

HEAT CONTENT AS A BASIS FOR THE LAKE CLASSIFICATION

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In the life of both a water body and all living on the Earth the solar radiation income and its spatial distribution play a leading role. The heat balance method may be used for lake classification and regioning.

We chose the *heat budget* as a basic classification factor. It is not difficult to determine the heat budget if there are thermal observations in lakes for the whole year. However, it is known that the available thermal data are insufficient and incomplete.

Studies conducted by L.F. Forsh and A.I. Tikhomirov showed that the mean water temperatures for a time period of 5-7 years are sufficient to characterize the mean multi-year variables. In 1989 V.L. Khubbatullin proposed the formula for evaluation of the heat budget through morphometric characteristics. The average difference between the experimental and theoretical results due to this formula is 10.5%, and for Kola peninsula and Karelia lakes it is about 10-12.5%.

The lack of database hinders obtaining the lake morphometric characteristics in the North-Western Russia and in the Intermediate region. The heat budget analysis is done for 3877 lakes by means of the Khubbatullin's formula.

In general it has to be noted that small lakes have specific features, including the heat budget formation.

The annual water temperature cycle in the lake expressed in the form of the dependence of the water temperature on the global radiation ($t^0 = t(Q)$), may characterize the thermal features of the lake and the effect of morphology, morphometry, local climate and hydrological peculiarities (mixing etc.). This original characteristic has been proposed by A.M. Szumiec.

The difficulties of such approach are in the development of the method allowing to find the ellipse parameters. All data have been obtained for a 8-9 year period (1978-1985, 1986). For the lakes considered, with the water temperature measured over the mentioned period, we chose 18 actinometric stations in the North-Western Russia and in the Intermediate region.

The mean water surface temperatures for 62 lakes in the European part of the country and for 90 lakes of the Intermediate region have been calculated for each month of the same period. For each lake the dependency $t = t(Q)$ has been plotted and the ellipse parameters (λ and α^0) have been obtained.

The results allow us to select lake classes by means of secondary factors λ and α^0 , characterizing the thermal state of the lakes.

It follows from the analysis of the results that the factors chosen for the lake classification reflect natural, physico-geographical peculiarities of regions and take into account their morphology, morphometry, lake hydrology and local climate. Thus they are integral and informative. Within these regions a more detailed division of the lakes may be done.