

# Hydrochemical and Isotopic Characteristics of Groundwater from Arsenic contaminated area in the Bengal Delta, India

SANDIP KUMAR MOHAKUD AND SYED HILAL  
FAROOQ

Indian Institute of Technology Bhubaneswar

Presenting Author: [skm18@iitbbs.ac.in](mailto:skm18@iitbbs.ac.in)

Arsenic (As) is one of the highly toxic geogenic contaminant present in the Groundwater (GW) globally. The Bengal delta is one of the worst As affected areas in the world. In the present study an attempt has been made to determine the severity of As contamination, its distribution in the shallow and deep aquifers and its relationship with the seasonal variation in parts of the Bengal delta. For this purpose, 15 groundwater samples including seven from deep and eight from shallow aquifers were collected from the Murshidabad district of West Bengal, India during monsoon and post-monsoon seasons. The samples were analyzed for As, Fe and also for isotopic ratios of oxygen and hydrogen. The study shows that in 93% of shallow and all of the deep groundwater samples As concentrations exceed the World Health Organization (WHO) permissible limit of 10 µg/L of As in drinking water. The groundwater samples do not show significant seasonal variation in As concentrations from monsoon to post-monsoon season. An absence of seasonal variation in As concentration and similar  $\delta^{18}\text{O}$  and  $\delta\text{D}$  values in shallow and deep groundwater ( $\delta^{18}\text{O}$ : Shallow monsoon to post-monsoon: -6.85 to -4.29‰; Deep monsoon to post-monsoon: -6.04 to -4.27‰; and  $\delta\text{D}$  : Shallow monsoon to post-monsoon: -48.82 to -26.77‰; Deep monsoon to post-monsoon: -41.81 to -28.05‰) indicates that the shallow and deep aquifers are well interconnected. A better correlation between Fe and As during post-monsoon season indicates development of reducing conditions during post-monsoon season which may be triggered by decomposition of the plant remains of previous crops and leads to higher mobilization of As from sediments to groundwater.