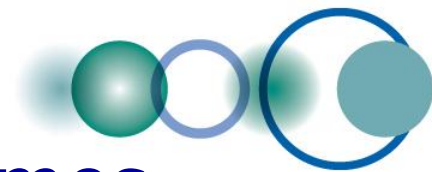


# ESA's contribution to GEOSS

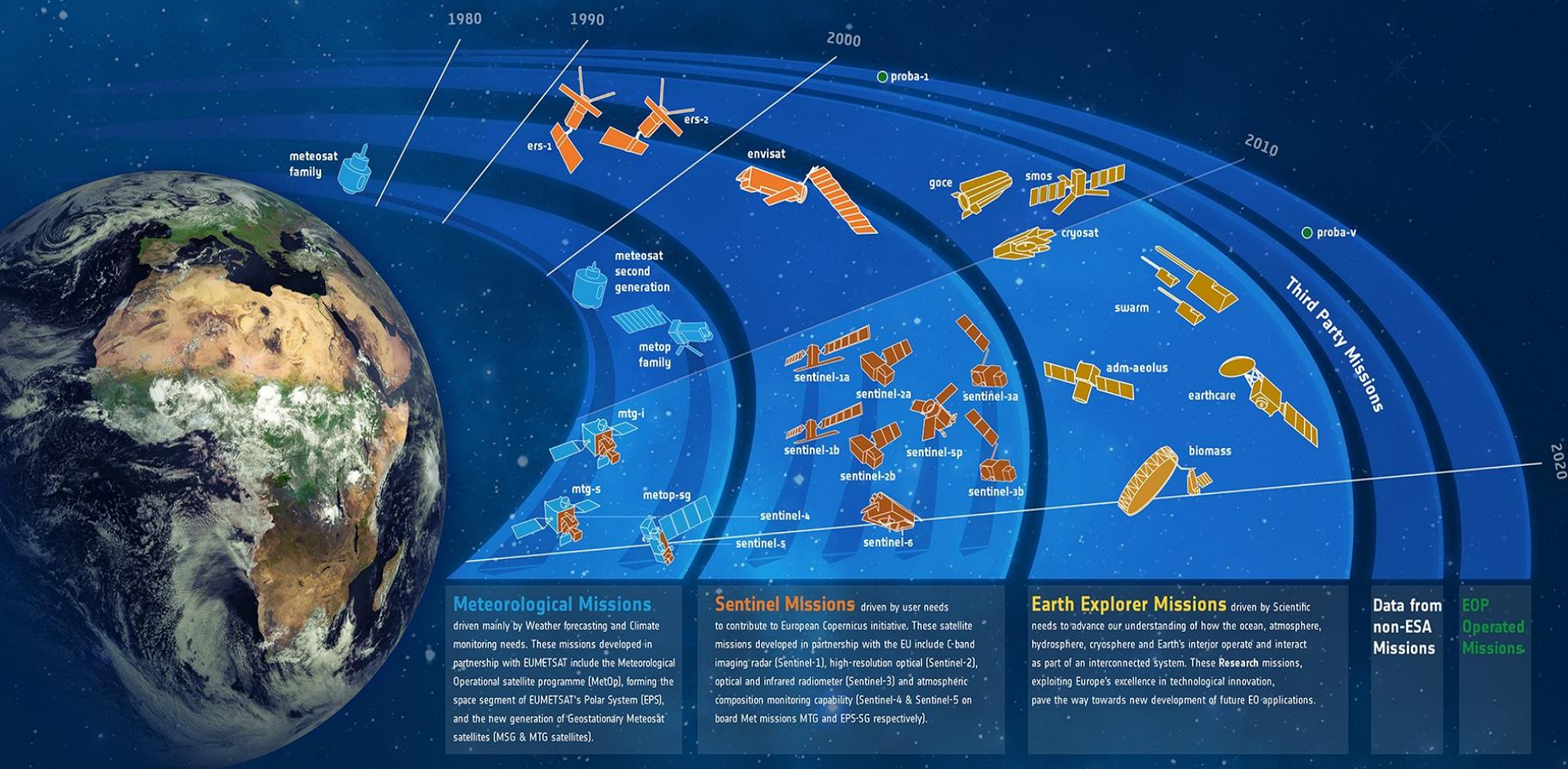
Stephen Briggs

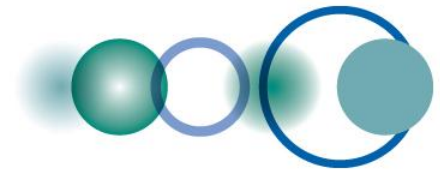
Senior Advisor, European Space Agency





# ESA Earth Observation Programmes





# ESA contribution to GEOSS

1. Satellite data, including coordinated data acquisitions for special initiatives of GEO
  1. GFOI
  2. Geoglam
  3. Supersites initiative
  4. Etc.
2. Contribution of projects/initiatives (CCI, TIGER, ...) directly and through CEOS
  1. International Charter Space and Major Disasters
  2. Climate measurements – ESA Climate Change Initiative
  3. Capacity building / Water resource management in Africa (TIGER)
  4. Etc...
3. Support of infrastructure
  1. GEOSS Portal
  2. Participation in Implementation Boards, Working Groups and Task Forces
  3. Seconded expert
  4. etc

# The Global Forest Observations Initiative

**Global Forest Observations Initiative fosters the sustained availability and use of satellite data for national forest monitoring systems to better manage forest resources.**

**GFOI will support countries' national efforts to implement the national forest monitoring systems in accordance with relevant international standards, including: UNFCCC guidance and the IPCC Good Practice Guidance by:**

- ***providing a platform for coordinating observations:*** work with space agencies (CEOS) in order to assure the systematic, sustained and worldwide acquisition and supply of forest observations;
- ***providing assistance and guidance on utilising observations:*** in collaboration with national institutions and international bodies such as the FAO, World Bank;
  - *develops methods, guidance and advice;*
  - *provides capacity building;*
  - *promotes ongoing research and development.*







**GFOI ensures the acquisition of core satellite data for 11 countries in 2013 rising to global coverage in 2016**

**GFOI reviews and promotes research and development needed to implement national forest monitoring**

**Review of Priority Research & Development Topics**

*R&D related to the use of Remote Sensing as National Forest Monitoring*

Version 1.0  
December 2013



**GFOI provides capacity building in coordination with others such as UN-REDD. It supports the use of satellite and ground data to monitor forests, estimate carbon stocks and greenhouse gas emissions**



