



## **Human and climatic impact on the Morava River behavior during last millennium (Lower Moravian Basin, Czech Republic)**

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The floodplain of the lower course of the Morava River in the Straznické Pomoraví area located in the Lower Moravian Basin is an excellent example of an environmental archive of which a detailed study could help understanding of the interplay between regional environmental changes, global climatic changes and human activities. The length of the meandering course of the Morava River through the study area is approximately 12 km and it is one of the last river segment modified by minimal channel regulations.

River behavior and changes of the fluvial styles are reconstructed based on floodplain architecture analysis supported by geophysical survey. The age of sediments is specified using radiocarbon and dendrochronological datings completed with  $^{137}\text{Cs}$  and persistent organic pollutant concentrations. Pollen analyses allow us to reconstruct the local vegetation changes.

Lithology of the floodplain deposits is conformable along a modern river channel. Sections exposed in erosional river banks reveal basal sands and sandy gravels often containing tree trunk or branch fragments. Charcoal or tree branches are preserved in overlaying greenish, sandy clay or clayey sand, usually with reductimorphic stains. The upper part of the sections is composed of sandy or clayey silts with intercalated smaller lenses or sand layers up to 20 cm thick. Geophysical survey suggests that the clayey cohesive sediments are present in whole area of the studied floodplain overlaying basal sand and sandy gravel. Most of these fine sediments were deposited in a low-energy river system during last millennium based on radiocarbon dating. These deposits were later partly eroded and replaced by medium-energy river system sediments in the northern part of the studied floodplain.

First human impact on the river behavior should be traced back to 9th century AD when people of the Great Moravian Empire constructed their fortified settlements in the Morava River floodplain. However, we did not find convincing evidence of this change in the studied floodplain archive. Last millennium was a period of increased agriculture use in the Morava River catchment. Colonization and deforestation of uplands surrounding the Lower Moravian Basin triggered erosion of weathering products of Paleogene and Neogene mudstones since 12th century. Clayey suspended load contributed to the formation of anastomosing fluvial style with dominating vertical sediment accretion. A change to modern meandering fluvial style has started during LIA severe floods at about 1600 AD. Lateral erosion created a system of abundant filled channels including the modern channel. Land erosion was accelerated since agrarian collectivization in 1950s when the most antierosional barriers were destroyed after large field formation. Flood intensity has increased together with sedimentation rate and river channel lateral erosion.

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