Project Database of ICP Forests
PROJECT DESCRIPTION

PROJECT INFORMATION

Project title: **Validation of remote sensing aboveground biomass map at EU scale**

Project ID: 296

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PROJECT DESCRIPTION

The European Space Agency's Climate Change Initiative is funding the BIOMASS project (https://climate.esa.int/en/projects/biomass/), aimed at providing global maps of forest aboveground biomass (AGB; in Mg ha-1), for selected years between 2005 and 2022, with these being capable of supporting quantification of biomass change. AGB is an Essential Climate Variable due to its functions as both a source of atmospheric CO2 (and other greenhouse gases) when forest is lost under Land Use Change or by degradation, and as a sink for CO2 due to forest growth. Information on forest biomass can also play a much wider role in understanding and predicting climate, for example in land surface modelling, estimation of carbon turnover, inferring the forest disturbance regime, and data assimilation in carbon cycle and climate models.
The mapping is at 100 m grid spacing with a target relative error of less than 20% where AGB exceeds 50 Mg ha-1.
The CCI-BIOMASS products rely on ESA's C-band (Sentinel 1A & B) and JAXA's L-band Synthetic Aperture Radar (ALOS-2 PALSAR-2) with additional information from space borne LIDAR (e.g. NASA's Global Ecosystem Dynamics Investigation Lidar GEDI). The mapping is achieved using algorithms developed within a globally consistent biomass retrieval framework and builds on the experience gained during ESA's GlobBiomass Project.
The quality of the maps is extensively verified through the use of existing and new ground and airborne data sets.
Within the scope of this project, the present request is to use the ICP Forests plots for validation of the CCIBIOMASS maps.
Ideally, reference forest plots should be at least 0.25 ha in area, well geolocated, and all trees within the stand should be measured (https://lpvs.gsfc.nasa.gov/AGB/AGB_home.html).
To explore the potential use of the ICP Forests Network data for validation of the CCI-BIOMASS maps, a pilot has been conducted using the French RENECOFOR network, involved in the ICP Forests Network.
It was possible to process all 102 0.5 ha plots into aboveground biomass estimates (Mg ha-1) and compare them to the CCIBIOMASS map.

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The aim of the present request is to estimate AGB for all ICP Forests Level II plots and use these sites to perform a validation of the CCI-BIOMASS maps.

This proposal aims to establish an active collaboration with the ICP Forests Network.

It is proposed to:

(1) organize a video-conference inviting all the concerned persons following advice from the Program Coordinating Center of ICP Forests (60 experts are listed on hXp://icp-forests.net/page/expertlist)
   - present the CCI-BIOMASS project
   - explain the contribution of ICP Forests during the validation phase
   - discuss ideas and suggestions from the ICP Forests community

(2) Analyse all included plot data and compare them with CCI-BIOMASS map values and possibly other reported AGB maps. During this period, conduct further discussions with experts to ensure quality of the outputs.

(3) Produce a draft manuscript and invite all concerned ICP Forests Network participants to read, comment, and coauthor the manuscript.

Data requirement:

- tree-by-tree inventory of each ICP Forests Level II plot, including tree taxonomy, trunk circumference, date of measurement (all measurements from 2000 to 2022), status (alive/dead/…)
- site descriptors: location, precise GPS coordinate (at least with 20m accuracy; with method of GPS coordinate attribution), age of plot, sylvicultural treatments (if any), soil type, geological substrate, altitude
- tree height measurements for at least a subset of the permanent trees.