

endangered. A careful analysis of such unexpected results shows that either the carbon discrimination model is no longer valid or the assumptions for the leaf water enrichment are violated. The analyses, resulting from such discrepancies facilitate the understanding of the causality of the tree-environment interaction.

Theme: O06. Stable isotopes in dendrochronology

Presentation Type: Oral

GLACIER FLUCTUATIONS FOR THE PAST FOUR CENTURIES OVER THE WESTERN HIMALAYA, INDIA - AS EVIDENCED FROM TREE-RING STUDIES

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An unprecedented enhancement in growth during the last few decades is detected in the 458 years long tree-ring records of Himalayan cedar (*cedrus deodara* D. Don) from the high altitude areas of Kinnor and Gangotri region of Western Himalaya, India. Dendroclimatological investigation indicates significant positive relationship of tree-ring index series with winter (December - January - February) temperature and summer precipitation and inverse relationship with summer temperature. Higher growth in recent few decades detected in tree-ring chronology has been noticed coinciding with the rapid retreat of the Himalayan glaciers. Suppressed and released growth patterns in the tree-ring chronology have also been observed to be well related to the past glacial fluctuation records of the region. The higher and lower tree growth epochs in the tree-ring records have reasonably have been found to be coinciding to the various glacial fluctuation records. The enhanced and suppressed growths in some years during recent decades have significant correlations with negative and positive mass balance records respectively. An extensive dendroclimatic and dendroglaciological investigation over high altitude Himalayan region may be useful to enhance our knowledge on snow and ice processes and their relevance to climate in the high mountain ranges.

Theme: O07. Dendrogeomorphology

Presentation Type: Oral

DYNAMIC TREE GROWTH RESPONSE TO CHANGING CLIMATIC AND HYDROLOGICAL CONDITIONS IN TEMPERATE FOREST

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Atmospheric and soil hydrological conditions largely determine the water status of trees. Internal water regulation mechanisms, however, partially uncouple tree water status from these controls. We examine the water relation of trees from different functional types (conifer vs. deciduous), and with different wood anatomy (ring- vs. diffuse-porous), from the temperate forest growing along hydrological gradients. Mature *Pinus sylvestris*, *Fagus sylvatica* and *Quercus petraea* growing along transects stretching from lake shores to the top of a nearby hill are equipped with 30 point dendrometers and 24 sap flow sensors. Hydrological processes at the study site are also closely monitored. The presentation will show first results and discuss the mutual effects of stem water storage, transpiration, and growth, and their interaction with environmental conditions. This study is part of ongoing multi-disciplinary investigations on the impacts of hydrological changes, with decreasing water availability and increasing temperatures, on terrestrial systems, and was established within the framework of the Virtual Institute for Integrated Climate and Landscape Evolution Analyses (ICLEA.de) project focusing on the lowlands of NE-Germany, a region with high vulnerability with respect to climate change effects, in particular water scarcity.

Theme: O02. Measuring and modelling wood formation

Presentation Type: Oral

TREE-RING: A SUITABLE IMPLEMENT FOR FIRE HISTORY RECONSTRUCTION IN SAVANNA WOODLAND AND DRY FOREST