Vegetaion masking effect on snow albedo feedback in Siberia during future global warming simulated by MIROC-ESM

*Manabu Abe[1], Kumiko TAKATA[2], Michio Kawamiya[1], Shingo Watanabe[1]

1.JAMSTEC, 2.NIPR

We have investigated future change in snow amount and vegetaion masking effect on snow albedo feedback (SAF) in Siberia, boreal forests region of the northern Eurasia, in the futute climate change simulation by Earth System Model, MIROC-ESM. Under the future scenario, RCP8.5, snow amount during fall-spring over the northern Eurasia decreases due to global warming. The significant reduction of snow amount is found in western Eurasia during fall-spring. On the other hand, although reduction of snow amount over Siberia in fall and spring occurs, winter snow amount over Siberia increases due to increasing snow fall, which is attributable to more water vapor with higher air temperature. Relating to such snow changes, then, surface air temperature (SAT) changes are enhanced through SAF. During spring, particularly, future SAT increases largely over Siberia, boreal forest region, although snow cover decreases less than that in western Eurasia. The dominant increase in SAT over Siberia is attributed to strong SAF which is caused by both reduced snow-covered surface albedo and reduced snow cover fraction. Further, to evaluate an effect of future LAI change on the surface albedo reduction, we have conducted an additional future climate change simulation, in which change in LAI is not included. The comparison between the future climate changes with and without the LAI changes suggests growing vegetation in the future may be a potential factor of the future strong warming through the vegetation masking effect on snow-covered surface albedo change.

Keywords: snow albedo feedback, vegetation masking effect, Earth system model