Project Database of ICP Forests

PROJECT DESCRIPTION

PROJECT INFORMATION

Project title:	**ICP Forests Ecological Studies Book** **Long-term Monitoring of Forest Ecosystems: Status, Changes, and Trends**
Project ID:	265
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Background and motivation

Three decades of monitoring effects from air pollution within the ICP Forests have provided a harmonized and standardized asset of long-term data series which allows scientists, stakeholders and policy makers to address the status and predict the fate of European forest ecosystems and their functioning in a changing environment. The last years have shown that due to the increasing frequency of climatic extremes and the ongoing, only partly reduced air pollution, unforeseen challenges exist for forest health, vitality and diversity in Europe. The public is alarmed and is asking to what extent these challenges will impact forest ecosystem services such as timber production, water purification, carbon storage and biodiversity in the long run. Addressing these questions requires a further improvement of our capacity to identify, analyze and assess the impact of natural and anthropogenic stressors on forest ecosystems and their resilience. Therefore, it is fundamental to do a comprehensive review of the monitoring results of ICP Forests within the coming years. Although the program has been running for more than 30 years now, such a comprehensive and coordinated presentation, analysis and discussion of the different surveys has not been done. A comprehensive analysis would maximize the use of the data collected under ICP Forests and better harmonize and integrate the data of the various surveys. Moreover, it would provide the scientific basis for expanding the scope of the monitoring activities in forest ecosystems. This is needed to further enhance the policy relevance of ICP Forests and to secure long-term financing of activities, the maintenance and development of the existing infrastructure and required staff through the ICP Forests member states.

Innovative scientific aspects

The intended project will be the first that uses combined long-term data characterizing biological, chemical, and hydrological ecosystem conditions for the assessment of the impact of air pollution / atmospheric deposition, pests/ disease and climatic extremes on status, changes, and trends of forests across Europe and beyond. Despite the fact that the literature provides many research results of cause-effect-relationships in forest ecosystems, the studied impacts and responses mainly stay restricted to few forest ecosystem types and/or few measured variables. ICP Forests features an unique geographical EU-wide coverage of the measurements comprising very diverse forest ecosystems and habitats allowing for the first time to directly compare measurement results from different sites in Europe due to the harmonized

methodology and data handling. As this coverage is accordingly highly demanding in synthesizing, the project will also explore the ways to account for this distinctive spatial distribution. The temporal coverage of the data involves manifold sources of variance due to changes in methodology over time, data transfer procedures and staff. The project will explore the interpretability of such data series and possibilities for harmonization, including adequate spatial and temporal stratification schemes for meaningful evaluations at the pan-European scale. The core of the project is a more in-depth analysis of the long-term monitoring data by comparing and assessing the results of the different surveys. In this way, we gain a better insight on how and to what extent the European forests have changed over a period of 30 years.

Outcome

The Programme-Coordinating Group of ICP Forests recommends the publication of the long-term monitoring results of ICP Forests in Springer's premier book series – Ecological Studies. Such a hard copy, highly rated book is broadening the target group from scientific to official and public, and is representing an appropriate output from 30 years of cost and work intensive monitoring.

This also includes the following outcomes of the project

1) An improved database in terms of data quality and data completeness.
2) An improved methodology for data gap filling and harmonization.
3) An improved methodology for analyzing and interpreting data of high spatial and temporal coverage.
4) Consistent long-term time series for all ICP Forests surveys according to standardized spatial and temporal strata.
5) A deeper understanding on how and to what extent human and natural factors impact forest ecosystem functions and services.
6) Provision of knowledge for the development of adoption and mitigation options regarding future stressors.
7) Provision of knowledge for the assessment of the effectiveness of policies in protecting the environment.