

**PRESSURE DOMINATED EO-ALPINE METAMORPHISM OF THE AUSTRALPINE UNITS
OF THE EASTERN ALPS: NEW DATA FROM THE WÖLZ COMPLEX**

by

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Eclogites are the classical rocks indicating pressure dominated metamorphism. Eclogite occurrences of the Eastern Alps are known from the very beginning of the introduction of the term eclogite by [1] for "diallag (omphacite) - garnet - kyanite - quartz - zoisite - assemblages" from Kupplerbrunn (Sausalpe) which generally is accepted as type locality of eclogites [2]. Most eclogites are spread from east to west in the Eastern Alps within a narrow zone of eo-Alpine exhumation ages of eclogite- to amphibolite facies assemblages which are of eo-Alpine age [3]. Only a few eclogite bodies occur in eo-Alpine low-temperature areas and therefore must be of pre-Alpine age. These pre-Alpine eclogites are dated as Variscan in the Ötztal basement [4] and preliminary age-data for the Hochgrößen eclogites point to a pre-Variscan age (FRANK pers. com.). Hence, modern geochronological and petrological investigations in the Austroalpine basement changed the geodynamic picture of the Eastern Alps significantly and the post-Variscan rock forming processes are now known to be dominant in many parts of the Austroalpine basement.

The post-Variscan metamorphic overprint starts with a temperature increase at low pressures and the emplacement of acid to basic magmatic bodies (Permian LP/HT-event). It is succeeded by a high pressure metamorphism at low to medium temperature (eo-Alpine HP/LT event). The metamorphic overprint of the LP/HT-assemblages and the magmatic bodies of Permian age by HP/LT-assemblages clearly dates this last pressure dominated metamorphism as Alpine metamorphic overprint of the Austroalpine units.

The regional distribution of this last metamorphic overprint is characterized by a continuous increase from N to S within the Austroalpine basement from low greenschist- to epidote-amphibolite and eclogite-facies conditions with a sudden end of regional PT increase at a tectonic line (SAM = southern limit of Alpine Metamorphism) still within the Austroalpine basement. The geothermic gradient of this regional metamorphism must be rather small (15 - 20° C/km) in order to cross the stability field of paragonite and hornblende before entering the omphacite stability field. The key rocks of such geothermal gradients are paragonite-amphibolites which occur N to the SAM and the eclogite facies assemblages as indicators of the epidote-amphibolite facies due to decreasing metamorphic conditions.

The Wölz complex east of the Pennine Tauern window and north of the type locality of eclogites (Sausalpe) is, similar to the Ötztal complex west of the Tauern window, a good example for this P-dominated metamorphic gradient.

The Wölz complex turns out to consist of two tectonic units which differ in terms of pre-Alpine metamorphism. Only one suffered from Variscan amphibolite facies overprint (Rappold unit) whereas the other (Wölz unit) suffered from post-Variscan metamorphism only. Both units were overprinted together during eo-Alpine pressure dominated metamorphism: P- and T-increase from 8 kbar (500°C) in the N (Ennstal), 10 kbar (< 600°C) in the center and 17 kbar (> 600°C) in the S (Murtal) at the transition to the Sausalpe complex where the first omphacite relics are present as inclusions in garnet, is derived by geothermobarometry.

These rock units continuously grade into the Sausalpe complex where they may represent poly-metamorphic and monometamorphic units which suffered from even higher PT-conditions of ~ 700°C/20 kbar approaching the SAM.

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Literature

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