Project Database of ICP Forests

PROJECT DESCRIPTION

PROJECT INFORMATION

Project title:	**Future Forest: Mapping major tree species distribution in Germany**
Project ID:	270
Contact person:	Jonathan Költzow // jonathan.koeltzow@fu-berlin.de Fabian Faßnacht // fabian.fassnacht@fu-berlin.de

PROJECT DESCRIPTION

General project

Title: Determination of tree species and tree condition on satellite imagery time series

The main innovations within the work packages 2 and 3 of FutureForest lie in the development of new methods for a nationwide determination of tree species and tree condition from satellite image time series.

The identification of the relevant information from large amounts of data requires efficient methods, e.g. from the field of artificial intelligence (deep learning). These methods are so flexible that different data sources can be efficiently merged. In the tree species determination project, for example, spatially high-resolution aerial photos and temporally high-resolution satellite image time series are to be linked in order to significantly improve the classification of tree species compared to standard methods through the progression information and detailed visual information.

In addition, by assessing validation areas in the field, not only the classification quality is to be checked, but also the influence of undergrowth and ground vegetation on the reflection values of the remote sensing data is to be examined in order to gain important information for the further optimization of the methods.

In the project part tree condition, the high temporal resolution of satellite image time series (Sentinel-2 of the ESA) is to be used to quickly compare the expected and observed condition of the forest in real time. Repeated deviations from the expected conditions can then serve as indicators of occurring forest damage and support the initial detection of forest damage.

Sub-project

The goal of the research is to map the most prevalent tree species in Germany and neighboring countries using a deep neural network and Sentinel 2 time series. The goal is to investigate the influence of plant phenology and undergrowth on the spectral values of given forest stands and ICP Forests data would be a welcome addition as the quality of any machine learning approach is greatly dependent on the amount and quality of training data.

It is planned to foremost use tree species and location as well as undergrowth information, but any addition to forest environment parameters will help to find underlying drivers for tree phenology changes.

As it is planned to map tree species using Sentinel 2 satellite data, only data from the year 2015 onward is of interest.

This document has been downloaded from the ICP Forests webpage http://icp-forests.net/page/project-list
For further information please contact the Programme Coordinating Centre (PCC) of ICP Forests pcc-icpforests@thuenen.de

Because of the spatial aspect of the work and the need to account for influences of location as well as for training sample quality assessment, the exact geolocation as well as the surveying date of the plots is needed.

The information of tree species distribution from the combined training data sets will be intersected with a data cube consisting of satellite data and large scale environmental as well as topographic data. If available, aerial orthophotos and canopy heights will be fed into the convolutional network as well.

This document has been downloaded from the ICP Forests webpage http://icp-forests.net/page/project-list
For further information please contact the Programme Coordinating Centre (PCC) of ICP Forests pcc-icpforests@thuenen.de