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Alginic Acid Accelerates Calcite Dissolution

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Arsenic Cycling Within Bangladesh Sediments: Evidence for an Oxidative Front and Phase Repartitioning

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Arsenic is a contaminant in the groundwater of Bangladesh and has resulted in the exposure of millions of people to drinking water. It is considered a World Health Organization standard. Solid concentrations of arsenic within the aquifer sediments typically do not exceed world guide levels, and, therefore, the question arises as to why arsenic is partitioned in the solution rather than the solid phase. To address this question we have obtained well preserved deep-seeded core from the Monsoonal alluvial delta Bangladesh. Spectroscopic analyses have been conducted to determine the speciation of arsenic, iron, and sulfur within the sediments. Additionally, laboratory studies of the sediments, in conjunction with those on model compound, have been performed to derive plausible description mechanisms of arsenic and to define the underlying chemical processes controlling arsenic mobility. Our work points to a complex cycling of arsenic in which an oxidative front has caused the destruction of arsenic-bearing sulfides (which appear preserved during transport and sediment deposition) and involved the formation of ar- senic onto oxidized solids, primarily those of Fe. Subsequent to repartitioning on ferric (hydr)oxide mineral surfaces, redistribution of such phases, stimulated by injection of labile carbon, has led to the concomitant redox cycling in the entire cycle implies an additional (and previously dismissed) step in the transport of arsenic into Bangladesh groundwater water. As a consequence, minimizing the drawdown (and thus the oxidative front) or utilizing deeper wells may provide water that is less contaminated with arsenic.

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