

# **GEOSS Common Infrastructure (GCI) GEO Foundational Tasks (GD 02)**

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3.6

**Task Team on Evolution of WIS**

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# GEO Strategic Plan

## Why the Geos Common Infrastructure (GCI)

GEO is a coalition of governments and participating organizations having as its mission the implementation of the **Global Earth Observation System of Systems (GEOSS)** to meet the need for **timely, quality long term global information** as a basis for sound decision-making.

Earth observations from **diverse sources, including satellite, airborne, in-situ platforms, and citizen observatories**, when **integrated together**, provide powerful tools for understanding the **past and present conditions** of Earth systems, as well as the interplay between them.

(GEO Strategic Plan 2016-2025)



# Societal Benefit Areas



# **GEO promotes Broad Open Data Policy**



# Implementing **GEOSS** through the GCI

## International Data Providers\*

### Environment



### Disasters



### Food & Security



### Satellites



### Biodiversity



### Energy



### Health



### Urban



## Regional and National Providers\*

### Chile



### China



### France



### Germany



### India



### Italy



### Japan



### New Zealand



### Norway



### Russia



### South Africa



### Spain



### Switzerland



### United Kingdom



### USA



## Private Sector Providers



## GEO Website



earthobservations.org

## GEOSS Portal



geoportal.org

## GEOSS Status Checker

FGDC.GOV  
FEDERAL GEOGRAPHIC DATA COMMITTEE



## GEOSS Yellow Pages



UNIVERSITÉ  
DE GENÈVE

## GEO DAB

Discovery and Access Broker (DAB)





## WIS 2.0 WMO Strategy requirements vs GEOSS Common Infrastructure(GCI)

GCI	
Content from multiple type of EO resources responding to SBAs	✓
Machine interoperable (APIs)	✓
Use and handling most common open data formats (see full slide)	✓
Public/ Private sources	✓
Pull method	✓
User are exposed to familiar interface: GEOSS Portal	✓
Collaborative development with a virtual team	✓
Use of APIs	✓
Usage of Cloud infrastructure (GEO DAB)	✓

# GCI Operations Foundational Task

## Content

- Continuous engagement with EO Data Providers

## Infrastructure functionalites

- Enhanced GEOSS Portal
  - GEOSS Yellow Pages
  - GEOSS Portal Widgets
  - GEOSS Portal Mirrors
- GEO DAB APIs  
GEO DAB VIEWS  
GEOSS Status Checker

## Engaging with Communities

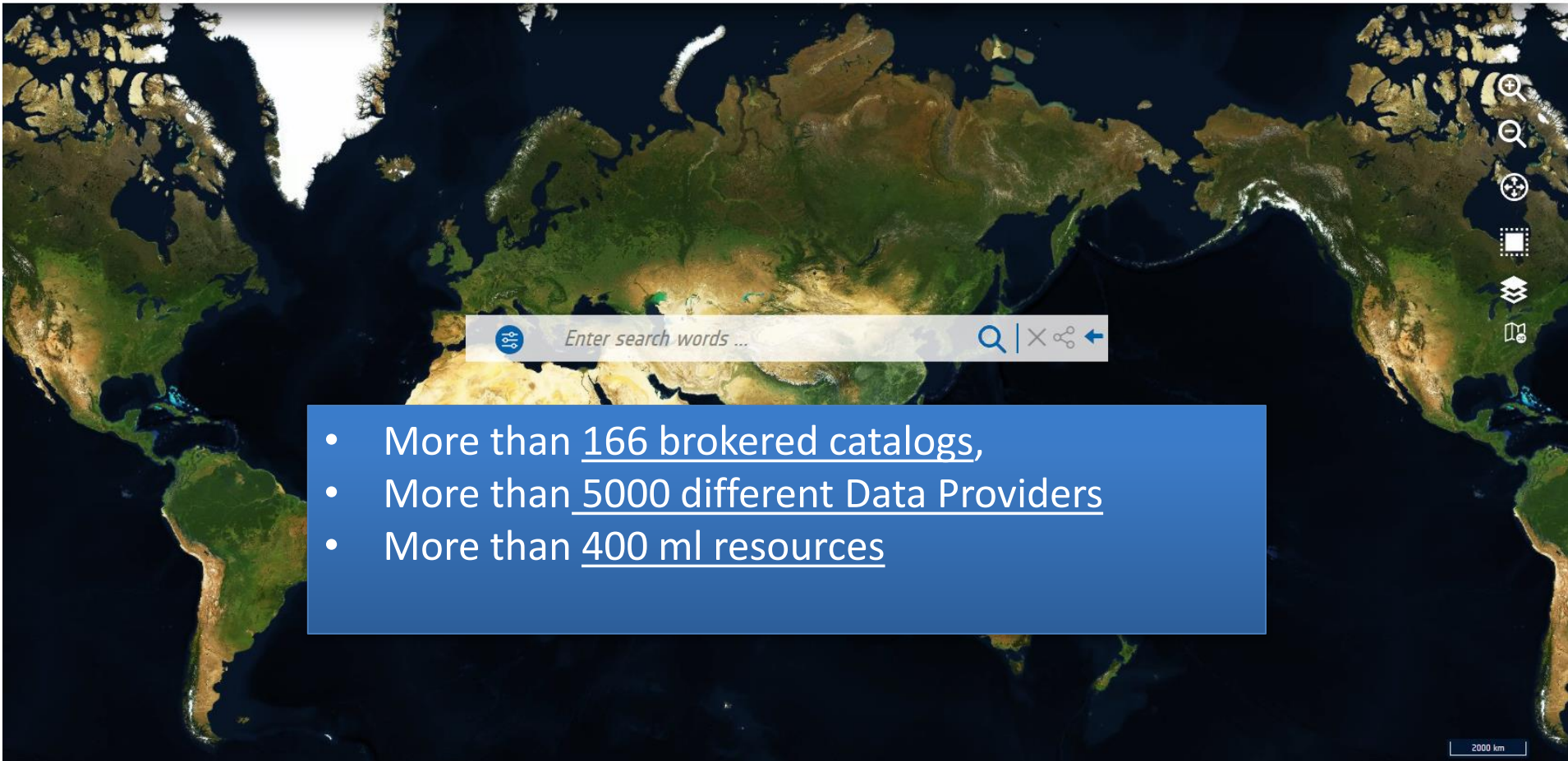
- Data Providers Workshops 2017- 2018
- Engagement & Involvement with GEO SBAs, GEO Flagships & Initiatives
- Engagement with Other Communities: ICRC; UNHCR

