Textural Relations and Mineral Compositions of Retrogressed Low-Grade, High-Pressure Metabasites and Phyllites around Krkonoše-Jizera Complex and near Kraslice in Krušné Hory Mts.

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The rocks from both areas are strongly retrogressed into greenschist facies assemblages. Relatively fresh blueschists with strong foliation, defined by blue amphibole, phengite and epidote, are locally preserved in the eastern part of the Krkonoše–Jizera Complex. Some coarse-grained unfoliated varieties with primary igneous pyroxene and pseudomorphs of plagioclase are also present in this area. Beside blue amphibole, albite, epidote and phengite, other blueschist facies minerals in metabasites are garnet, chlorite, titanite and aegirine. Blue amphibole is usually replaced by chlorite and albite or it occurs in the core of actinolite grains. Boundaries between these two amphiboles are mostly sharp but continuous. Composition of blue amphibole ranges from glaucophane to riebeckite with $X_{Al}=Al/(Al+Fe^{3+})=0.37–0.75$ and $X_{Mg}=Mg/(Mg+Fe^{2+})=0.4–0.68$. Variation of X_{Al} contents in the blue amphibole is result from the whole rock composition, but also from zoning in individual crystal, where riebeckitic variety occurs in the core and glaucophane on the rim. Na-Ca amphibole was not found yet in these blueschists. Na-pyroxene occurs as thin rim around igneous diopsidic augite, which is rarely preserved in some coarse-grained rocks (gabbros?). It is aegirine (Di_{43-48}, Aeg_{40-45}) with low jadeite content (Jd_{8-12}). Epidote is rich in Fe ($X_{Al}=0.656–0.886$). Backscatter images show zoning of epidote represented by increase of X_{Al} from core to rim. Composition of phengite ranges in Si from 3.3 to 3.4 a.p.f.u.. Accessory biotite found in some retrogressed blueschists is rich in Fe ($X_{Mg}=0.535$ to 0.699). Chlorite composition ranges between $X_{Mg}=0.37–0.622$ and it is difficult to distinguish different chlorite generations. Garnet associating with blue amphibole occurs only in metabasites from the Kopina Hill, locality in the Poland side. Its presence was already described by Smulikovsky (1995). Garnet forms idioblastic grains with numerous inclusions of epidote, white mica, quartz and opaque minerals. It is rich in Fe (Alm_{55-70}, Grs_{25-35}, Py_{1-3}, Sps_{1-15}) and shows progressive zoning with decrease of Mn and Ca and increase of X_{Mg} towards rim.

Surrounding phyllitic rocks from the Krkonošsko-Jizera Complex contain porphyroblasts of chloritoide in the fine-grained matrix composed of white mica, quartz and chlorite. Chloritoid forms small needles of different orientations and usually it crosses cut the foliation. In some very fine-grained rocks, chlorite forms porphyroblasts with interlayers of white mica. Chloritoid is rich in Fe with $X_{Mg}=0.078–0.083$, chlorite has $X_{Fe}=0.64–0.68$ and white mica is relatively rich in Si=3.2 a.p.f.u.

The mafic rocks from the vicinity of Kraslice in the Krušné Hory Mts. are strongly retrogressed and the minerals relating to the HP/LT metamorphic stage are preserved only rarely. Amphibole composition ranges from Ca-Na- to Ca-amphibole. The Ca-Na amphibole corresponds to winchite with $X_{Al}=0.16–0.22$ and $X_{Mg}=0.7–0.72$. Calcic amphibole is actinolite in composition. Epidote is rich in Fe ($X_{Al}=0.66$-0.74). Chlorite has $X_{Mg}=0.32–0.62$ and accessory stilpnomelane was also observed. Plagioclase is pure albite with anorthite component of about 1 %. Surrounding phyllites contain, similar to that in the Krkonošsko-Jizera Complex, Fe-chloritoid ($X_{Mg}=0.09–0.12$) and chlorite ($X_{Fe}=0.66–0.69$). In some fine grain varieties, chlorite forms porfyroblasts and it associates with phengitic white mica (Si=3.2 a.p.f.u.).

Thermobarometric calculations with help of the PTGIBBS (Brandelik and Massone 2004) program used for phyllites with chloritoid indicate temperature of about 400 °C and pressure of 12 kbar. PT conditions, estimated based on mineral composition of blue amphibole, chloritoid and phengite in metabasites, are comparable with the epidote blueschist composition 6 of Evans (1990). Textural relations from the metabasite indicate breakdown of blueschist facies minerals, mainly of glaucophane and formation of chlorite and albite. The presence of biotite and actinolite rimming blue amphibole could be the result of nearly isothermal decompression after maximum pressures were reached.

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