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MIDDLE TRIASSIC PYROCLASTICS INTERCALATIONS WITHIN THE REIFLING BEDS OF THE CHOČ NAPPE, SLOVAKIA

GEOLOGICAL SETTING

The Tatra Mts. and Chočske Vrchy Mts. are composed of several nappes comprising Mesozoic rocks. The studied rocks built the most external nappe named Choč Nappe that pertained to so called Hronicum paleotectonic unit. During late Anisian-early Ladinian time Hronicum underwent intensive disintegration that involved deeper-water marine sedimentation. The sediments formed in the basin represent mid-to-outer platform limestones and dolomites (Ramsau Beds) that pass upward to basinal nodular cherty limestones (Reifling Beds) with mudstone intervals (Partnach Beds). Such a succession is typical also for the Northern Calcareous Alps where the mentioned lithostratigraphic units have been defined. The age of the studied sediments has been determined by means of conodonts and forams as late Anisian-early Ladinian (Zawidzka, 1972; Gaździcki & Zawidzka, 1973).

VOLCANOCLASTICS AND THEIR SEDIMENTARY CONTEXT

Several pyroclastic horizons have been recently found in the late Anisian-Ladinian Reifling beds of the Hronicum unit (Choč nappe) from the Central Carpathians. The tuffites have been recognised in Polish Western Tatra (Wielkie Koryciska Valley) and in Slovakia, in Choč Mts. (Matiašovce profile) and in Povazshky Inovec unit (Bečkov profile).

The tuffite-hosted Reifling Beds are composed of fine-grained, dark-grey to brownish nodular limestones rich in benthic fauna debris (echinoderms, brachiopods, bivalves, forams). Quite intensive bioturbations indicate good ventillation of sea floor.

The studied pyroclastics from Bečkov site occur ca. 8 meters above light-coloured limestones with reddish cherts. The tuffites occur within calcilutite and thick-bedded bioclastic limestones (*Grafensteinkalk*) and form 3 horizons ranging

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from 10 to 20 cm in thickness. The pyroclastics from Matiašovce form 2 horizons 10 cm thick within turbiditic limestones.

The studied tuffites are olive-green, plastic deposits and show sharp contacts with the adjoining host carbonates while the nonvolcanic, dark-coloured claystone horizons pass more gradually to the intervening carbonates. In contrast to fossil-rich host carbonates and dark claystones/mudstones, the tuffites are completely avoid of macro- and microfossils.

Primary sedimentary structures are highly obliterated in plastic tuffites since they served as easy-slip horizons during postsedimentary tectonic movements in the region.

RESULTS

Microscopic studies revealed a complete alteration of primary pyroclastic material. No typical pyroclastic structures, relics of igneous minerals (quartz, feldspars), or fragments of volcanic glass and clasts of parent magmatic rocks were found. Oriented microstructure are observed in studied rock from Matiašovce. It indicates that the rocks were subjected to tectonic movements. The rocks from Bečkov show the "domain" structure.

The studied pyroclastic rocks consist mainly of very fine illite flakes (5-8μm). They are cut by carbonate veinlets and impregnated (sample from Bečkov) with carbonates (calcite, dolomite). Beside this, opaque minerals (Fe-Ti oxides, iron hydroxides, pyrite) may occur in laminae, lenses and irregular stripes. Grains of detritic quartz in studied rocks are very rare.

EDS microprobe studies have shown that the Mg-Fe illite displays the Fe/Mg ratio varying from 0.17 to 0.43 and the sum $MgO+FeO_{tot.}$ from 6.36 to 9.17 wt.%.

X-ray diffraction patterns of all samples of pyroclastic rocks indicate them as to be composed of illite±layered minerals, calcite and quartz. X-ray patterns of separated <0.2 μm fraction of clay minerals, after treating with glycol and heating at 550°C, have confirmed the presence of illite in all samples. In the samples from Bečkov was documented the presence of chlorite. In the samples from Matiašovce were detected mixed-layered minerals of chlorite-vermiculite type (corrensite?) and vermiculite there. Ir index of illitic material estimated by Środoń's (1984) method was found to be near 1. The polytype 1M (authigenic) illite dominates in fraction <0.2 μm samples of Bečkov. In other samples (fraction 0.2-2μm) there the illite politype $2M_1$ (detritic) and minor amount of politype 1M (authigenic) occur.

The supposed character of parent magma of the examined rocks has been reconstructed on the ground of discrimination diagrams for major and trace elements. The projection points of pyroclastic rocks from Slovakia plot in TAS, SiO_2-Zr/TiO_2, Ti/Zr, Zr/TiO_2-Nb/Y diagrams within the fields of basalts and trachyandesites, similarly as earlier described pyroclastic rocks from Koryciska Wielkie Valley in Poland (Koszowska et al. 2001). Both pyroclastic rocks from Poland and Slovakia show this same characteristic anomalies in normalized incompatible element spider diagrams and REE patterns.

FINAL REMARKS

According to Masaryk et al. (1995), the volcanogenic origin of similar Middle Triassic rocks in Slovakia is controversial. The present field and sedimentological studies indicate definitely pyroclastic origin of these rocks from Bečkov and Matiašovce of the Choč unit. Lack of unequivocal and unquestionable evidences (lack of typical pyroclastic structures, relic of igneous minerals, fragments of parent magmatic rocks) is due to very fine grained (ash, dust) and glassy character of primary pyroclastic material. Consequently, it was strongly altered and, probably, mixed with detritic material during later processes related with sedimentation and diagenesis under deep-water marine conditions. Moreover, later tectonic processes resulted in additional mixing of pyroclastic and detritic material since the rocks in question were serving as slip planes for surrounding rigid rocks. Apart from illite, the rocks studied consist of chlorite, vermiculite and mixed-layered chlorite-vermiculite (corrensite?). This data seem to confirm our conclusion that the rocks in question are the products of transformation of mafic pyroclastic material.

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