
WP23_25: Global Products of Common Essential Variables from Multiple Satellite Data

1540,200

Basic Information

Full title of the Initiative

Global Products of Common Essential Variables from Multiple Satellite Data

Short Title or Acronym

GEO PRODUCTS

Current category in the 2020-2022 GWP

New activity

Proposed category in the 2023-2025 GWP

Pilot Initiative

Points of Contact

First Name	Last/Family Name	Email
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Purpose

Objective

To consolidate the high-level satellite products of common terrestrial essential variables for serving multiple GEO projects

Please provide a short description of the Initiative

Various terrestrial essential variables (EVs) have been proposed, evaluated and used by different GEO projects. To effectively characterize their spatial and temporal variations on regional and global scales, high-level satellite products that are transformed from raw observations have to be relied. These products need to be accurate, temporally sufficiently long, continuous and consistent.

With the rapid development of cloud computing and storage, many institutes and even individual scientists are generating various high-level satellite products of terrestrial EVs. These products have been shared on different platforms through internet, but they are usually produced from different satellite data, therefore having highly variable spatial/temporal resolutions and coverage, quality and accuracy. This initiative is a community activity, for a panel of experts to evaluate the current status of the high-level satellite products, assess the characteristics of the satellite products of common EVs, inter-compare multiple products by using in situ measurements, develop new methodology for generating the consolidated products from multiple satellite raw observations, and bridge the product developers and the users by interacting with the relevant working groups of various GEO projects.

Why is this Initiative needed?

GEO has successfully coordinated the share of raw satellite observations from various sources, but most applications require high-level products that have to be converted from raw satellite data. Generation of high-level satellite products requires a high-degree of expertise and vast resources, but such activities have not been well coordinated. Multiple products of even the same EV are often scattered in the internet, but the users have difficulties to find and also hard to decide which products to use since the quality and accuracy of those products are unclear. Many GEO projects have their own working groups to create the data records of certain EVs. There is a urgent need for a coordination of product generation, evaluation, inter-comparison and validation, particularly on the products of the common EVs that are relevant to multiple GEO projects.

What evidence is there to support this need?

Evidence one: Almost all GEO projects require high-level satellite products, and many of which are the same. For example, the products of some bio/geophysical variables (e.g., leaf area index, land surface temperature, evapotranspiration) are highly relevant to multiple GEO projects, such as Global Agricultural Monitoring, Global Forest Observation Initiative, Global Ecosystems Initiative. Geodata for Agriculture and Water, Global Agricultural Drought Monitoring, and the regional GEOSS. Evidence two: high-level satellite products are usually produced from a specific mission or sensor due to the funding mechanism. For example, multiple global LAI products have been generated from many individual sensors (e.g., MODIS, VIIRS, MERSE, AVHRR), but they have different characteristics. Evidence three: the satellite product producers and the users are often disconnected. For example, the current satellite products have the "fixed" spatial and temporal resolutions, but monitoring deserts/glaciers may not need high resolutions, but monitoring crops during the growing seasons require high resolution.

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?

No

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
a data inventory and portal for existing products	Planned	all GEO Members	
various improved satellite products	Planned	all GEO Members	
quality and accuracy assessment reports	Planned	all GEO Members	
forum between the products developers and the users			

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?

it will guide to select the most appropriate high-level satellite products for various societal benefits applications

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

The quality and accuracy of different products will be assessed through inter-comparisons and validation

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 will save vast resources, take full advantage of satellite observations, and improve the effectiveness of GEO application projects.

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.

1. Assemble a panel of world-leading experts with expertise in generating the high-level satellite products. There will be several working groups, each focusing on one or multiple EVs.
2. Interact with the relevant working groups of various GEO projects for identifying the common CVs and also defining the user requirements
3. Develop the inventory of the high-level satellite products, document their characteristics, and also create a products portal for wider applications.
4. Conduct product assessment, validation and intercomparison
5. Develop new methodologies for generating the more accurate, continuous and consistent high-level products at multiple spatial and temporal from various available satellite data, rather than using data from a specific mission/sensor.
6. undertake outreach work by organizing workshops, summer schools, and training classes.

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

- no supporting documents provided -

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

No

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?

No

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?

USD1,000,000

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

It is hoped that the projects of the Ministry of science and technology of China (for example, national key R & D projects) can be funded.

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.

- no answer given -

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.

This is a new project.

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).

We have developed the Global LAnd Surface Satellite (GLASS) products of different bio/geophysical variables. As of Dec. 2021, the GLASS products have been downloaded over 1.7PB by the global users from over 400 institutes.

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)?

Yes

Please provide examples, with evidence where available.

Based on the GLASS products, there have been over 2,000 papers published in various journals, including some high-impacting journals, such as Nature and Science.

Please provide supporting documentation if available.

- no supporting documents provided -

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.

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

Stakeholder Engagement and Capacity Building

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

No

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

No

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?

Yes

Please list these user categories or regions.

Universities, remote sensing centers and other institutions using remote sensing products in various countries.

What are the plans for further engagement of users in the Initiative?

The reliability and availability of the output results from the project can be evaluated.

Does the Initiative have a documented capacity development strategy?

No

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

We will collect relevant products, documents and metadata information from existing remote sensing product

platforms. After that, the accuracy of various products will be compared and evaluated, and suggestions for rational use will be given.

Are there any commercial sector organizations participating in this Initiative?

No

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

No

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

No

Does the Initiative have a plan for commercial sector engagement?

No

Governance

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

We will establish an expert team to review the scheme and give suggestions on work arrangement. At the same time, we will set up a working team to carry out daily work.

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

No

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

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

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.

- no answer given -

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

- Informal discussions with users / beneficiaries
- User or beneficiary surveys
- Website statistics
- Consultations or events
- Evaluations

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

Yes

How are the results of the monitoring and evaluation activities shared with

participants and the wider GEO community?

The results will be updated and shared through the web page.

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

No

Participants

Please list the active individual participants in the Initiative

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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.

- no answer given -

- no supporting documents provided -

Co-Editor Management

List of co-editors for this initiative

- no answer given -