

## 7500 years of pine tree-ring $\delta^{13}\text{C}$ values from northern finland

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Long-term efforts of collecting pinewood (*Pinus sylvestris* L.) preserved as subfossils in lake sedimentary archives in northern Finland (e.g. Eronen et al. 2002), and their subsequent tree-ring analysis and dating have resulted in a tree-ring chronology and climatic analyses covering the past  $\sim 7.5$  ka (e.g. Helama et al., 2002; 2008).

During the past three years, this supra-long pinewood chronology, complemented with newly sampled subfossil trunks, has been measured for its isotopic composition of carbon ( $\delta^{13}\text{C}$ ) which serves as a sensitive proxy for past photosynthesis, yielding indirect estimations of temperature, moisture and cloudiness.

Dendrochronologically cross-dated tree-ring material was dissected in either annual or decadal segments from living trees and subfossil samples and  $\alpha$ -cellulose extracted for isotopic analysis. In addition to the recent calibration period, an annually resolved chronology was produced to cover much of the 6<sup>th</sup> century CE. The 7500-year chronology is decadal resolved, with sample replication  $\geq 5$  throughout the sequence.

The  $\delta^{13}\text{C}$  data reveal new insight into regional climatic trends of the mid- and late Holocene, systematics of large scale geographical and within-tree isotopic variability and the existence and nature of age trends in tree-ring  $\delta^{13}\text{C}$  records

### References:

Eronen, M., Zetterberg, P., Briffa, K.R., Lindholm, M., Meriläinen, J., Timonen, M., 2002. The supra-long Scots pine tree-ring record for Finnish Lapland: Part 1, chronology construction and initial references. *Holocene* 12, 673-680

Helama, S., Lindholm, M., Timonen, M., Meriläinen, J., Eronen, M., 2002. The supra-long Scots pine tree-ring record for Finnish Lapland: Part 2, interannual to centennial variability in summer temperatures for 7500 years. *Holocene* 12, 681-687.

Helama, S., Mielikäinen, K., Timonen, M., Eronen, M., 2008. Finnish supra-long tree-ring chronology extended to 5634 BC. *Norsk Geogr. Tidsskr.* 62, 271-277.