



## **NEW PETROLOGICAL DATA ON THE HP-ROCKS OF THE ZONE OF PFUNDS (LOWER ENGADINE WINDOW, SWITZERLAND/AUSTRIA).**

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Within the Engadine Window of the western Eastern Alps, which exposes HP-LT-rocks, penninic units are exposed. 3 main units can be differentiated (from bottom to top): Zone of Pfunds (Valais), Tasna unit (Briançonnais), Fimber unit (Piemontais). In this paper we discuss new occurrences of HP-minerals in the Zone of Pfunds at Piz Mundin which are typical for subduction related metamorphism. The Piz Mundin represents an ophiolitic sequence that is overprinted by HP-LT-metamorphism during the Tertiary. The geochemistry of the basalts identifies them as tholeiitic basalts. The sediments covering the basalts are of Cretaceous age. BOUSQUET 1998 reports carpholite, high-Si-phengite and glaucophane from that region. Crossite - following him can be found in late veins within the basalts. His petrological calculations define pressures up to 15 kbar at 380° C based on carpholite and glaucophane. He distinguished a region with carpholite and UCHP-metamorphism from a region without carpholite and "normal" HP-metamorphism. During detailed geological mapping of the first author it was possible to demonstrate that the occurrence of carpholite is limited by the bulk chemistry of the metasedimentary host rock. Metasediments with clastic input show no carpholite - there might be too much detrital feldspar in the sediment, preventing the development of carpholite. Moreover in the basic rocks (metapillows and metabasalts) it was possible to find also metamorphic clinopyroxene and aragonite. Clinopyroxene is rimmed by glaucophane and/or stilpnomelane. Glaucophane itself shows high zonation: blue core with pigments, rimmed by an inclusion-free blue amphibole which itself is rimmed by a slightly green to colourless amphibole (actinolite? or tremolite). The metamorphic pyroxene shows about 25 % jadeite- and 40 % aegirine-component. HP-conditions might be higher than those given by BOUSQUET et al. 2002 as pyroxene is a precursor of glaucophane. The new findings of metamorphic aragonite are the

first reports of that mineral in the Eastern Alps. The Engadine Window exposes rocks that we want to define as UCHPs (Ultra Cold High Pressure Rocks), which are typical for subduction related metamorphism. We like to define the typical paragenesis by the following P-T-conditions: max. 400 °C to 420 °C and pressures higher than 10 kbar. So the UCHPs show no metamorphic garnet or chloritoid. The P-T-field of UCHPs does not necessarily correspond to the Lawsonite-blueschist-facies defined by EVANS 1990. The main difference is given by the upper thermal boundary of the UCHPs that is defined here by the occurrence of carpholite in metasedimentary rocks. The carpholite breakdown reaction strongly depends on temperature ( $T_{max} \sim 410 \text{ °C}$ ). Other comparable regions with typical UCHPs are: The San Franciscan complex Crete in Greece Parts of the Western Alps Parts of the Menderes Massive (Turkey). A common feature of all the mentioned regions is the occurrence of typical HP-LT-minerals that indicate a development by subduction-related metamorphism and rapid exhumation, in most cases correlateable to fast isothermal decompression during exhumation.

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