**Integrating remote-sensing and ground-based observations for estimation of emissions and removals of greenhouse gases in forests**

*Methods and Guidance from the Global Forest Observation Initiative*

Edition 1.0  
January 2014

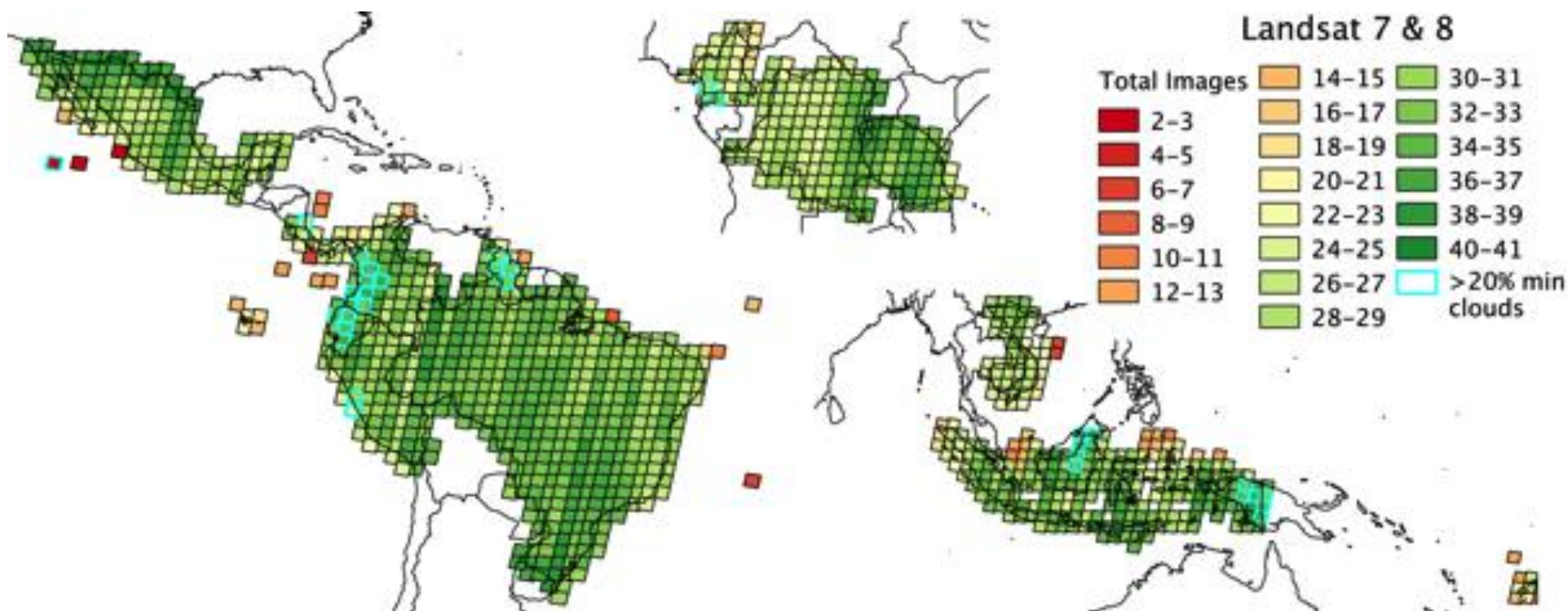


**GFOI Methods and Guidance report guiding the use of Satellite and Ground data for national forest monitoring and estimation of carbon stocks and greenhouse gas emissions. This advice is consistent with IPCC Guidelines and UNFCCC requirements as agreed in November 2013 in Warsaw.**



Year	Coverage added	No. <u>countries*</u>	Area* (Mkm <sup>2</sup> )	Total Area* (Mkm <sup>2</sup> )
2013	GEO-FCT National Demonstrator countries GFOI Participating Countries	15	20.5	20.5
2014	UN-REDD National Programme Countries WB-FCPF Participating Countries CD-REDD Project Countries (BMU)	36	18.5	39.0
2015	UN-REDD Partner Countries WB-FCPF Partner Countries Other Pan-Tropical Countries	17	9.0	48.0
2016	Global	127	84.8	132.8

Year	Coverage added	No. countries*	Area* (Mkm <sup>2</sup> )	Total Area* (Mkm <sup>2</sup> )
2013	GEO-FCT National Demonstrator countries GFOI Participating Countries	15	20.5	20.5

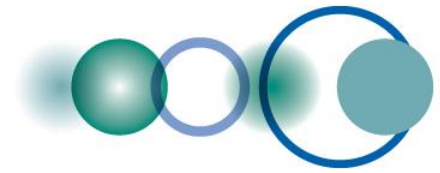


- **Element 2: Coordinated strategies for national data acquisitions**
- **Designed to address the fundamental national information requirements for GFOI**
- **National-level complement to the Global Baseline Strategy**
- **Developed in consultation with 17 countries at SDCG and SilvaCarbon meetings**
- **Provides a **GFOI Space Data Services** 'menu' for countries to choose from in support of their national forest monitoring systems' needs**

Meeting	Participating Countries
SDCG-4 (Pasadena)	Mexico, Colombia, Ecuador, Peru, Guyana, Honduras
SDCG-5 (Rome)	Uganda, Tanzania, Kenya, Democratic Republic of Congo
SilvaCarbon Asia (Chiang Mai)	Thailand, Vietnam, Cambodia, Laos, Philippines, Nepal, Indonesia

