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In this presentation, we would like to introduce our recent publication, Ikawa et al., 2015, Agricultural and Forest Meteorology:
http://audioslides.elsevier.com//ViewerSmall.aspx?source=1&doi=10.1016/j.agrformet.2015.08.247
An open black spruce forest, the most common ecosystem in interior Alaska, is characterized by patchy canopy gaps where the forest understory is exposed. This study measured CO_2, sensible heat, and latent heat fluxes with eddy covariance (EC) in one of those large canopy gaps, and estimated understory fluxes in a black spruce forest in 2011 –2014. Then understory fluxes and ecosystem fluxes were compared. The understory fluxes during the snow-free seasons were determined by two approaches. The first approach determined understory fluxes as the fluxes from the canopy gap, assuming that fluxes under the canopy crown also had the same magnitude as the canopy gap fluxes. The second approach determined the understory fluxes by scaling canopy gap fluxes with a canopy gap fraction, assuming that only canopy gaps, which mostly constitutes the forest floor, contribute to fluxes. The true understory fluxes would be in between these two estimates. Overall, the understory accounted for 53 (39 –66) %, 61 (45 –77) %, 63 (45 –80) %, 73 (56 –90) %, and 79 (59 –98) % of the total net ecosystem productivity (NEP), gross primary productivity (GPP), ecosystem respiration (RE), sensible heat flux (H), and latent heat flux (LE), respectively. The ratio of understory NEP (NEP_U) to the ecosystem NEP (NEP_E) and similarly calculated LE_U/LE_E during the daytime increased with vapor pressure deficit (VPD) at low VPD conditions (~ 2000 Pa) at half-hourly temporal scale. At high VPD conditions, however, NEP_U/NEP_E decreased with VPD, whereas LE_U/LE_E was maintained at the high level even at high VPD conditions. Despite large ranges of the estimates for the understory contributions, we conclude that the understory plays an important role in the carbon and energy balances of the black spruce ecosystem, and their contribution highly depends on the level of VPD.

キーワード：carbon cycle、boreal forest、understory

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