



Project acronym: CATTAL

Project title: Comparative analysis of treeline trees across latitudinal gradient

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Discipline: Earth Sciences & Environment: Global change & Climate observation

Station(s): Kevo Subarctic Research Station (Finland), Cairngorms (Scotland, UK)

Our goal is to compare wood anatomy, growth-climate response, and fine root biomass of treeline trees along a latitudinal gradient. We hypothesize that shorter growing season at the Arctic treeline than at treelines in temperate zone (around 50° latitude) could be expressed in different biomass allocation patterns of treeline trees and their different growth-climate response, mainly in terms of the length of the seasonal window of growth sensitivity to temperature.

Our intention is to collect data from Scots pine (*Pinus sylvestris*) in two areas (Kevo 69°N, treeline elevation ca 200 m, Cairngorms 57°N, treeline elevation ca 600 m). These data will be supplemented by already gathered measurements from Central Alps and the Vysoké Tatry Mts. Two sites in each area will be selected. Preference will be given to sites located on gentle to medium-inclined slopes within the south-facing slope quadrant. Local conditions and availability of sites suitable for our research have been discussed with station managers. The approximate location of field sites will be decided in advance based on communication with station managers (also because of applications for research permits), however the exact location of field sites will be defined during the field reconnaissance trip.

At each site we will randomly select dominant and co-dominant trees and determine basic stem morphological parameters. 30 trees will be measured in terms of stem morphological analysis, from which 25 will be cored (5 mm cores). Tree-ring cores will be processed to derive chronologies of anatomical cell parameters. The number of cored trees can be reduced if required by land-owners.

Additionally, soil samples from 0-10 cm of mineral soil will be collected with a steel corer of 4 cm diameter. We plan to sample 20 points in a regular grid around each tree at the maximum distance of 2 m from the tree. 15 trees will be sampled in this way.