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Impact assessment of edaphic factors on groundwater quality

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Abstract
Fifteen water abstraction structures along the two streams adjacent to the NIASM site were selected for studying the geochemistry of the groundwater and abiotic factors responsible for their distribution. The results indicated that the groundwater is alkaline with high electrical conductivity (EC). The Total Hardness is below the prescribed drinking water limit whereas Na concentrations are far below the permissible limit. The sodium absorption ration (SAR) distribution pattern indicated downstream increase in the areas due to surfacial obstruction of the natural drainage system. EC of water shows a positive correlation with major cations Ca + Mg (R^2= 0.63) and Na + K (R^2= 0.61) which indicates a strong lithological control on the major oxide cations of the groundwaters. There is a strong positive correlation between EC and Cl (R^2= 0.96) while the correlation between EC and HCO_3 is weak (R^2= 0.12) indicating that the amount of chloride in the groundwater controls the EC. The samples showed considerable scatter with a weak correlation (R^2= 0.19) between NO_3-N and EC. Such variation in the NO_3-N concentration from the groundwaters reflects the role of physical process such as evaporation and /or anthropogenic additions to the groundwater. The SO_4 concentration showed no distinct correlation with EC (R^2= 0.07) indicating that its concentration did not contribute to the conductivity of groundwaters from the NIASM site. Based on the SAR values, the groundwater for irrigation purposes are classified as 'good' and most of them belong to the Ca+Mg>Na+K; HCO_3+CO_3>Cl+SO_4 facies.

Keywords: Groundwater quality, edaphic factors, groundwater facies