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TAKING THE PULSE OF OUR PLANET FROM SPACE

EUMETSAT ECMWF EUSPA

Towards Open Knowledge: the GEO Knowledge Hub

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Open Knowledge for a Sustainable Future: The GEO Knowledge Hub & the GEO Youth CoP

24.05.2022

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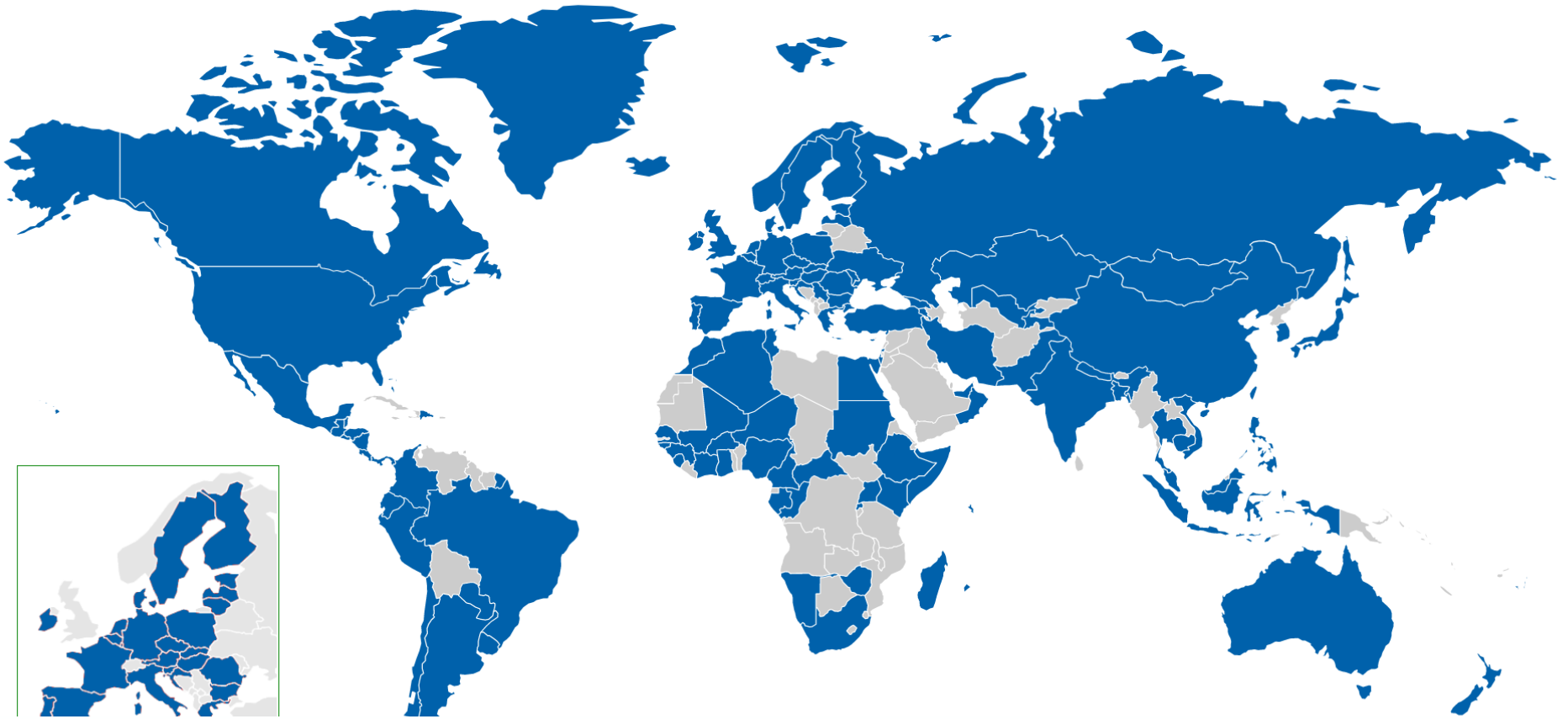
Group on Earth Observations

GEO Member Map for the year 2022

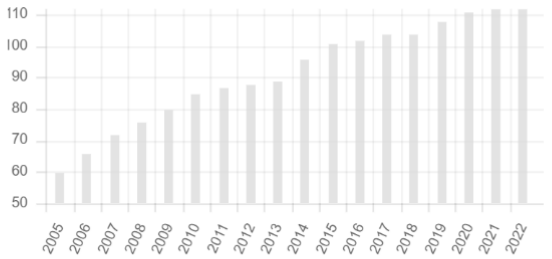
(Use slider under the map to change the year)



