

Statistical Evaluation and Hydrogeochemistry of Groundwater from Western Part of Chandrapur District, Maharashtra with Special Emphasis on Human Health Risk Assessment

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Abstract

The groundwater samples were collected from the phreatic aquifers of PG2 watershed of western part Chandrapur district, Maharashtra. The geogenic processes like dissolution of calcium rich minerals are responsible for increase of Ca^{2+} content in groundwater. In the groundwater samples, HCO_3^- and SO_4^{2-} are the prevailing dominant anions. The TDS, TH, Ca^{2+} , Mg^{2+} , Na^+ , HCO_3^- as well as Cl ions present in basement rocks have been attributed to the geogenic factor through the factor analysis. K^+ , SO_4^{2-} as well as NO_3^- correspond to fertilizers and soil amendments used by people to enhance crop production, which is regarded as anthropogenic input. The silicate weathering at water-rock interface is the main process of generation of various solutes in groundwater. The multiple regression analysis expresses the TDS as a linear function of the ions and Ca^{2+} , Mg^{2+} , Na^+ , HCO_3^- , Cl, SO_4^{2-} and NO_3^- contribute significantly to the bulk chemical composition of the groundwater from the study area. The health hazard quotient (HQ) for children (4.94%) and adults (7.95%) denotes the intensity of different health risk vulnerable zones at a specific site.

Keywords: Rock-Water Interaction, Silicate Weathering, Statistical Evaluation, Health Risk Assessment, Chandrapur District, Maharashtra

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