## Usage & Impact

- Demonstrating Impact
- Usage and Applications

Content

## Some numbers on GEOSS Assets

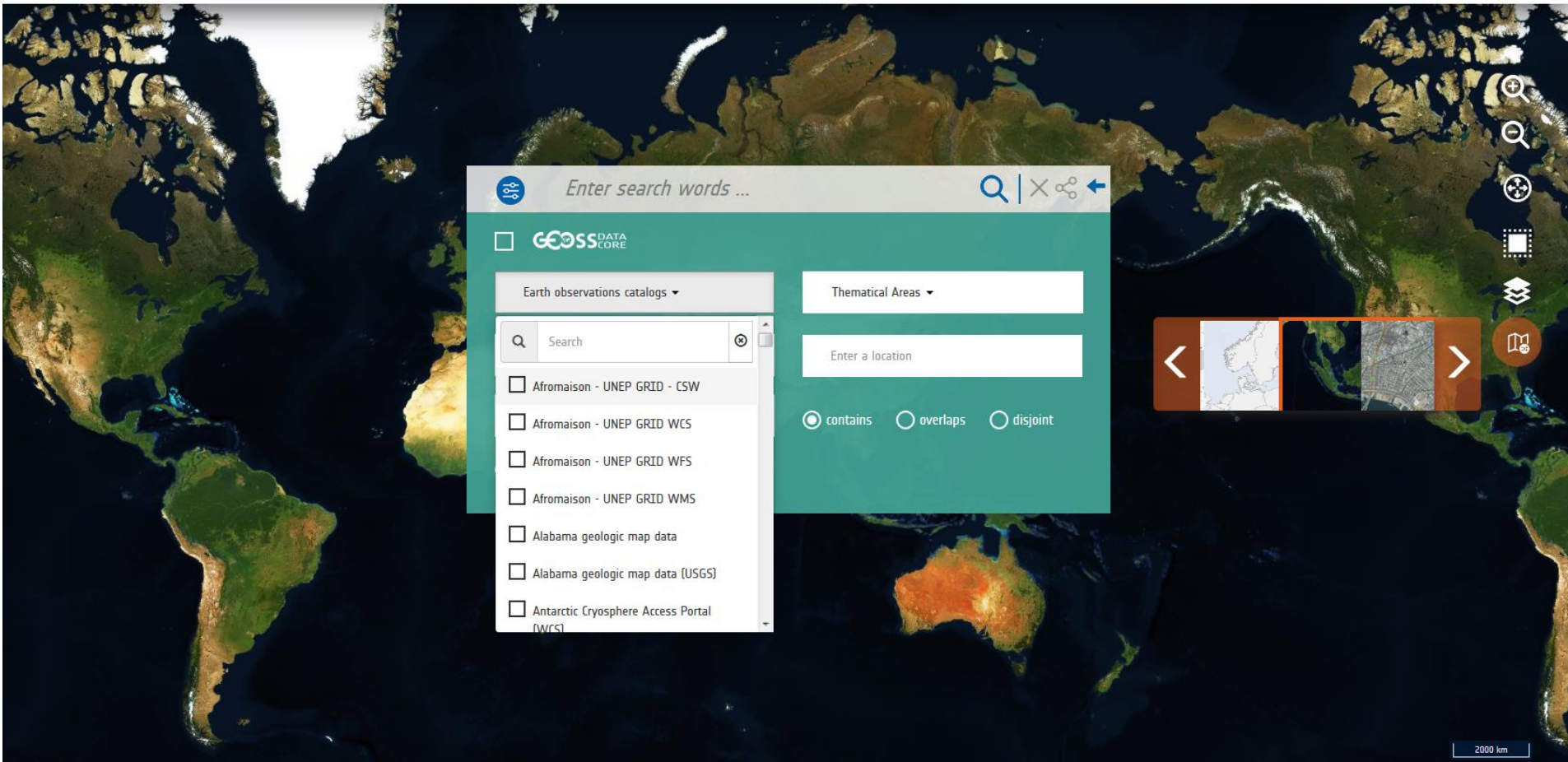


- More than 166 brokered catalogs,
- More than 5000 different Data Providers
- More than 400 ml resources



Infrastructure  
functionalites

# The Enhanced GEOSS Portal



OGC CSW 2.0.2 AP ISO 1.0	INPE
OGC CSW 2.0.2 ebRIM EO	<b>CKAN</b>
OGC CSW 2.0.2 ebRIM CIM	DCAT
ESRI GEOPORTAL 10	GI-cat
OAI-PMH 2.0	ESRI GEOPORTAL 10
OpenSearch 1.1	NCML-OD
OpenSearch 1.1 ESIP	BCODMO
OpenSearch GENESI DR	NCML-CF
CKAN	NetCDF-CF 1.4
CUAHSI HIS-Central	FTP populated with supported metadata types
ESRI REST API 10.3	WAF Web Accessible Folders
OGC WCS	GeoNetwork (2.2.0 or greater)
OGC WMS	Ecological Markup Language 2.1.1
OGC WFS 1.0.0, 1.1.0, 2.0.0	NERRS (National Estuarine Research Reserve System)
OGC WMTS	HMA CSW 2.0.2 ebRIM/CIM
OGC SOS 1.0.0, 2.0.0, 2.0.0 Hydro Profile	HDF
OGC WPS 1.0.0	IADC DB (MySQL)
OGC CSW 2.0.0 Core	GrADS-DS
OGC CSW 2.0.2 AP ISO 1.0	FedEO
OGC CSW 2.0.2 ebRIM/EO AP	ARPA DB (based on Microsoft SQL)
OGC CSW 2.0.2 ebRIM/CIM AP	ESRI Map Server
IRIS Station	SHAPE files (FTP)
IRIS Event	KISTERS Web - Environment of Canada
HYRAX THREDDS SERVER 1.9	Environment Canada Hydrometric data (FTP)
<b>OAI-PMH 2.0 - Harvesting</b>	OpenSearch 1.1
GBIF	Earth Engine
DIF	RASAQM
HYDRO	EGASKRO
UNAVCO	SITAD (Sistema Informativo Territoriale Ambientale Diffuso)
CDI 1.04, 1.3, 1.4	File System
ISO19115-2	GDACS
THREDDS 1.0.1, 1.0.2	GeoRSS 2.0
THREDDS-NCISO 1.0.1, 1.0.2	Degree catalog service 2.2
	OpenSearch GENESI DR
THREDDS-NCISO-PLUS 1.0.1, 1.0.2	Healthsites API Json

