



The Copernicus Global Land Service: status & evolution

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on behalf
the GIO - Global Land
consortium

What is Copernicus?

- **The European system for monitoring the Earth**

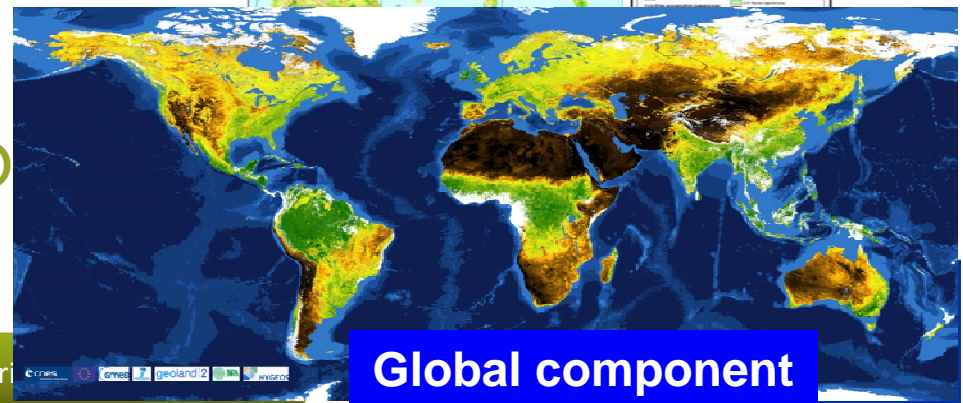
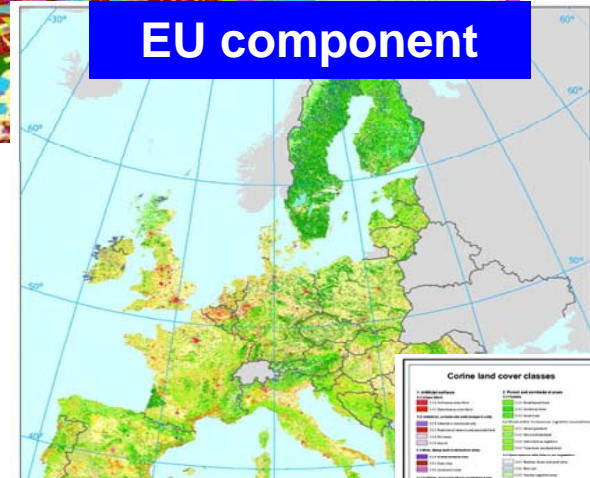
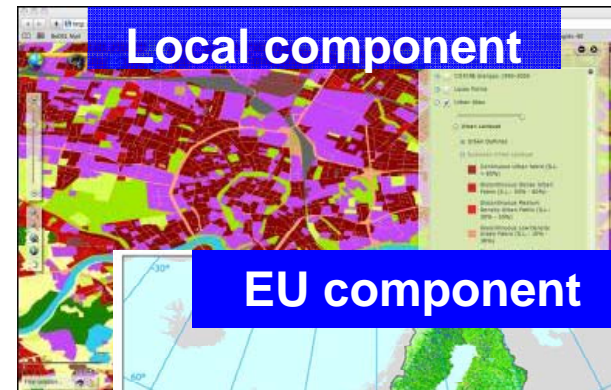
- The European response to **global information needs**
- An **independent Earth Observation system** for Europe
- The **largest fleet of satellites**, ground and air sensors
- An **end user-oriented** programme of services
 - Managing the environment
 - Understanding and mitigating the effects of climate change
 - Ensuring the civil security
- Joined-up **information for policymakers, scientists, businesses and the public**
- Previously known as the Global Monitoring for Environment and Security (GMES) programme

Overview of Copernicus



The Land Service components

- **Local → EEA**
 - Zooming on “hot spot” (e.g. urban atlas, protected areas, coastal areas)
- **Continental → EEA**
 - Pan-European products (Corine 2012, 5 High Resolution layers on imperviousness, forest, grassland, wetland, water)
- **Global → JRC**
 - **Bio-geophysical variables (Essential Climate Variables) at global scale.**



