

CONTRASTING PRESSURE CHARACTERS OF THE VARISCAN VS. ALPINE GREENSCHIST FACIES METAMORPHISM IN THE WESTERN CARPATHIANS (CZECHO-SLOVAKIA)

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Three structural domains are distinguished in the Western Carpathians: the Veporicum is a part of the central domain and the Gemericum of the inner one. Greenschist facies metamorphic terrains of various age occur both in Veporicum and Gemericum. Some of them are Paleozoic sequences only affected by Variscan metamorphism, some are Permo-Mesozoic sequences only affected by an Alpine metamorphism. Variscan phyllitic sequences which display an Alpine overprint also occur.

In the past years a systematic study of the pressure character of the Variscan metamorphism in several quartz-phyllitic sequences not affected by Alpine metamorphic overprints has been done. The pressure character was estimated by means of the composition of potassic white mica as deduced from X-ray analyses: b values measured in 551 selected samples revealed low pressure conditions. However, Alpine metamorphic overprints may be more widespread than commonly assumed, and a low (to very low) grade Alpine regional heating may have changed the composition (and consequently the b cell dimension) of muscovite without having produced any other detectable mineral and structural alteration in the Variscan metapelites. In such a case, the above 551 muscovite b data may not reflect the pressure conditions of the Variscan metamorphism, but could represent a mixed result of Variscan plus Alpine effects.

In order to clarify this problem, some phyllitic sequences for which the Permo-Mesozoic age of sedimentation has been ascertained (or, in some cases, is commonly admitted), have been studied with the same procedures. The results indicate a medium to high pressure character.

Therefore, contrasting pressure characters of the Variscan vs. Alpine metamorphism were ascertained. The Variscan metamorphism turns out to be related to a quite high value of the metamorphic thermal gradient (about 40°C/Km). The Alpine metamorphism turns out to be related to a significantly lower metamorphic thermal gradient (about 15°C/Km), corresponding to the lowest range of values pertaining to the barrovian-type metamorphism, close to the boundary with the range of the high pressure metamorphisms.