



A palaeochannel evolution history from Late Glacial to Middle Age in Jászság area in Hungary

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A palaeochannel at Megyeserdő near Jászberény in the centre of the Jászság subsidence basin on the northern fringers of the Great Hungarian Plain was investigated. This palaeochannel had remained unaffected by groundwater draining, river regulation, river bed drying and dredging operation of the 19th and 20th centuries. It was thus possible to conduct environmental history analyses based on the sediment deposited in the oxbow lake. We opened a 2 m deep geological trench in the centre of the marshland covered palaeochannel which we complemented with an undisturbed boring down to 3 m. We selected this location for obtaining a profile because many prehistoric archaeological sites from the Mesolithic, the Neolithic, the Copper Age and the Bronze Age and we assumed that the sediment catchment basin would be suitable for reconstructing the environmental background of prehistoric cultures and their interaction with the environment. We divided the geological profile and core sequence into 10 subsamples which we submitted to sedimentological, radiocarbon, pollen analytical and malacological analyses. We submitted material from four samples for radiocarbon measurements to the Institute of Nuclear Research in Debrecen. The measurements on plant remains and bones gave the following results: 9055 ± 70 uncalBP between 1.5–1.4 m; 5598 ± 90 uncalBP between 1.2–1.1 m; 4400 ± 60 uncalBP between 0.8–0.7 m; and 862 ± 50 uncalBP at 0.4 m. The environmental analyses allow the reconstruction of the following development sequence in the studied basin and its broader environs. Phase 1: The central areas of the Jászság subsidence were covered with forests of Scots pine and spruce, perhaps mixed with birch. The hinterland was characterised by extensive grassland (dry alluvial fan in the Jászfelsőszentgyörgy–Pusztamonostor area).

The characteristics of the sediments suggest that either lower-lying infusion loess accumulated at the beginning of the Holocene as a result of neotectonic subsidence, or redeposited sediments in the late Glacial or early Holocene. Phase 2: In the later Mesolithic, closed woods dominated by oak, elm and linden, and gallery woods dominated by willow had evolved by 8268 calBC at the latest. This vegetation was either mixed with Scots pine at the beginning of the Holocene or significant amounts of Scots pine pollens were transported by floodwaters from the relict-like pine woods in the north to the studied sediment catchment basin. The composition of the malacofauna indicates that the palaeochannel was an active watercourse with living water. Traces of forest disturbance by slash and burn and grazing could be demonstrated at the close of the Mesolithic and the beginning of the Neolithic; the species diversity of the forests remained unchanged and human activity was indicated by the appearance and expansion of weeds tolerant of trampling and grazing. Phase 4: Spanning the period from close of the Bronze Age to the end of the Iron Age, this phase is characterised by the absence of forests owing to forest clearance, extensive grazing, and the continuous presence of stockbreeding communities and cultures succeeding each other. No cereal pollens were identified from this phase. The infilling of the palaeochannel accelerated and the proportion of cold-tolerant Mollusca species grew. Phase 5: Human activity between the Roman Imperial period and the Middle Ages intensified, surpassing by far the intensity of the previous period. This phase is characterised by continuous grazing, soil degradation, and the complete silting up of the original riverbed. Gilled snails disappear from the sediment and are gradually replaced by pulmonate aquatic snails. The lake underwent a phase of eutrophication. Phase 6: The pollen samples for the 12th–13th centuries indicate both the creation of fields for cereal cultivation and the presence of hardwood and softwood forests, indicating a mosaic of forest belts, pastures and ploughland. A eutrophic lake evolved in the palaeochannel. Phase 7: In the 13th–14th centuries, the extent of natural forests decreased, while the size of cereal fields increased (perhaps reflecting a population growth). In addition to wheat, rye was now also grown, the latter perhaps indicating a cooler climate, suggesting the initial phase of the Small Ice Age of the 14th–15th century. A floating mat covered with reedmace, reed, reed sweet grass and sedge evolved in the palaeochannel.