

Abstract

Sediments of Bohemian Forest lakes are important natural archives. Their sedimentary record covers postglacial history of the lakes as well as history of natural processes in a wider region. It also documents local settlements and changes in landscape management. The lake sediments have attracted the interest of the scientific community since the end of the 19th century. Despite of the fact that modern paleolimnological and paleoecological investigations were already performed in the second half of the 20th century in the Bohemian Forest Mts., the great potential of the lake sediments was not fully utilized in scientific research so far. The ultimate objective of this thesis is to deepen knowledge of these natural archives and support their utilization in future studies.

Several specific objectives have been set to achieve the ultimate objective: i) to compare age of the Bohemian Forest lake sediments with the recent knowledge of local deglaciation at the end of the last ice age, ii) to integrate chronostratigraphic marker horizons as one of the tools of Late Glacial sediment dating, iii) to assess the role of bioerosion in chitinous subfossil freshwater invertebrate remains on the record representativeness, and iv) to prove the presumed dystrophic nature of the lakes during the Holocene using analysis of subfossil caddisfly (Insecta: Trichoptera) remains. To fulfil the objectives, lake sediment cores from four lakes (Laka Lake, Plešné Lake, Prášílské Lake, and Rachelsee) and one infilled lake (Stará Jímka) were studied using a multi-proxy approach.

Based on the results, I conclude that the age of sedimentation onset in Bohemian Forest lakes may differ from age of the moraines damming the lake water. The oldest sequences of lake sediments cover at least the whole Late Glacial period. In cores from Stará Jímka and Rachelsee, two chronostratigraphic marker horizons were identified – a volcanic ash (tephra layer) from the Laacher See volcanic eruption and a layer containing glassy iron-rich microspherules often interpreted as evidence of an extraterrestrial impact event at the Younger Dryas onset. Both markers can considerably improve dating precision (i.e. to decrease statistical uncertainty associated with an age estimate) of the studied sedimentary records. In the chitinous invertebrate remains (microturbellaria cocoons and caddisfly frontoclypeal apotomes) from Laka Lake, Prášílské Lake, and Stará Jímka, four morphological types of microboring structures were distinguished – simple holes, meandering tunnels, asterisk-like tunnels, and abrasions. These structures were observed in ~10% of the microfossils and provide the first evidence of bioerosion of chitinous remains in Quaternary lake sediments. The overall good microfossil preservation suggests near-bottom anoxic conditions or sufficiently high sedimentation rate. Caddisfly remains are rarely used in paleolimnological studies. A successful taxonomic analysis of these remains in sediments of Prášílské Lake underlines their importance as one of the valuable biological proxies. The reconstruction of caddisfly fauna succession in Prášílské Lake clearly demonstrates signs of natural acidification and dystrophy in the Bohemian Forest region since the Late Pleistocene-Holocene transition. The results can be used as a baseline for assessment of biological recovery in this lake.

This thesis provides a new insight into the history of Bohemian Forest lakes and their catchments. Future studies may benefit, at most of the localities, from the presence of Holocene and Late Glacial sediments characterized by well-preserved subfossil chitinous remains and the two chronostratigraphic markers. These markers have never been documented together at one site and their finding is also the first record in Czechia. They can be used for comparisons of paleolimnological records from Bohemian Forest lakes with natural archives from geographically remote areas.