Table 1: Countries Consulted to Date

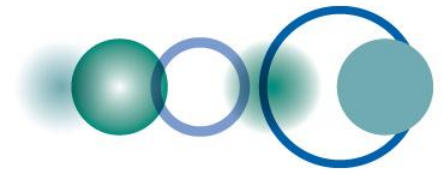




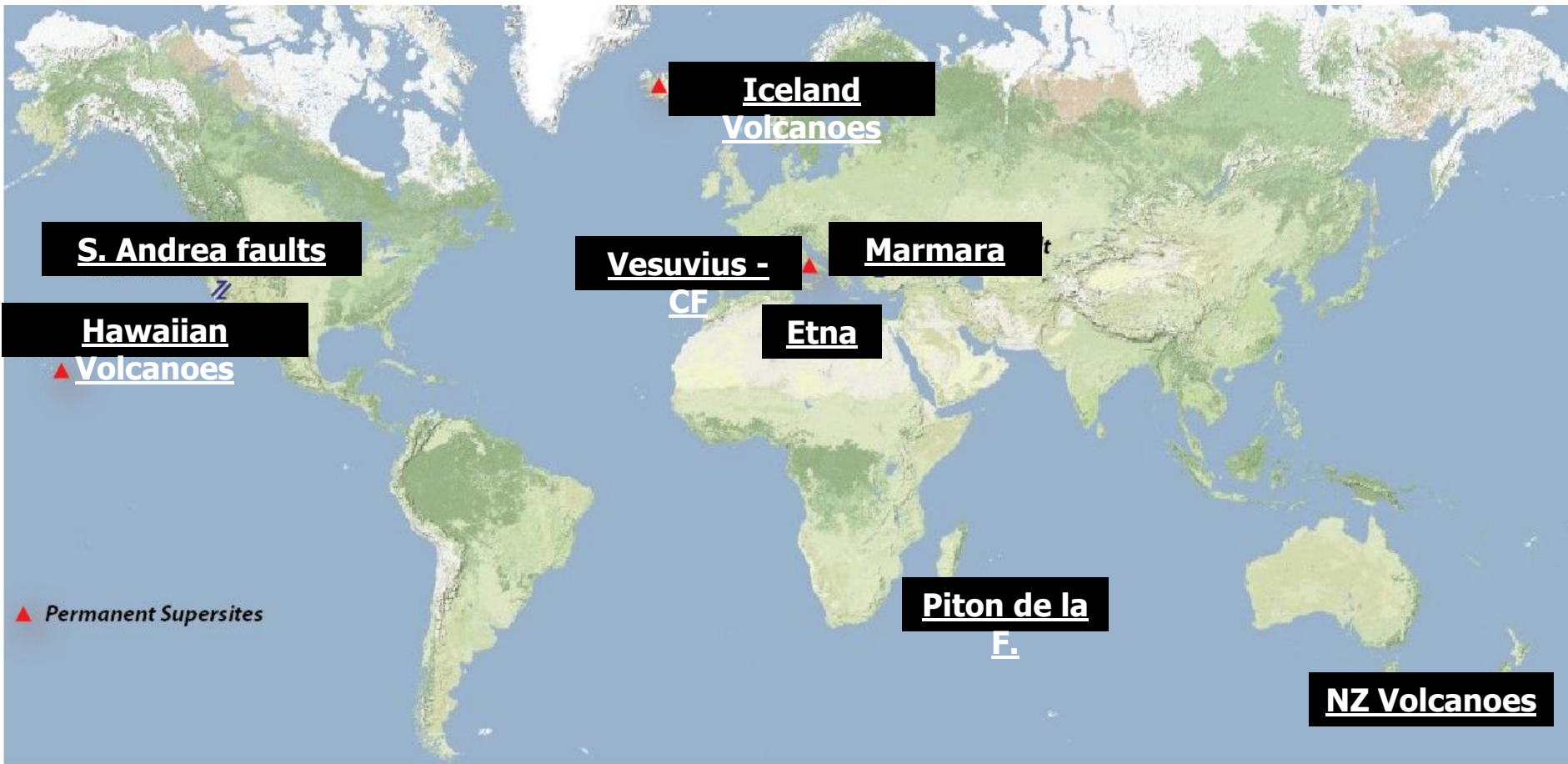
## The GEO Geohazards Supersites Initiative

- Pooling satellite imagery and terrestrial in-situ data for earthquake and volcano studies.
- Aims at enriching our knowledge about geohazards by empowering the global scientific community through collaboration of space and in-situ data providers and cross-domain sharing of data and knowledge
- Primarily through providing easy and free-of-charge access to comprehensive satellite and ground-based geophysical (raw) data sets derived from different sources and different disciplines

