

Mineralogical investigation of soils formed on carbonate rocks in the Bükk-Highlands (Hungary)

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The primary aim of our mineralogical investigation was to study the mineral composition and the soil-forming materials of the soils in the native forests of the Bükk Mts. The investigated soils can be found at the top of the Bükk Mts., on the so-called Bükk Highlands. This limestone plateau is composed primarily of limestone but contains also dolomite and shale. In the course of our investigations we have analysed four soil profiles. The formation of the acidic and humus rich upper layer of the soil profiles is influenced by the mineral composition and the weathering of the rocks. In order to study the composition of soil minerals thermoanalytical and X-ray diffraction measurements have been carried out. Different soil particle fractions have been analysed by polarizing microscopy. According to the thermal analyses the most abundant mineral in the soil samples was quartz, accompanied by clay minerals and oxides-hydroxides (Földvári, 2011, Zagórski, 2010) (Fig. 1). The presence of calcite could only be evidenced in a few samples. The X-ray diffraction measurements have also confirmed these findings, because according to this we can say that quartz represents the most significant proportion in all of the soil profiles, and besides quartz, clay minerals, feldspar and oxides-hydroxides also occur; respecting calcite we have got interesting results, as this mineral appears only in four layers and in very little concentrations in all of the soil profiles (Fig. 2.).

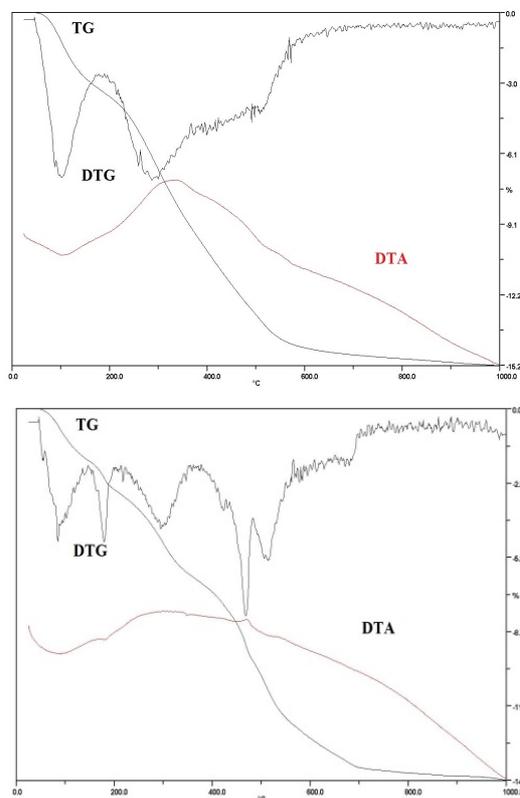


Fig. 1.: Thermal analysis results of some of the soil samples.

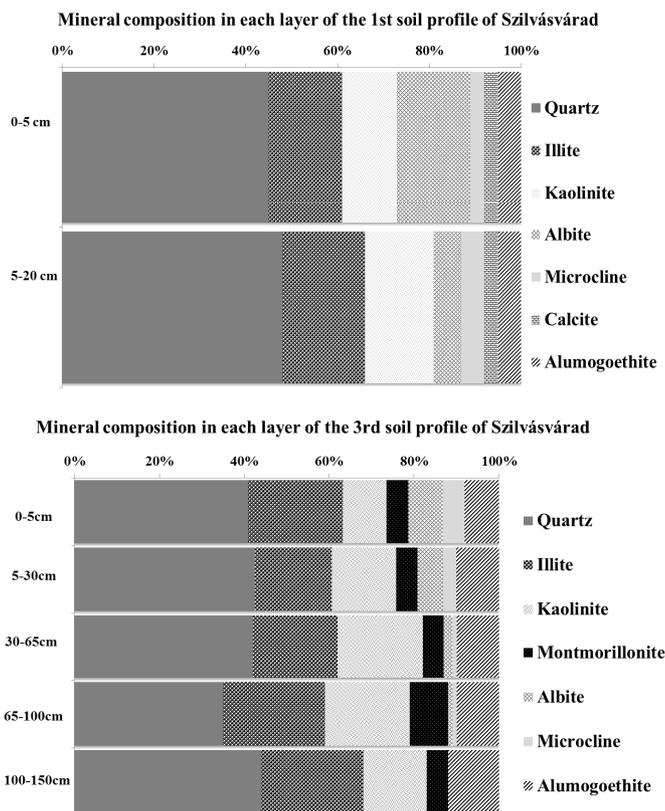


Fig. 2.: X-ray diffraction results of some of the soil samples.

X-ray analyses have also revealed the presence of aluminogothite in each of the profiles, a mineral, indicating a previously warmer and humider subtropical climate. This warmer climate of the area has been periodically changing for over 65 million years with a colder and dryer climate and these changes also affect the development of the soils.

The investigated soil samples of the Bükk Highland contain significant amounts of silicates, so apparently they cannot be the product of the weathering of limestone solely. The major part of soil-forming material originates presumably from previous dust fallings or the agglomerate materials of erosion.

Földvári, M. (2011): Handbook of thermogravimetric system of minerals and its use in geological practice. MÁFI, 213: pp. 180.

Zagórski Z. (2010): 19th World Congress of Soil Science, Soil Solutions for a Changing World, 1 – 6 August 2010, Brisbane, Australia.

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