

PALEOCLIMATOLOGICAL STUDIES ON TRAVERTINES FROM BUDAKALÁSZ (BUDA MTS., HUNGARY): EVIDENCE FROM STABLE ISOTOPIC DATA

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Introduction

Travertines from the Pannonian Basin have been studied for almost one hundred years. However, principles, concepts and technical background in geology have been dramatically changed during the past decades. As a consequence, beside stratigraphic and microfacies descriptions, valuable information can be contributed to paleohydrological and paleoclimatological studies by using geochemical and stable isotope data obtained on travertines. The major goal of this work is to carry out a detailed C and O stable isotope study on Budakalász travertine (Buda Mts., Hungary) in agreement with previous microfacies analyses (KOVÁCS, 1995) to find out the origin of CO₂ in water from which travertine deposited.

Geological background, sampling and applied techniques

The Pleistocene Budakalász travertine deposit lies on early Oligocene Hárshegy Sandstone and Kiscell Clay Formations. Early Pleistocene limnic clay and gravel terrace can be found under the limestone suggesting a former limnic and fluvial environment (SCHEUER *et al.*, 1987). The travertine is covered by a few meters thick loess and overlain by a thin humus layer. The Ezüsthegy quarry is approximately 800 meters long and 15–20 meters high. Sixty travertine samples have been collected at three vertical sections of the travertine quarry. Microfacies and petrographic analyses have been performed on some samples. Selected travertines were analyzed for $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ using Finnigan 250 MAT Delta-S mass-spectrometer.

Results and conclusions

Based on petrographic and microfacies analyses, the Budakalász travertine samples of the three sections studied can be divided into two stratigraphic groups. The lower part of each section (approx. 15 meters thick) consists of massive travertine that represents smooth slope facies, and in the terrace pools, shrub facies as the result of bacterial activity. The whole lower part of the sections is characterized by values of $\delta^{13}\text{C}(\text{PDB}) = 2.2\text{‰}$ and $\delta^{18}\text{O}(\text{PDB}) = -12.1\text{‰}$. The upper part of the beds studied represents marsh pool facies, deposited from a small lake, and has values of $\delta^{13}\text{C}(\text{PDB}) = 1.7\text{‰}$ and $\delta^{18}\text{O}(\text{PDB}) = -10\text{‰}$. Between the lower and upper parts of the sections calcareous mud layers were observed inferring to terrestrial period and could have been a relatively long break in deposition. Based on the isotopic data, and using PENTECOST's (1995) classification, the Budakalász travertine is thermogene fresh water limestone which formed presumably associated with late activity of the Miocene volcanism widely recognized around the studied area.

References

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