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#### **Titel**

Fluid inclusion study on quartz from fissures in the penninic rocks of the western "Tauern Fenster", the Austrian Alps.

From geochemical data Hörmann and Morteani (1972) and Lausch, Müller and Morteani (1974) deduced that there is a close relationship between the metamorphic grade of the country rock and the crystallisation temperatures of the carbonates in the alpine fissures of the penninic rocks of the western "Tauern Fenster" (Tyrol, Austria).

From oxygen isotope data on biotite, quartz and carbonates Friedrichsen and Morteani (unpubl.) deduced that these minerals crystallizes in the fissures at the same temperature as the surrounding rocks during a phase of tensional tectonics following the main period of alpine tectonic activity.

A fluid inclusion study by microthermometric method on quartz from fissures gives therefor an information on the composition of the fluid phase during the temperature maximum of the alpine metamorphism. It is obvious that only primary inclusions should be examined.

In the studied quartz crystals there are many fluid inclusions of apparently secondary origin, but it can be shown that these inclusions are real primary inclusions formed in syncrystalline ruptures.

Depending upon the composition of the fluid inclusions the whole western "Tauern Fenster" could be subdivided into two areas:

a) An area corresponding to the Zillertaler and Tuxer Alps in which the inclusions are characterized by high CO<sub>2</sub>-contents (ranging from 0 to 80 vol. %).

The inclusions formed early showed high CO<sub>2</sub>-contents. However this was found to decrease gradually in the inclusions formed later the youngest inclusions were found to be nearly free of CO<sub>2</sub>. As for the salt content in these inclusions, those with very high CO<sub>2</sub>-content ( 50 vol. %) were generally found to contain about 6 % by weight of the total salts. Furthermore the salt contents increased very steeply thereafter as the CO<sub>2</sub> started decreasing. The maximum salt content was found to be about 18 wt. % corresponding to 15 - 30 vol. % CO<sub>2</sub>. The younger inclusions were low in their salt contents, and exhibited almost the same trend as the CO<sub>2</sub>. The time of formation of the inclusions can be qualitatively established by the density of the CO<sub>2</sub> phase; earliest inclusions are characterized by high density CO<sub>2</sub> inclusions, whereas late inclusions have a low density CO<sub>2</sub> phase.

b) In the area of the Grossvenediger and in the south of it generally no CO<sub>2</sub> content could be detected in the fluid inclusions by microthermometric methods. The salt content of the aqueous phase was about 5 to 7 % by weight. The only CO<sub>2</sub>-rich fluid inclusions are found in the quartz veins within the eclogites collected from the area south of the Grossvenediger.

From the temperature of homogenisation (determined by microthermometry in the present study) and the temperature of metamorphism (determined by oxygen isotope geothermometry by Hoernes and Friedrichsen (1974)) the pressure during the mineralization in the fissures of the Grossvenediger area was about 3 kb. As compared to the pressure estimated from the solid phases in the surrounding rocks the pressure deduced from fluid inclusions is lower by about 1 - 3 kb.

In the area of the Tuxer and Zillertaler Alps the pressure as deduced from the fluid inclusions is about 6 kb. This value is in good agreement with that deduced from the mineral parageneses in the surrounding rocks.