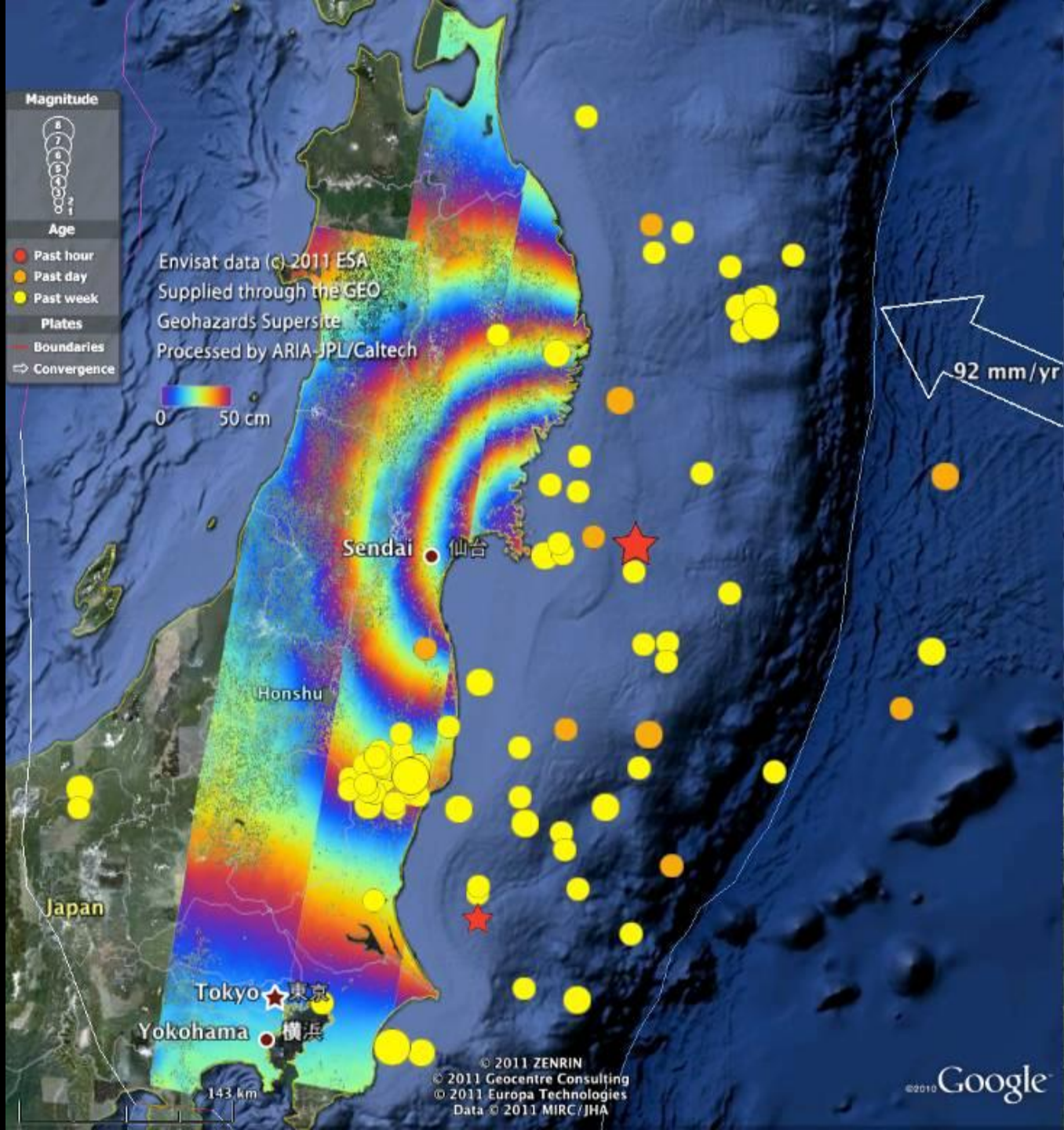




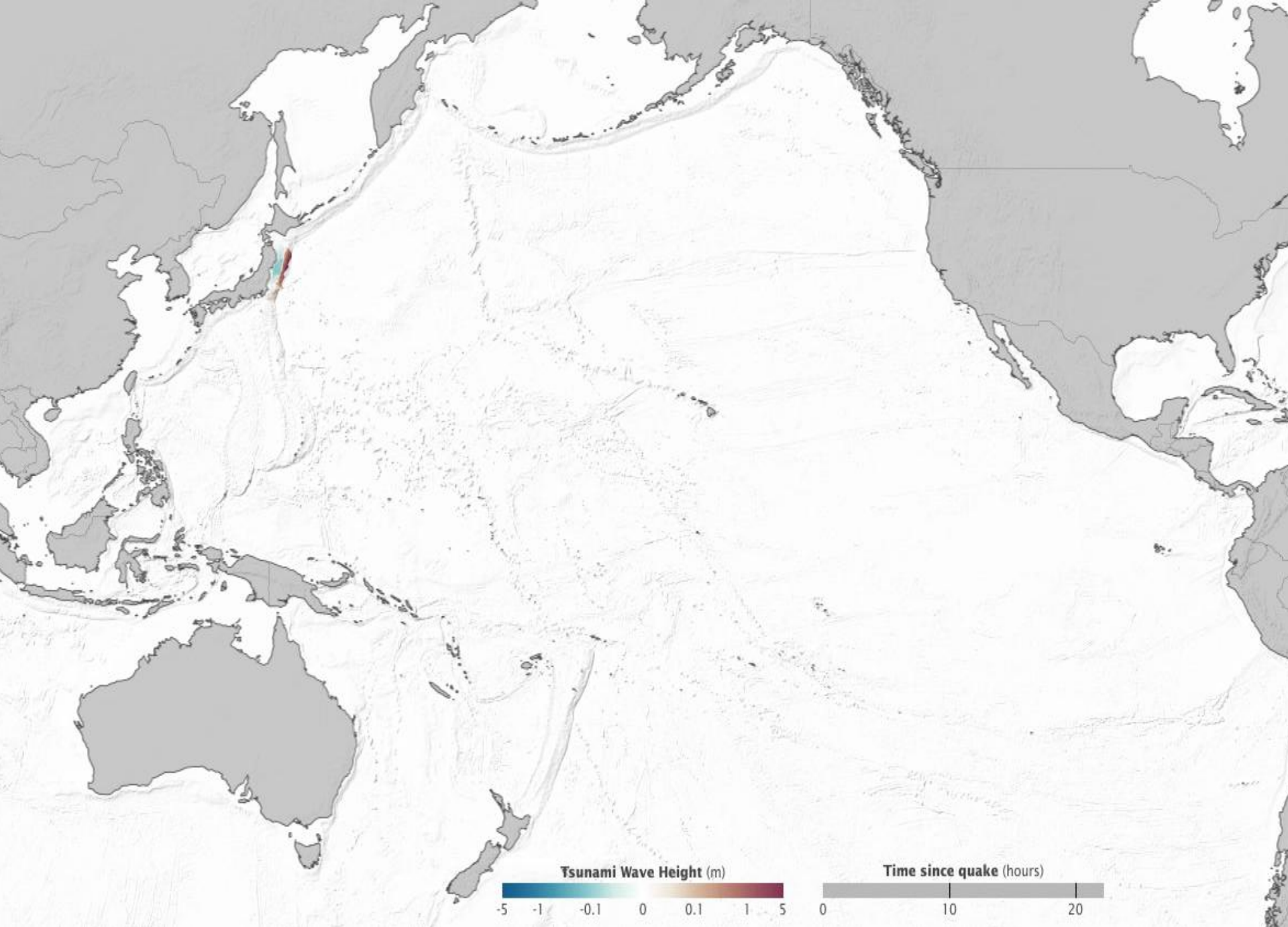
# Permanent Supersites



Hawaii, Iceland, Marmara Region, Mt Etna, Vesuvius - Campi Flegreii  
Considered: Piton de la Fournaise, New Zealand Volcanoes, San Andreas Fault Supersite

