

THE LÖTSCHEENTAL TRANSECT AS AN EXAMPLE TO MONITOR THE INFLUENCE OF GLOBAL WARMING ON TREE-GROWTH

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The anthropogenic influence on the earth's climate system and in particular the temperature increase observed over the past century is no longer disputed. Impacts of the recent warming trend are currently recognized for both abiotic (e.g., glacier shrinkage, sea-ice thinning) and biotic (spring greening, treeline advance) systems. Forested ecosystems, which contain about 90% of the living terrestrial biomass and regulate most of the land-atmosphere flux of water vapor, represent one of the most important biosphere systems. The impacts of climate change on tree-growth represent a critical shift to an important feedback to the earth's climate system, carbon cycle, and environmental services.

Insight into the timing and processes of intra-annual growth is essential to understand the physiology of tree-ring formation as well as to correctly interpret the signal of anatomical or isotopic wood structures. Recent research has significantly improved the tools and methods used to monitor tree growth.

In my talk I will present results about differences in timing of tree-ring formation, growth, and cell sizes between two phenologically different species (deciduous *Larix decidua* versus evergreen *Picea abies*) growing along a 6°C natural temperature gradient in the subalpine forest of the Lötchen valley, in the central Swiss Alps. Observations are based on 10 years of high-resolution monitoring of sites, tree physiology and growth of mature trees distributed along a 1400 m elevation gradient. Particular focus will be given to the importance of high-resolution monitoring to understand the mechanism of growth and its responses to environmental changes.