

Dynamics of the physicochemical characteristics of the thermomineral waters of the Darginsky field (before the reconstruction of the springs in 2019–2020)

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Abstract. The paper presents the results of studies (2017 and 2019) of the physicochemical characteristics of the thermomineral waters of the Darginsky field, obtained before the reconstruction of the springs in 2019–2020. The obtained data were compared with the data from the studies of previous years (1958–2014) in order to study the dynamics of the measured indicators in over time. It was found that the waters of the Darginsky field are characterized by the constancy of the chemical composition and reservoir temperatures calculated by means of hydrochemical geothermometers. This fact indicates a stable hydrogeological regime of the field. For many years, spatial hydrogeochemical heterogeneity has also been preserved within the field, which consists in the differences in some physicochemical indicators (surface temperatures, concentrations of Na⁺, Cl⁻, SO₄²⁻, HCO₃⁻, etc.) of the thermomineral waters discharged in different sites (Northern, Central, Southern). It is shown that the content of microcomponents (B, Br⁻, Li⁺) in the studied waters, which were measured in different laboratories (or with different methods of chemical analysis) can differ significantly. The most reliable estimates of reservoir temperatures of the Darginsky field are obtained using Na-K, K-Mg and SiO₂ hydrochemical geothermometers. The reservoir temperatures mainly range from 60 to 100 °C, which corresponds to a circulation depth of the thermomineral waters of about 2–3 km. These researches provide a basis for the studying the further dynamics of hydrogeochemical indicators of the Darginsky field, including after the reconstruction of the thermomineral springs.

Keywords:

thermomineral waters, chemical composition, hydrochemical geothermometers, Sakhalin Island

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