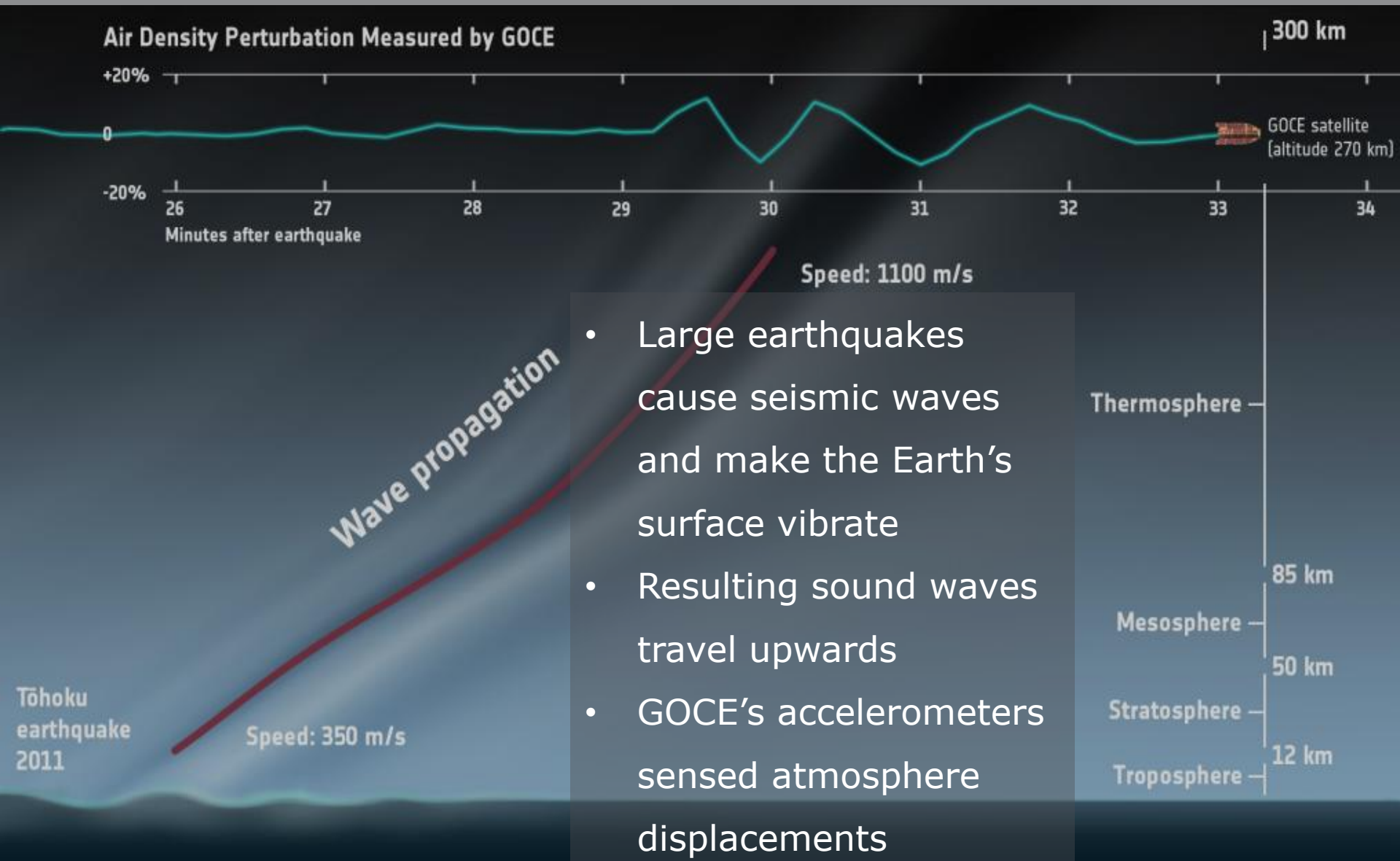








# GOCE: Seismometer in Space



- Large earthquakes cause seismic waves and make the Earth's surface vibrate
- Resulting sound waves travel upwards
- GOCE's accelerometers sensed atmosphere displacements



# GEOGLAM Crop Monitor in AMIS Market Monitor



## Market Monitor

No.11 – September 2013

www.amis-outlook.org

The *Market Monitor* is a product of the Agricultural Market Information System (AMIS), a G20 Initiative to provide information, analysis and short-term supply and demand forecasts. It covers

### Contents

World Supply-Demand Outlook	1
Crop Monitor <b>NEW</b>	2

AMIS

No. 11 – September 2013 | 2

### Crop Monitor (As of 28 August)

This is the first GEOGLAM Crop Monitor developed for AMIS\*. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data, and was conducted by experts from global, national and regional monitoring systems. For each of the four crops, a paragraph summarizing current conditions is provided, accompanied by a satellite-based indicator map. Each map depicts crop vegetative growth anomalies from August 28th (relative to a 12 year average), over the main crop growing regions within AMIS countries.

**Wheat:** Prospects are favourable in the Northern Hemisphere. Winter wheat harvest is complete and spring wheat is in late-maturity to harvest stages. In the US, Canada, Russia and Kazakhstan spring wheat conditions are good though final yields will depend on favourable weather in the coming month. Crops in the Southern Hemisphere are in early-vegetative to reproductive stages and conditions are mostly favourable. In Australia overall conditions are average to above-average but rainfall in the next month will be critical as there is some concern over dry conditions in parts of the country. In Argentina conditions are good although additional moisture is needed. In Brazil frosts caused some significant crop damage and there is some concern over excessive wetness. In South Africa winter wheat conditions have improved since July, following widespread precipitation.

**Maize:** General conditions are good. In the US approximately half of the maize is in good to excellent condition and in spite of dry weather and rising temperatures in August, a bumper production is expected largely due to increased planted area. In Canada, conditions are favourable and yields are expected to be average to above average. In the EU, prospects are good except in northern Italy, Hungary, Austria, Slovenia and Croatia where there is concern due to late sowing and dry and hot conditions. In Russia, current yield prospects are favourable despite low soil moisture in the south. In China, India, Mexico and Ukraine conditions are generally good. In Brazil the second maize crop harvest is almost complete and it is expected to be favourable.

**Rice:** Growing conditions are favourable. The monsoon season in South and Southeast Asia has maintained good moisture across most of the region. In India, conditions are favourable as monsoon rains in Thailand, precipitation has been widespread, though there is some concern over local favourable conditions were maintained in Vietnam and the Philippines with some concern flooding. In China, good moisture conditions were maintained in the North China Plain the over flooding in the northeast and excess moisture in the southwest. Meanwhile, south of conditions and above normal temperatures raise concern. In Japan, conditions are mostly early developing rice.

**Soybeans:** Growing conditions are favourable. In the US, about half of the crop is in good although prolonged dry conditions in the Midwest are raising concern. In China, condition North China Plain and in the Northeast production regions. In India, conditions are favourable over excessive moisture.

\*GEOGLAM aims at strengthening global agricultural monitoring by improving the use of satellite information for crop production forecasting. It is implemented within the framework of the inter-ministerial Group on Earth Observations (IGEO). Both GEOGLAM and AMIS were endorsed by the G20 Heads of States/Declarations (Cannes, November 2011) when GEOGLAM was tasked to "coordinate satellite monitoring observation systems in different regions of the world in order to enhance crop production projections and weather forecasting data." Within this framework, GEOGLAM is providing global crop outlook assessments in support of AMIS market monitoring activities.

