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CONDITION OF CARBONATE-CALCIUM EQUILIBRIUM OF WATER IN LAKES OF STATE NATIONAL NATURAL PARK "KOLSAI KOLDERI"

Abstract. The carbonate system is an important system of chemical equilibria in natural waters, its state is determined by the direction and intensity of the chemical, physical-chemical, chemical, biological and other processes occurring in the lake, the river waters. Study of calcium-carbonate equilibrium is of great importance for practical purposes, as determined by the state of aggressive properties of water, it has the ability to destroy the carbonate rocks and concrete hydraulic structures. Based on the results of the experimental field and laboratory studies conducted hydrochemical calculations of the main components of carbonate-calcium equilibrium water Lakes State National Natural Park "Kөlsai Kөlderi" for summer 2015: CO_2, H_2CO_3, H^{+1}, HCO_3^-, CO_3^{2-}, Ca^{2+}.

It was established that in summer 2015 free dissolved CO_2 content is in the range of 0.30-2.26 mg/dm^3. The equilibrium concentration of CO_2 is much lower (0.002-0.46 mg/dm^3) than the amount of free dissolved carbon dioxide. For this reason, the calcium carbonate supersaturation water quantity is less than 1 (0.006-0.61), aggressive water contains carbon dioxide in an amount of 0.8-1.2 mg/dm^3. Such aggressive concentration of carbon dioxide in accordance with existing standards (more than 15 mg/dm^3) is not harmful to concrete constructions based on Portland cement.

For all components of carbonate equilibrium tendency to their decrease with increasing altitude. The lowest concentrations of carbon dioxide, the product quantities activities Ca^{2+} and CO_3^{2-}, water supersaturation of calcium carbonate found in the lake below the pass Sarybulak having ultrafresh water (26.62 mg/dm^3), the minimum content of calcium ions (3.01 mg/dm^3) and bicarbonate ions (12.2 mg/dm^3). In addition, the water of the lakes has aggressive leaching, i.e. being able to dissolve the calcium carbonate in the concrete and wash unbound lime concrete body $Ca(OH)_2$.

Keywords: natural waters, chemical composition, mineralization, calcium-carbonate equilibrium, the quantity of water supersaturation of calcium carbonate, aggressive carbon dioxide.