# **GCI Principles as to interoperability standards:**

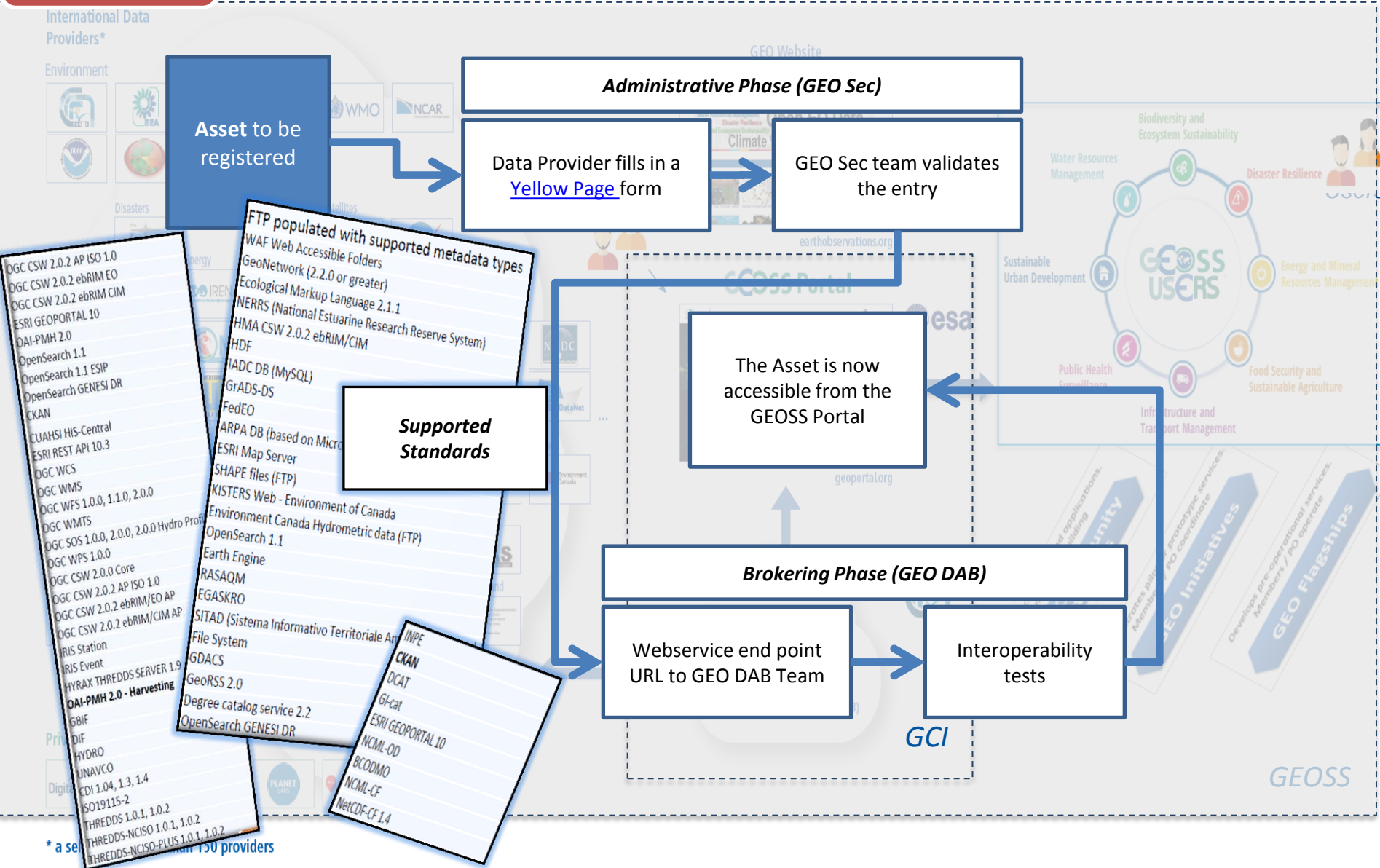
- 1) Advocate the use of and support the implementation of international and community standards;
- (2) Do not impose any existing standard, leaving the multiple GEO Communities of Practice to select and implement the ones they consider most effectively
- (3) Support the many standards characterizing the multi-domains covered by GEOSS through the implementation of the mediation/brokering pattern
- (4) Maintain and evolve the mediation/brokering capabilities of the GEOSS platform in order to implement the ultimate interoperability standards (the IT landscape changes rapidly) but continuing to support the existing legacy standards



# The GCI Operations Virtual team



# The Simplified Registration Workflow: GEOSS Yellow Pages





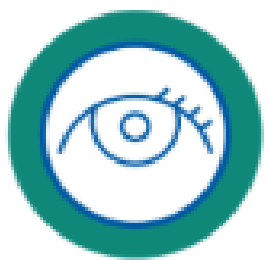
Infrastructure  
Functionalities

# GCI towards the GEOSS Platform

*GEOSS API*



*GEOSS View*



*GEOSS Widget*



*GEOSS Mirror*



*GEOSS Like*



Reuse of some GEOSS key functionalities like discovery, access, GEOSS Like  
To easily connect to GEOSS from other Portals

- Reuse of the GEOSS Portal tailored to resources and themes of your Community
- Speed up access and collaboration of the Community

A unique User Feedback System across different Providers to:

- Rate
- Commenting
- Share

Reuse

Customise

Collaborate



## **Reuse GEOSS Platform: *Look & Feel* and *Functionality* ...**

... is available for reuse by other portals to

- *Align with GEOSS Look & Feel for a ‘one portal’ experience.*
- *Combine GEOSS **mapping** functionality, **search** and **results** display functionality and integrate this together with their own functionality.*

## 1. Mirroring and customising the GEOSS Portal site for SBAs, Flagships, Initiatives, Communities

It is available at [www.geoportal.org/community/GEO\\_X\\_Initiative](http://www.geoportal.org/community/GEO_X_Initiative)

The customisation will better serve the specific community interests by filtering:

- Catalogues and search results by a specific theme or **GEO DAB view** (e.g., cold regions, mountains, etc.)
- Location of interests
- Services/Processing/Tools (in the future ...)

