

Numerical simulation of regional precipitation difference in east Siberian Taiga forest with nonhydro statistic model

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The forest in Siberia is called as Taiga forest. A characteristics of Taiga forest is the existence of forest in low precipitation condition. The precipitation amount of north area is larger than south area in Lena river middle basin. There are many research for tower scale in Siberia, however, there is no study for the difference of precipitation amount in Lena river middle basin. Our study focuses on atmosphere and land surface for regional scale. The objective is to make clear why precipitation difference occurs.

We conducted the forest survey in Elgeei site. Elgeei is located in 60.01N, 133.49E. We set Elgeei site as south part site. North part site is Yakutsk (62.15N, 129.14E). Compared with Yakutsk site, the tree individual size was larger in Elgeei site. The mean tree height was 8.1m in Elgeei and 5.9m in Yakutsk. There is the same trend in diameter at breast height (DBH), 8.1cm in Elgeei and 6.7cm in Yakutsk. From forest survey it was thought that water condition was more appropriate for Elgeei Taiga forest. We constructed the observational tower and installed observational devices at Elgeei site in August 2009. The observed elements are meteorological state quantity, turbulent fluxes and soil state quantity.

To make clear why the water condition is different between Elgeei and Yakutsk, we conducted numerical simulation, using a nonhydrostatic model (JMA-NHM). According to our simulation, the precipitation mainly occurred in south west part and north east part of Lena middle watershed. The region was corresponded with mountain area. Elgeei was in the rain area between south west part and north east part, however, Yakutsk was not in the area. Thus one reason of precipitation amount difference is orographic precipitation.

In the point of water circulation, the evapotranspiration is one of the key factors for precipitation. The evapotranspiration is controlled by some factors. We also examined the surface parameter impact to precipitation amount. Examined parameter were the surface albedo, the evaporation efficiency rate and the roughness length. The precipitation amount is most affected by the surface roughness length. In the conference we are going to discuss about land surface parameter impact to precipitation amount of Lena river watershed.

Keywords: East Siberia, Precipitation, Downscaling, Nonhydrostatic Model, Land surface