

Linkage between net ecosystem exchange of H₂O and CO₂ over boreal forest at eastern Siberia

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To improve our understanding of C/H₂O/energy exchange over eastern Siberia boreal forest, two observation sites at a larch dominated forest in the middle and southern part of Lena basin were compared. One is the Spasskaya Pad station at Yakutsk YK (62.25N, 129.23E). The other station named Elgeei EG (60.00N, 133.82E) is located at 300 km southeast of Yakutsk. Average of annual precipitation during 1986-2004 is 290mm and 230mm at Ust-Maya, which is the nearest station at a distance of 60km from Elgeei, and Yakutsk, respectively, while difference of the other meteorological values such as air temperature and humidity is small (Suzuki et al., 2007). The dominant species in the forest is larch (*Larix cajanderi*), mixed with birch (*Betula pendula*), willow (*Salix bebbiana*) and pine (*Pinus sylvestris*). The stand density of larch trees is 1040 trees ha⁻¹ (2600 trees ha⁻¹ including birch, salix and pine) and the mean stand height of upper canopy, which is comprised of larch trees, is around 25m.

The observation during growing season of 2010 and 2011 shows following results: 1) Meteorological condition were not different at the two sites. 2) Seasonal change of ground environment such as soil water and temperature was a little different between the two sites; melting of frozen soil started at beginning of May at both sites, but growing ratio of melting depth (active layer depth) was larger at YK than EG. The soil water content was larger at EG than YK through the season. 3) Evapotranspiration measured by the eddy covariance system showed similar way of seasonal change and total amount was not so different, while Net ecosystem CO₂ exchange was 1.5 times at EG compared to YK. 4) Seasonal variation of evaporative coefficient (actual evapotranspiration / potential evaporation), ecosystem water use efficiency (CO₂ uptake / evapotranspiration) and their correlation to the environmental variables were not always similar for the two sites.

Keywords: evapotranspiration, carbon cycle, boreal forest