Number of Members (2022)

Africa:	30
Americas:	20
Asia/Oceania:	22
C.I.S.:	6
Europe:	35
Total:	113

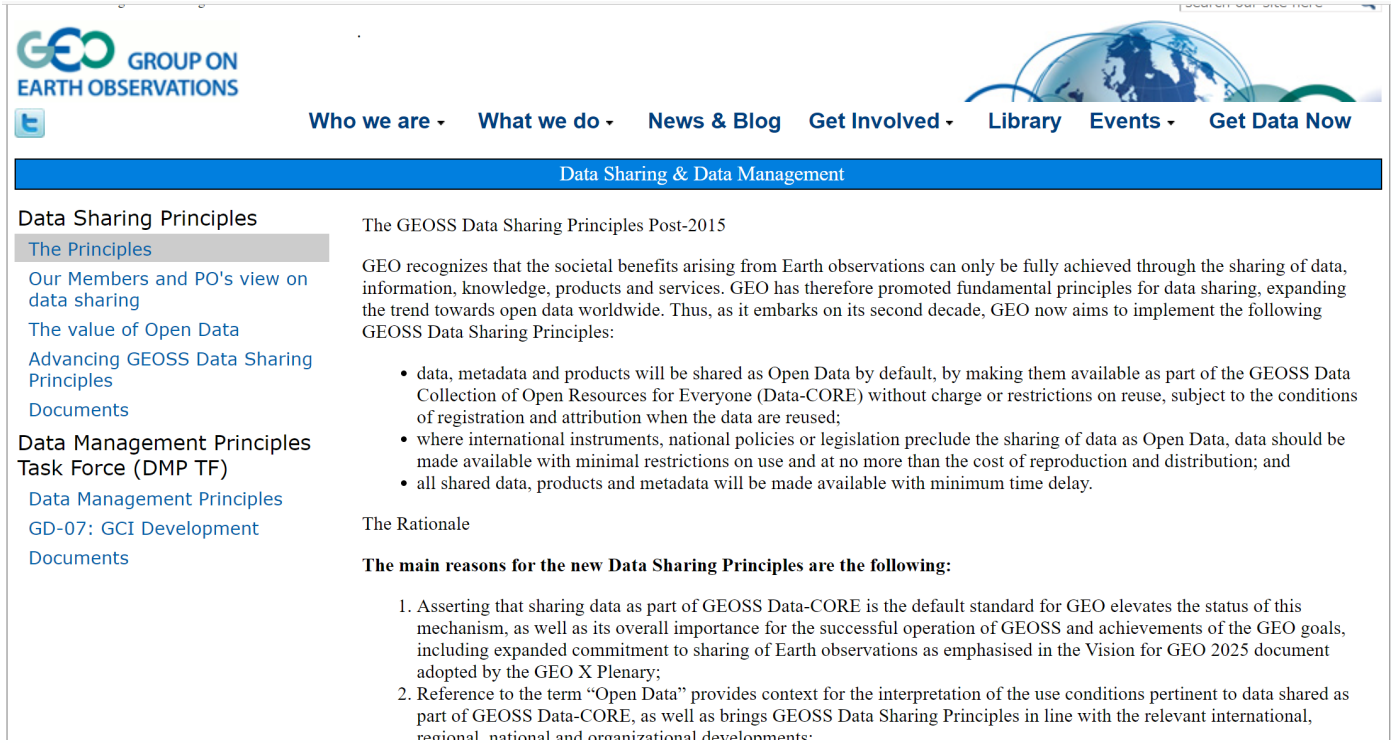
Number of Members by year



GEO is a partnership of more than 100 national governments and in excess of 100 Participating Organizations that envisions a future where decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations.

Some History

GEO Data Sharing Principles (post 2015)



GEO GROUP ON EARTH OBSERVATIONS

Who we are | What we do | News & Blog | Get Involved | Library | Events | Get Data Now

Data Sharing & Data Management

Data Sharing Principles
- The Principles
- Our Members and PO's view on data sharing
- The value of Open Data
- Advancing GEOSS Data Sharing Principles
- Documents

Data Management Principles Task Force (DMP TF)
- Data Management Principles
- GD-07: GCI Development
- Documents

The GEOSS Data Sharing Principles Post-2015

GEO recognizes that the societal benefits arising from Earth observations can only be fully achieved through the sharing of data, information, knowledge, products and services. GEO has therefore promoted fundamental principles for data sharing, expanding the trend towards open data worldwide. Thus, as it embarks on its second decade, GEO now aims to implement the following GEOSS Data Sharing Principles:

