Estimation of carbon translocation and allocation in Siberian larch saplings at Mongolian forest using ^{13}C pulse-labeling experiment

*Asami Kitayama[1], Atsuko Sugimoto[2], Byambasuren Mijidsuren[3], Batdelger Purevsuren[3]

1.Graduate School of Env. Science, Hokkaido Univ., 2.Faculty of Earth Env. Science, Hokkaido Univ., 3.Mongolian University of Life Science

Tree-ring analysis has been conducted in Mongolian northern forest area to investigate tree response to rapid environmental change in recent years. The results showed that severe drought events induced decrease in Siberian larch tree growth in recent years. However, physiological response of larch trees to environmental change has not yet been well understood in this region. In addition, it is still not clear how tree allocates assimilated carbon in tree body, although it is necessary to interpret tree-ring data.
Thus, we conducted ^{13}C pulse-labeling experiment using larch tree saplings in 2014 summer at KT site (47.7N, 107.6E) to estimate carbon allocation in trees and physiological response to environmental change in this region. Larch tree saplings were labeled by $^{13}CO_2$ in the middle of June and the beginning of August. The labeled trees were sampled for the period from 1 week to 1 year to investigate carbon allocation in tree body.
Most of the ^{13}C assimilated in the middle of June was kept in the needles until just before defoliation, and the carbon allocation to other tree parts (e.g. branches, stem and roots) was small. Assimilated ^{13}C in the beginning of August rapidly translocated from needles to other parts, and the carbon allocation to the roots was large compared to ^{13}C assimilated in June. The result probably indicates carbon accumulation in autumn for growth in the following year. Our results also showed a possibility that ^{13}C fixed in August preferentially allocated from storage pools to needles for growth of new shoots in the following spring compared to ^{13}C assimilated in June.

Keywords: Mongolia, Larch tree, 13C pulse-labeling, Carbon allocation

