MINERALOGY OF THE TRIASSIC METAVOLCANICS OF THE BÜKK MTS. (NE HUNGARY)

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Middle-Upper Triassic successions of the Bükk Mts. are characterised by alternating carbonate-dominated platform and basin facies sedimentary formations with intercalated volcanics. The stratigraphy of this period is uncertain. Syngenetic features are overprinted by low grade regional metamorphism and ductile deformation, and additional local alterations in most rock bodies. These bodies were subject of large-scale tectonic displacements, producing contacts of fragmented fault blocks, where stratigraphic continuity cannot be determined. In several cases it is not clear, if certain formations, even if now adjacent at some outcrops, developed subsequently as part of the same succession, or in synchronous successions at different locations. In consequence of this situation, various hypotheses regarding stratigraphic position of metavolcanics were applied, and metavolcanics formations were mapped variably.

Excessive sampling and testing were performed in the past few years to define the geochemical and mineralogical composition of the metavolcanics formations. Based on trace element geochemistry, metavolcanics can be grouped into three genetic units, also representing chronostratigraphic horizons: (1) alkaline Bagolyhegy Metarhyolite (BMR) of uncertain age, (2) Ladinian calc-alkaline Szentistvánhegy Metavolcanics (SMV) and (3) Carnian alkaline Szinva Metabasalt (SMB). Here we present the result of the mineralogical tests of 41 samples representing these formations. Tests included X-ray powder diffraction (XRPD) of bulk samples, optical microscopy of thin sections and electron probe microanalyses (EPMA) with standardless EDX point and area measurements on polished sections. Quantitative evaluation of the XRPD data was made by Rietveld refinement in TOPAS4 software, providing the rock forming minerals and amorphous content. Only matches of mineral species supported by optical and EMPA observations were accepted. Quantitative data were cross-checked using ICP-AES or WDXRF major element compositions of the bulk samples. In the case of accessory minerals, EPMA and optical microscopy observations were used.

Rock forming minerals are shown on Figure 1. Most important common characteristics are that feldspars are albite and potassic feldspars, and dioctahedral micas have phengitic compositions in every sampled rock. Excess potassic feldspars were found in metasomatic, excess calcite in peperitic rocks. BMR has a simple composition of quartz, feldspars, and sericite. SMV is the most voluminous and heterogeneous of the three formation, samples of this are grouped by differentiation and by structural position (North-eastern vs. South-eastern Unit). Beyond quartz, feldspars and sericite, andesitic and basaltic varieties of the NU contain chlorite, epidote group minerals, pumpellyite and titanite as alteration products of mafic minerals. The same rock types of the SU contain phengite or celadonite of 1*M* polytype and anatase instead of titanite, indicating lower metamorphic grade. SMB rocks are composed mainly of feldspars, chlorite, pumpellyite and titanite, in some cases with significant amount of relict augite and actinolite as its alteration product.

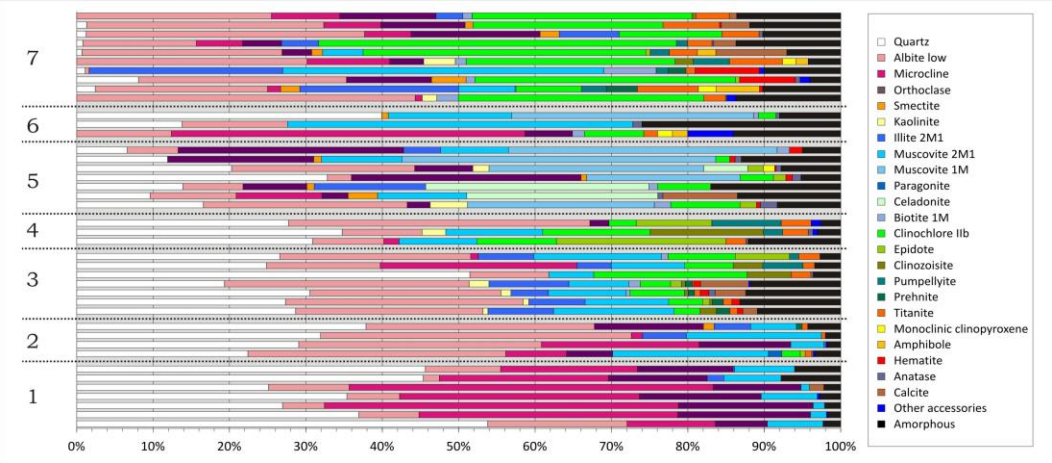

Fig. 1. Quantitative evaluation of the XRPD measurements. Minor phases and varieties occurring in single samples only are merged but identified structural varieties of micas are indicated. Grouping: 1 – BMR metarhyolites, 2 – SMV (NU) rhyolitic/dacitic rocks, 3 – SMV (NU) andesitic rocks, 4 – SMV (NU) basaltic andesitic rocks, 5 – SMV (SU) metavolcanics, 6 – SMV special rocks, 7 – SMB metabasalts.