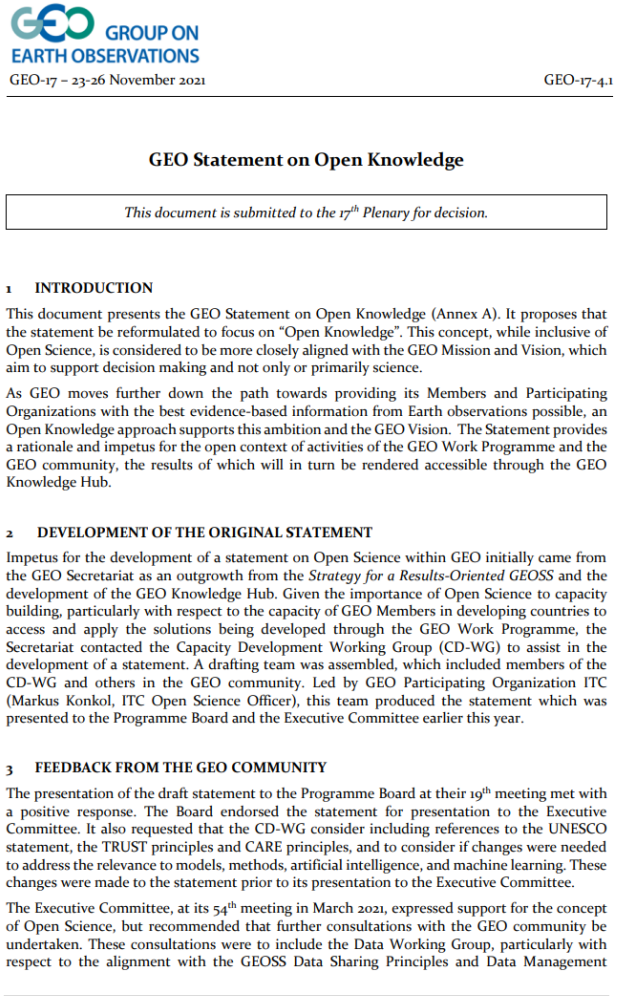
- data, metadata and products will be shared as Open Data by default, by making them available as part of the GEOSS Data Collection of Open Resources for Everyone (Data-CORE) without charge or restrictions on reuse, subject to the conditions of registration and attribution when the data are reused;
- where international instruments, national policies or legislation preclude the sharing of data as Open Data, data should be made available with minimal restrictions on use and at no more than the cost of reproduction and distribution; and
- all shared data, products and metadata will be made available with minimum time delay.

The Rationale

The main reasons for the new Data Sharing Principles are the following:

1. Asserting that sharing data as part of GEOSS Data-CORE is the default standard for GEO elevates the status of this mechanism, as well as its overall importance for the successful operation of GEOSS and achievements of the GEO goals, including expanded commitment to sharing of Earth observations as emphasised in the Vision for GEO 2025 document adopted by the GEO X Plenary;
2. Reference to the term "Open Data" provides context for the interpretation of the use conditions pertinent to data shared as part of GEOSS Data-CORE, as well as brings GEOSS Data Sharing Principles in line with the relevant international, regional, national and organizational developments;

Open Knowledge Statement (GEO week 2021)



GEO GROUP ON EARTH OBSERVATIONS

GEO-17 – 23-26 November 2021 GEO-17-4.1

GEO Statement on Open Knowledge

This document is submitted to the 17th Plenary for decision.

1 INTRODUCTION

This document presents the GEO Statement on Open Knowledge (Annex A). It proposes that the statement be reformulated to focus on "Open Knowledge". This concept, while inclusive of Open Science, is considered to be more closely aligned with the GEO Mission and Vision, which aim to support decision making and not only or primarily science.

As GEO moves further down the path towards providing its Members and Participating Organizations with the best evidence-based information from Earth observations possible, an Open Knowledge approach supports this ambition and the GEO Vision. The Statement provides a rationale and impetus for the open context of activities of the GEO Work Programme and the GEO community, the results of which will in turn be rendered accessible through the GEO Knowledge Hub.

2 DEVELOPMENT OF THE ORIGINAL STATEMENT

Impetus for the development of a statement on Open Science within GEO initially came from the GEO Secretariat as an outgrowth from the *Strategy for a Results-Oriented GEOSS* and the development of the GEO Knowledge Hub. Given the importance of Open Science to capacity building, particularly with respect to the capacity of GEO Members in developing countries to access and apply the solutions being developed through the GEO Work Programme, the Secretariat contacted the Capacity Development Working Group (CD-WG) to assist in the development of a statement. A drafting team was assembled, which included members of the CD-WG and others in the GEO community. Led by GEO Participating Organization ITC (Markus Konkol, ITC Open Science Officer), this team produced the statement which was presented to the Programme Board and the Executive Committee earlier this year.

