

## **Contribution of geophysical methods in the study of the floodplain structure (the Litavka River, the Czech Republic)**

Kristýna Kotková (1,2), Tomáš Matys Grygar (2,3), Štěpánka Tůmová (2,3), and Jitka Elznicová (3)

(1) Faculty of Science, Charles University, Prague, the Czech Republic (kristynakotkova@seznam.cz), (2) Institute of Inorganic Chemistry AS CR, v.v.i., Řež, the Czech Republic, (3) Faculty of Environment, J. E. Purkyně University in Ústí nad Labem, the Czech Republic

Mining and processing of polymetallic ores near the city of Příbram (the Czech Republic) have strongly impacted the fluvial system of the Litavka River. Beside of polymetallic mining during several hundred years with a peak between 1850 and 1950, the Litavka River was also influenced by uranium ore mining between 1948 and 1989. Severe contamination of the Litavka River system is known, but the alluvial architecture and specific distribution of contamination has not yet been satisfactorily described. However, such pieces of information are necessary for the predictions of the future behaviour of contaminants in the river system.

We used geophysical methods for visualisation of subsurface layers of sediments and we have proved them very useful for the survey of the floodplain structure. It is especially advantageous when the surface topography of the floodplain does not reveal its internal structure, e.g. due to floodplain levelling by aggradation. Specifically, dipole electromagnetic profiling, also denoted electromagnetic induction sensing (DEMP) was used for quick detection of major heterogeneities in the floodplain structure. In addition, electrical resistivity tomography (ERT) was used for the exploration of lines across the heterogeneities shown by DEMP. This approach allows to choose the appropriate plan for the subsequent sampling in the floodplain to include all its structural (lithogenetic) units. Such rational strategy allows for reducing total amount of sampled sites without the risk of losing important information and production of false images. Both used geophysical tools and manual drill coring and the elemental analysis by handheld X-ray fluorescence spectrometry produced clear images of floodplain architecture and pollutant distribution. The internal structure of the Litavka River floodplain shows that lateral deposition and reworking of sediments played the main roles in the floodplain building. In the next centuries the lateral channel movement will rework contamination which is maximal in the current channel belt.