

On the origin of salt in the Caspian Sea

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A very serious problem associated with the evolution of the Caspian Sea, is the appearance of salt in it with a chemical composition that is different from the ocean salt (Svitoch, 2014). There are several hypotheses proposed to explain the specified properties. In each of them states that the salt entered the sea from the Arctic or Indian oceans or from the Mediterranean Sea, and then it was subsequently reworked by numerous evaporations. But they do not explain the mechanism of salt accumulation in the Caspian lowlands and its chemical composition changes. In recent years, our studies have shown that after Paratethys disconnecting from the Mediterranean Sea the transgressions of the Black and Caspian seas occurred as a result of periodic melting of the continental ice. The flow of water through the mountain range from the Black Sea to the Mediterranean Sea led to the formation of the Bosphorus Strait. The erosive lowering of the river bed flowing out of the Black Sea is gradually lowered limit of the possible filling of the seas Paratethys descendants. A mathematical reconstruction of the Sarmatian Sea in current relief showed that the theoretical contours of the sea very well coincide with the contours obtained according to the natural geological research. This shows that over the past ~ 14 million years the significant changes in the landscape of the Black Sea-Caspian lowlands in the whole did not happen.

The results allow creating a new understanding of the dynamics of the coasts and seas levels, and the origin of salt in the Caspian Sea. In our opinion the oceanic salt in the Caspian Sea remained since Paratethys connection with the Mediterranean Sea. As a result of tectonic processes of the Alps formation there was a gradual separation of the Paratethys from the Mediterranean Sea. As a result of negative freshwater balance the water in the Caspian depression evaporated with continuous (some time) inflow of salt water from the ocean. Thus, water evaporated and salt turned into a evaporites. A similar phenomenon occurred in the Mediterranean Sea at the beginning of the Messinian Salinity Crisis (Yesin (Esin), 1987). Thus there was the accumulation of salt in the Caspian Sea and in the lakes of Elton and Baskunchak. Later the continental salt (with continental runoff) accumulated in the Caspian Sea. And same time there was a gradual periodically washout of salt. In the periods of melting of the continental glaciations the level of the Caspian Sea rose and there was the salt outflow in the Black Sea, and then into the Mediterranean Sea.

References

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