



Decadal dynamics of tundra vegetation on cryogenic landslides of Yamal Peninsula, West Siberia, Russia

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Hundreds of landslides were triggered by increased precipitation and wetting of the active layer in central parts of the Yamal peninsula in 1989. A database of satellite images was collected to follow landslide activity before and after this major landsliding, and a key study area of ca. 60 km² near Mordy-Yakha river was chosen for closer examination. The 1989 event is clearly visible when Landsat TM images from 1988 and 1990 are compared. In addition, historic data from CORONA and KH9 revealed another major landsliding in the Central Yamal in early 1970's. The database includes also Very High Resolution (VHR) data from QuickBird-2 (2004), WorldView-2 (2013) and WorldView-3 (2017), which allowed more detailed investigation of vegetation succession and detection of smaller landslides. Field data including leaf-area index (LAI) and aerial photos from UASs were collected from sample areas around the time of acquisition of 2017 WorldView-3 image.

Visual analysis of VHR imagery and change detection using Normalised Difference Vegetation Index (NDVI) showed that no new large-scale landslides has occurred within the study area, but tens of smaller slides, mainly slope failures on lake shores have occurred since 2004. Most of the new landslides detected from 2013 image had increased in area and/or revegetated especially by graminoides by July 2017. The NDVI-change 2004–2013 showed clearly revegetation process of 1989-slides' shear surfaces, while between 2013 and 2017 most of the NDVI increase took place on exposed beds of drying lakes. Preliminary results showed good correlation between measured LAI and the NDVI derived from the satellite data.