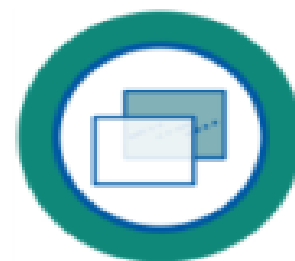
(click [here](#) for short clip demoing the concept)

## 2. GEOSS widgets

A freely-available instantiation of selected GEOSS Portal widgets is available for possible customization in various areas of application (e.g. a specific SBA, Initiatives, etc.).

- This will be accomplished by publishing portal code parts (widgets) wrapped up in API
- Kernel at server side (continue maintenance, enhancements, etc., like a library)

*GEOSS Mirror*



*GEOSS Widget*



## GEOSS View

- Subset of the whole GEOSS resources defined by applying a set of clauses
  - *Discovery clauses* (e.g. spatial envelope, keywords, sources, etc.)
  - *Access clauses* (e.g. data format, access protocol, CRS, etc.)
- Defined “View” exposed to the GEOSS Portal



**Consumer-defined View** – i.e. Client-side These views are available only for the client application which defined the view.

**Provider-defined View** – i.e. Server-side These views are available for all client applications.

**GEOSS Portal**



**GEO DAB**

Infrastructure  
Functionalities

EAM

GEOSS  
end-Users

Different APIs for serving diverse Application development users

GEOSS Application  
Developers  
(intermediate Users)

GEOSS Applications

GEOSS Portal

GEO

	Geospatial Expert	Web Dev. Expert
Standard Web Services (OGC Web Services, OAI- PMH, CKAN, etc.)	X	
OpenSearch (Extended)	X	
GEO DAB API JS		X
GEO DAB API REST		X



# Involvement with GEO Flagships – Initiatives 2017-forward

## Flagships

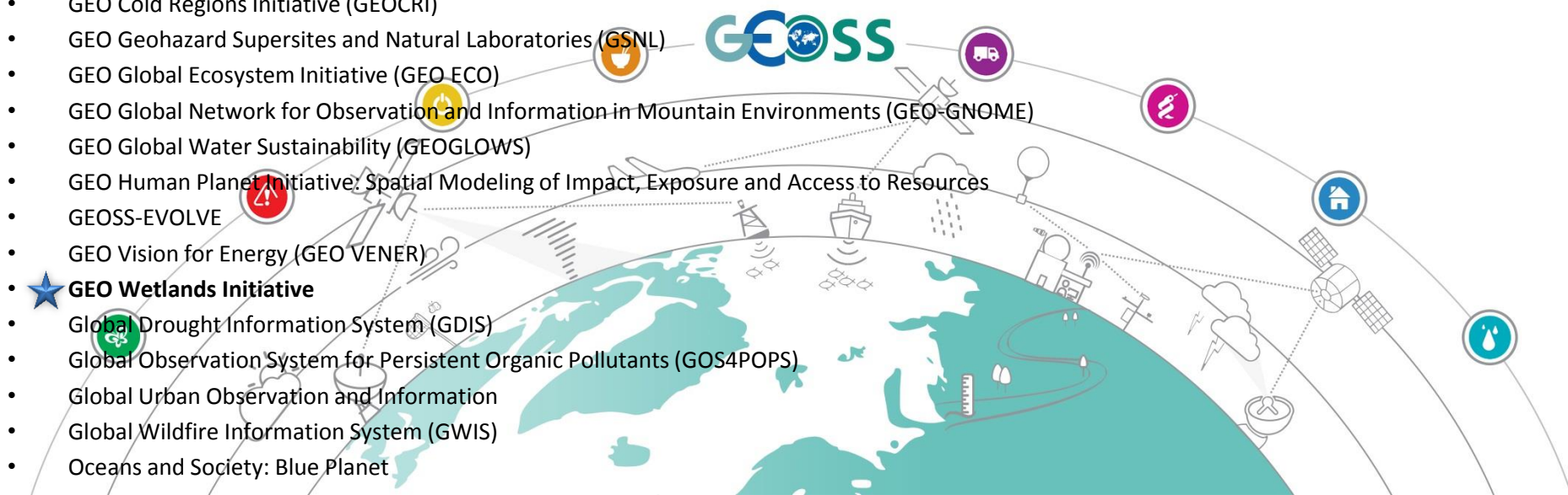
- GEO Biodiversity Observation Network (GEO BON)
- GEO Global Agricultural Monitoring (GEOGLAM)
- Global Forest Observation Initiative (GFOI)
- ★ **Global Observation System for Mercury (GOS4M)**

★ In 2018 All Flagships and Initiatives will be asked to nominate a GCI Focal Point

