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Climate reconstruction based on high-resolution palynological analyses of Lake Pannon sediments (Late Miocene, Central Europe)

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Environmental changes within lake systems are quick processes, which are not easily detected within paleontological studies. Best results are achieved by high-resolution analysis of cores, which allow describing even small scale changes on decadal to millennial time spans. Rhythmic patterns in these records may be related to Milankovitch and even sub- Milankovitch cycles, which are rarely resolved in pre-Pliocene lakes. The clay pit Mataschen in the Styrian Basin of SE Austria provides ideal conditions for such high-resolution palynological analysis. Within our projects two subsequently 50-cm-long cores are studied with a sample density of 10 mm and analysed for pollen and dinoflagellate assemblages. In addition, the ostracod assemblages are analysed in 5 mm intervals. First results suggest a stable lake level during deposition of the first core. This assumption is based on the absence of significant variations in the abundance of the dinoflagellate *Impagidinium* sp. and the stable amount of Pinaceae. Fluctuations observed in the pollen spectra of other taxa are thus supposed to represent changes in the surrounding vegetation. Most striking is the coincident shift of *Spiniferites* sp. and heterotrophic dinoflagellate cysts with changes in the composition of the pollen assemblage. While the differences in the dinoflagellate assemblages are most likely based on the nutrient content of the surface waters, the pollen reflect variations of the vegetation zones. The dominance of mesothermic trees is replaced by a high amount of grasses such as Poaceae, Cyperaceae and *Sparganium* sp. Soon after, forests start to spread again with a rising number of *Abies* sp., *Pinus* sp. and *Cathaya* sp. This distribution seems to be triggered by climatic conditions, especially by a decrease of precipitation. Geophysical data (magnetic susceptibility and gamma ray) reveal several highly significant cyclicities and point to astronomical forcing throughout the section. Based on estimations of sedimentation rates, the described high frequency vegetation shifts seem to have happened within only few tens or hundreds of years during the earliest Late Miocene.

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