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THE METAMORPHIC EVOLUTION OF VARISCAN ECLOGITES FROM THE NORTHERN ÖTZTAL COMPLEX (TIROL, EASTERN ALPS)

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Within the polymetamorphic Austroalpine Ötztal Complex (ÖC), Variscan eclogites have been described mainly from the central part (MILLER & THÖNI, 1995) but also from the northern (EICHHORN, 1991) and western part (BERNHARD, 1994) of the ÖC. *P-T* data are very sparse and exist only from the eclogites from the central ÖC. The eclogites from the northern part of the ÖC occur as small lenses within amphibolites. The metamorphic peak assemblage is garnet + omphacite ± taramite ± katophorite ± hastingsite + clinozoisite + rutile + quartz. During the retrograde evolution of these rocks, the formation of abundant symplectites, composed of albite-rich plagioclase + tschermakite + diopside-rich clinopyroxene, occurred. The mineral assemblage in the adjacent amphibolites is hornblende + plagioclase + epidote + quartz ± barroisite.

Thermobarometry of the northern ÖC eclogites was performed by simultaneous calculation of all possible reactions within the peak metamorphic assemblage garnet + omphacite + clinozoisite + barroisite + quartz with the program THERMOCALC v. 3.1. (HOLLAND, 2001, written comm.) and the data set of HOLLAND & POWELL (1998). The approach we used is the average *P-T* calculation approach by POWELL & HOLLAND (1988, 1994). Calculations assuming $a(H_2O) = 1$, yields *P-T* conditions of 620 – 650 °C and 1.7 - 2.3 GPa. It was not possible to obtain any additional information about $a(H_2O)$, since an independent *T*-estimate, to calculate *P*-$a(H_2O)$ diagrams, could not be obtained. Calculations of garnet-clinopyroxene temperatures with the calibration of KROGH-RAVNA (2000), yields a wide range of temperatures of 370 – 650 °C, depending on the calculation of Fe^{3+} and thus was not considered reliable.

The *P-T* conditions of symplectite formation were calculated to be ca. 650 °C and 1.0 - 1.3 GPa. This is in very good agreement with data from barroisite-bearing high-*P* amphibolites which yielded *P-T* conditions of 640 °C and 1.1 GPa. The adjacent amphibolites record information about the last stage of the Variscan *P-T* evolution, namely an amphibolite-facies overprint of 570 – 650 °C and 0.6 - 0.8 GPa. These data indicate that these eclogites underwent a nearly isothermal decompression at 600 – 650 °C from ca. 1.7 - 2.3 GPa to 1.1 and 0.7 GPa during the Variscan metamorphic event in the ÖC.

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