

## **Arsenic mobilization in the Ganga fluvial plane: A case study of Bhojpur, India**

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The occurrence of organic matter in the sediment has a strong influence on arsenic (As) propagation in the subsurface. The meandering nature of the Ganges River has created a large number of oxbow lakes in the fluvial plains of Bhojpur District, Bihar, India. Here, the upper 60 m of the Holocene deposits contain clay-rich oxbow-lake sediment with a high organic matter content which is seen as the cause of arsenic contamination in the groundwater. With the help of the Google Earth image analysis we selected an oxbow lake in the Barhara Block as natural laboratory for our research. The thickness of the sediment fill of the oxbow lake in the Barhara Block is approximately 12 meter. The core data of the oxbow lake sediment fill show organic matter deposition intercalated with clay. The sediment below the oxbow lake has a low permeability due to its high clay content, leading to slower drainage after the rainy season. A hydraulic gradient due to the high water content in the oxbow lake sediment causes flow towards the sand-prone point bars that border the oxbow lake. It is asserted that the organic-rich sediment of the oxbow lake leads to anaerobic conditions and the reduction of Fe (OH)<sub>3</sub> or oxidation of organic matter. Due to the hydraulic gradient these conditions are transported from the oxbow lake to the adjacent point bars where reaction takes place with solid-state Fe-As oxide, which leads to the release of As and can therefore directly affect the distribution of As concentration in the groundwater. Simulations with PHREEQC will be used to clarify the transport mechanisms.