## Initiatives

- AfriGEOSS: Reinforcing Regional African
- ★ **AquaWatch**
- Asia-Oceania GEOSS (AOGEOSS)
- Climate Change Impact Observation on Africa's Coastal Zones (GEO-CCIOACZ)
- Data Access for Risk Management (GEO-DARMA)
- Earth Observations for Ecosystem Accounting (EO4EA)
- ★ **Earth Observations in the Service of the 2030 Agenda for Sustainable Development (EO4SDGs)**
- EuroGEOSS
- GEO Carbon and GHG Initiative
- GEO Cold Regions Initiative (GEOCRI)
- GEO Geohazard Supersites and Natural Laboratories (GSNL)
- GEO Global Ecosystem Initiative (GEO ECO)
- GEO Global Network for Observation and Information in Mountain Environments (GEO-GNOME)
- GEO Global Water Sustainability (GEOGLOWS)
- GEO Human Planet Initiative: Spatial Modeling of Impact, Exposure and Access to Resources
- GEOSS-EVOLVE
- GEO Vision for Energy (GEO VENER)
- ★ **GEO Wetlands Initiative**
- Global Drought Information System (GDIS)
- Global Observation System for Persistent Organic Pollutants (GOS4POPS)
- Global Urban Observation and Information
- Global Wildfire Information System (GWIS)
- Oceans and Society: Blue Planet

★ Ongoing discussion on leveraging GCI components: Resources and Tools



Engaging with Communities

# GEO Data Providers Workshop Strengthening the Community

## Engagement @ 2<sup>nd</sup> Data Providers Workshop Florence 2017

132 people registered from 93 different organizations and 95 people actually attended with approximately 40 organizations that were new to GEOSS.



The participants represented the following types of organizations and institutions:

- Not for profit research and innovation companies;
- National and International research institutes;
- National Research Council;
- Humanitarian and Environmental NGOs;
- United Nations and World Bank;
- Governmental and Intergovernmental Agencies;
- National Geographic and Research Institutes;
- National Space and Specialized Agencies;
- Private sector such as Amazon Web Services, CloudSigma, DEIMOS Engenharia, Deimos Imaging, Deltares; Development seed, EARS, Esri, ETT, Google, VITO

## Planning @ 3<sup>rd</sup> Data Providers Workshop 20-23rd March 2018, ESA, Esrin, Frascati

### “The GEOSS Platform (r)evolution “ Data Providers meet Users

### 3rd GEOSS Data Providers workshop 20-23 rd March 2018 at ESA, Frascati; Italy



## Usage & Impact

# Demonstrating Impact

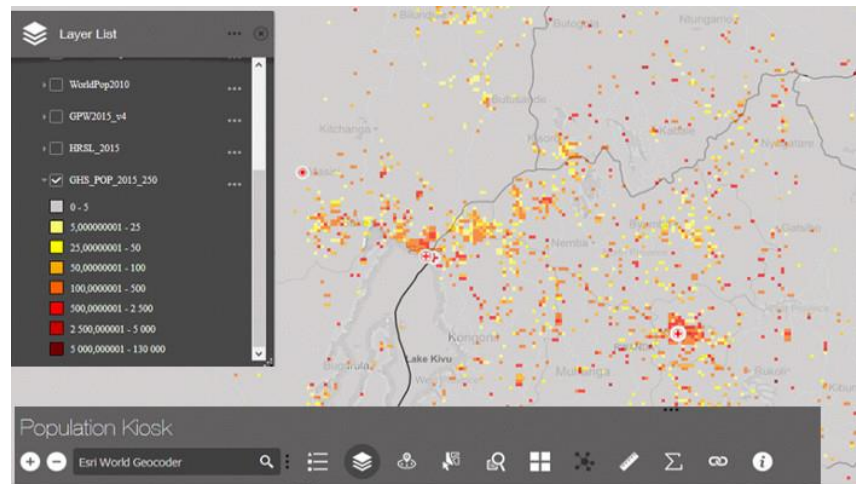
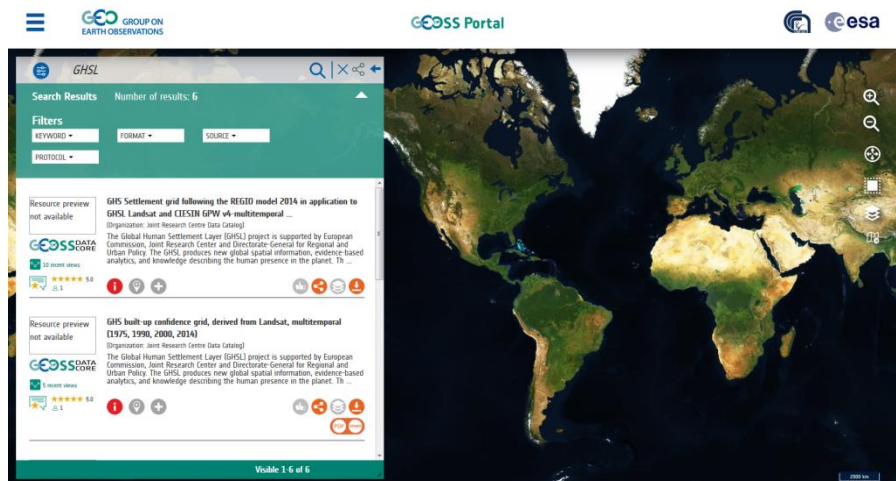
## Connecting Providers and Users of Earth Observations through the GCI

