Late Miocene environmental changes in an embayment of Lake Pannon on a decadal-scale

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Lake Pannon is a well documented lake system, which covered south-eastern Europe for approximately six million years. Although the basic processes of lake evolution, its faunistic inventory and its surrounding vegetation zones are understood, the pace of environmental changes is still poorly constrained. Especially, the linkage between climate change and shifts in lake environments is still a matter of ongoing research.

The clay pit Mataschen (SE Austria) exposes lowermost Tortonian (= lower Pannonian) deposits of Lake Pannon along its north-eastern margin. Due to its laminated sediments and the aspect, that former studies already reported a relatively warm regional climate, Mataschen offers ideal conditions for high-resolution analyses based on palynomorphs. Furthermore, geophysical data (magnetic susceptibility and gamma ray) reveal several highly significant cyclicities and point to astronomical forcing throughout the 30-m-thick section. Within this study, two consecutive 50-cm-long cores were studied with a sample distance of 10 mm and analysed for pollen and dinoflagellate assemblages. Based on preliminary estimates of sedimentation rates, the studied cores encompass environmental changes within only few hundreds of years during the earliest Late Miocene. Despite rather stable lake level conditions, as indicated by constant amounts of *Pinus* and *Impagidinium*, shifting patterns within both palynomorph groups are evident. Dinoflagellate cysts show re-occurring short-time events with blooms of heterotrophic taxa. These events may point to significant increases of nutrients in the surface water due to variations in the mean annual precipitation as indicated by the pollen data. Within the pollen record, the lake shore vegetation is most sensitive to alternations in climate. Lake Pannon was surrounded by Taxodiaceae swamps and wetlands of *Sparganium*, *Typha* and species of Poaceae and Cyperaceae, whose expansion is significantly varying within few decades whilst the hinterland vegetation displays a delay as it needs more time to react.

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"Green Walls": Microbiology of algae growing on sandstone walls and implications for the impacts of climate change on cultural heritage

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Recent observations have shown that many sandstone buildings, including important components of the UK's cultural heritage, are becoming covered with green algal growths. This is likely to result from recent changes in air quality and the impacts of a changing climate. The precise influences of these growths on the stone surface and sub-surface are under considerable debate. The underlying question is whether they are benign and indeed bioprotective, or conversely if they are detrimental and biodeteriorative. To approach this question, there is a need for interdisciplinary studies linking geomorphological expertise with that of molecular microbiology and climatology.