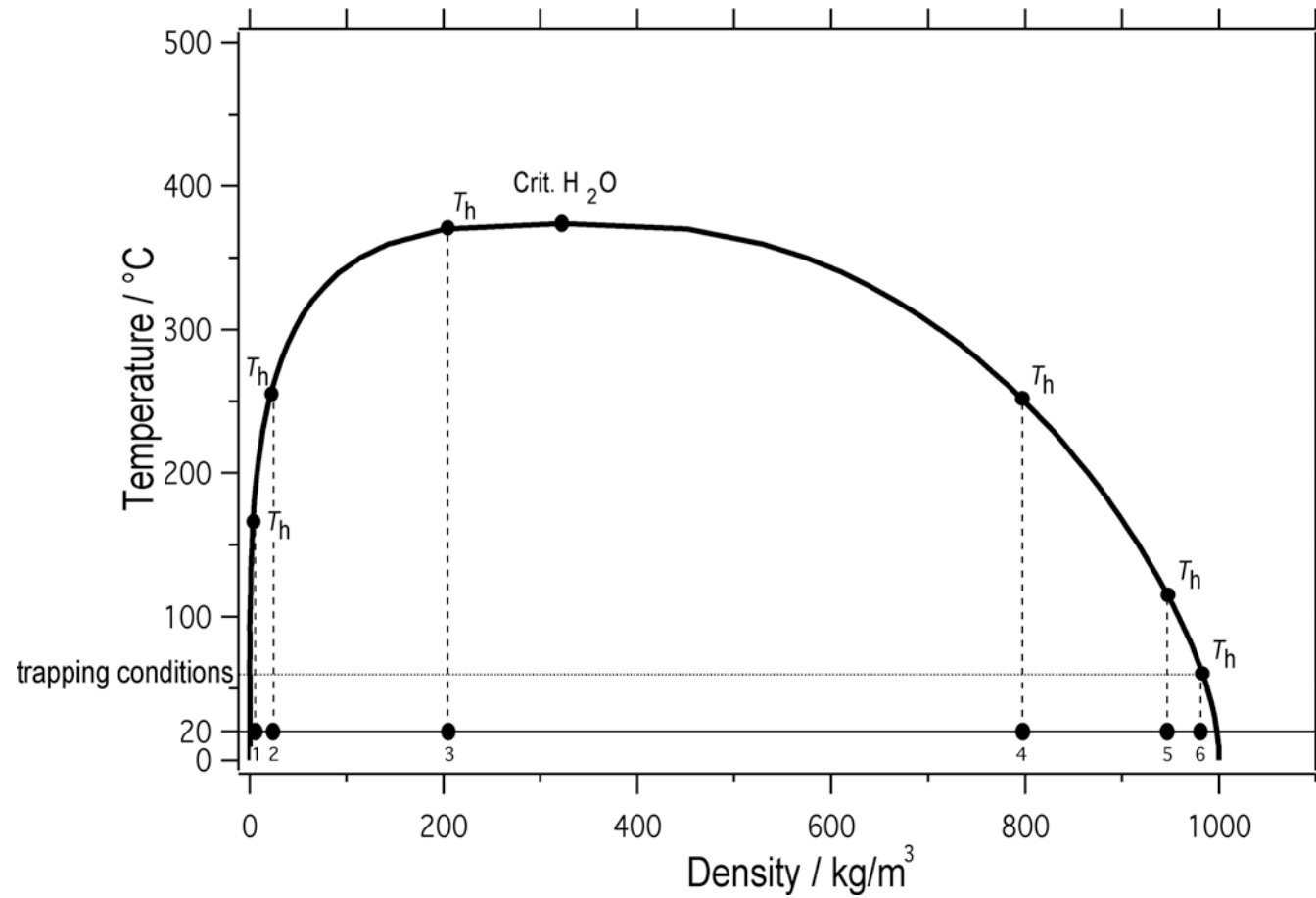


3.3) Formation conditions

- The formation conditions have been calculated from the measured data from the fluid inclusions



Heterogeneous Trapping



Conclusion

- Vein formation occurred between the Variscan orogeny (280 Ma - 340 Ma) and the formation of the Eggenburgian ocean (20 Ma)
- No significant leaching of silica in the vicinity of the vein
- Chemical differences between the different zones (formation of clear quartz, smoky quartz and amethyst)
- Near surface formation conditions