

EVIDENCE OF ULTRA HIGH PRESSURE CONDITIONS IN ECLOGITES FROM THE MOLDAQUIBIAN ZONE, BOHEMIAN MASSIF

FARYAD, S.W

Institute of Petrology and Structural Geology, Charles University, Albertov 2, Prague, Czech Republic
e-mail: faryad@natur.cuni.cz

Results of thermobarometric calculations done on eclogites and garnet peridotites from two units (the Gföhl and the Monotonous) of the Moldanubian zone are presented. The Kutná Hora crystalline complex is assumed to be a part of the Gföhl unit that consists of gneisses, migmatites and granulites with lenses of eclogites and garnet peridotites (SYNEK & OLIVEROVÁ, 1992). MEDARIS et al. (1995) estimated pressures of 3.8 GPa / 1100 °C for garnet peridotite, but lower pressures of 1.5-2.0 GPa / 850-1000 °C were established for eclogites containing garnet and omphacite + rutile. Thermobarometric calculations done on two kyanite-bearing eclogites, one occurring in granulite and the other in serpentinized garnet peridotite indicate very high-pressure conditions. Eclogite from peridotite forms ca. 20 cm thick and 2 m long sills/dykes having composition of plagioclase-rich gabbro close to anorthosite. It contains Mg-rich garnet (Py₄₂Gr₃₄Alm₂₂) and omphacite with Jd₃₀. Garnet is replaced by Al-rich clinopyroxene (CPx) and anorthite ± amphibole and kyanite by anorthite and spinel. The content of majorite in garnet ranges between 0.6-1.3 mol%. The surrounding garnet peridotite has relics of olivine, orthopyroxene (OPx), CPx, spinel and rare amphibole. Chromium-rich spinel forms inclusions in garnet and in CPx. Compositional maps indicate transformation of spinel into Mg-rich garnet (Py₆₉Gr₁₁Alm₁₈). CPx is diopside with X_{Mg} = 0.9, and OPx with X_{Mg} = 0.8 contains about 17 wt. % of Al₂O₃. Eclogite enclosed in granulite contains two textural and compositional varieties of garnet and CPx. The eclogite facies garnet -Gr I (Py₃₆Gr₃₄Alm₂₈) associates with omphacite Cpx- I (Jd₂₉). Garnet I is partly replaced by Al-rich CPx II and anorthite. The new Ca-rich garnet Gr-II (Py₁₀Gr₆₅Alm₂₃), forming either individual grains or rimming the coarse-grained eclogite facies garnet, indicates textural equilibrium with Al-rich CPx and plagioclase. There is a sharp compositional jump between these two garnet varieties. Small amount of tschermakitic amphibole replacing Ca-rich garnet is also present. Maximum PT conditions of ~4 GPa at 750 °C were calculated for eclogite. The garnet peridotite reveals pressure conditions similar to eclogite but at relatively high temperature of about 1000 °C. Textural relations and chemical composition, mainly the presence of Ca-rich garnet in eclogite, suggest that the decompression was followed by rapid cooling.

Eclogite from the Monotonous unit near Svetlík, studied by O'BRIEN & VRÁNA (1995) have only relics of eclogite facies assemblages. Maximum pressure estimated for the garnet-omphacite-kyanite assemblage is 2 GPa at 750 °C. Some samples, however, contain omphacite with parallel rods of quartz and garnet with inclusions of disordered graphite that may suggest UHP metamorphism.

References

- MEDARIS, L.G. FOURNELLE, J.H., GHENT, E.D., JELÍNEK, E. & MÍSAŘ, Z. (1998): *J. metamorphic Geol.*, 16, 563-576.
O'BRIEN, P. & VRÁNA, S. (1995): *Geol. Rundschau*, 84, 473-488.
SYNEK, J. & OLIVEROVÁ, D. (1992): Variscan nappe tectonics, 7th Geol. Workshop, Kutná Hora, 58p.