More detailed information on the GEOGLAM crop assessments is available on: [www.geoglam-crop-monitor.org](http://www.geoglam-crop-monitor.org)

order: AAPF (Canada), GUS CropWatch (China), CSIR/AR (South Africa), ASAR/US (USA), CSIRO (Australia), COMVET (Brazil), GISTDA (Thailand), EC JRC-MARS, FAO, ISRO (India), JAXA (Japan), ASIA RICE, IRI (Russia), INTA (Argentina), LAPAN/MOA (Indonesia), Mexico (SIAP), NASA, UMD, and USDA FAS/ USDA NASS (US), Ukraine Hydromet Center/NASA-NSAU (Ukraine), VAST/VMMB (Vietnam).

The findings and conclusions found in this joint multiple-agency reporting are only consensual statements from the GEOGLAM expert group, and do not necessarily reflect those of the individual Agencies represented by these experts. Map data source: Main crop type areas based on the IFPRI SPAM 2005 beta release (2013). Crop calendars based on FAO and USDA crop calendars. NDVI anomaly data produced by NASA/USDA/UMD based on NASA MODIS data.

## AMIS Crop Monitor

No. 12 – October 2013 | 2

### October

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 12 – October 2013 | 3

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 13 – November 2013 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 13 – November 2013 | 3

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 14 – December 2013 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 15 – January 2014 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 16 – February 2014 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 17 – March 2014 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 18 – April 2014 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 19 – May 2014 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 20 – June 2014 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 21 – July 2014 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 22 – August 2014 | 2

Crop Monitor\*

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AMIS

No. 23 – September 2014 | 2

Crop Monitor\*

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AMIS

No. 24 – October 2014 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 25 – November 2014 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 26 – December 2014 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 27 – January 2015 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 28 – February 2015 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 29 – March 2015 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 30 – April 2015 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 31 – May 2015 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

No. 32 – June 2015 | 2

Crop Monitor\*

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AMIS

No. 33 – July 2015 | 2

Crop Monitor\*

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AMIS

No. 34 – August 2015 | 2

Crop Monitor\*

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AMIS

No. 35 – September 2015 | 2

Crop Monitor\*

Crop Monitor is developed for AMIS\* by GEOGLAM. It summarizes latest crop conditions for AMIS crops based on regional expertise and analysis of satellite data, ground observations, and meteorological data.

AMIS

## Operational GEOGLAM Global Crop Condition Assessments published monthly within the G-20 AMIS Market Monitor Bulletin

the GEOGLAM expert group, and do not necessarily reflect those of the individual Agencies represented by these experts. Map data sources: Main crop type areas based on the IFPRI/IASA SPAM 2005 beta release (2013). Crop calendars based on FAO and USDA crop calendars. NDVI anomaly data produced by NASA/USDA/UMD based on NASA MODIS data.

from the following partners (in alphabetical order): ABARES/DA/CSIRO (Australia), ARS (USA), ASAR/US (USA), ASIA RICE, IRI (Russia), INTA (Argentina), LAPAN/MOA (Indonesia), Mexico (SIAP), NASA, UMD, and USDA FAS/ USDA NASS (US), Ukraine Hydromet Center/NASA-NSAU (Ukraine), VAST/VMMB (Vietnam).

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2005 beta release (2013). Crop calendars based on FAO and USDA crop calendars. NDVI anomaly data produced by NASA/USDA/UMD based on NASA MODIS data.

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2005 beta release (2013). Crop calendars based on FAO and USDA crop calendars. NDVI anomaly data produced by NASA/USDA/UMD based on NASA MODIS data.

# Two climate action paths



WMO



of UNESCO



UNEP



ICSU



UNESCO



UNEP



ICSU

WORLD METEOROLOGICAL  
ORGANIZATION

INTERGOVERNMENTAL  
OCEANOGRAPHIC COMMISSION

INTERGOVERNMENTAL  
OCEANOGRAPHIC COMMISSION

## THE SECOND REPORT ON THE ADEQUACY OF THE GLOBAL OBSERVING SYSTEMS FOR CLIMATE IN SUPPORT OF THE UNFCCC

## FOR THE FOR CLIMATE UNFCCC

### EXECUTIVE SUMMARY

April 2003

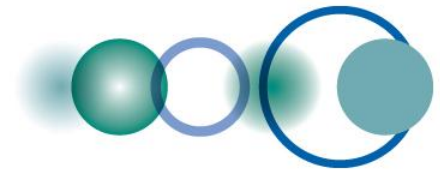
GCOS – 82 (ES)

(WMO/TD No. 1143)

UNITED NATIONS  
ENVIRONMENT PROGRAMME

INTERNATIONAL COUNCIL FOR  
SCIENCE

INTERNATIONAL COUNCIL FOR  
SCIENCE



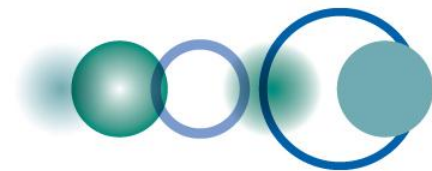
## ESA Climate Change Initiative

Realise the full potential of the long-term global EO archives that ESA, together with its Member states, has established over the last thirty years ...

... as a significant and timely contribution to the ECV databases required by the United Nations Framework Convention on Climate Change

95 MEuro over 6 years.



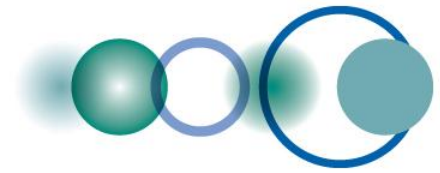


Atmosphere	Ocean	Terrestrial
<b>Composition</b>	<b>Surface</b>	
Aerosol Properties	Sea Surface Temperature	Land Cover
Methane & Long Lived GHGs	Sea Level	Fire Disturbance
Ozone	Sea Ice	Soil Moisture
Carbon Dioxide	Ocean Colour	Glacier and Ice Caps
Precursors (for Aerosol & O3)	Sea State	Ice Sheets
Upper Air	Current	Snow Cover
Cloud Properties	Sea Surface Salinity	Albedo
Temperature	Carbon Dioxide Partial Pressure	Leaf Area Index
Water Vapour	Phytoplankton	FAPAR
Wind Speed and Direction	Ocean Acidity	Lakes
Earth Radiation Budget	Sub Surface	Above Ground Biomass
Surface	Carbon	Permafrost
Surface Air Pressure	Current	Ground Water
Surface Air Temperature	Nutrients	River Discharge
Surface Precipitation	Ocean Acidity	Soil Carbon
Surface Radiation Budget	Oxygen	Land Surface Temperature
Water Vapour (Surface Humidity)	Salinity	
Near-surface Wind Speed	Temperature	
	Tracers	
	Global Ocean Heat Content	