3 FEEDBACK FROM THE GEO COMMUNITY

The presentation of the draft statement to the Programme Board at their 19th meeting met with a positive response. The Board endorsed the statement for presentation to the Executive Committee. It also requested that the CD-WG consider including references to the UNESCO statement, the TRUST principles and CARE principles, and to consider if changes were needed to address the relevance to models, methods, artificial intelligence, and machine learning. These changes were made to the statement prior to its presentation to the Executive Committee.

The Executive Committee, at its 54th meeting in March 2021, expressed support for the concept of Open Science, but recommended that further consultations with the GEO community be undertaken. These consultations were to include the Data Working Group, particularly with respect to the alignment with the GEOSS Data Sharing Principles and Data Management

GEO is moving from Open Data to Open Knowledge!

The mind shift to open knowledge

- Open Access
- Open Data
- Open Software
- Open Infrastructure
- Open Education

…why open knowledge?

.....Our Only Planet

Where is the knowledge?

How to accelerate impact?

How to empower countries to prevent, face and respond to major environmental and societal challenges?

2020-2022 GEO Work Programme

GEO Flagships

GEO Biodiversity Observation Network GEO BON	GEO Global Agricultural Monitoring GEOGLAM	Global Forest Observation Initiative GFOI	Global Observation System for Mercury GOS4M

GEO Initiatives

AquaWatch AQUAWATCH	Data Access for Risk Management GEO-DARMA	Data Integration and Analysis System DIAS	Digital Earth Africa DE-AFRICA	Earth Observations for Ecosystem Accounting EO4EA	Earth Observations for Health EO4HEALTH
Earth Observations for the Sustainable Development Goals EO4SDG	GEO Capacity Building in North Africa, Middle East, Balkans and Black Sea Region GEO-CRADLE	GEO Global Water Sustainability GEOGLOWS	GEO Human Planet HUMAN-PLANET	GEO Land Degradation Neutrality GEO-LDN	GEO Vision for Energy GEO-VENER
GEO Wetlands GEO-WETLANDS	Geohazard Supersites and Natural Laboratories GSNL	Global Drought Information System GDIS	Global Network for Observations and Information in Mountain Environments GEO-MOUNTAINS	Global Observation System for Persistent Organic Pollutants GOS4POPS	Global Urban Observation and Information GUOI
Global Wildfire Information System GWIS	Oceans and Society: Blue Planet BLUE-PLANET				

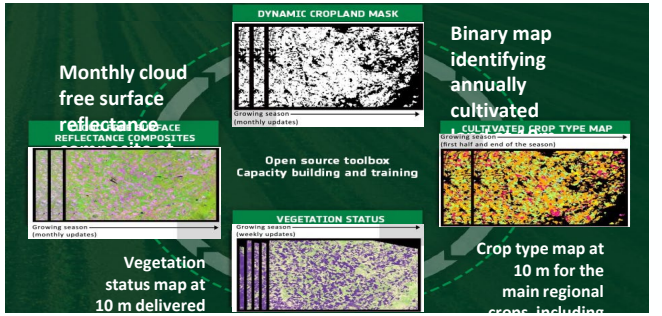
GEO Community Activities

Advancing Communication Infrastructure and Services ACIS	Arctic GEOSS ARCTIC-GEOSS	Chinese High-resolution Satellite Data Resources CSDR	Climate Observation, Simulation and Impacts CLIMATE-OBS	Copernicus Atmosphere Monitoring Service CAMS	Copernicus Climate Change Service C3S
Digital Earth Pacific DE-PACIFIC	Earth Observation and Copernicus in support of Sendai Monitoring EO4SENDAI-MONITORING	Earth Observation Industrial Innovation Platform for Sustainable Development EO-IIP	Earth Observations for Disaster Risk Management EO4DRM	Earth Observations for Managing Mineral and Non-Renewable Energy Resources EO4MIN	Earth Observations for the Atlantic Region ATLANTIC-EO
Earth Observations for the Water-Energy-Food Nexus EO4WEF	Enhancing Food Security in African Agricultural Systems with the Support of Remote Sensing AFRICULTURES	Forest Biomass Reference System from Tree-by-Tree Inventory Data GEO-TREES	GEO Citizen Science GEO-CITSCI	GEO Essential Variables GEO-EV	GEO Global Ecosystems GEO-ECO

