

Petrology of metacarbonate rocks of the Austroalpine Basement (Eastern Alps): tectonometamorphic implications

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Marbles and calcsilicate rocks of different units of the Austroalpine Basement (Eastern Alps) were investigated regarding their petrological characteristics to get some information about how these rocks evolved during the Pre-Alpine and Alpine events. An additional outcome of this study is a map showing the index minerals in calcitic and dolomitic marbles of the Austroalpine unit in the Eastern Alps.

The Austroalpine Basement consists of several nappes built up by lithostratigraphic units which are characterised by different tectonometamorphic evolutions. The Austroalpine basement can be subdivided into four major nappe systems. The Silveretta-Seckau and the Ötztal-Bundschuh nappe systems consist dominantly of paragneisses and micaschists. The more variegated Koralpe-Wölz and the Drauzug-Gurktal nappe systems comprise micaschists, paragneisses, quartzites, amphibolites and marbles.

Marbles of the Ötztal-Bundschuh complex partly bear humite-group minerals (mainly Ti-clinohumite; Ti-Chu) together with Fo and in addition Di and Spl accompanied by two (one Variscan and one Alpine) Mg-carbonate generations (Ehlers & Hoinkes, 1987). The Ötztal marbles experienced higher metamorphic Variscan grades (about 690°C) compared to the Alpine event, which is calculated at about 480-510°C. The metacarbonate rocks of the Drauzug-Gurktal nappe systems are very pure and only contain rare Tre together with Cc and Dol.

Within the Koralpe-Wölz nappe pile the metamorphic grades increase from north to south from greenschist to eclogite facies conditions. Marbles of the Schneebergzug west of the Tauern Window typically contain Tre and coexisting Tlc at temperatures of 500-550°C. The increase of the metamorphic grades is clearly documented in the marbles east of the Tauern Window by a change of the index minerals. Lowest grades at about 437-465°C are indicated by the presence of the assemblage Dol+Cc+Qtz (CMSCH-System) and are calculated for the northernmost part of the nappe pile in the Sölk valley (belonging to the Wölz Complex). Going 20km further south Tre occurs and temperature calculations yield 540-562°C for the Greim Complex in the central Wölz Mountains. Within the overlying Rappold Complex (near Oberwölz) temperatures increase to 660-691°C and refer to the first occurrence of Di. Di is further stable going southwards in the Millstatt, Koralpe-Saualpe (680-740°C) and Pohorje Complexes. Furthermore Di is present as relics within Tre (Rappold, Millstatt and Laas Complexes). Fo is stable only in some distinct spots: in the southern Koralpe-Saualpe Complex (Schwanberg) it is accompanied by Di and Ti-Chu, in the Strallegg Complex (Stubenberg) it occurs together with Ti-Chu and Chl and within the Siegraben Complex it builds up an assemblage with Spl (CMASCH-System). There are no clear indications of polymetamorphism either mineral relics nor mineral chemical zonations and reaction textures. The only exceptions are Di-inclusions within Tre, which can be assumed as Pre-Alpine relics (Rappold, Millstatt and Laas Complexes).

Ehlers K., Hoinkes G. (1987). Titanian chondrodite and clinohumite in marbles from the Ötztal Crystalline Basement. *Mineralogy and Petrology* 36, 13-25.