



Project acronym: InForPine

Project title: Effects of climate change on intra-annual wood formation processes of Scots pine at its upper distributional limit

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Discipline: Earth Sciences & Environment: Ecosystems & Biodiversity

Station(s): Finse Alpine Research Centre (Norway)

Temperature determines the position of arctic and alpine treelines, but water availability may temporarily limit tree growth in cold environments due to recent climate change. Little is known about how exactly tree radial growth is affected and how this effect varies through time. This is particularly true for subalpine southern Norway where little dendrochronological research has been done.

In this project, we combine different dendrochronological methods to better understand how climate is limiting radial growth of a major boreal conifer species at high elevation east of the Finse Arctic Research Center, which is in the dry rain shadow of Hardangervidda.

Dendrochronological samples (wooden cores) of Scots pine (*Pinus sylvestris*) were collected at its upper distributional limit (ca. 950 m asl) and in a closed stand at lower elevation (ca. 730 m asl). In addition, sensors recording its radial growth (dendrometers) and microclimate (soil moisture and temperature, air humidity and temperature) with sub-daily resolution were installed at both sites. Processed samples and recorded data will be used to analyze the effects of climate on radial growth at annual (tree-ring width) to weekly (wood anatomy) to sub-daily resolution (dendrometer records) over recent decades. Finally, we aim to predict tree growth at the upper site through 2050 using a space-for-time approach.

Results will be compared to similar research at high-latitude and high-elevation sites (e.g., northern Norway, Abisko). Findings may help to improve models of forest distribution and carbon cycling to better assess the impacts of climate change on subalpine and subarctic forests from local to continental scales.