**EUMETSAT**

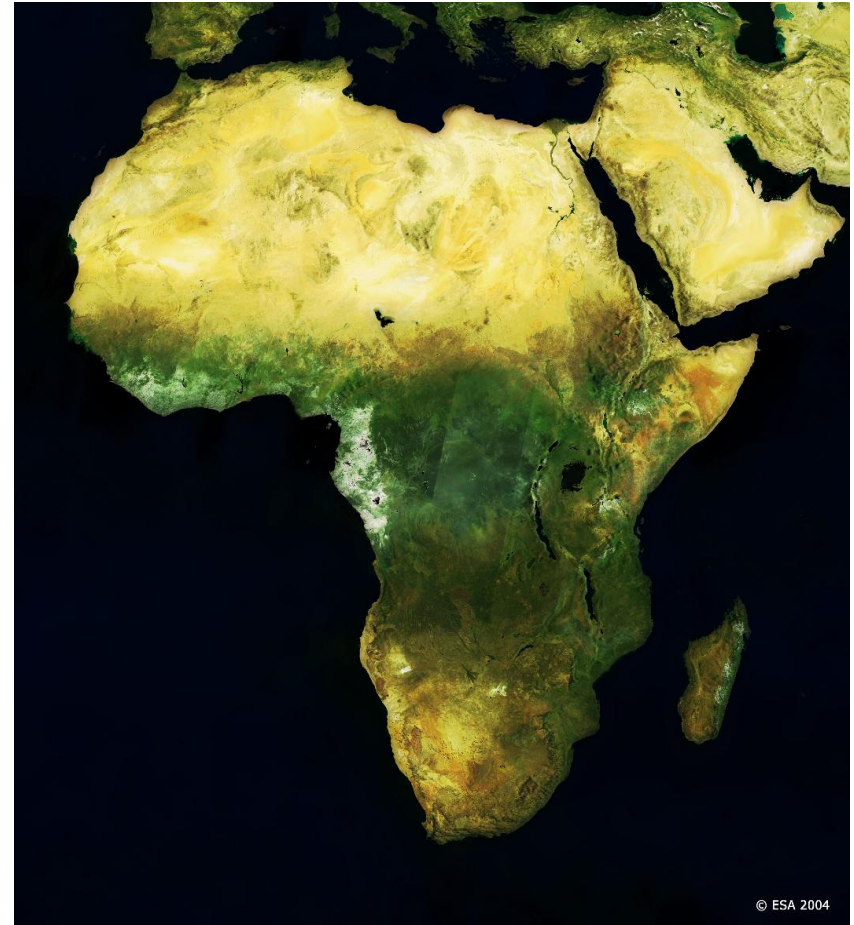
**CCI Started**

**CCI Scope**

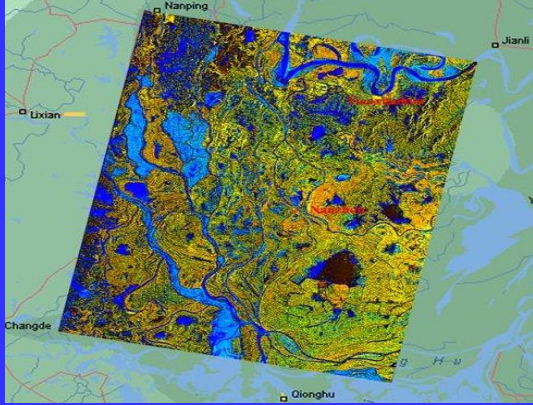


## The TIGER Initiative: Origin

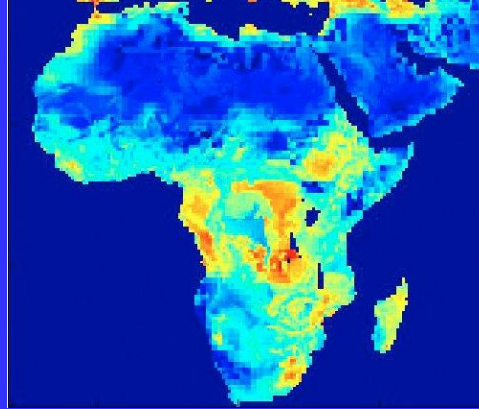
- In 2002, ESA launched the TIGER as a CEOS contribution to **implement the recommendations of the WSSD.**
- The paucity and **poor quality of information on water & land resources** required for IWRM is considered a key limitation to achieve the WSSD goals;
- The TIGER goal is to “*assist African countries to overcome problems faced in the collection, analysis and dissemination of water related geo-information by exploiting the advantages of Earth Observation technology*”.