An example of how **GEO** make an impact by connecting innovative Earth observations solutions with those who need them can be seen with the **Global Human Settlement Layer (GHSL)**, which was developed by the European Commission's Joint Research Centre with the support of many partners. Key products emerging from this work include the two editions of the **"Atlas of the Human Planet"** and further applications are being explored within the GEO Human Planet Initiative.

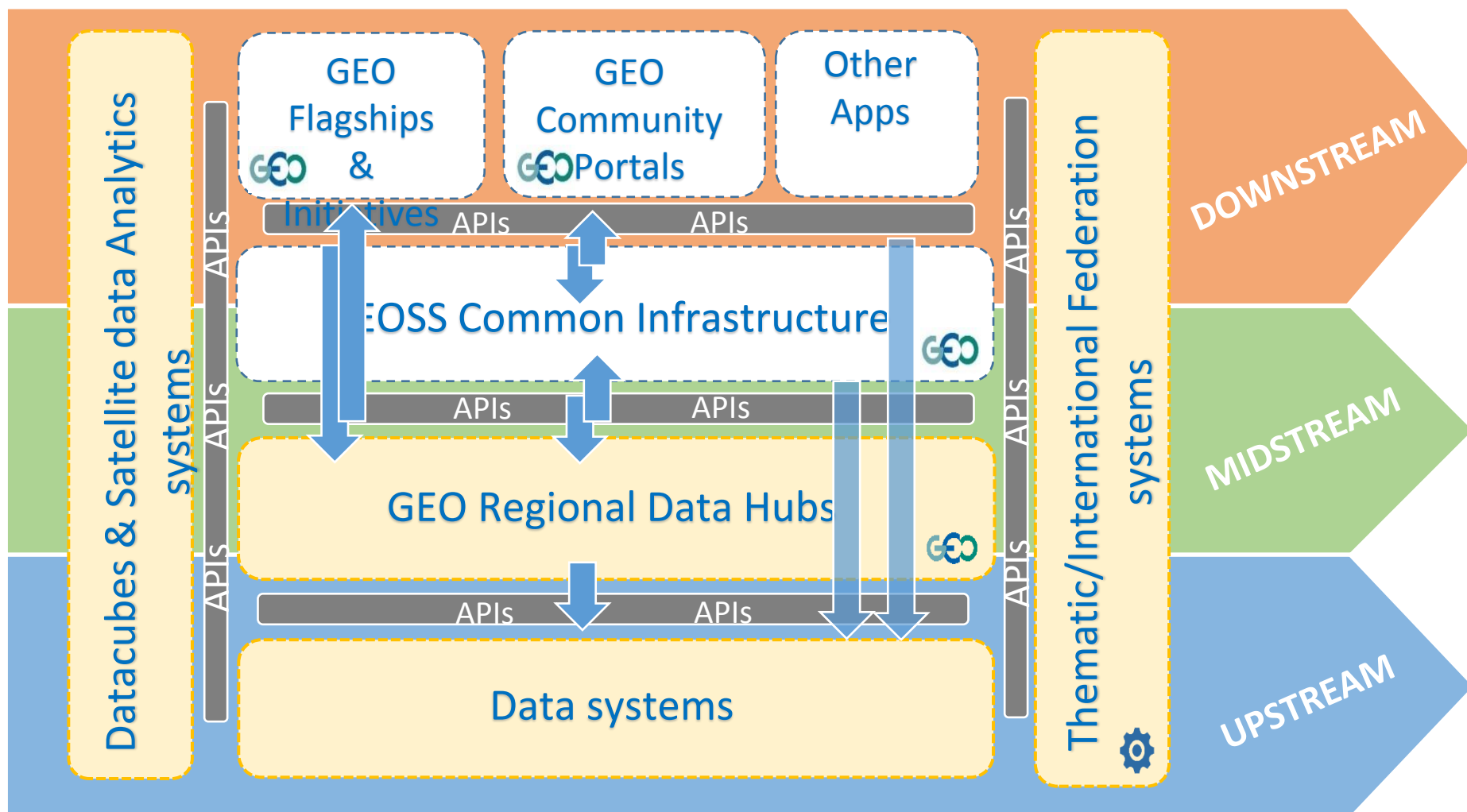
**At the end of 2016, the GHSL dataset was brokered by the GEOSS Common Infrastructure (GCI), making it widely discoverable and accessible through the GEOSS Portal.** Thanks to this work, **GEO enabled ICRC to access free and open global population data and use it in their field operations.**

