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The Role of Climate and Larch Budmoth Outbreaks reflected in δ^{13}C- and δ^{18}O-Signatures of an Alpine Tree-Ring Chronology

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The Alpine region is highly sensitive to climatic changes. Understanding the natural variability in the Alpine climate is a prerequisite to correctly interpret the trends of the last decades under growing anthropogenic influence and to make accurate predictions for the future.

Analysing stable carbon and oxygen isotopic ratios (^{13}C/^{12}C and ^{18}O/^{16}O) in tree-rings is a reliable method for climate reconstruction, providing both: high sensitivity to climatic changes and annual resolution. Combining living and historic material of European larch (*Larix decidua* Mill.) sampled in the Valais (Lötschental and Simplon), Switzerland, a period of more than 1000 years is covered. As a part of the project "Millennium - European Climate of the last Millennium" this new chronology will contribute to a better assessment of the amplitude of climate variability in the Swiss Alps.

We investigate the possible influence of the larch budmoth (*Zeiraphera diniana* Gn.) on the isotopic signature of tree-rings of the long chronology and from four additional field sites in the same region. The larch budmoth is a foliage-feeding insect, which occurs in periodical outbreaks, causing discernable physical alterations of cell growth in tree-rings. Whether or not these outbreaks impact isotopic signatures, thereby masking climate signals, needs to be determined in order to prevent errors in the climate

reconstruction, but may also provide new insights on the physiological response of the trees to the insect outbreaks.

First results of the last 100 years indicate a strong climate forcing at this site. In comparison to the climatic signal, the effect of the larch budmoth on the δ^{13}C- and δ^{18}O-signatures seems negligible.