

WP23_25: Forest Biomass Reference System from Tree-by-Tree Inventory Data

1514,284

Basic Information

Full title of the Initiative

Forest Biomass Reference System from Tree-by-Tree Inventory Data

Short Title or Acronym

GEO-TREES

Current category in the 2020-2022 GWP

Community Activity

Proposed category in the 2023-2025 GWP

GEO Initiative

Points of Contact

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Purpose

Objective

Establish a fair and equitable funding mechanism to support the collection of tree by tree forest inventory data for the validation of EO based biomass maps.

Please provide a short description of the Initiative

GEO-TREES shall support the establishment and development of a global activity of in situ biomass reference measurement sites, the Forest Biomass Reference System (FBRS), to complement existing and planned space-based forest biomass observation instruments. These sites will provide integrated, multi-observational, multi-scale reference data to support global space-based forest biomass mapping and will include high-quality georeferenced data on tree biodiversity. Climate change concerns impose an immediate and urgent demand for verifiable and consistent measures of forest biomass in order to reduce the major uncertainties in calculations of carbon stocks and fluxes associated with the terrestrial biosphere. International agreements have made it imperative to obtain accurate estimates of biomass and its changes: under the Paris Agreement (Article 4, paragraph 2) each nation needs to prepare, communicate and maintain successive Nationally Determined

Contributions (NDCs) that it intends to achieve.

Why is this Initiative needed?

This activity is needed to provide the data required to validate EO-based above ground forest biomass products.

What evidence is there to support this need?

International agreements have made it imperative to obtain accurate estimates of biomass and its changes: under the Paris Agreement (Article 4, paragraph 2) each nation needs to prepare, communicate and maintain successive Nationally Determined Contributions (NDCs) that it intends to achieve. This need can be addressed by earth observation, if products are consistently verified. Thus, the carbon certification sector is in urgent need of verifiable data.

Is this Initiative open to participation by representatives of any GEO Member, Participating Organization, and GEO Associate?

Yes

Are you aware of other projects or initiatives at a global or regional scale (both in GEO and externally) that provide similar products or services?

Yes

Please describe.

There exist several initiatives to collect tree by tree inventory data, e.g. <https://forestgeo.si.edu/> or <https://www.forestplots.net/>. These are founding partners of the GEO-TREES initiative.

How is this Initiative unique?

GEO-TREES collaborates with those networks. GEO-TREES will complement their data with precise coordinate measurements, airborne and terrestrial lidar observations and share the responsibility to engage funding partners. Finally it will process the collected data in a global common standard to make it ready to use for EO applications.

Please identify the most important actual and/or intended outputs (products, services, etc.) produced by the Initiative, along with their intended and/or actual users. This list does not need to be comprehensive but should identify the outputs which are most used and are expected to have the greatest potential impact.

Output	Status	Users	Additional info
AGB in t/ha @ 1 ha resolution	Planned	EO and modelling communities	

If needed, please provide additional comments or explanation to accompany the outputs table

- no answer given -

What kinds of decisions are the outputs of this Initiative primarily intended to support?

Data will be used to validate global EO based above ground biomass maps which will support activities related to UNFCCC and REDD+.

How will these decisions benefit from the outputs of this Initiative?

GEO-TREES will help to provide verifiable estimates of AGB.

What kinds of impacts (for example, reduced loss of life, monetary savings, conservation of biodiversity, etc.) are anticipated as a result of the use of the outputs of this Initiative?

It is anticipated that verified EO based AGB maps will lead to a more transparent and verifiable spending in the context of REDD+ activities, it will lead of a better use of these data to quantify the impact of climate change and it will support science and research in this domain which has perse a societal value. It will also provide science-based support for the rapidly-expanding carbon markets.

Has this Initiative been asked to provide specific information (for example, reports, data, services) on an ongoing basis to an international convention, organization, or other multilateral body?

No

Technical Synopsis

Please provide a brief description of the methods used by the Initiative to produce its (actual or planned) outputs.

GEO-TREES will engage potential donor organisations (space agencies, private and public partners) to fund the collection of forest reference observations. The collection and curation of the data will be managed by established network partners (e.g. ForestGEO, ForestPlots, TMFO), will be processed and shared via <https://forest-observation-system.net/>.

Ground collected data will be classical census data at 1ha resolution (tree species, dBH, photographs), airborne lidar data and terrestrial lidar.

If you would like to provide further details on the technical methods, you may upload one or more documents here.

- ceos_wgcv_lpv_biomass_protocol_2021_v10.pdf ([link](#))

Are there any significant scientific or technical challenges that need to be resolved by the Initiative during the 2023-2025 period?

Yes

Please describe these challenges and the steps being taken to solve them.

The main technical challenge is to engage partners to fund the required fieldwork.

Does the Initiative expect to complete any key new outputs, improvements to existing outputs, or improvements to the methods of producing outputs, in the 2023-2025 period?

Yes

Please describe these new outputs or improvements.

We would like to establish ~30 reference sites and ~70 gap filling sites and share its data with the community (30% of the required sites as requested in the CEOS cal/val protocol). Funding for 5 reference sites is secured.

Please identify the key tasks that must be implemented to ensure delivery of these changes, with target dates for completion.

Task	Task description	Expected completion (month/year)
Budget	engage funding partners to implement 30% of the planned sites.	12/2023

Resources

Have all resources required to implement the Initiative's planned work in the 2023-2025 period been secured?

- Gap in financial resources

What is the estimated funding gap for the 2023-2025 period?

10000000 EUR

What actions is the Initiative taking to obtain the required resources?

The CEOS cal/val protocol estimates the total costs of the BRM network with 30MEur (100 reference sites and 200 opportunity sites). The goal to collect funding for 1/3 of these sites is very ambitious. If the funds can not be raised in the 2023-2025 period, the number of sites will be reduced accordingly.

