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Assessment of surface and ground water Quality of Haridwar district of Uttarakhand

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Abstract : An analytical study of major cations and anions of surface and ground water of Haridwar district has been carried out to assess the spatial and seasonal variation of water quality. The impact of industrialization, urbanization and agricultural practices on surface and groundwater quality had been evaluated. Major ion chemistry of these waters has been studied to understand chemical weathering process, factors controlling on ionic chemistry and to assess ionic sources.

Surface and groundwater samples were collected during January, May and October representing the winter season, summer and post monsoon season. The groundwater samples from tubewells and handpumps were collected from three broad land use categories i.e. industrial, agricultural and urban. These samples were analyzed for dissolve major ions (HCO^-_3, SO^{2-}_4, Cl^-, NO^-_3, PO^-_4, F^-, Na^+, K^+, Mg^{2+}, Ca^{2+} and SiO_2. Among anions HCO^-_3 was the most dominant (73%) followed by SO^{2-}_4 (15.4%), Cl^- (6.6%), NO^-_3 (4.8%), F^- (0).6%) and PO^-_4 (0.3%) and among cations, Ca^{2+} is the most dominant (71%) followed by Mg^{2+} (19%), Na^+ (7.7%), and K^+ (2%). Most of the samples were of Ca-$HOCO_3$ type followed by Ca-HCO_3-SO_4 and Ca-Mg-HCO_3-SO_4 types.

The seasonal variation in groundwater shows higher ionic concentration in summer season in comparison to winter and post -monsoon season. The dilution of water due to recharge during monsoon season possibly lower the ionic concentration while evaporation during summer and winter season and enhanced rock water interaction increases ionic concentration which in turn increases TDS and EC concentration in winter and summer season in comparison to post monsoon season. The surface and ground water were found to be under moderate to no problem category for irrigation purposes.

Key Words : Hydrochemistry, Water quality, Industrialization, Urbanization, Water Pollution, Seasonal variation.

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