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Hydro-Geochemistry of Qare-Sou Catchment and Gorgan Gulf, Iran: Examining Spatial and Temporal Distribution of Major Ions and Determining the River's Hydro-Chemical Type

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Abstract : This study examined the hydro-geochemistry of Qare-Sou catchment and Gorgan Gulf in order to determine the spatial distribution of major ions. In this regard, six hydrometer stations in the catchment and four stations in Gorgan Gulf were chosen and the samples were collected. Results of spatial and temporal distribution of major ions have shown similar variation trends for calcium, magnesium, and bicarbonate ions. Also, the spatial trend of chloride, sulfate, sodium and potassium ions were same as Electrical Conductivity (EC) and Total Dissolved Solid (TDS). In Nahar Khoran station, the concentrations of ions were more than other stations which may be related to human activities and the role of geology. The Siah Ab station’s ions showed high concentration which is may be related to the station’s close proximity to Gorgan Gulf and the return of water to Qare-Sou River. In order to determine the interaction of water and rock, the Gibbs diagram was used and the results showed that water of the river falls in the rock range and it is affected more by weathering and reaction between water and stone and less by evaporation and crystallization. Assessment of the quality of river water by using graphic methods indicated that the type of water in this area is Ca-HCO₃-Mg. Major ions concentration in Qare-Sou in the universal average was more than but not more than the allowed limit by the World Health Organization and China Standard Organization. A comparison of ions concentration in Gorgan Gulf, seas and oceans showed that the pH in Gorgan Gulf was more than the other seas but in Gorgan Gulf the concentration of anion and cation was less than other seas.

Keywords : hydro-geochemistry, Qare-Sou river, Gorgan gulf, major ions, Gibbs diagram, water quality, graphical methods
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