

積雪深の変動が凍土域の地温に及ぼす影響評価

朴 昊澤¹、A. フェードロフ²、矢吹裕伯¹

¹ 海洋研究開発機構

² 永久凍土研究所、ヤクーツク、ロシア

A retrospective analysis of impacts of changing snow depth on permafrost temperature

Hotaek Park¹, A. Fedorov², Hironori Yabuki¹

¹ Research Institute for Global Change, JAMSTEC

² Melnikov Permafrost Institute, Yakutsk, Russia

Snow is an important factor influencing on the Arctic system. The snow cover/depth indicates overall the decreasing rates during the past few decades associated with climate warming, although the increase in the rates is found in some regions (i.e. eastern Siberia and northern Canada). To assess the insulation effect of the snow on soil thermal states, a land surface model (CHANGE) was applied to the period 1901–2009, with six experiments treating precipitation differently. The increases (i.e. more 30% than the original) in precipitation during the winter season enhanced soil warming resulting in the decrease (i.e. 3–4 × 10⁶ km²) in near-surface permafrost extent and vice versa. The increased/decreased snow depth caused soil temperature to change ±1.2°C in maximum, which was mostly significant in regions covered by continuous permafrost classified by International Permafrost Associate (IPA). Regionally, the significant increase in permafrost temperature was found in eastern Siberia, while the increase in North America was relatively weak. The experiments using CHANGE model addressed that the insulation of snow depth was more remarkable in continuous permafrost region.