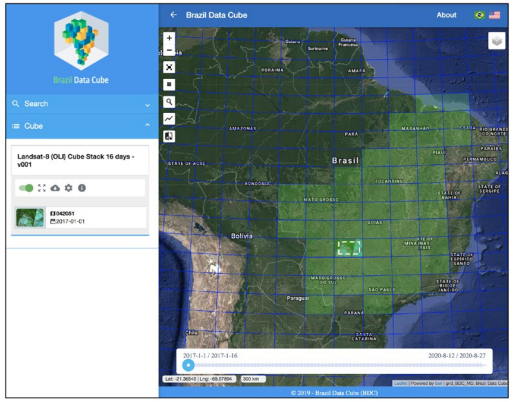
some examples:

Global Observation System for Mercury

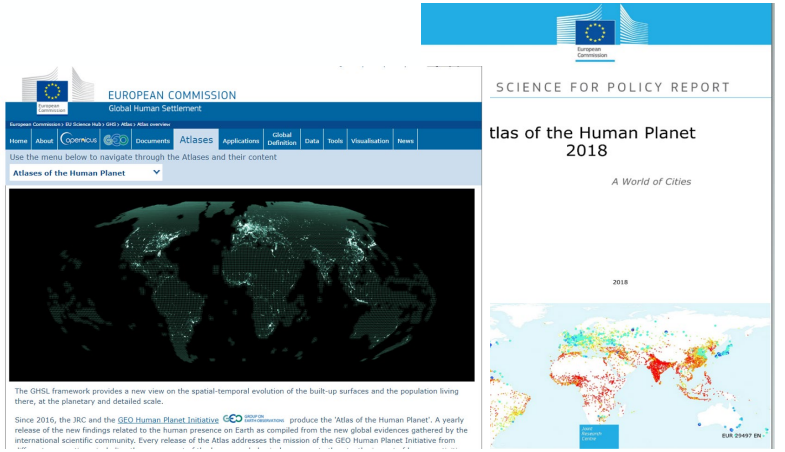
GEOGLAM/ Sen2Agri



Land Use Land Cover Classification/ Brazilian Data Cube



GEO - Human Planet Initiative



Global Wildfires Information Systems

Knowledge Resources

Publications

remote sensing MDPI

Article

Production of a Dynamic Cropland Mask by Processing Remote Sensing Image Series at High Temporal and Spatial Resolutions

Silvia Valero [1,*], David Morin [1], Jordi Inglada [1], Guadalupe Sepulcre [2], Marcela Arias [1], Olivier Hagolle [1], Gérard Dedieu [1], Sophie Bontemps [2], Pierre Defourny [2] and Benjamin Koetz [3]

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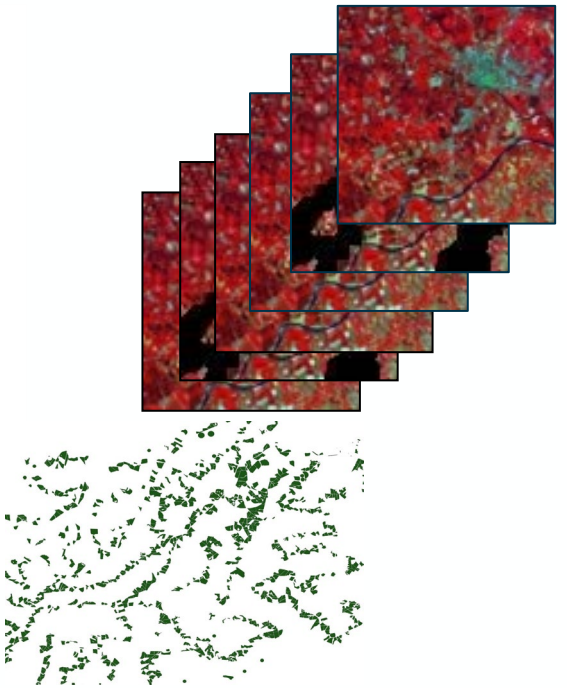
Abstract: The exploitation of new high revisit frequency satellite observations is an important opportunity for agricultural applications. The Sentinel-2 for Agriculture project S2Agri (http://www.esa-sen2agri.org/SitePages/Home.aspx) is designed to develop, demonstrate and facilitate the Sentinel-2 time series contribution to the satellite EO component of agriculture monitoring for many agricultural systems across the globe. In the framework of this project, this article studies the construction of a dynamic cropland mask. This mask consists of a binary "annual-cropland/no-annual-cropland" map produced several times during the season to serve as a mask for monitoring crop growing conditions over the growing season. The construction of the mask relies on two classical pattern recognition techniques: feature extraction and classification. One pixel- and two object-based strategies are proposed and compared. A set of 12 test sites are used to benchmark the methods and algorithms with regard to the diversity of the agro-ecological context, landscape patterns, agricultural practices and actual satellite observation conditions. The classification results yield promising accuracies of around 90% at the end of the agricultural season. Efforts will be made to transition this research into operational products once Sentinel-2 data become available.