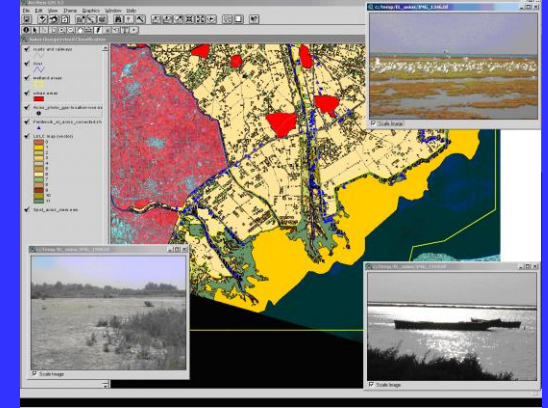




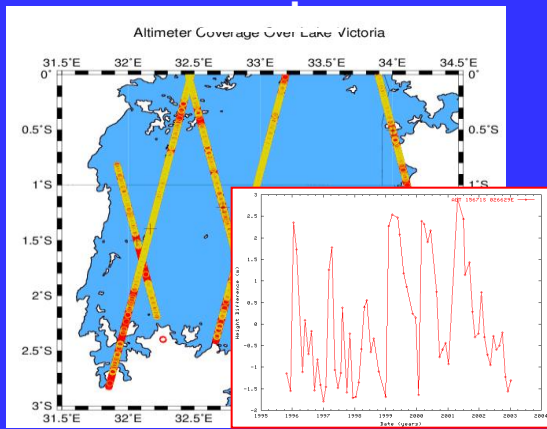
Water extend and Flood



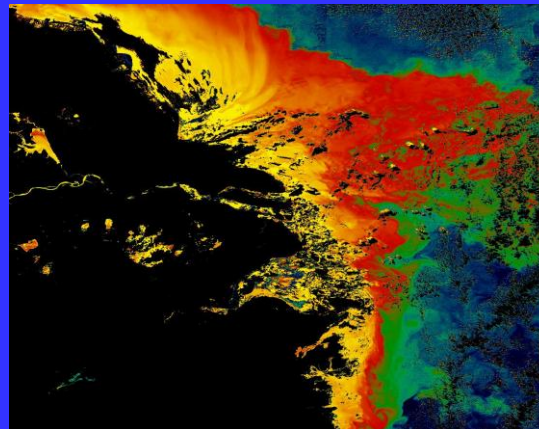
Soil moisture



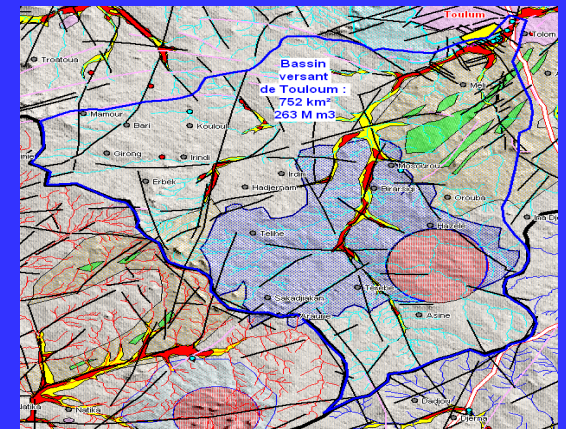
Land cover and use dynamics



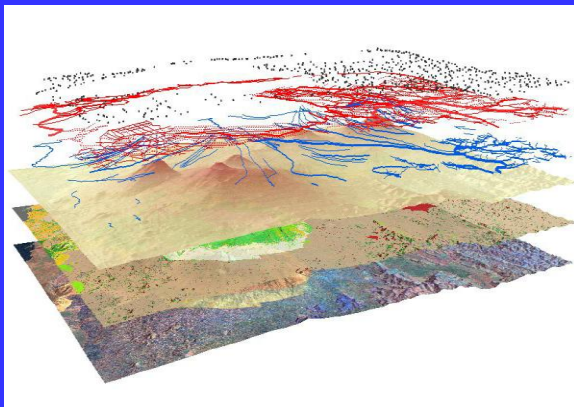
Water levels



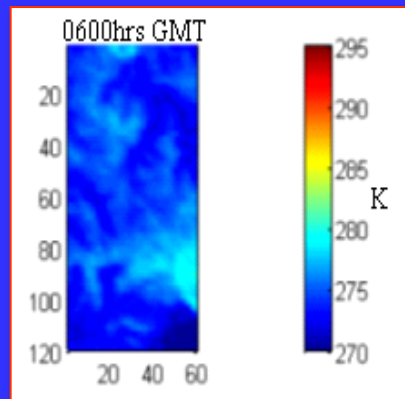
Water Quality



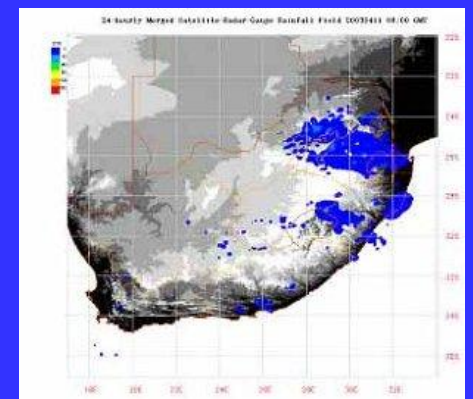
Groundwater potential



Topography

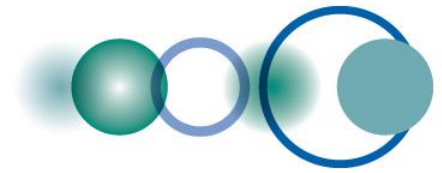


Evapotranspiration



Precipitation





## **Other relevant ESA projects and initiatives**

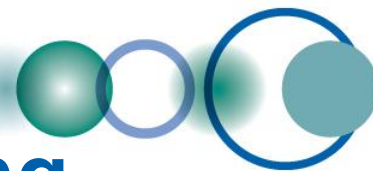
- Global Land Cover and Land Cover Change: GlobCover and CCI Land Cover
- Disaster Risk Management (CEOS)
- Biodiversity
- Water Quality, Water-Cycle and Water Management
- Life-Cycle Data Management
- Etc.

## **Expertise and resources**

- Experts in Implementation Boards
- Experts in Working Groups and Task Forces
- Expert seconded to the GEO Secretariat

# GEOSS Portal

## Developing and operating



www.geoportal.org/web/guest/geo\_search\_overview?p\_p\_id=srgPortlet\_WAR\_geoportal&p\_p\_lifecycle=0&p\_p\_state=normal&searchType=advanced&s

Discover, Access, Contribute  
Earth Observations and Information & Services

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[VIDEO TUTORIAL](#)
[SEND FEEDBACK](#)

Focus on: Precipitation (DAB) +

SEARCH

globcover x

Related Topics x

+ Themes

+ Country/Geography

+ Data Access Conditions

+ Earth Observation Catalogs

Start Date End Date

[CLEAR](#) [SEARCH](#)

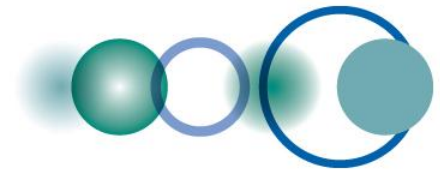
Total Results: 13

[All](#)
[Datasets](#)
[Websites and documents](#)
[Monitoring and Observation Systems](#)
[Alerts, RSS, and information Feeds](#)

Legend

[1](#)
[2](#)
[NEXT](#)
[LAST](#)

**GlobCover land cover map world ESA 2009**  
 The European Space Agency's ESA GlobeCover is a global land cover map that has been produced in an automatic and global way and is associated



# Summary involvement with GEO

## Putting in:

- Data from a number of satellite missions
  - Archives
  - Coordinated data acquisitions
- Projects and initiatives
- GEOSS Portal
- Expertise and resources

## Getting out:

- Advocacy for the importance of Earth Observation at high political level
- Additional visibility for ESA
- Support for open data policy
- New collaborations