

**The interrelationship between isotopic signatures, sediment characteristics and groundwater quality in diverse groundwater environment of the Upper Yamuna basin, India**

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The Upper Yamuna basin has one of the most complex and fragile hydrogeological systems in the Indian subcontinent. The interaction of the over-exploited aquifers in the region with a dynamic environment poses the challenge for researchers to understand the behaviour of groundwater contaminants. Further, delineating geogenic contaminant from anthropogenic pollutants has also become difficult with continuous changes. In this context, the study presented here uses geochemical tools such as stable isotopic signature and subsurface sediments to evaluate their interrelationships for understanding the hydro-geochemical nature and processes involved in variation in groundwater quality in the region. The preliminary investigation has shown a trend of distinct change in the hydro-geochemistry of the region, that was comparable to the variation in stable isotopic signatures. Further, the microscopic investigation of subsurface sediments as well as a simulation for sediment-groundwater interaction using PHREEQC has also shown some interesting results. The study highlights the interrelationship amongst the different variables to account for changing hydrogeochemistry in Upper Yamuna basin.

Keywords: Groundwater; River Yamuna; Isotopic signature; Sediments; PHREEQC