



## **Crustal imbrication and nappe folding in the southeastern Tauern Window**

Friedrich Hawemann (1), Peter Gipper (1), Mark R. Handy (1), and Roland Oberhänsli (2)

(1) Institut für Geologische Wissenschaften, FU Berlin, Malteserstr. 74-100, 12249 Berlin, Germany, (2) Institut für Erd- und Umweltwissenschaften, Universität Potsdam, Karl-Liebknecht-Str. 24-25, 14476, Potsdam-Golm, Germany

Metapelitic rocks in the cover of the European Basement exposed in the southeastern Tauern Window document a polyphase deformational history associated with Cenozoic subduction, accretion and exhumation along the European continental margin during Alpine Orogeny. The Mallnitz area is special in exposing almost all structural levels of the Alpine metamorphic edifice, including a stack of imbricated nappes derived from the European margin (Venediger Nappe System) that is separated by a roof thrust from overlying ophiolites of Alpine Tethys (Glockner Nappe).

Our samples record four distinct phases of mineral growth and define a clockwise P-T path with two baric peaks that are separated by a period of decompression: (1) Pseudomorphs after lawsonite preserved within garnet clasts and predate the earliest schistosity in the area. These pseudomorphs are interpreted to document Paleogene accretion and subduction of a distal part of the European margin, possibly to blueschist-facies conditions; (2) Subsequent growth of a first generation of biotite and phengite forming the earliest schistosity indicate temperatures of about 560°C at 8 kbar. Chloritoid inclusions in garnet yield similar temperatures within error and are characteristic of amphibolite-facies conditions during isoclinal folding of the obducted nappes; (3) Newly formed staurolite and a second generation of micas characterize the second and main schistosity in the area which, together with continued garnet growth, indicate a second peak of metamorphism at 600°C and 9 kbar. We attribute this second baric peak to tectonic imbrication and thickening associated with the formation of the Venediger Nappe Complex. Subsequently, the nappe stack was exhumed in Late Paleogene time at nearly isothermal conditions. Cross micas overgrow the main schistosity and their recorded range of decreasing temperatures and pressures indicate ongoing exhumation and cooling in Neogene time. We relate this to upright folding and doming, and to extensional shearing along the Katschberg shear zone in the eastern part of the Tauern Window. This final phase of exhumation appears to be related to late orogenic indentation of the Adriatic microplate in early to middle Miocene time.