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Comparative analysis of the main ionic composition of hyperhaline lakes: the Aral Sea, the Dead Sea and Lake Urmia

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The composition of water is an important hydrochemical characteristic of a salt water body. It plays an important role in shaping the conditions for the functioning of an ecosystem. It must also be taken into account when determining the salinity of water, since the measurement of salinity by standard oceanological equipment on the basis of electrical conductivity in waters with an ion ratio other than oceanic leads to large errors.
Analytical methods for laboratory determination of the concentration of chlorides, sulfates, calcium, magnesium, total carbon and total alkalinity using potentiometric titration, and the potassium content using a gravimetric method, adapted for hyperhalin waters with ion-salt composition different from oceanic are described. The error of the methods was no more than 1.7% for halogens, 4% for sulfates, 1.5% for carbonate ions, 0.7% for bicarbonate ions–, 4% for calcium ions, 3 , 2% for magnesium, 1.3% for potassium.
The components of the main chemical composition of hyperhaline reservoirs were obtained for the Aral and Dead seas and Lake Urmia. The salinity of these bodies of water, expressed by the total amount of basic ions, was determined.
The studied natural water bodies are terminal lakes characterized by high water salinity, which is many times higher than the salinity of ocean water. The ratios of the main ions in the studied sources differ significantly between the water bodies as well as from similar ratios in the world's ocean.