

GC33F-04: Detecting Anthropogenic and Climate Change Induced Land Cover and Land Use Change in the Vicinity of an Oil/gas Facility in Northwestern Siberia, Russia

Qin Yu¹, *Nikolay I Shiklomanov*², *Dmitry A Streletskiy*², *Ryan Engstrom*² and *Howard E Epstein*³,
(1)George Washington University, Geography, Washington, DC, United States, (2)George Washington University, Washington, DC, United States, (3)University of Virginia Main Campus, Environmental Sciences, Charlottesville, VA, United States

Arctic ecosystems are changing dramatically due to changes in climate, vegetation and human activities. Northwestern Siberia is one of the regions which has been undergoing various land cover and land use changes associated primarily with animal husbandry and oil/gas development. These changes have been exacerbated by warming climatic conditions over the last fifty years. In this study, we investigated land cover and land use changes associated with oil and gas development southeast of the city of Nadym within the context of climate change based on multi-source and multi-temporal remote sensing imagery. The impacts of land use on surface vegetation, radiation, and hydrological properties were evaluated using the Normalized Difference Vegetation Index (NDVI), albedo and the Normalized Difference Water Index (NDWI). The results from a comparison between high spatial resolution imagery acquired in 1968 and 2006 indicate that the vegetation cover was reduced in areas disturbed by oil and gas development. Vegetation cover increased in natural landscapes over the same period. Water logging was found along the linear structures near the oil/gas development, while in natural landscapes the drying of thermokarst lakes is evident due to permafrost degradation. Derived indices suggest that the direct impacts associated with infrastructure development are mostly within 100 m distance from the disturbance source. While these impacts are rather localized they persist for decades despite partial recovery of vegetation after the initial disturbance.