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ICE AND SNOW REGIME OF EURASIAN WATER BODIES FROM SATELLITE AND IN SITU OBSERVATIONS

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Arctic and sub-arctic lakes and internal seas are an integrator of climate processes, and due to their response to regional and global variations in the climate system, a strong indicator of existing or potential changes. Variability of ice and snow regime is important for their physical, chemical and biological properties, and for human activity (navigation, transport, fisheries, tourism etc).

We present studies of ice and snow cover of the Caspian and Aral seas, Baikal, Ladoga and Onega lakes using synergy of simultaneous active (radar altimeter) and passive (radiometer) observations from radar altimetric satellites (TOPEX/Poseidon, Jason-1, ENVISAT and Geosat Follow-On and recently launched in 2013 French-Indian satellite SARAL/Altika), complemented by SSM/I passive microwave data. We analyse temporal variability of altimetric waveform parameters over ice-covered and ice-free surface for AltiKa and complement this analysis by satellite imagery (MODIS, Landsat), as well as our dedicated field observations of ice cover properties along the AltiKa tracks in spring 2013 and 2014. An ice discrimination approach is presented and evolution of ice conditions from historical data and satellite observations is analysed.

We also present results of our field studies on lakes Ladoga, Baikal (Russia) and Hovsgol (Mongolia). We address formation of giant (diameter 5-7 km) rings on Lake Baikal ice and provide the most complete existing inventory of the ice rings based on satellite imagery and photography for 1974-2014. We analyse the timing of and duration of their existence as well as associated ice and water column structure, and basing on the results of our hydrographic surveys beneath the ice rings in Lake Baikal in 2012-2014 suggest a new explanation of their origin.

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