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CLAY MINERALOGY OF THE P/Tr BOUNDARY SECTION OF BÁLVÁNY HILL, BÜKK MOUNTAINS, HUNGARY

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In the frame of a multidisciplinary research project we are studying the Permian/Triassic (P/Tr) boundary, for a better understanding of the dramatic and abrupt ecological change in this period. At the P/Tr boundary about 95% of the marine species became extinct (Sepkoski, 1996). The current presentation is a report of some of the clay mineralogical data in a Hungarian geological section crossing this boundary.

Our section is located close to the top of the Bálvány Hill in the Bükk Mountains (about 120 km northeast of Budapest). This is a composite section, exposed in two outcrops within a distance of a few hundred m from each other. The outcrop containing the lower part of the section is situated on the northern slope of the hill and is called "Bálvány North". The upper part of the section is cropping out at the eastern side of the hill and is referred to as "Bálvány East". The section contains the top of the black, thick bedded Nagyvisnyó Limestone Formation and the lower part of the Gerennavár Limestone Formation. The Gerennavár Limestone Formation starts with the fine-grained siliciclastic "Basal Bedset" followed by the thin bedded "Transitional Bedset" (Hips and Pelikán, 2002).

The uppermost part of the Nagyvisnyó Limestone turns to a marl, the HCl insoluble part of it increases from 2 to 40%. Going further upward follows the very homogeneous Basal Bedset of an average carbonate content of 26% only, except for a 2 cm thick limestone and a 3 cm thick sandstone layer (Zajzon, 2003). The thin bedded Transitional Bedset consists of limestone interlayered by marl and clay horizons.

In the section the HCl insoluble residue consists mainly of clay fraction minerals. The larger size terrigeneous grains are rare, except for the above mentioned 3 cm thick sandstone layer in the Basal Bedset. This layer is a fine-grained sandstone cemented by carbonate. It contains much (two magnitudes) higher amount of terrigeneous grains than any other beds from the section. The heavy mineral population is very mature. Zircon represents most of the grains. The rest are tourmaline and rutile, some actinolite is also present (Zajzon, 2003).

For clay mineral studies the collected samples have been crushed and decarbonated by 5 vol% CH_3COOH. After washing to neutral pH, the < 10 μm fraction has been separated by sedimentation, applying Stokes' law. The clay fractions were measured by X-ray diffractometry on non-oriented, oriented untreated and oriented ethylene glycol treated samples.

The clay minerals of the section are kaolinite (7.1 Å), a 10 Å phase (muscovite, illite) and smectite (14.2–14.4 Å). Usually kaolinite is dominant. For ethylene glycol treatment the 14.2–14.4 Å reflection of smectite shifts to 16.5 Å. This clay mineral pattern does not change from the Permian to the Triassic in the section: there is no indication of any tuff layer or other volcanic activity, just the relative carbonate amount changes from layer to layer.

The lack of the change in the clay mineral spectrum is similar to another P/Tr transition zone (Gárdony–1 borehole) in the Transdanubian Unit, where the dominating clay mineral is illite (Zajzon, 2003).

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