

3rd International Conference on Earth Science & Climate Change

July 28-30, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

Assessment of salinity and groundwater quality with special emphasis to fluoride in a semi-arid region of India

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The significant quantity of groundwater is being used for domestic, agricultural, industrial and land-use related activities in Punjab in last few decades due to the rapid increase in industrialization, population and crop production which has led to groundwater exploitation. The groundwater is extracted without responsible management as well as without due attention to the quality issues. Monitoring of water quality is one of the important steps in water resources management. The routine monitoring of groundwater can assure the populace about the quality of their drinking water and helps in recommending remedial action to check further deterioration in quality. In many parts of India, fluoride (F⁻) is one of the most undesired elements present in underground water extracted for drinking purposes and its presence higher than the prescribed permissible limit in groundwater significantly affects the human health and may lead to fluorosis, an endemic disease. Prevalence of fluorosis has been reported mainly due to intake of fluoride rich groundwater over a long period of time. In the present study, groundwater quality of Bhatinda district in South West Punjab was evaluated from groundwater samples to understand its hydro-geochemistry with special reference to the salinity and fluoride. The problem of salinity is due to the higher temperature in summers which increases the evaporation thus salts in soils rise closer to surface causing salinity. The concentration of F⁻ was found very high and was above permissible limits in about 70% of area and this indicates the risks of dental caries in the populace of study area. Thus, the present study indicates that regular monitoring of groundwater is an important step to avoid human health risks and to assess its quality for various ecological purposes. Therefore, proper management practices are required for sustainable use of groundwater in this agriculture-dominated region.

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