Geophysical Research Abstracts
Vol. 21, EGU2019-1183, 2019
EGU General Assembly 2019

Aufeis of the Yana and Indigirka river basins (Russia): the database from historical data and recent Landsat images

Olga Makarieva (1,2), Andrey Shikhov (1), Nataliia Nesterova (1,4), and Andrey Ostashov (1)

(1) St. Petersburg State University, Institute of Earth Sciences, St. Petersburg, Russian Federation (omakarieva@gmail.com), (2) Melnikov Permafrost Institute, Yakutsk, Russia, (3) Perm State University, Perm, Russia, (4) State Hydrological Institute, St. Petersburg, Russia

Aufeis are one of the glaciation forms and formed by a complex interconnection between river and groundwater. The dynamic of aufeis assessed by the analysis of remote sensing data can be viewed as an indicator of groundwater changes in warming climate which are otherwise difficult to be observed naturally in remote arctic areas.
Detailed spatial geodatabase of aufeis in the Indigirka and Yana Rivers, the basins area 305 000 and 246 000 km2, Russia was compiled from the Cadaster of aufeis of the North-East of the USSR published in 1958, topographic maps and Landsat images for 2013-2017. The aufeis area share varies from 0.26 to 1.15% in different river sub-basins within the studied area.
Digitized Cadaster (1958) contains the coordinates and characteristics of 897 aufeises with total area of 2064 km2 at the Indigirka River basin and 385 aufeises with total area 739 km2 at the Yana River basin. The Landsat-based identification of aufeises for 2013–2017 allowed the description of 1213 (583) aufeises on a total area of 1287 (426) km2 at the Indigirka (Yana) Rivers. The satellite-derived total area of aufeis is 1.6 times less than in the Cadaster (1958). At the same time, more than 900 aufeis identified by Landsat images analyses are missing in the Cadaster (1958). It implies that the aufeis formation conditions may have been changed between the mid-20th century and the present.
The interannual variability of the aufeis area was estimated by the example of the Bolshaya Momskaya naled (aufeis) and the group of large aufeis in the basin of the Syuryuktyakh River for the period of 2001-2016. The results of analysis indicate a tendency towards a decrease in the area of the Bolshaya Momskaya naled in recent years, at the same time the reduction in the aufeis area in the basin of the Syuryuktyakh River has not occurred.
The combined digital database of the aufeis is available at https://doi.pangaea.de/10.1594/PANGAEA.891036.