Assessment of recent vegetation changes in permafrost areas from West Siberia using Google Earth Engine

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Abstract

In the arctic regions the elements of terrestrial cryosphere are highly affected by climate change and experience faster changes then other regions around the globe (IPCC, 2018). An important component of the terrestrial cryosphere is permafrost, considered as an Essential Climate Variables, being extremely vulnerable to the increasing trend of temperature. Consequently, permafrost degradation generates irreversible changes in the plant species composition and distribution and hydrological system, affecting the infrastructure and local comunities. The objectives of this study are to quantify the landscape changes, particularly vegetation changes, based on free satellite images in several sites distributed over all types of permafrost zones (continuous, discontinuous, isolated and sporadic) located in West Siberia. To quatify these changes, Google Earth Engine was used for data processing of images in from the Landsat archive aquired in summer season in the last 30 years. The analysis of the evolution of mean values of several indices (i.e. NDVI, TCG etc.) exibit a slight greening as reported by other studies in southern tundra. Also, significant wildfire scars have been identified in the southern part of the studied area in several years.