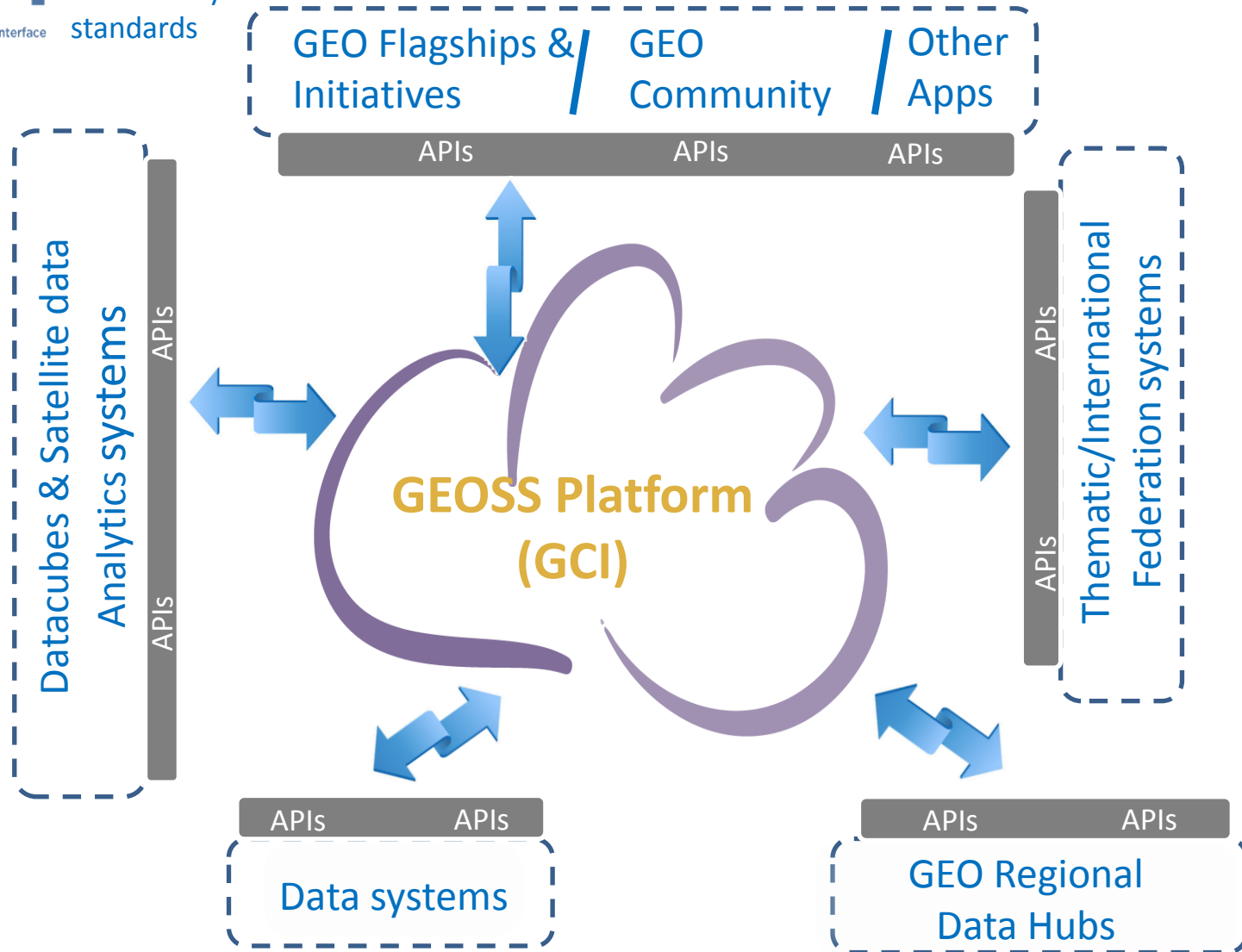
The International Committee of the Red Cross (ICRC) works around the world to protect and assist the victims of the war and other emergency situations. **To be most effective, it is vital that the size of the populations affected by a conflict or disaster situation be accurately estimated.**

**Thanks to the GEO's convening power and GCI support, ICRC is now able to benefit of the open population data for its operations in the field.**



# Discussing the future of GCI - GEOSS ? @ GEOSS EVOLVE Initiative!







# Thank you Merci



**WMO OMM**

World Meteorological Organization  
Organisation météorologique mondiale