



Carbon and oxygen isotope signatures in conifers from the Swiss National Park

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Our study investigates the physiological response and plasticity of trees under climatic changes for larch (*Larix decidua*) and mountain pine (*Pinus mugo* var. *uncinata*) in the Swiss National Park. This research was done in the context of investigation tree mortality and their potential to survive under the harsh mountainous conditions.

For the stable isotope analysis we selected four mountain pine and four larch trees from each a south- and north-facing slope. Oxygen isotope ratios can give insight into water sources and evaporative processes. To understand the differential response of mountain pine and larch to short-term climatic changes we measured $^{18}\text{O}/^{16}\text{O}$ in water extracted from twigs and needles as well as soil samples for each species at both sites. The seasonal variabilities in $^{18}\text{O}/^{16}\text{O}$ needles and twigs of mountain pine and larch trees as well as soil samples were related to changes in climate conditions from end of May until middle of October.

To reveal the main climatic factors driving tree growth of pine and larch trees in the long-term, tree-ring width chronologies were built and bulk $^{18}\text{O}/^{16}\text{O}$, $^{13}\text{C}/^{12}\text{C}$ wood chronologies were analyzed and correlated with climatic parameters over the last 100 years. The results indicate a strong influence of spring and summer temperatures for larch trees, while variation of spring and summer precipitations is more relevant for mountain pine trees.

This work is supported by the Swiss National Science Foundation, Marie-Heim Vöglin Program PMPDP-2 145507