

Arsenic in southern Louisiana groundwaters: A North American analog for Bangladesh and West Bengal, India

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Arsenic (As) is a highly toxic and carcinogenic metalloid that can cause serious health effects, including increased risk of cancers (e.g., skin, lung, bladder, and kidney), infant mortality, and reduced intellectual and motor function in children to populations chronically exposed to As-contaminated groundwater. Indeed, it is estimated that more than 140 million people worldwide are drinking As-contaminated groundwater (i.e., $\text{As} \geq 10 \mu\text{g kg}^{-1}$), and the most severely affected region is the Ganges-Brahmaputra-Meghna (GBM) delta in Bangladesh and India. Studies in southern Louisiana (USA), and particularly, those within the lower Mississippi River delta, reveal high As concentrations (up to $\sim 640 \mu\text{g kg}^{-1}$) in shallow groundwaters. Although some rural populations rely on shallow groundwaters as drinking water, it remains unknown what affects, if any, the elevated groundwater As has had on these communities. The regional extent of high As shallow groundwaters is controlled, in part, by the distribution of Holocene sediments, deltaic deposits, and organic-rich sediments [1]. Field and laboratory batch incubation studies suggest that the As is largely of geogenic origin, and further that microbial reduction of Fe(III)/Mn(IV) oxides/oxyhydroxides within the sediments likely contributes the bulk of the As to the shallow groundwaters. Data from three field sites in southern Louisiana are discussed in context with the results of laboratory batch incubation studies and biogeochemical modeling.

[1] Yang et al. (2014) *Environ. Sci. Technol.* 48, 5660.