Geophysical Research Abstracts
Vol. 19, EGU2017-11606, 2017
EGU General Assembly 2017

Present Permafrost Thaw in Central Yakutia, North-East Siberia: Surficial Geology and Hydrology Evidence

Jolanta Czerniawska (1) and Jiri Chlachula (1,2)

(1) Institute of Geoecology and Geoinformation, FGG, Adam Mickiewicz University, Poznan, Poland; jolczer@amu.edu.pl,
(2) Laboratory for Palaeoecology, Dept. Env. Security, Tomas Bata University in Zlin, Czech Republic; Altay@seznam.cz

Current climate change in the high-latitudes of Eurasia is a generally accepted phenomenon characterized by increased annual temperature values and marked weather anomalies observed in the sub-polar and polar regions. In the northern and NE Siberia, this trend of the MAT rise, documented particularly over the last three decades, is believed to account for the territorial lowland as well as insular mountain frozen ground thaw that in turn has triggered ecosystem feedbacks on the local as well as regional scales. In the northern regions of Yakutia, this is principally witnessed by accelerated near-surface dynamics of seasonally activated de-freezing grounds and inter-linked geomorphic and hydrological actions affecting large-scale tundra landscape settings. In the southern and central taiga-forest areas with perennial alpine and continuous permafrost conditions, respectively, an increased depth of the seasonally melted top-soil layers has become evident accompanied by thermokarst lake expansion and ground surface collapsing. Some cryogenic depressions generated from small gullies over the past decades eloquently demonstrate the intensity and scales of the current permafrost degradation in the Siberian North. The fluvial discharge is most dynamic in late spring to mid-summer because of the cumulative effect of snow-melting because of a high solar radiation and short intervals of torrential rains. Yet, the climate-change-dependent and most active geomorphic agent is the accelerated permafrost thaw seen in landslides and tundra-forest cover decay due to a higher water table. Numerous preserved biotic fossiliferous records Pleistocene and early Holocene in age are being exposed in this process providing unique palaeoecology evidence at particular sites. These climate-generated processes have mostly highly negative effects to the natural habitats (migratory animal routes and riverine biota due to an earlier ice-melting) as well as the local settlement communities (infrastructure destruction resulting from the top-ground melt-water saturation, road-base disintegration, slope slumping, drinking water supply, etc.).