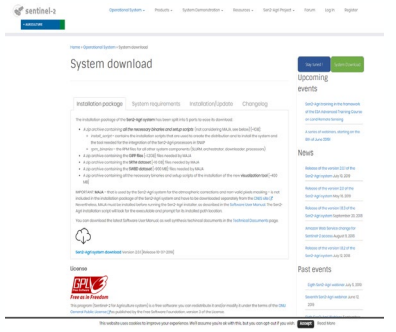
Keywords: cropland mapping; satellite image time series; Sentinel-2; dynamic classification; Random Forests

1. Introduction

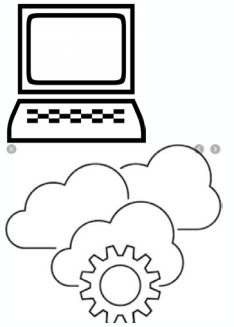
RS / In Situ Data



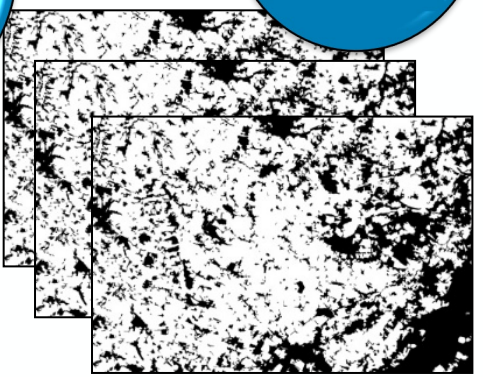
Open Source Software



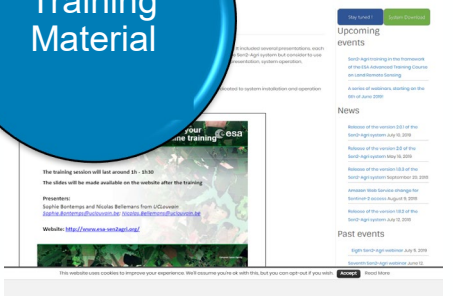
Sandbox/ Computing environment



Output



Training Material

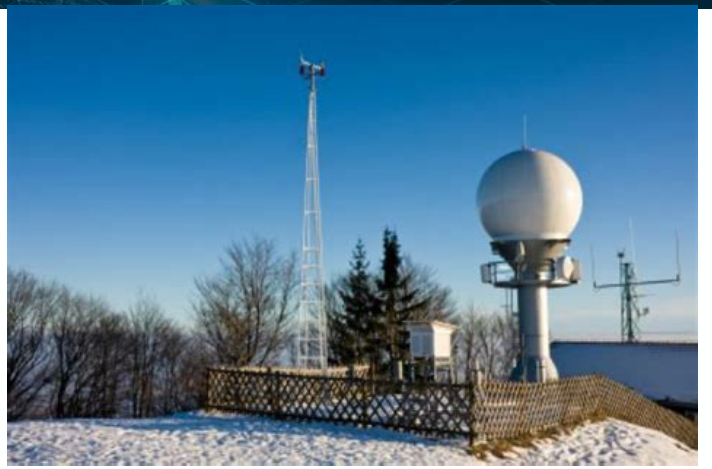


Users Stories

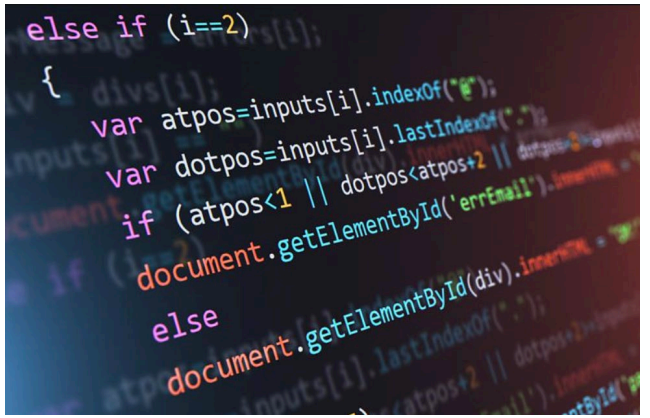
Type	Format archived in GKH	Purpose
Text documents	HTML, PDF, and DOC files	Describe methods and results (non-peer reviewed)
Scientific papers	PDF	Describe methods and results (peer reviewed)
Software (self-contained)	Jupyter notebooks, R/python scripts and markdown files	Executable and documented scripts to services that don't require API (e.g, AWS)
Software (API-dependent)	Jupyter notebooks, R/python/Google scripts and markdown files	Executable and documented scripts to services that require API (e.g, Google Earth Engine, Open Data Cube)
Software (Sandbox)		
Links to software packages	Github links (with metadata and DOI)	Link to executable and documented scripts/algorithms
In situ data	CSV, XLSX, TXT, SHP, NetCDF (and other relevant types)	Description of ground samples
Links to in situ data	Metadata with DOI	Links to in situ data deposited in repositories (e.g., PANGEA)
Links to satellite data	STAC (Spatial Temporal Asset Catalog) files and CEOS opensearch XML scripts.	Provides general description of sets of images stored in cloud services
Links to any other relevant data and/or products	Metadata and other relevant formats	Links to data used in the application which is not strictly from satellites or ground measurements.
Videos	MP4, AVI, MKV	Describe methods, results, capacity development, talks
Training Material	Videos, PDF,	Documents, videos that provides instructions

