

Geochemical and hydrochemical analysis of 4 major playas in central Iran (Yazd Province) and their relation with surrounding bedrocks

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The Iranian playas are one of the important playa zones in the world. The study area is located in central Iran, with four different playas (Zarin, Kalute, Tout and Aghda), and covers more than 1500 Km². These playas are structural and erosional types and their morphology depend upon the amount of evaporative and capillarity conductivity.

Based on geochemical analysis, there is a positive relationship between the surrounding parent rocks and the concentration of major and minor elements in the playa sediments. For example, abundance of Sr, Ba and Sn in the sediments of the southern Zarin playa indicate the chemical weathering of acidic igneous rocks that crop out in the south. Hydrochemically, the brines of these playas are of the Na-Ca-Mg-K-Cl-So₄ series with PH ranging from neutral to slightly alkaline (subalkaline). The concentration of some of the above ions are very high in these brines, which is due to the composition of parent rocks in the surrounding area. On the basis of chemical composition of the brines especially their trace element (concentration of Br less than 27 ml and ratio of Cl to Br which is more than 290) and concentration of gypsum and halite in sediments, a meteoric origin (meteoric water of first order of neutral group) is suggested for these brines.

Therefore, it can be concluded that there is a clear relationship between the parent rocks and the geochemistry of sediments and hydrochemistry of brines in these playas.