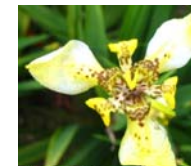
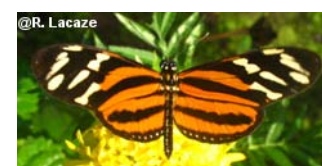
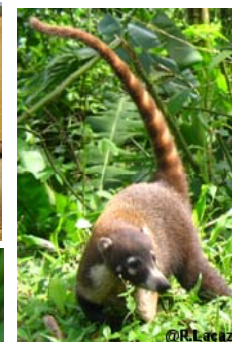
Global Land Service - 1

- **Support and consolidate:**

- EU contribution to **GEO/GEOSS**
- **EU policies** at international level
 - e. g. Climate and Development policies
- **EU commitments** under international treaties and conventions
 - e. g. UN "Rio" and climate conventions

- **Policies focus:**

- Crop Monitoring and Food security in and outside Europe
- Biodiversity, Protected areas and Forest cover monitoring
- Drought Assessment and Desertification
- Carbon modeling, land use and land cover change
- Support to Earth Observation African Activities



Global Land Service - 2

- **Heritage**

- 10+ years of EU R&D activities
 - E.g. FP7-Geoland2 & FP7-DevCoCast research projects
- Accompanied by e.g. EUMETSAT Land Surface Analysis SAF

- **Constraints**

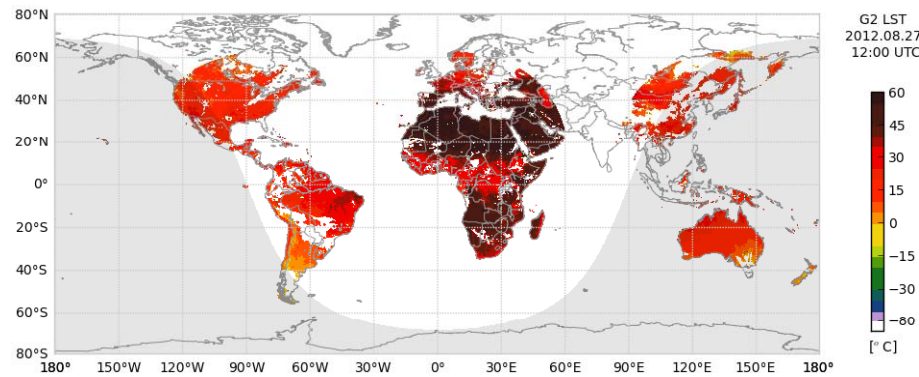
- Core products for multiple users
- Mature for operational activities
- Sustainable & reliable deliveries
- Validated following standards
- No duplication but complementarity

- **Global systematic monitoring service**

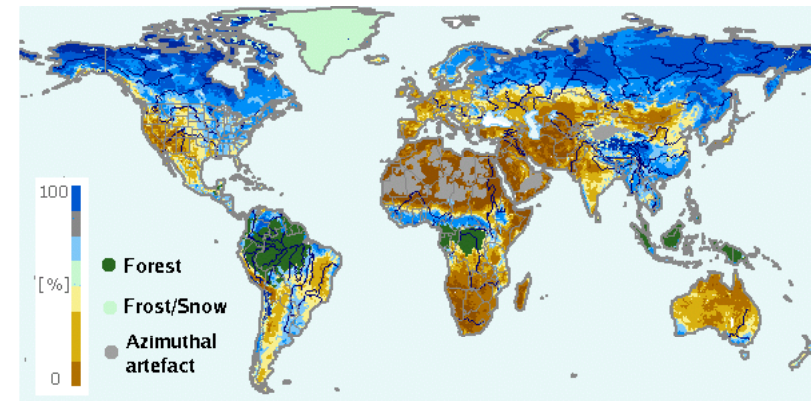
- Production
 - Bio-geophysical variables
 - NRT & historical time series (up to 15 years)
 - Over the globe
- Quality control
- Archiving & re-processing
- Dissemination & user support

