

Sedimentology, mineralogy, lake evolution and chronology of the Quaternary Tata thermal lacustrine travertine

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Abstract

In the area of Tata town (Hungary) there are several Quaternary travertine outcrops of which the Porhanyó-Quarry is the best exploited one. The principal goal of our work was to define the depositional environment of the Tata travertine. Former archaeological studies focused on the reconstruction of the Middle Paleolithic Mousterian culture of the site. We conducted petrographical and microfacies studies together with paleomagnetic and XRD measurements for paleoenvironmental and chronological evaluations.

The travertine of the Porhanyó-Quarry can be divided to vertically six units. Algal and other phytoclastic and phytothermal grainstone, boundstone and floatstone are considered to be the dominant microfacies of travertines. On the wall of the quarry and NE from the Quarry, next to the Öreg-lake carbonate vents and cones can be found and these forms prove former spring activities on the bottom of an erstwhile shallow lake. The lake, fed by thermal springs could have formed in a siliciclastic floodplain or delta system. The three main lacustrine phases of the lake evolution were interrupted first by a palaeosoil formation and flooding event, followed up by fluvial-eolian event and finally finished by eolian sedimentation. The lacustrine phases represent intensive spring activity generating relatively high water levels, while the fluvial to eolian phases are related to be reduced spring activity with water level drops. The upwelling thermal water brought quartz grains with the thermal water from the Pannon siliciclastic bedrock to the surface. These grains are preversed in the centre of the carbonate vents. Due to the intensive spring activity many carbonate vents were preserved in the quarry. The different facies (vent, cascade, pond) migrated during the evolution of the travertine complex due to changes in morphology and flow direction.

Keywords: Porhanyó Quarry, travertine, lacustrine deposition, mineralogy, chronology, paleoclimatology.