

東シベリアカラマツ林の蒸発散を相補的に支える森林構成と土壌水分特性

小谷亜由美¹、太田岳史¹、T.C. Maximov²

¹名古屋大学大学院生命農学研究科

²北方圏生物研究所 (ロシア)

Complementary role of canopy composition and soil water availability on evapotranspiration over larch forests in eastern Siberia

Ayumi Kotani¹, Takeshi Ohta¹ and Trofim C Maximov²

¹Graduate School of Bioagricultural Sciences, Nagoya University

²Institute for Biological Problems of Cryolithzone

Unusually wet active layer maintained for a few years at Spasskaya Pad larch forest of Yakutsk caused decline of larch trees and would change water and carbon flux (Ohta et al., 2014). To investigate the vulnerability of larch forest faced to too wet condition, we compared two larch forests on different location. One is the Spasskaya Pad station (SP) at Yakutsk, and the other named Elgeei station (EG) is located at 300 km southeast of Yakutsk. During the comparing period (2010-2012), the evapotranspiration and CO₂ exchange, observed by the eddy covariance method, showed that the two forests gave almost the same total evapotranspiration; however, the net and gross uptakes of CO₂ at the EG forest were 1.6 and 1.3 times those at the SP forest, respectively. The difference in aboveground biomass was probably responsible for the higher productivity (CO₂ uptake) at EG. Less aboveground biomass would result in less transpiration at SP, which would be compensated for in total evapotranspiration by soil evaporation and transpiration by the forest floor vegetation. Another contrasting feature between the two sites was the dynamics of soil water availability for plants. Although soil water was generally greater at EG than SP, clay-rich soils high water capacity at EG would limits plant to uptake water. It is likely that forest transpiration is commonly optimized to the same level of evapotranspiration under similar meteorological conditions through differences in the contributions of evapotranspiration from the floor vegetation and the soil water availability. There would be some robust system supporting stable evapotranspiration in despite of temporal and spatial variability in forest composition in this region.

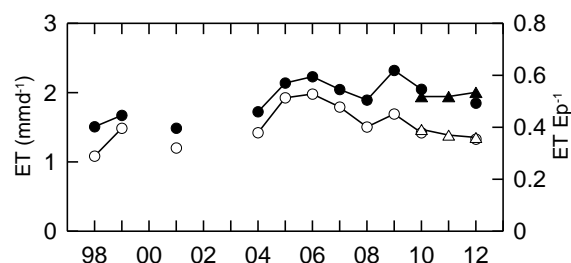


Fig.1 Annual variation of evapotranspiration (black) and evaporative coefficient (white) at SP (circle) and EG (triangle). Each plot indicates mean during JJA.

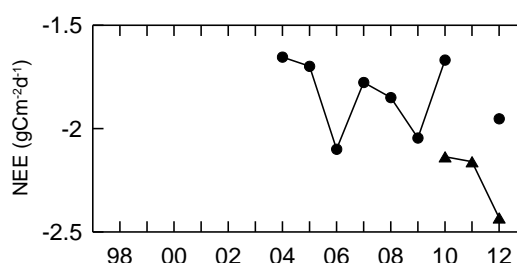


Fig.2 Annual variation of CO₂ exchange at SP (circle) and EG (triangle). Each plot indicates mean during JJA.

References

Ohta, T. et al., Effects of waterlogging on water and carbon dioxide fluxes and environmental variables in a Siberian larch forest, 1998–2011, *Agricultural and Forest Meteorology*, 188, 64-75, 2004.