



## Applications of thermal analysis in soil mineralogy in NE 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 formed on compacted carbonate rocks in the Bükk Mountains' native forest in NE Hungary. The investigated soils can be found on a limestone plateau, called the Bükk-Highlands. The formation of the differently 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 thermal analysis (Mettler Toledo TGA/DSC 1 type thermogravimeter ( $5^{\circ}\text{C}/\text{min}$ , air atmosphere,  $25\text{--}1000^{\circ}\text{C}$ )) was applied. The results of the analyses were also verified with X-ray diffraction measurements (Philips P W3710/PW1050 type X-ray diffractometer).

With grain-size distribution measurement using the Köhn pipette, fractions were separated to clay ( $<0.002\text{ mm}$ ), silt ( $0.002\text{--}0.2\text{ mm}$ ), fine sand ( $0.02\text{--}0.2\text{ mm}$ ) and coarse sand ( $0.2\text{--}2\text{ mm}$ ). By thermal analysis sieved soil samples as well as the separated fractions were evaluated. It was established that fine sand, clay and silt were the major soil constituents, while the ratio of coarse sand was less significant in most of the samples.

According to the thermal analyses and the X-ray diffraction measurements the most abundant mineral in the soil samples was the quartz, not the calcite. Besides quartz clay minerals, feldspars, oxides-hydroxides and chlorites also occurred. The amount of calcite determined by thermal analysis was compared to the results obtained with X-ray diffraction measurements, and we observed good relation between them.

It has been concluded that the investigated soils 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 from the agglomerate materials of erosion.

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