

Effect of hydro-thermal condition in active layer of permafrost to larch tree transpiration and forest evapotranspiration at eastern Siberia

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To improve our understanding of water cycle in eastern Siberia boreal forest, two observation sites at a larch dominated forest were compared. The dominant species in these forests is larch making the upper canopy, and mixed with mainly birch and willow, although composing ratio differs at each forest. Atmospheric condition was similar in the two sites, but soil properties such as soil texture, seasonal thawing ratio and soil water content was different. We use datasets of larch tree transpiration based on sap-flow measurement and forest evapotranspiration based on tower flux observation. Environmental factors explaining temporal variation of the larch transpiration and forest evapotranspiration were extracted by a path analysis. Remarkable difference between sites was found in influence of the soil temperature and water. Generally soil temperature affects positively to root water uptake in layer of the fine root concentration. In one site with soils of high water permeability, soil temperature of some depths has negative correlation to the water fluxes possibly via deepening active layer which accelerates soil water infiltration. Such relation was not found in the other site with high water holding capacity through the active layer. Vertical profile of the soil water due to difference of the soil texture and seasonal thawing ratio is an important factor on distinctive response of two forests.

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