

Occurrence frequency of ice and snow accretion in the boreal forest regions, Fairbanks and Yakutsk

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Generally snow covers the ground, even if the ground type is different in such as tundra and taiga. Erosion/deposition of the snow cover and growth/decay of ice and snow accretion to vegetation occasionally occur, and the surface albedo changes and will affect the atmosphere. Previous research has demonstrated the high variations of the surface albedo in winter/spring in snow-covered forest regions in various global climate models. In this study, we focused on the surface albedo over snow-covered forest regions, and carried out field observations to verify the occurrence frequency of ice and snow accretion in the boreal forest regions. Using interval cameras installed on the observation tower at the site located to the north of Fairbanks (USA) and on the observation tower at the site located to the north of Yakutsk (Russia), ice and snow accretion in the boreal regions were monitored. It was found that the boreal forest at the Yakutsk site is covered with snow in comparison with the boreal forest at the Fairbanks site for a long term. After calculating using a one-dimensional mathematics model about the energy flow including atmospheric multiple scattering, it was shown that the mean surface temperature rises approximately 0.5 [K] when the boreal forest is not covered with snow. In this presentation, the snow albedo parameterization and the one-dimensional mathematics model are discussed to contribute to a better understanding of the role of snow in the climate system.

Keywords: ice accretion, snow accretion, albedo, boreal forest