Abstract

Nallampalli block in Dharmapuri district is selected to assess the groundwater quality with special reference to fluoride contamination. The research work carried out through field investigations through well inventory survey, remote sensing study, sample collections and hydrogeochemical analysis. GIS technique is adopted for generation of various thematic maps and spatial data integration. The major rock types in the study area are charnockites, gneisses and pyroxenites. The average annual rainfall in the block is 837 mm. The IRS P6 LISS III satellite data is processed through ERDAS imagine image processing software and utilized for preparation of various thematic maps such as lineaments, vegetation index, land use / land cover and geomorphology. Groundwater samples were collected from 34 wells for both pre and post monsoon period and to assess the groundwater quality in the study area. In general, fluoride contamination is the major problem affecting drinking water quality in the block and the concentration is ranges from 0.4 to 3.7 mg/l. Fluoride contamination in groundwater is linearly correlated with other major ions, which indicates that most of the ions show meager positive correlation. The concentration of fluoride and major ions in groundwater is assessed through traverse plot in different directions. The Base Exchange plot and the groundwater facies analysis were carried out. Rock water interaction and assessment of fluoride contamination is one of the major objectives in the research work. In order to assess the influence of weathering on leaching of fluoride in groundwater is studied through estimation of CIA. The main purpose of the study is to understand the controlling parameters on fluoride concentration in groundwater. This has been done through spatial integration of various thematic layers such as geology, lineament density, drainage density, geomorphology, water level and land use / land cover. The impact of fluoride contamination to health and various methods involved in removal of fluoride from groundwater are discussed. Overall, the spatial and temporal variability in fluoride in the study area will pave a path to design a sustainable planning and management of the groundwater resource to protect and supply potable water to dependent population.