

ACG033-P13

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Observations on photosynthesis and C and N stable isotopes of arctic ecosystem in Eastern Siberia

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North Eastern Eurasia is covered by permafrost which is the largest and the deepest in the world, and taiga forest (deciduous conifer larch) exists on it. It is expected that northern edge of taiga (taiga-tundra boundary) is greatly affected by global warming, and change in vegetation may cause greenhouse gas emission. Northward expansion of taiga forest ecosystem or expansion of tundra ecosystem may affect greenhouse emission opposite direction. Therefore, it is very important to know the vegetation change and its controlling factors.

Field observation on photosynthesis of larch and C and N isotope ratios of plants were carried out in taiga-tundra boundary ecosystem at Chokurdakh in 2008, 2009 and 2010 to investigate the response of the photosynthesis on various environmental factors. Observed rate of photosynthesis changed with PAR, and decreased when the chamber temperature was more than 20 centigrade. N content and N and C isotope ratios of larch needles varied among years and also among the sites. Needle delta C-13 was higher in 2009 than in 2008 and 2010, and needles N content was negatively consistent with delta C-13. No significant difference in larch needle delta N-15 was found between 2009 and 2010. Larch trees are generally found on tree mound which consists of sphagnum, however several trees were found growing at wet area where landscape was similar to wetland. Larch needle delta C-13 at wet area was lower than the trees at the other sites, so were the needle delta N-15 and N content. Needle delta C-13 value would usually increase with N content among the larch trees growing sites, however, needle delta C-13 value decreased with N content changed from 2008 to 2010 within the same growing site. Needle delta N-15 value would usually increase with N content among the larch trees growing sites. Within the same growing site, delta N-15 usually did not change with N content observed from 2008 to 2010. To compare morphological difference of the larch trees growing at tree mound area and wet area, the needle length showed that the average needle length was significantly shorter at tree wet area than in mound area.