

Research Unit Forest Dynamics - colloquium

Date: 02.06.2025

Time: 10:30

Room: Engler-Saal

Duration: 25 minutes

Author: Tito Arosio, RG Ecosystem Ecology

Chairs: Kerstin Treydte, Yann Vitasse

Title: **Alpine Tree-ring stable isotopes: species physiology, methods, and Holocene hydroclimate**

Abstract:

Tree-ring stable isotopes ($\delta^{18}\text{O}$, $\delta^2\text{H}$, $\delta^{13}\text{C}$) provide powerful records of past climate and plant physiology. Using the Alpine Holocene Triple Tree Ring Isotope Record from *Larix decidua* and *Pinus cembra*, combined with methodological evaluations, we disentangle climate signals from species-specific physiological effects. The $\delta^{18}\text{O}$ chronology carries a strong hydroclimate signal with a significant drying trend over the Holocene, while $\delta^2\text{H}$ and $\delta^{13}\text{C}$ highlight contrasting metabolic strategies between the two species. By using different chronology construction methods, we demonstrate their influence on preserving low-frequency signals. The findings advance isotopic, physiological, and methodological integration for improved hydroclimate reconstruction.