Why Earth observation applications are irreproducible

Insufficient documentation



Unavailable data

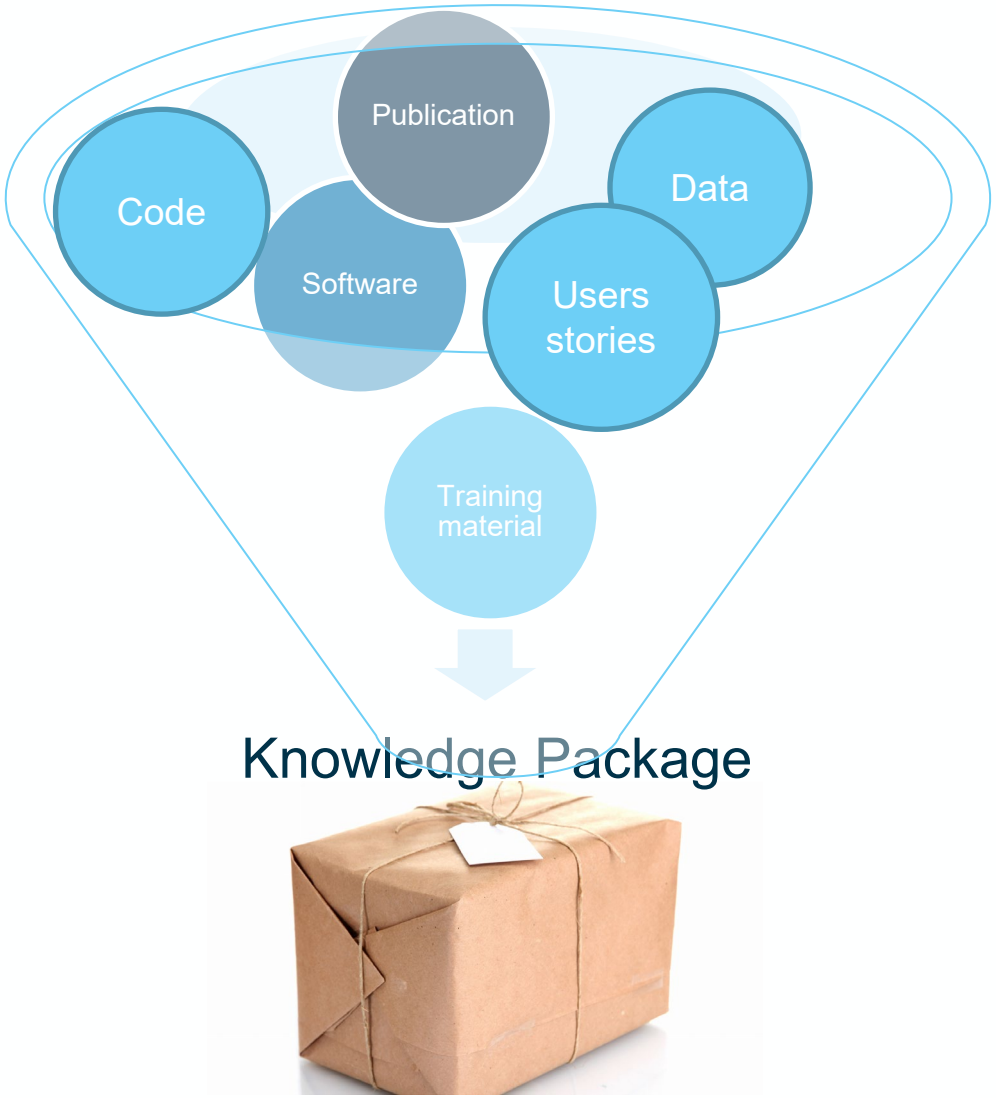


Software used unavailable

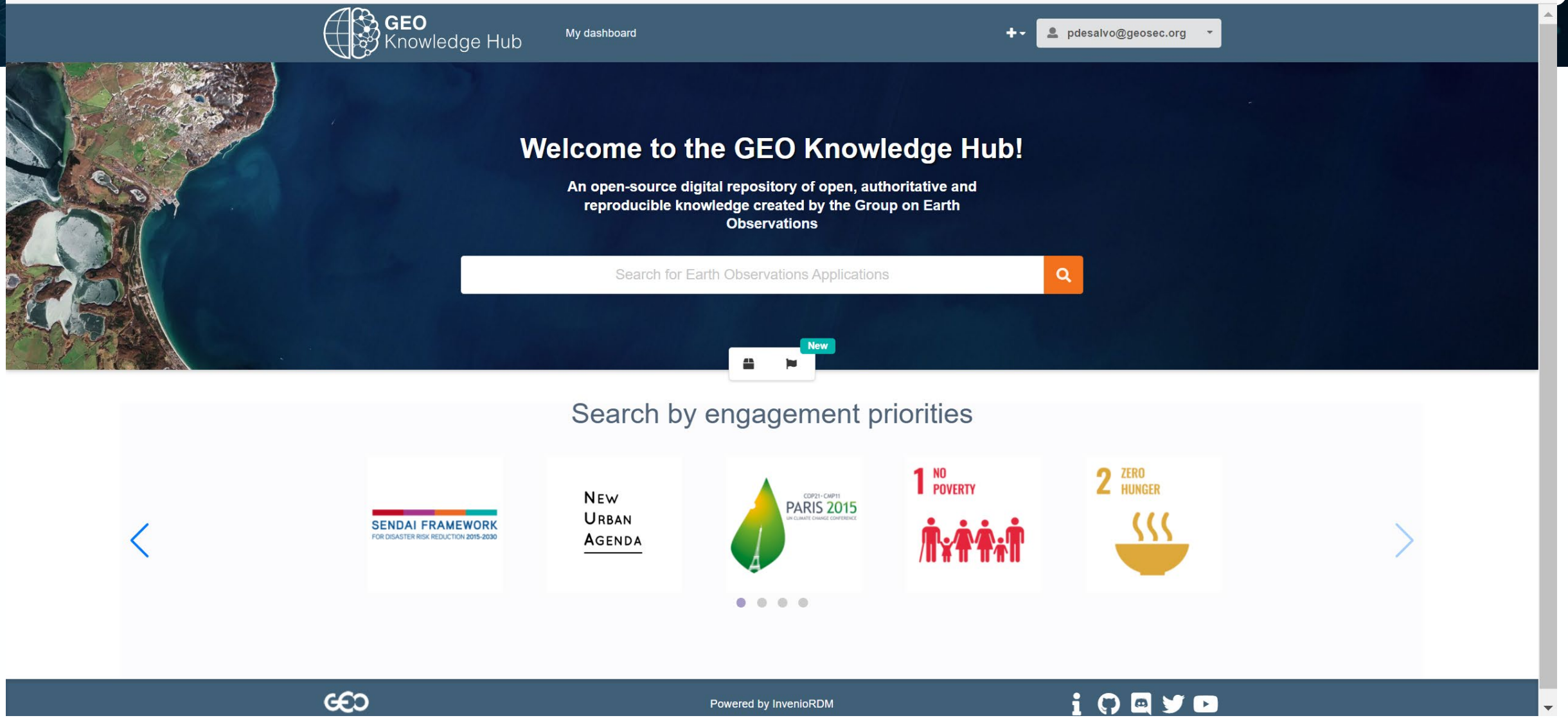
Which version to use?

Scattered platforms

GEO Knowledge Package unique concept



Welcome to the GEO Knowledge Hub



https: //gkhub.earthobservations.org

GEO Knowledge Hub Users Outreach & Uptake

GKH

Youth COP &
Universities

National Institutions

International Org.
Humanitarian/NGOs

Thank You

https: //gkhub.earthobservations.org