AMPHIBOLITE FACIES METAMORPHISM OF THE MARIÁNSKE LÁZNĚ COMPLEX

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A set of 32 garnet amphibolite samples from the SF margin of the allochthonous metaophiolite Mariánské Lázně Complex (MLC) and its mantle (e.g. from the Služatín, Číhaná, Závišín, Bezvěrov, Hoštec, Otročín, Bezděkov, Kosmová, Teplá localities) was chosen for the petrologic and geothermobarometric study. The samples represent 4 groups of rock types: amphibolized eclogites, amphibolized gabbros, amphibolites free of precursor relics and amphibolites with mineral assemblage showing retrogression up to low–PT amphibolite facies. An analysis of transitional stages between HP mineral assemblages and amphibolite facies assemblages facilitates a reconstruction of post–HP metamorphic development of the rocks.

Three methods were used for investigation of garnets. comparison of chemical composition within all samples, determination of zoning within individual grains and comparison of zoning trends in garnets from selected samples.

Preliminary conclusions follow:

* the chemical composition of garnets (Alm 48–57%, Prp 10–26%, Grs 22–32%, Sps 0.1–4.5%) differs from that of eclogite garnets given by Jelínek (1989) in substantially lower pyrope component,
* contrasting garnet composition in three groups of garnet amphibolites largely reflects variations in bulk–rock composition,
* compositionally distinct garnets from a number of samples display similar zoning trends and indicate a common history,
* the variation in content of individual garnet components does not exceed 4%.

Hornblende analyses were recalculated by several methods to crystallochemic formulae (23 oxygens, 13 (15) cations, Fe^{3+} content). All the studied grains were classified as calcic hornblendes; the most common ones are the ferroan pargasitic hornblendes (Leake, 1984), however, tschermakitic, edenitic and pargasitic hornblendes were also detected in a few samples.

Plagioclase up to three compositionally and structurally distinct generations have been identified in some samples. Oligoclase–andesine is abundant, and more calcic plagioclase An_{30-50} is relatively less frequent. Very small grains of almost pure albite were located along hornblende margins in some samples and, on the contrary, extremely calcic plagioclase has been detected in coronas around garnets. Matrix plagioclase tends to be slighly zoned, rims are enriched in Ca. It is significant to recognize all stages of plagioclase formation as the An–content in plagioclase is the most important factor for resulting pressure values.

The **geobarometer** calibrated by Kohn & Spear (1990), for Mg and Fe end–members of the system:

anortite + tremolite = grossular + pyrope + tschermakite + quartz

has been used for estimation of pressure conditions of the amphibolite assemblage formation after strong selection of samples according to calibration criteria. Two geothermometres have been applied for estimates of temperature. Graham & Powell (1984), and Blundy & Holland (1990). Obtained values were used for the second cnmparative calculation of pressure.

Values of pressure for MLC garnet amphibolites vary from 8 to 12kbar. After consideration of mineral equillibria by means of double thermometry results fit, microstructural study and elimination of extremes,the most reliable results have been obtained for three samples: Hoštec – 9.3 kbar (720 °C), Teplá – 10.0 kbar (690 °C), and Bezvěrov – 11.2 kbar (700 °C).

Relatively high values of P and T reaching the lowest limit of eclogite formation conditions (Jelinek, 1992), and number of almost unaffected eclogitic relics suggest that the most significant role during formation of the amphibolites was played by activity of fluids and not by a strong decrease in P and T (cf. O'Brian, 1991). Therefore a role of deformation is supposed to be substantial for variations in intensity of amphibolite facies metamorphic imprint.