Please list all financial and non-financial contributions to the Initiative (other than in-kind, voluntary participation by individual contributors) having a value of more than USD 50,000.

Contributing Organization	GEO Status	Type of Resource	Value	Currency
CNES	France	Other	100000	Euro
ESA	ESA - European Space Agency	Data	500000	Euro
CNES	France	Data	200000	Euro
ForestPlots (Leeds University)	United Kingdom	Data	4000000	Euro
ForestGEO (Smithsonian Institute)	United States	Data	4000000	Euro
IIASA	IIASA - International Institute for Applied Systems Analysis	Data	2500000	Euro

Lessons from the 2020-2022 Period

Were all planned activities for the 2020-2022 period implemented as expected?

Yes

Were there any key challenges faced by the Initiative in the 2020-2022 period?

No

Were there any impacts or changes to operations due to COVID-19?

No

Please describe the key changes proposed for the 2023-2025 period, for example, new projects, new areas of focus, or adjustments to the activity governance.

no changes

Does the Initiative have outputs (products, services, etc.) available to users now, even if only on a pilot or testing basis?

Yes

Please provide any available information describing this usage (for example, user statistics, results of user testing) and/or feedback from users (for example, user comments, evaluations).

Networks provided historical data for the BRM candidate sites. These data is shared via <https://forest-observation-system.net/>

Please provide supporting documentation if available.

- no supporting documents provided -

Do you have evidence of any impacts that have occurred in part as a result of using the outputs of the Initiative (for example, policy decisions taken, behaviour changes by users, risks mitigated)?

No

Have there been any internal or external reviews or evaluations of the Initiative since 2019?

No

Please indicate any GEO Work Programme activities with which you have ongoing collaboration.

- GFOI - Global Forest Observation Initiative

Please indicate any additional GEO Work Programme activities with which you would like to establish new collaborations.

- GEO BON - GEO Biodiversity Observation Network

Stakeholder Engagement and Capacity Building

Are there specific countries or organizations that your Initiative would like to engage?

Yes

Please list these countries, regions or organizations.

Institutions collecting forest census data in countries in the tropical belt.

What are your plans to engage them?

These institutions shall be engaged through existing partnerships with our network partners.

Does your Initiative engage users in the work of the Initiative (for example, consultation, testing, co-design)?

Yes

Please briefly describe the Initiative's approach to engaging users.

User (representatives of Space Agencies) are part of the steering committee and can express their needs through regular board meetings.

Does the Initiative have a user engagement strategy or similar kind of document?

No

Are there categories of users that are not represented at this time, but you would like to engage?

No

Does the Initiative have a documented capacity development strategy?

No

Please describe the approach to capacity development that is being implemented by the Initiative?

Capacity development is taken care of by the network partners (e.g. ForestGEO, ForestPlots, TMFO), each having its own capacity building and training plan and activities

Are there any commercial sector organizations participating in this Initiative?

No

Are there opportunities for commercial sector uptake of the outputs of the Initiative?

Yes

Please describe these opportunities.

The collected data will be shared and will be openly accessible. This could potentially be of interest for EO service providers in the forestry domain.

Is there already commercial uptake occurring?

No

Are there opportunities for further commercial sector participation in the Initiative?

Yes

Please describe these opportunities.

Commercial sector entities are invited to co-fund the GEO-TREES activity.

Does the Initiative have a plan for commercial sector engagement?

Yes

Please describe this plan or upload the relevant document.

- no answer given -

- no supporting documents provided -

Governance

Please describe the roles of each of the key leadership positions, as well as any team structures involved in day-to-day management.

The Governance plan of GEO-TREES is under development. (See separate a preliminary version of the Governance document).

Is there a steering committee or other governance bodies that advise the Initiative but are not involved in day-to-day management?

Yes

Please describe the roles of each body. If there are multiple governance bodies, please describe the relationships among them (such as through a governance structure diagram).

The steering committee is at the moment composed of the team that proposed the activity. Its role and responsibility is detailed in the preliminary version of the Governance Document.

- geo_trees_governance_document.pdf ([link](#))

What methods does the Initiative use to communicate with its participants?

- Email / e-newsletters
- Regular conference calls
- Website

Please describe the key risks that could delay or obstruct the completion of the planned activities and outputs of the Initiative, along with any actions taken to mitigate these risks.

Description of the hazard	Description of the possible impacts	Scale of impact	Likelihood of occurrence	Mitigation measures
Inability to raise sufficient funding	It will impact the number of sites that can be set up by GEO-TREES	Severe	Possible	no mitigation measure
Drop of interest in the activity by network partners	It will reduce the choice of sites that can be included in GEO-TREES, a loss of historic data and a loss of credibility	Severe	Possible	engage different networks

What methods are used by the Initiative to monitor its effectiveness?

- Informal discussions with users / beneficiaries

Would the Initiative be interested in assistance from the GEO Secretariat for developing an impact plan?

No

How are the results of the monitoring and evaluation activities shared with participants and the wider GEO community?

It is too early to set up an impact plan. We are still in the course of setting up the project and engaging its first partners.

Are any monitoring or evaluation activities required by funders/contributors?

Yes

Please describe and provide reports if available.

- no answer given -

- no supporting documents provided -

Participants

Please list the active individual participants in the Initiative

First name	Last name	Email address	Member	Org
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Other information

Please provide any other comments or information that was not included in the previous sections, but you would like to appear in the Implementation Plan.

More information about the GEO-TREES initiative can be found in the Governance Document as well as in the website : geotrees.cnrs.fr

- no supporting documents provided -

Co-Editor Management

List of co-editors for this initiative

- no answer given -