

ORIGIN OF RED CLAYS AT THE RIGHT BANK OF THE RIVER SAJÓ

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The department has been working on the geological mapping of the northeastern foreland of the Bükk Mountains at an observing scale of 1:10,000 since 1993. During the geological mapping several re-worked and erosional lag surficial red clay occurrences were mapped in the Kazincbarcika–Miskolctapolca–Diósgyőr triangle. Our boreholes exposed 2–8 m thick reddish clay and palaeosol sediments near Sajóbábony.

The “red” and “reddish clays” dominantly situated on the hilltops on Miocene, Carpathian and Sarmatian various clastic deposits, subordinately on rhyolitic tuffs or on their weathered material. Re-worked by various landslides they can be found in the colluvium in a thickness up to 11 m. Red clay infillings can be found even higher than 350 m in the karst depressions of the Bükk Mountains, between 250 and 330 m in the neighbouring western side of the hills, while 190–210 m in the tectonically lowering southeastern hills. According to the latest lithostratigraphical charts they belong to the Kerecsend Red Clay Formation (Jámbor, 1998).

During the observations the surface extension of red and reddish clays we more-or-less determined and samples were taken from several outcrops and boreholes. The analysis of the grain size distribution, mineral composition (using X-ray diffraction and thermal analysis), structure (electron microscopy) and plasticity of the samples was carried out. The composition of ferrous concretions were analysed separately. The results were compared to the composition of the underlying beds, other red clays and palaeosols from North Hungary.

The red clays are reddish brown or rarely brick red, their grain size is dominantly fine sandy silt according to the scale of Atterberg. Quartz dominates in the mineral composition (51–60%) in the samples of exploring boreholes near Sajóbábony. The high amount of potassium feldspars and the 4–6% amorphous phase suggest rhyolitic tuff origin. It is supported by the dominant montmorillonite (15–20%) and illite (4–12%), while the amount of kaolinite is only 0–3%. The material is coloured by 3–4% hematite and gibbsite.

The plasticity coefficient of the samples is between 25 and 35, so they are called fat clay in soil mechanics. It correlates well with the high montmorillonite and other clay mineral content. Therefore soil creeps and fluctuations, mixing of palaeosols

and recent soils and the forming of thick colluvium can be frequently observed in the profiles of steep valley slopes.

During the geological mapping, profiling and drilling we found extended Sarmatian shallow marine bentonitic rhyolite tuffs contaminated with sand and silt in the hilly area, which is an important soil forming factor on superimposed lag surfaces.

Comparing to the other formations of North Hungary (Viczián, 2002; Fekete, 2002) the red clays of the area are characterised by high amount of smectite and quartz, but their kaolinite content is very low. The composition and behaviour of our samples show similarity with the so-called “nyirok” (Kozák et al., 2002) which is a kind of loam mainly formed by the weathering of tuffs, and it is less similar to the types formed by eolian materials (loess).

Hungarian red clays are dominantly aged Pliocene and Pleistocene (interglacial), however, dating is often uncertain. Age determination of cave deposits (e.g. Füköb and Kordos, 1977) give information about the age of re-working. We found mammoth tooth fragments in partly transported red clays on an uplifted hilltop near Parasznya and Pleistocene frost wedges filled with red clays and Sarmatian gravels.

To sum up, the red and reddish, partly eroded clay surface lags located to mainly Sarmatian hilltops are assumed to be the Pliocene weathering material of underlying strata which is partly eroded, partly re-worked during the strengthening tectonic and erosional dissection of Pleistocene age.

Since red clays cover extended areas they have an important economic significance. They determine the features of recent soils, the stability of slopes, the potential manner and possibilities of building up and their allochthonous occurrences even can be used as ceramic raw material.

References

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