Abstract book – Poster presentations
Regular sessions

00613
Modeling of a climate-adapted tree species distribution for Germany based on National Forest Inventory and remote sensing data. Tree Species Project

If you have chosen the theme "free topic" please indicate 1 or 2 keywords here.
Forest Inventory, Tree Species Map

Poster

K. Pietras-Couffignal [1], S. Schnell [2], M. Freudenberg [3], P. Magdon [3]

[1]Thuenen Institut/Poznan University of Life science - Eberswalde (Germany), [2]Thuenen Institut - Eberswalde (Germany), [3]University Göttingen - Göttingen (Germany)

Abstract

Forest ecosystems are strongly influenced by climate change and currently one of the main concerns of forestry is the development of adaptation strategies. Knowledge of the occurrence of specific tree species in a given area, combined with current and future local growing conditions, is essential to carry out the design of adaptation scenarios for the future.
This requires accurate information with high spatial and temporal resolution. With the "Tree Species" project, we want to provide a database and models to select tree species adapted to the changing climate and local habitat conditions in Germany.
Such data, which are essential for good forest management planning, are not yet available at the national level in Germany. In particular, spatially explicit data on the current distribution of tree species, which could be used to develop maps and decision-support tools, is lacking.
The current distribution of tree species will be determined within the project itself based on spatial and temporal remote sensing data from the Copernicus program. Artificial intelligence algorithms are used to classify the time series. Data from the National Forest Inventory are also used to obtain the required training data.
The first step in our project is to develop an up-to-date map of the occurrence of tree species based on these data.
The following results and products are to be developed and made freely available as part of the project:
1. Analysis of high-resolution digital ortho aerial photographs (DOP)
- Development of a method based on 'deep learning' for detection of individual trees and delineating tree crowns,
- Development of a method for estimating local species composition,
- Application of the above studies (a) and (b) on all inventory plots for which suitable images are available.
2. Analysis of Copernicus satellite data
3. Development of recommendations for species composition adapted to climate and stand condition.
Expected results:
- Map of tree species composition for the whole of Germany, including the most dominant species,
- Map of resistance indicators,
- Map showing the optimal distribution of tree species adapted to habitat conditions and future climate,
- Recommendations to help strengthen stable forest ecosystems.