



## Modeled and measured stable isotope data in Siberian tree rings

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Stable isotopes in tree-rings are widely used for the reconstruction of environmental conditions, but more information could be extracted when using mechanistic models for their interpretation. Tree-ring width, cell wall structure and stable carbon as well as oxygen isotope analyses in tree wood and cellulose were carried out for four larch trees (*Larix cajanderi* Mayr) from northeastern Yakutia (69°N, 148°E) during the period from 1945 to 2004 and these data compared with several models.

Based on a biochemical model of photosynthesis and modified model of stomatal conductance our work provides intra-annual dynamics of carbon content in photoassimilates and isotope composition in tree-rings depending on climatic factors. The mechanistic Roden-Lin-Ehleringer model was used to quantify both the physical and biochemical fractionation events associated with hydrogen and oxygen isotope ratios in tree-ring cellulose. Simulation results were compared with measured data.

Predictions of carbon isotope ratios from Fritts, ORCHIDEE and LPX models were consistent with measured data. The Roden-Lin-Ehleringer oxygen model allowed the prediction of humidity and source water enrichment as well as oxygen isotope effects associated with leaf water enrichment.

This work was supported by Marie Curie Fellowships (EU-ISOTREC 235122; 909122) awarded to Sidorova Olga and a grant of Russian Scientific School 5327.2012.4.