

P-T evolution of the granulite complex rocks, NW Bohemia, Czechoslovakia

JANA KOTKOVA

*Geological Survey, Malostranske nam 19,
Praha 1, Czechoslovakia*

Two areas with granulite occurrences are situated close to the fault zone separating two major units of the Bohemian Massif, namely, the Saxothuringicum and Tepla-Barrandian zones. In the north-east, acid granulites and granulite gneisses (Qtz + Pl + Kfs + Gt + Ky + Ru + Bt + Mu) associated with garnet lherzolites, dunites and griquaites were encountered in deep boreholes (several up to 500 m) and as xenoliths in the Tertiary volcanic rocks.

To the south-west, granulites with transitions to granulite gneisses outcrop in the Ohre crystalline region. They are associated with orthogneisses and migmatites, displaying various degrees of deformation.

Two types of granulites were distinguished on the basis of garnet character and composition; granulites s.s (large garnets with up to 44 mol%, mainly 25-35 mol% Prp); and granulites s.l. with corroded garnets or even relicts relatively enriched in almandine and depleted in pyrope component. Zoning profiles of garnets of both granulites and lherzolites reflect high-grade homogenization of cores and retrograde re-equilibration of rims.

Peak metamorphic conditions experienced by granulites are estimated at 790° C and 15 kb. Geothermobarometry in lherzolite results in T = 850° - 1050° C and P = 25-30 kb.

Two-feldspar thermometry yielded T = 470-730° C, the lowest T corresponding to retrograde re-equilibration (annealed texture), the highest mainly to disequilibrium. Low T may reflect neglecting of extragranular exsolution from perthites.

Metamorphic reactions observed in granulites and garnet lherzolites do not indicate any decompression or temperature increase after the metamorphic peak. This feature makes them exceptional among all the granulite

complexes of the Bohemian Massif. Cr-rich spinels occurring in dunitic (Sp-Grt-Px symplectites) probably record only a slight decompression.

K/Rb and Rb/Sr ratios in granulites correspond to those of undepleted granulites.

The apparent isobaric cooling recorded in granulites suggests that low fluid activity has also to be taken into account. However, estimates of the peak metamorphic conditions correspond to low thermal gradient (< 20 °C/km), and lack of any signs of thermal re-equilibration rules out the possibility of isostatic (erosional) uplift of the rock pile.