

TRACES OF THE LATE WEICHSELIAN THERMOKARST LANDSCAPE ALONG THE SOUTHERN MARGIN OF THE FORMER EUROPEAN PERMAFROST ZONE

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Thermokarst is the geomorphologic/genetic designation for areas where thaw of permafrost leads to local or widespread collapse, subsidence, erosion, and instability of the ground surface. Although thermokarst processes are recently peculiar to regions underlain by permafrost, i.e. in particular to lowlands of high latitudes Arctic areas (Alaska, Canada, northern and eastern Siberia), geomorphology and sediments reflecting former thermokarst presence can be found also in middle latitudes, far from the recent permafrost areas. So-called “fossil thermokarst” features, including thermokarst gullies, lakes and other kind of depressions, have been documented from many areas of northern and northwestern Europe as well as from Northern America. In contrast to those areas,

the knowledge on the thermokarst processes and landscapes along the southern margin of the Last Glacial permafrost zone (i.e. ~44–47°N) is still relatively fragmental.

Presented research deals with the Late Pleistocene geomorphological and sedimentological evolution of the Třeboň region in South Bohemia, Czech Republic, (49.1°N, 14.7°E; 400–430 m asl) located during the Last Glacial Maximum ~110 km north of the Alpine piedmont glaciers and ~ 420 km from the southern edge of the North European Ice Sheet.

Periglacial features like fossil polygons, nets or ice-wedge pseudomorphs documented in the study area prove the presence of permafrost in the region during the Late Pleistocene. We have also observed involution features (ball-and-pillow structures, injection tongues, and festoons) formed in unpaved sandy sediment, which testify permafrost degradation processes, probably during the Late Weichselian.

Moreover, besides these periglacial features, we have discovered overall 27 depressions filled by lacustrine sediments and peat. Most of them are covered by artificial fishponds of Medieval and Modern origin and thus hardly recognized in the landscape. These basins vary in size (tens up to hundreds of meters in diameter) in the depth of their infill (1–12 m), nevertheless, they share several common features such as their location on Miocene sedimentary bedrock, elongated shape, and the presence of tectonic faults that often run along their major axis. According to radiocarbon and relative palynostratigraphical dating, the largest basins (Fig. 1) were formed along the Pleniglacial/Late Glacial transition (~ 16–15 ka), whereas the smaller depressions during the Late Glacial/Early Holocene. Based on detail geomorphological investigations (approx. 300 hand drilling) and comparison of the geological and hydrogeological setting of the study area with the classical thermokarst landscape of Central Yakutia, we assume that these basins are the result of the complex of thermokarst processes, including formation and collapse of *alases* and consequent surface degradation of the permafrost, which occurred here during periglacial conditions of the Late Weichselian.

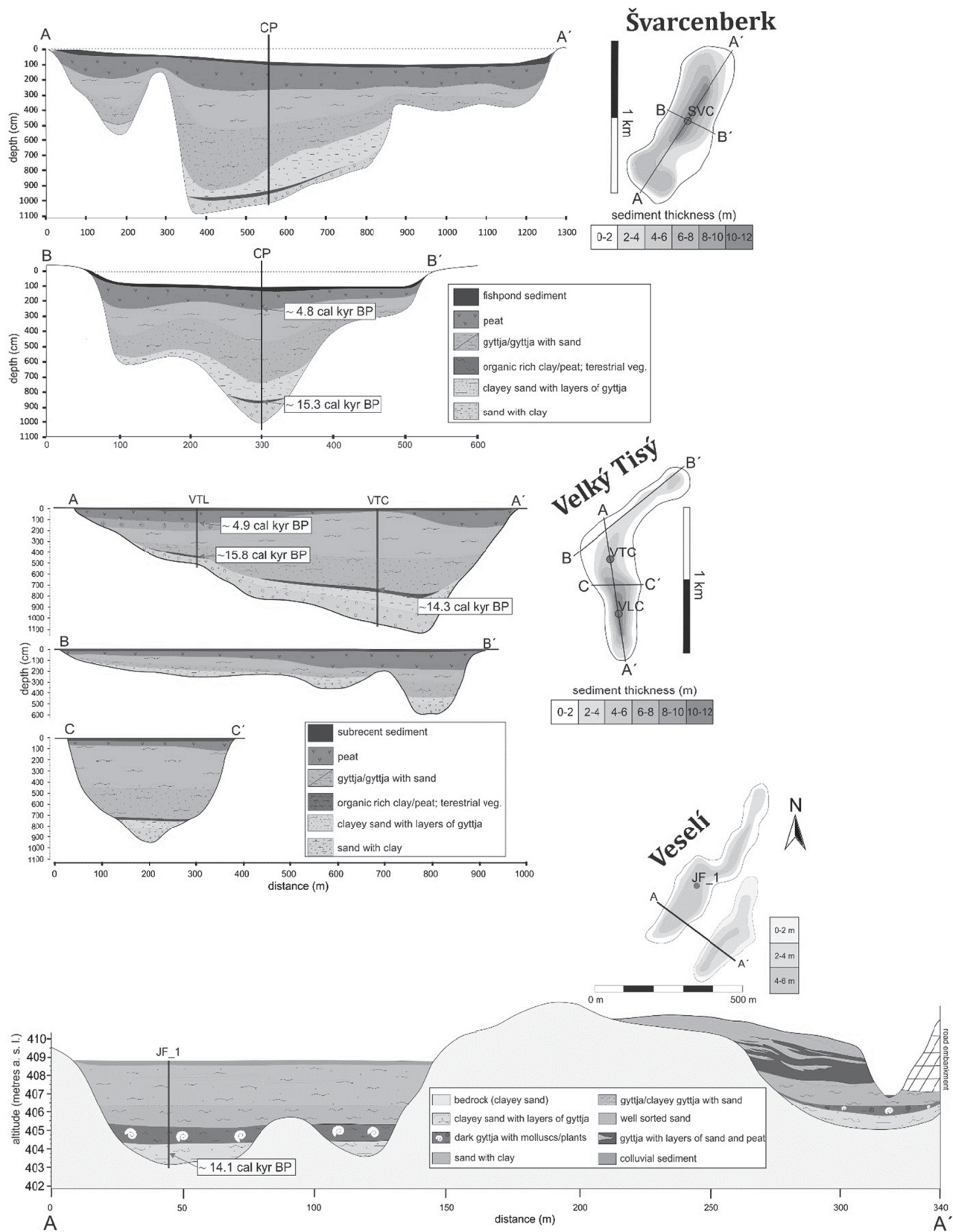


Fig. 2. Cross-sections through three biggest lake basins – Švarcenberk, Velký Tisý, and Veselí n. L. together with results of radiocarbon dating of the basal sediment (calibrated radiocarbon ages)