

EXPLORATION OF TEPID AND HOT WATER RESOURCES IN THE TOKAJ MOUNTAINS (HUNGARY) BY GEOELECTRICAL MULTI-ELECTRODE MEASUREMENTS

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ABSTRACT

The Tokaj Mountains lie in Northeastern Hungary and comprise the Central-Northern part of the Carpathian Volcanic Chain, an arc that is genetically related to subduction of an oceanic slab between the European and African plates. Subduction occurred from the North-Northeast in the Western Carpathians and from the East in the Eastern Carpathians during the Upper Tertiary-Quaternary.

The Tokaj Mountains comprise the Southern part of the Slanské-Tokaj Unit, a volcanic range situated in a 1.5 to 3 km deep graben ca. 100 km long and 15 to 20 km wide in Northeastern Hungary and Eastern Slovakia. The graben is filled by a Middle-Upper Miocene (Badenian-Sarmatian-pamionian) volcanic-sedimentary sequence and is bordered by the North-Northeast trending Hernád Fault and the Northwest trending Szamos Fault. The Southeast margin of the graben is bordered by the Northeast-trending Bodrog Fault, which is a part of the major strike-slip, left-lateral Zagreb-Zemplén Fault of the Pannonian Basin. Within the graben, the major faults trend North-South or nearly perpendicular to the Bodrog Fault.

The groundwater of the volcanic mountains can flow only in fissures and fractures. The precipitation infiltrates on the higher areas of the mountain, and then rise on the edge of the mountain. Along the Hernád Line, which is the Western border of the Tokaj Mountains, several tepid and warm water wells can be found and in order to better understand this ground water system geoelectrical multi-electrode measurements has been carried out at three locations (Pányok, Korlát and Abaujszántó) successfully. The results indicate that several faults are present in the area starting from 20 meters below the surface. With the help of these results, the tepid and warm waters in the area later can be more effectively exploited.

Keywords: Tokaj Mountain, volcanic hain, multi-electrode measurements, european plate, african plate, hernád fault, szamos fault, bodrog fault, zagreb-zemplén fault, tepid and warm water