



DANUBE CONFERENCE 2019

**XXVIII CONFERENCE
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COUNTRIES ON HYDROLOGICAL
FORECASTING AND HYDROLOGICAL
BASES OF WATER MANAGEMENT**

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BOOK OF ABSTRACTS

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THE POSSIBLE WAYS OF RATIONAL USE THE KATLABUH LAKE'S WATER RESOURCES ON THE BASE OF WATER-SALT BALANCE

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In the lower reaches of the Danube on the territory of Ukraine in the Odessa region is the freshwater lake Katlabuh which belongs to the system of the Danube lakes is an adjustable water body. During last decades, because of decrease of the area of land irrigation, volumes of water intake from the Katlabuh reservoir also significantly decreased and pumping of water from the Danube River stopped at all. All this caused deterioration of water quality. In particular, the salinity of the Katlabuh Lake in recent years exceeds by 2-2,5 times permissible rates for drinking and irrigation water.

Danube river is the main source of fresh water for the Katlabuh lake. Nowadays, the operating mode of reservoir is determined by the phases of the water regime of the river Danube: during the passage of spring high water, when the water level in the river is much higher than the water level in the lake, Danube water enters the reservoir (when it fills up to the normal back-up level); during the summer period, the floodgates are closed; in autumn, at low water levels in the Danube, floodgates are opened and there is a large discharge of water from the reservoir (to the level of the dead volume of the lake (LDV)).

The purpose consists in analyzing physical and geographic, morphometric, hydrological, hydraulic characteristics of the Katlabuh lake and rivers feeding it; investigation of the water regime of the Danube River from Reni to Ishmael; calculation of water and salt balances components of the Katlabuh lake. To find ways of hydrological and ecological problems possible solution to reduce mineralization and to improve water quality.

The method of water balance is one of fundamental scientific approaches with respect to research of hydrological regime of reservoirs, lakes and ponds. Results show that precipitation on the water surface of the lake is up to 33% and supply of water from the Danube River flowing by gravity form, to a significant extent, an input portion of water balances (44%). In the output part of the water balance, evaporation from the water surface has the greatest importance (59%). During summer months the water from the Katlabuh Lake supports levels of the system of lakes Lung – Safyan. The values of discrepancies of water balances in the period of 1999-2015 fall within the limits of accuracy of the source information.

Calculation of salt balances of lakes is carried out on the basis of water balance studies. This will allow to check the accuracy of calculations of the components of the water balance, and to perform mathematical modeling of the functioning of the reservoir under various conditions of its operation. The results of calculations of the salt balance showed that the greatest part of the incoming components is given by the arrival of salts with surface runoff (40%) and the arrival of salts with Danube water (39%). Outgoing part is determined to a greater extent by discharges of water along with salts in the Danube river (34%) and loss of salts for irrigation (31%).

Violation of the Katlabuh lake water exchange processes according to monitoring data led to the accumulation of salts and deterioration of water quality in the northern and the central parts.

When choosing a technical solution for the return of the lakes close to the natural connection with the river to improve the quality of water in the lake, it is necessary to increase the volumes of filling it with the Danube water, to increase irrigation water intakes and reduce the flow of saline waters of the rivers that feed the lake.

Keywords: Katlabuh lake, water quality, mineralization, water regime, balance's components.

