

Variability of ice cover of Baikal lake inferred from historical and satellite measurements

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Lake Baikal is the World's largest non glacial source of high quality potable fresh water. Studies of ice cover in Baikal have been underway for more than 150 years now. This unique data base, complemented by modern data on ice regime in different parts of the lake, gives an opportunity to study global and local patterns of climate variability. Present state of satellite monitoring of Baikal ice have been limited mostly to data in the visible range and some limited number of SAR imagery. In this respect, satellite microwave observations offer reliable, consistent, weatherindependent, and easily accessible data on the ice cover.

Historical data on freezing and break-up dates is studies systematically with correlation to global climate events and temperature on previous months. The detailed picture of freezing and break-up is derived from MODIS, AVHRR and ERS

imagery, the correlations with dynamic structures of the lake circulations is investigated.

We have done the study of ice cover in Lake Baikal using active and passive microwave data from two sources. The first source is the satellite altimetry data from the TOPEX/Poseidon (T/P) satellite, operating since 1992 and followed by Jason-1 since 2002. This information was complemented by more than twenty year long passive microwave data set from the SMMR and SSM/I side-looking radiometers. Using these two sources of data we have computed time series of beginning and end dates of ice season, of ice season duration and of ice cover extent. These time series show pronounced regional, seasonal and interannual variability and for the first time provide continuous time series of modern ice cover variability in lake Baikal.

Keywords: lake ice; Lake Baikal, remote sensing, global change.