

Selected problems of changes in morphometry, bathymetry and thermal conditions in the lake complex at the forefield of Aavatsmarkbreen

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The lakes are located in the marginal zone of Aavatsmarkbreen. These are the following: Upper, Middle and Lower. They all have a connection with the sea and thus show untypical thermal and salinity conditions.

The vertical range of lake water temperatures shows rare thermal conditions. Heat flow in the water mass is mainly dependent on and influenced by characteristic layers of both fresh and salty water, which are the result of the water exchange between the lake and the sea. The water layer of high salinity intensifies heat accumulation, which results in a sudden temperature jump at a certain depth. The highest and most stable water temperature was found at the depth of 4 to 6 metres, irrespective to the thermal changes taking place in the layer above. It posed a barrier to heat coming in from both the layer above and from the lake bottom. The range of water temperatures was similar to the range of electrical conductivity. This means the main cause for shaping thermal phenomena in the lake was salinity. A similar layout of the heat layers in the studied lakes was also recorded by Pietrucień and Skowron (1983).

In summer 2004 (August 26) a spatial measurement of surface diversity of water temperatures was taken. According to the results, the values of temper-

atures were similar; the highest were recorded at the shore section of the lake as well as at the throat of the Lower Lake.

In summer 2004 GPS, a receiver with the built-in echosounder, was used to take bathymetric measurements. The results were referred to the average water level during summer. Additionally, measurements were taken in order to establish the course of the lakeshore. The bathymetric plan was used to find out that the area of the lakes is similar to the value from the year 1982 (Pietrucień, Skowron 1987) and totals 8.03 ha. Some differences stem from the natural changes in the water reservoirs as well as certain errors connected with the measurement techniques. The average depth of all the discussed water bodies was 2.6 m. The largest differences in depth were recorded in western section of the Upper Lake. Two new deeps were found in northern part of the Middle Lake and at the connection with the Upper Lake.

Morphometric changes of the analysed water bodies result in periodical disappearance of the features characteristic for meromictic lakes. This means thermal conditions of water masses of the lake have a significant influence on both physical parameters and dynamics of water, as well as the changes in its bathymetry, including parameters which describe the lake basin.

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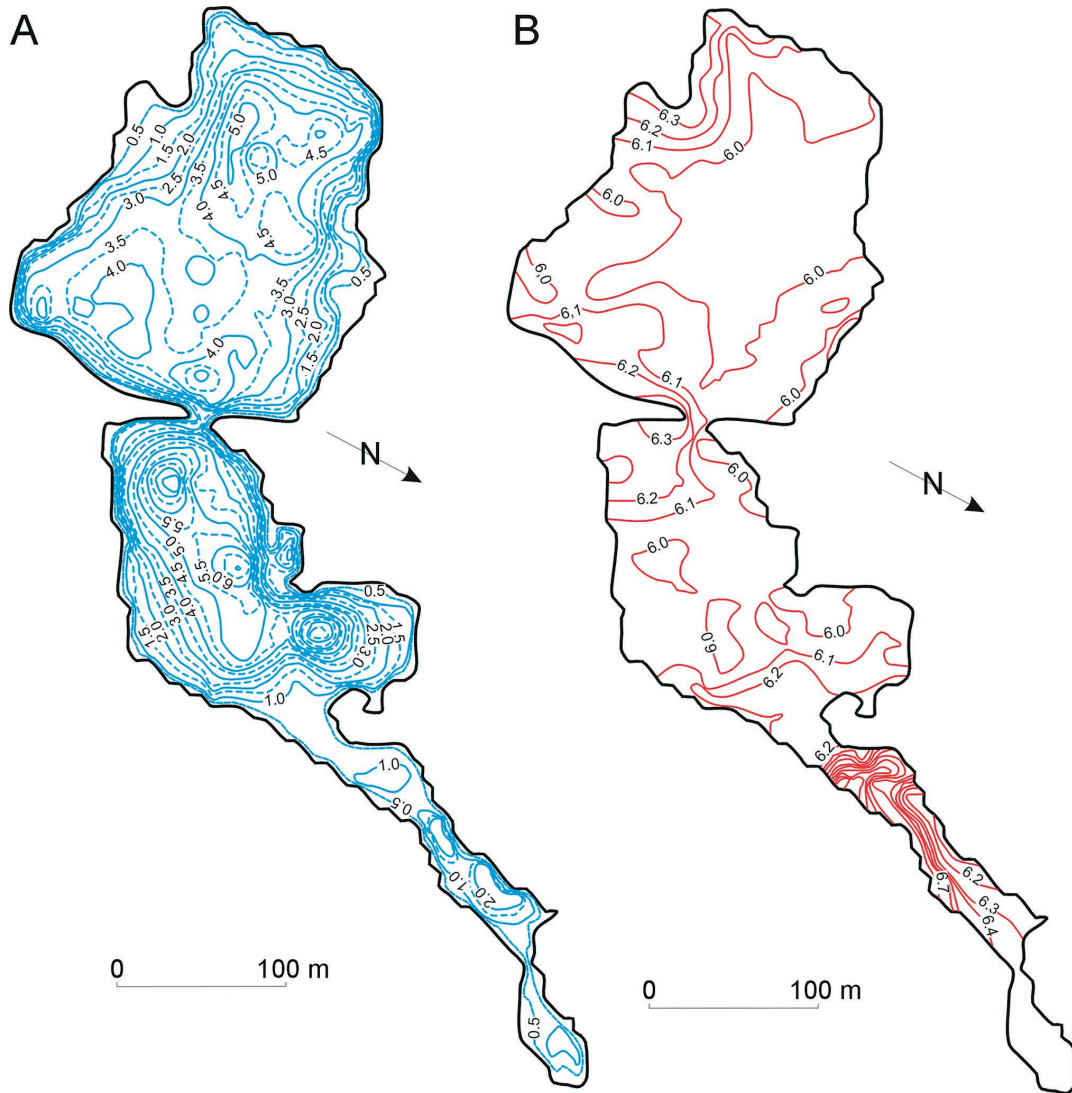


Fig. 1. A – bathymetry (m) and B – surface water temperature (°C) of moraine lakes at the southern forefield of Aavatsmarkbreen

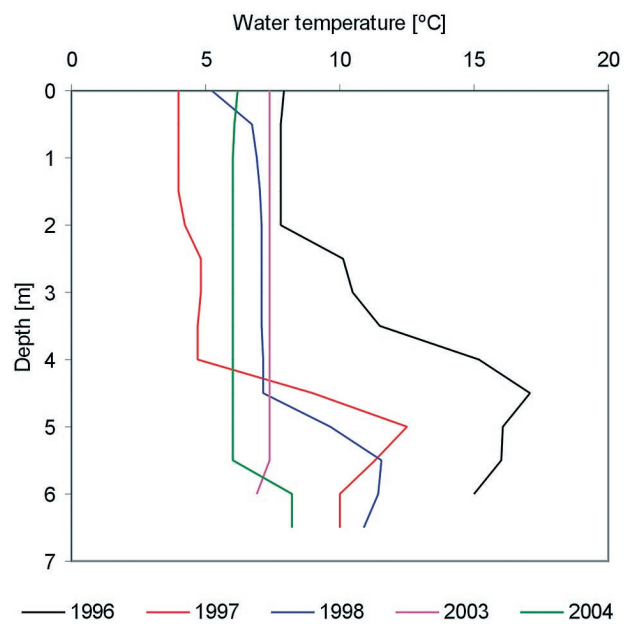


Fig. 2. Water temperature in the Upper Lake in selected years during summer season