## Hydro-Geochemistry of Fluorine: A Case Study from Fractured Aquifer System of Dharwar Granites, A.P, India

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Water demand already exceeds supply in many parts of world and as population continues to rise at an unprecedented rate, many more areas are expected to experience this imbalance in the near future. Mismanagement and over-exploitation has not only caused decline of groundwater levels but also causes deterioration in water quality. Fluoride is one of such parameters where impact of over exploitation has been observed. Fluoride is often called a two edged sword since its deficiency and excess leads to diseases dental caries & fluorosis.

A pilot watershed called Maheshwaram watershed has been considered for such investigations of over-exploited granitic aquifer. The fluoride in groundwater is highly variable with space and time which is one among causes for selection of present watershed. Groundwater of Maheshwaram watershed can be divided into two major hydro-chemical facies, 1) Ca-HCO<sub>3</sub> and 2) Na-HCO<sub>3</sub> with certain local patches of Ca-Cl and Na-Cl type. Facies 1 has shallow (young) waters, which dominate in recharge areas during rapid flow conditions, whereas facies 2 show shallow and mixed waters, which dominate intermediate or downstream areas during low flow conditions.

Relationship of fluoride concentrations on various parameters viz., meteorological parameters (evapo-transpiration, rainfall etc), groundwater level surface and other water quality parameters have been studied. Results have indicated the presence of other geogenic sources of fluorine apart from fluorite. Further, correlation of  $F^-$  verses Na<sup>+</sup>,  $F^-$  verses HCO<sub>3</sub> and  $F^-$  verses Li strongly support the release of fluorine from silicate weathering. Before adopting any procedure for reducing contamination, one has to understand the hydro-geochemistry of particular contaminant. Therefore present investigation explains dependency of fluoride on other hydro-geochemical processes. Once the process is understood thoroughly the remedial strategies can be planned.

Keywords: Fluorosis, Hydro-geochemistry, Granites, Hard rock aquifer.

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