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Geodatabase and WebGIS project for long-term permafrost monitoring at the Vaskiny Dachi Research Station, Yamal, Russia

Dvornikov Y., Leibman M., Heim B., Bartsch A., Haas A., Khomutov A., Gubarkov A., Mikhaylova M., Mullanurov D., Widhalm B., Skorospekhova T., Fedorova I.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The research station Vaskiny Dachi (VD) in central Yamal, Western Siberia was established in 1988. Continuous monitoring of the permafrost state is conducted since 25 years, which allows collecting a large amount of data related to permafrost state and environment of this region. To store and visualise the geospatial data, containing our knowledge of the research area and research topic, we created a geodatabase (GDB) to operatively process different types of geospatial data. The produced GDB contains so far 11 vector feature datasets and raster data in the same coordinate system. The vector data represent: 1) bathymetry; 2) social-economic objects; 3) field data; 4) geomorphology; 5) hydrography; 6) landscapes; 7) permafrost; 8) snow; 9) topography; 10) vegetation; 11) long-term measurement grids and transects (Circumpolar Active Layer Monitoring (CALM) transect, CALM measurement grid). All these feature datasets contain 60 feature classes of spatial data in total. Some of the geodata layers are directly linked to data bases of field data. The raster data contain 37 layers, including a digital elevation model with derivatives, a map of snow distribution for the key site, bathymetric maps and other maps of different scale. Moreover, the key area is a site for international research projects and the ongoing exchange of the data is supported by the VD GDB. Geographical Information System (GIS) allows collecting, storing and processing geospatial data from different sources in a wide range of types and formats. WebGIS platforms allow displaying the geospatial data for different users, giving the impression of the general processes on the certain geographic area. Also, we use the WebGIS service to publish the data and to make it available for the larger community. This paper is an overview on the permafrost studies at the VD research station, the GDB for permafrost monitoring as well as the established Yamal WebGIS project.

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