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MEROMICTIC LAKES OF RUSSIA

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Meromictic lakes are rare type of water bodies. They are characterized by stable vertical stratification caused by the difference in density between layers of water, which persists for many years, centuries, and even millennia. The first inventory of meromictic lakes mentioned 121, including 12 in the USSR. In 2009, the “Encyclopedia of Inland Waters” listed 224 meromictic lakes, 14 of which in Russia. Russia occupies one-seventh of the Earth’s land area, but the number of identified meromictic water bodies was disproportionately small. Having collected publications on meromictic water bodies in Russia from the late 19th century to the present, we compiled a new list of 54 water bodies. This list includes 31 coastal marine water bodies (excluding the Black Sea, which is the world’s largest meromictic body of water), 14 karst lakes, five glacial lakes, four endorheic saline meromictic water bodies in arid zone, and one artificial pond. The most common type of meromictic water body in Russia is coastal marine, where the layered structure arises from the covering of seawater by surface runoff. Seven bodies of water are found on the coast of the Barents Sea, 15 on the White Sea, one on the Bering Sea, three on the Sea of Japan, and three on the Sea of Okhotsk. In the White and Barents Seas, meromictic lakes separated from the surrounding seawater during postglacial coastal uplift; in the Far East, their formation is usually associated with coastal sediment dynamics. Most continental meromictic lakes are of karst origin, while the Northwest of the country many are of glacial origin with high iron and manganese contents in their bottom waters. The smallest group are endorheic salt lakes in arid regions, where during periods of high humidity a fresh upper layer may appear on top of the salt water, where during periods of high humidity a fresh upper layer may appear on top of the salt water. The ecosystem of meromictic lake consists of a vertical sequence of communities in different layers. In the bottom zone, there is an anoxic zone inhabited by ancient microorganisms. At the boundary between the aerobic and anaerobic zones (chemocline), there is a highly productive zone with autotrophic microorganisms: in the case of sulfide anoxia these are sulfur bacteria performing the most ancient anoxygenic photosynthesis; in iron-manganese anoxia, these are iron-oxidizing bacteria that help maintain the mineralization gradient. It is important to ensure all meromictic water bodies are protected along with and surrounding landscapes.

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