

Tree cover and regeneration dynamics across the arctic-boreal transition zone in N Norway and NW Russia

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Why

The aim is to characterize the spatiotemporal roles of environmental conditions and changes in shaping the structure and location of the arctic-boreal transition zone, including changes in tree recruitment capacity. Different climatic fractions of the landscape and the different growth forms across the arctic-boreal transition might show profoundly different response pattern to environmental changes. A rewarding way to gain knowledge about the dynamics of this transition zone, is growth and age structure analysis of the dominating tree species across the zones. This project focus on Scots pine.

The project will form a PhD thesis composed of four papers with the preliminary titles:

- Variation in height growth-climate relations in *Pinus sylvestris* along coast-inland gradients
- Structural divergence in the arctic-boreal transition between different climate regions
- Conifer age structure variation along spatial and temporal scales in Northern Norway and Northwestern Russia
- Tree recruitment capacity across the treeline zone: climate driven spatial and temporal variation

How

The study uses a three dimensional gradient approach reflecting regional differences in major environmental drivers. Two altitudinal study sites are placed along each of three oceanic-continental gradients located along the major atlantic-arctic gradient (Figure 1). At each study site 50x50 m sample plots are located to the forest-, treeline- and krummholz zone, respectively. Data collection on location, site characteristics, light condition, stand structure, age structure, tree-, sapling- and seedling characteristics, height increment and diameter growth follow the PPS Arctic Manual.



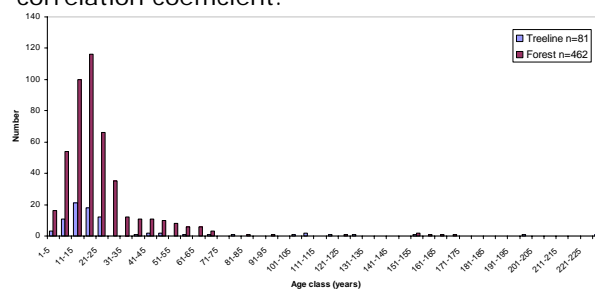
Photos: I.E. Mathisen



Preliminary results

First results will be obtainable late 2008, but the age structure for Børselv, Northern Norway, is presented below. In general the age structure show the same pattern in both the forest and treeline zone with main age classes between 10 and 30 years. The oldest individuals were found in the treeline zone. However, at this site recruitment were lacking completely in the krummholz zone.

Further analyses will include multivariate analyses for the spatiotemporal variations; correlation analyses and response function analyses will be used for climate-growth relationships; and non-identifiable sources of spatial autocorrelation in growth pattern will be tested for by Pearson correlation coefficient.



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