

## Groundwater hydrochemistry, Variation of Arsenic and Monsoonal influence : An explanation regarding release mechanism assisted by isotopic signatures

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The investigation examines the groundwater and surface water geochemistry of two different geomorphics in West Bengal. During investigation, several key factors are taken into account e.g. potential influences of groundwater abstraction on the hydrochemical evolution of the aquifer, the effect of different water inputs (monsoon rain, irrigation and downward percolation from surface water impoundments) to the groundwater system and accompanying As release. A natural levee and low-land flood plain have been chosen for said investigation. The results reveal that the stable isotopic signatures of oxygen ( $d_{18}\text{O}$ ) and hydrogen ( $d_{2}\text{H}$ ) are governed by local precipitation, the isotopic composition falls sub-parallel to the Global Meteoric Water Line (GMWL). The  $\text{Cl}/\text{Br}$  molar ratio indicates vertical recharge into the wells within the flood plain area, notably during the post-monsoon season, while influences of both evaporation and vertical mixing are visible within the natural levee wells. The important finding is the increasing mean DOC concentrations (from 1.33 to 6.29 mg/L), from pre- to post-monsoon season, which is indicative of possible inflow of organic carbon to the aquifer during the monsoonal recharge. This suggests the subsequent increase in AsT, Fe(II) and  $\text{HCO}_3$  highlighting a possible initial episode of reductive dissolution of As-rich Fe-oxyhydroxides. The abrupt increase in the mean As(III) proportions (by 223%), notably in the flood plain samples during the post-monsoon season. This is attended by a slight increase in mean AsT (7%). This may refer to anaerobic microbial degradation of DOC coupled with the reduction of As(V) to As(III) without resulting in additional As release from the aquifer sediments.