Югорский государственный университет, Ханты-Мансийск
Институт почвоведения и агрохимии, СО РАН, Новосибирск
Институт лесоведения РАН, Москва
Университет Орлеана, Франция
Национальный исследовательский Томский государственный университет

ЗАПАДНО-СИБИРСКИЕ ТОРФЯНИКИ И ЦИКЛ УГЛЕРОДА: ПРОШЛОЕ И НАСТОЯЩЕЕ

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RECENT DYNAMIC OF HYDRO-ECOSYSTEMS OF THERMOKARST DEPRESSIONS IN THE CENTRAL SIBERIA FROM SATELLITE AND IN SITU OBSERVATIONS: IMPORTANCE FOR AGRICULTURE AND HUMAN LIFE

Elena A. Zakharova[1,2] , Alexei V. Kouraev[1,2,3], Stephane Guillaso[4,5], Franck Garestier[6], Roman V. Desyatkin[7], Alexey R. Desyatkin[7,8]

[1] LEGOS, Université de Toulouse, CNES, CNRS, IRD, UPS Toulouse, 14 av Ed. Belin, Toulouse, 31400 France
[2] State Oceanographic Institute, St Petersburg, Vasilyevskiy ostrov, Beringa 38, 119397 Russia
[3] Tomsk State University, Tomsk, Pr. Lenina 36, 634050 Russia
[4] GIPSA-Lab, CNRS, UGA, 38000 Grenoble, France
[5] Computer Vision and Remote Sensing Group, Technische Universität Berlin, 10587 Marchstr. 23, Berlin, Germany
[6] M2C, University of Caen, France
[7] Institute of the Biological Problems of the Cryolithozone, SB RAS, Yakutsk, Lenin ave. 41, 677980 Russia
[8] Melnikov Permafrost Institute, SB RAS, Yakutsk, Merzlotnaya 36, 677010 Russia

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Alases, the thermokarst depression occupied by grasslands and lakes, are an important element of the Central Yakutian periglacial landscape. They form the lifestyle of local people by providing them with water, hayfield and pastures. Using Landsat-8 satellite images we demonstrated that the lake area fraction is highest (5.4 %) on the V terrace of the Lena River, characterized by high content of massive ground ice. The grasslands dominate on the higher, more denuded terraces.

AAccording to altimetric satellite observations, for 2002 - 2010 lake water level increased on average on 1.3 m resulting in lake expansion. Since 2011, the lakes area decreased and water level declined on 70 cm on the middle terraces, while at higher elevations the wetting trend continued until 2016. Using high-resolution TerraSAR-X radar images we found that the discarded previously small thermokarst lakes (<0.025 km^2), indicating regions of young thermokarst, contribute up to 11 % into the total lake area. In situ observations of grassland dynamics showed their synchronous cyclic variability with the lake area and the general increasing trend of their productivity. This dynamics on 50 % is explained by amount of pre-winter precipitation with two years delay. We explain this delay by the buffering effect of watershed soils.

TThe cyclic variability of the lake water regime and grassland productivity strongly affect the local agriculture, which is based on horse and cattle breeding in alases. We estimated that the alas grasslands are capable to provide enough forage supply for local communities. But the real alas yield is several times less than the theoretical one because of grassland degradation resulted from recent thermokarst as well as water logging of the most productive phytocenoses. The poor access to remote alases can also be a limiting factor for the traditional local economy.