

## Hydrogeochemistry and Arsenic distribution in the Surface and ground waters of NCT, Delhi

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The ground water and surface water in Delhi has been collected for understanding the hydro geochemical processes controlling their water quality and As distribution during 2003 to 2004 for four seasons. The pH ranges from 6.70 to 8.28, EC varies from 453 to 37520  $\mu\text{S}/\text{cm}$ . Correlation matrix shows that there is good correlation between EC with Na, Cl, and  $\text{SO}_4^{2-}$ . While Na is showing good correlation with Cl and same is the case with  $\text{SO}_4^{2-}$  and  $\text{HCO}_3^-$ . K is also showing medium correlation with  $\text{SO}_4^{2-}$ . The major ion chemistry of the water in few locations reveals Na/Cl ratios depleted with respect to that of the seawater reflecting an anthropogenic  $\text{Cl}^-$  source. In the secondary channels and in a pond near the alluvial plain where the high  $\text{NO}_3^-$  due to contamination linked to anthropogenic sources. Sulphate is very high in selected locations like Dhansa tube well water. These are deeper wells, which reflect the *in-situ* salinity rather than contamination by anthropogenic source.  $\text{HCO}_3^-$  concentration varies from 32 to 220 mg/l, which indicates the addition from the anthropogenic source. Dissolution of carbonates and reaction of silicates with carbonic acid account for the addition of  $\text{HCO}_3^-$  to the groundwater and oxidation of sulphite may be the source of  $\text{SO}_4^{2-}$ .  $\text{SO}_4^{2-}$  is mostly below desirable limit (200mg/L) but in few sites even exceeded permissible limit (400mg/L) indicating the local source.  $\text{PO}_4^{3-}$  in all the waters is very low. F values are very high in Dwarka region and Tulsi Nagar region due to local input from anthropogenic source. Dissolve silica reflects the same trend of surface water indicates the natural source for the water. Ca has exceeded desirable limit (75mg/l) in many sites. Na is also very high as in the surface water indicating the leaching from alkaline soils and saline soils in the area. Mg and K are also high. K is higher in all areas and it might have been derived from the anthropogenic source. In few sites Fe has crossed permissible limit (1mg/l) indicating anthropogenic source.

The As concentration ranges from 1.70 to 10.0  $\mu\text{g l}^{-1}$  (mean values of 4.31 ) with minimum concentration in Raney wells and maximum in the kotla Mubarak Pur regions. In Delhi the As in sediment is not high as reported in literatures, hence it is believed that dumping of garbage and simultaneous leaching into open land fill sites may be the source for As in Delhi ground water. The shallow aquifers have more As than the deeper aquifers. Details studies are undertaken to understand the temporal and spatial variation and geochemical processes controlling the water quality which will certainly throw more light along with detailed sampling and analysis.