

Amphibolites in the Vicinity of the Nové Město na Moravě (NE Part of the Moldanubian Zone, Bohemian Massif) – the Evidence of Older Granulite Facies Metamorphism

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The north-eastern part of the Strážek Moldanubicum, close to its border with Svratka Crystalline Unit, is characteristic by occurrence of the variously migmatized biotite ± silimanite paragneisses, leucocratic biotite ± muscovite migmatites, including smaller, usually elongated bodies of the metamorphic mafic rocks, representing garnet-free or garnet ± clinopyroxene amphibolites to granulites, both locally banded, and rocks having (showing) features corresponding rather to garnet-rich restite. Except mentioned rocks, smaller bodies of ultramafic rocks such as serpentinites and pyroxenites also occur.

The mineral paragenesis typical for studied samples of amphibolites includes assemblage of the greenish to green-brownish pargasitic amphibole and plagioclase with An₂₉₋₈₅, which is sometimes complemented by preserved assemblage of garnet and clinopyroxene, corresponding to higher metamorphic grade, represented by transition between at least upper amphibolite and granulite facies. Garnets are predominantly of an almandine-grossular composition (Alm₄₀₋₆₀, Gro₂₄₋₃₅, Pyr₁₂₋₃₁, Spe₁₋₅) and often show inclusions of small grains of bluish clinopyroxene (up to ca 20% of Jd component), rutile, ilmenite and apatite. Other, not so common accessory minerals are zircon, sphene, minerals of epidote group and quartz. Anhedronal chlorite and biotite are rare retrograde phases in garnet-free amphibolites, while symplectites of green amphibole and plagioclase forming diablastic textures around garnet are typical for garnet amphibolites. Comparing basicity of plagioclases, inside symplectites is higher than outside (less than An₅₀) and is increasing towards the garnet, as a result of reactions producing An-rich plagioclase e.g.: 3 Prp + 11 Di + 7 Qtz + 4 H₂O = 4 Tr + 3 An. The replacement of clinopyroxene by green to green-brownish amphibole on the rims is also documented in several samples of garnet amphibolites. No orthopyroxene or its relics was not found.

Binary diagrams based on the major oxides vs. SiO₂ chemistry suggest the existence of at least two suites of studied rocks. Amphibolites have characteristics corresponding to tholeiite series, only one sample is displayed in the calc-alkaline field of the

AFM diagram. The REE values normalized by chondrite (Boyn-ton, 1984) are characterised by Eu/Eu* (0.87–1.35), Ce_N/Yb_N (0.97–12.81), Ce_N/Sm_N (0.52–3.38) and Eu_N/Yb_N (1.14–2.40).

Hornblende-plagioclase geothermobarometry applied to pairs of hornblende and plagioclase from symplectites surrounding garnets (Holland and Blundy, 1994), combined with amphibole geobarometry (Johnson and Rutherford, 1989; Schmidt, 1992) gave the interval 780.5 °C, 6.7 kbar and 797.7 °C, 8.5 kbar for the sample from the locality near the Rokytno vil-lage and 833.6 °C, 8 kbar and 861 °C, 9.9 kbar for the sample from the locality Pohledec. Although temperature values seem to be slightly overestimated, due to hornblende high persistence (up to 1000 °C, 10 kbar) the plagioclase-garnet-clinopyroxene ± hornblende assemblage is typical for both upper amphibolite and high-P granulite facies. Thus, it is no reason to be in doubt that some samples of garnet-clinopyroxene amphibolites represent rocks corresponding to amphibolite/granulite facies transition or that their peak metamorphism could be under granulite facies conditions.

References

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Denudation Surfaces, Development of Pannonian Formations and Facies Distribution Indicate Late Miocene to Quaternary Deformation of the Transdanubian

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The Transdanubian Range (TR) suffered a moderate extension during the rifting of the Pannonian basin between ~18 and ~11 Ma. Post-rift phase was connected to the deposition of different "Pannonian" (e.g., Late Miocene) formations both on

top of the TR and in fastly subsiding basins around it. Because of postulated thermal character of this subsidence, continuation of syn-rift faulting was generally not considered during late Miocene (Horváth, 1993). The paucity of direct structural