B05-P03

SURFACE AND SUBSURFACE CONDITIONS AND SATELLITE IMAGES IN PERMAFROST AREA AFTER WILDFIRE, SEWARD PENINSULA, ALASKA

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In Seward Peninsula, western Alaska, large tundra fires burned a wide area, underlain by discontinuous permafrost, near the Kougarok River in 1971 and 2002. Both Fires destroyed the vegetation, and the ground surface thermal condition in active layer was altered. The objective of this study is to understand the characteristics of the post-fire variations in the distribution and condition of the permafrost and of the changes attributed to the wildfire in the thermal and water conditions in the active layer. Especially, we tried to detect thaw depth, surface and subsurface conditions by using satellite images.

Summer field observations were conducted at both burned and unburned sites in the area beginning in 2005. The average thaw depth at the burned sites in 2005 was more than 50% deeper than the depth at the unburned sites, while less than 10% deeper in 2014. The differences in thaw depth have decreased over time. Mean annual ground temperature and freezing index at burned sites were about 1.0 °C higher and 50% lower than those at unburned sites.

The visible satellite image at the burned site detected white-colored areas, corresponding to *Calamagrostis canadensis* growing areas confirming by the ground truth, surrounded by green-colored areas. The averaged thaw depth at the white-colored areas was 81cm, while 45cm at the surrounding green-colored burned areas. The surface roughness values at the white-colored and green-colored areas were 28.0 and 18.7, respectively. Also there was a significant difference in the normalized difference vegetation index (NDVI) between the white-colored and green-colored areas, 0.044 and 0.18, respectively. Thus, satellite images of areas after wildfires may help detect low NDVI areas that have a deeper thaw depth and rougher surface with the possibility of thermokarst development.