

Sensitivity of hydrological conditions to climate change in Siberian tundra

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Specific vegetation and snow/ice exist on the surface and there are sub-surface structure occurring from existence of permafrost in tundra regions. They affect the hydrological cycle through determining the evaporation and sub-surface runoff processes. One concern is the variability of hydrological cycle in these regions through The authors has been studying these issues since 1997 under the GAME-Siberia project and Frontier project of JAMSTEC. Most of such studies have been made in the tundra regions of North American Continent, but the present study is the first time for Siberian tundra. In the present presentation, the general conditions of hydrological cycle in Siberian tundra, development of land hydrological model and variability of hydrological cycle will discussed. The study was made near a drainage at Tiksi, near the mouth of Lena River facing the Arctic Sea.

As for the general conditions, inter-annual variability of hydrological terms (precipitation, evaporation, runoff, storage) will be shown based on observation. Year to year stability of evaporation, peculiar behavior of seasonal variation of runoff will be discussed.

Land hydrological model was developed to be applicable to annual cycle including winter and summer season. Most of the basic processes were taken from various studies made by past studies. Importance of winter redistribution of snow due to strong wind conditions and high sublimation amount was shown. Simulation of sensitivity of hydrological cycle due to global warming using IPCC scenarios shows different tendency than generally discussed for mid latitudes.