Project Database of ICP Forests
PROJECT DESCRIPTION

PROJECT INFORMATION

Project title: Climate change impacts on forest phenology, and implications for swedish forest management

Project ID: 2

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PROJECT DESCRIPTION

The overall aim of the project is to estimate the impact of climate change on phenology of important Swedish tree species. We will analyse phenological changes in the recent past, and simulate the effect of future climate changes, in order to assess the implications for forest management and economics. The project will provide scenario analyses of future vulnerability to changing growing seasons, and evaluate adaptations/mitigation strategies for sustainable forest management in Sweden.
We will study environmental processes distributed over very large space-time domains using data from a variety of sources including databases, point measurements, remote sensing, physically based numerical models, and forest management strategies. We approach the task through close collaboration and integration of expertise from several scientific fields and by utilizing a combination of state-of-art data processing, regional climate model (RCM)-based climate scenarios, ecosystem and forest growth modelling, and management simulation tools.

Specific project aims are to:

1. develop methodology for integrating remote sensing and climate data for observing and explaining recent changes in phenology in northern Europe,
2. map recent phenological changes in northern Europe,
3. develop process-oriented phenological models that describe the seasonal development of common Swedish forest species, and to integrate these in an existing ecosystem model,
4. simulate phenological changes in Sweden based on RCM-generated climate change scenarios for the coming 50-100 years, based on a range of emission scenarios and global models,
5. assess the implications of these changes on species composition and forest ecology and management in Sweden, and, propose management strategies for Swedish forestry and ecosystem services based on the generated scenarios.

Societal value of the research

The project will provide information for the development of adaptation strategies for the forestry sector for coping with climate change. Data will be made available for planning of sustainable forestry through choice of suitable species and provenances, and suitable management practices. It will also generate information that will enable better assessment of economical implications of phenological changes and of forest damage risks, e.g. frost events, pests and insect infestations.

Furthermore, the project will generate information for more accurate predictions of land transformation due to changing climate zones, e.g. sensitive sub-arctic tundra areas of northern Europe changing into forest. This has implications for the management, use (e.g. reindeer herding) and protection of the Swedish mountain zone. Indirectly, the project will generate information for improving the land-atmosphere feedback dynamics in coupled climate-ecosystem models, of benefit for climate modelling and for e.g. computation of changes to the Swedish carbon balance.

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