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Distribution of Hg in floodplain sediments of the Litavka River, the Czech Republic

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Floodplains are one of the most complex sedimentary environments which are often used for stratigraphic purposes. Such complexity is overweighed by their value as an archive – they may offer high quality and detailed sedimentary records of the past anthropogenic impacts within the given region.

Fluvial sedimentary archives are a bit difficult for reading - sedimentation is prone to natural processes which results in a spatially and temporally variable mosaic of sedimentary environments. The knowledge on floodplain architecture is necessary and requires a combination of tools from more disciplines, such as fluvial geomorphology, sedimentology, and also geophysics.

Depth profiles of Hg concentrations were studied in sedimentary profiles sampled from the transect across the floodplain of the Litavka River near the town of Příbram, the Czech Republic, in order to assess the fate of Hg in the fluvial environment. The Litavka River belongs among the most polluted rivers in the Czech Republic. Its pollution originates from processing of polymetallic ore mined in vicinity of Příbram since late 18th century (1786-1970s).

Chemostratigraphic analysis of depth profiles in Litavka floodplain sediments indicated decreasing Hg concentrations with increasing distance from the current river channel. Mean Hg concentration at the top of nearest sedimentary floodplain profile reached $\sim$2010 μg/kg, whereas with distance it decreased to $\sim$944 μg/kg. Furthermore, in larger depths of near channel sedimentary profiles we also observed consequences of post-depositional Hg migration.

Lower mean Hg concentration ($\sim$100 μg/kg) was found in the farthermost profile on the Pleistocene terrace at the floodplain edge. Due to negligible impact of the most recent sediment deposition and position of this profile outside of Q100 discharge range, the major source of Hg should be the atmospheric deposition. Therefore, atmospherically and fluvially dispersed Hg pollution has been distinguished by analysis of sediments on the Pleistocene terrace.

Concentrations of Hg in the Litavka River floodplain result from combination of different deposition mechanisms – fluvial sedimentation transport and lateral re-working and re-deposition of sediments enriched in Hg, together with less important contribution from atmospheric deposition of Hg.

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