Examples of products

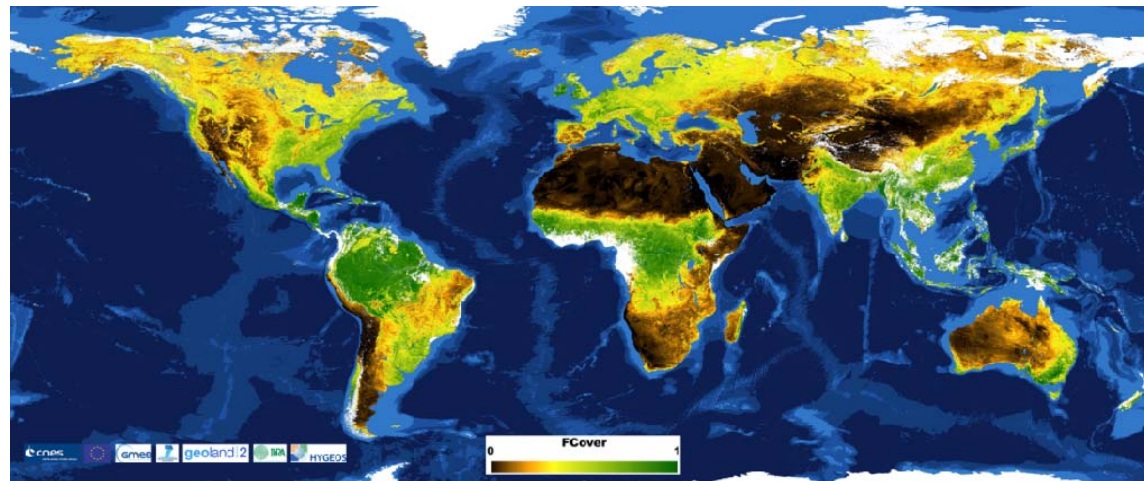
Land Surface Temperature



Soil Water Index



Fraction of green Vegetation Cover



Portfolio

Variable	Temporal Coverage	Temporal resolution	Spatial coverage	Spatial resolution	Sensor	Timeliness
LAI/FAPAR/FCover	1999 – present	10 days	Global	1km	SPOT/VGT	3 days
NDVI/VCI/VPI	1999 – present	10 days	Global	1km	SPOT/VGT	3 days
Dry Matter Productivity	2009 – present	10 days	Global	1km	SPOT/VGT	3 days
Burnt Area	1998 – present	1 day	Global	1km	SPOT/VGT	3 days
TOC Reflectance	2013 – present	10 days	Global	1km	SPOT/VGT	3 days
Surface Albedo	1999 – present	10 days	Global	1km	SPOT/VGT	3 days
Land Surface Temperature	2009 – present	1 hour	Global	0.05°	Σ Geo	1 day
Soil Water Index	2007 – present	1 day	Global	0.1°	Metop / ASCAT	1 day
Water bodies	1999 – present	10 days	Africa*	1km	SPOT/VGT	3 days

* soon Global

Quality Monitoring

- **Technical product quality**
 - Semi-automatic checks at production centres
 - E.g. visual check by operational staff
- **Scientific product quality**
 - Per variable according to CEOS/LPV protocols
 - Cross-cutting: consistency across variables using the Land Data Assimilation System (LDAS)
- **Service quality**
 - Semi-automatic checks on dissemination system
 - E.g. regular report on product availability

Free and open product access

- **Simple registration required**
- **Subscription to receive the near-real time products**
- **Internet access**
 - Website coming soon: <http://land.copernicus.eu/global>
 - Currently:
 - Geoland 2 portal: <http://www.geoland2.eu/core-mapping-services/biopar.html>
 - DevCoCast web site: <http://www.devcocast.eu>
- **GEONETCast broadcast access**
 - Via EUMETCast over Africa & the Americas

Sensor continuity

- **Ensuring the continuity of the service**
 - Replace nominal sensor by new sensors data:
 - E.g. ASCAT from MetOp-A to MetOp-B,
 - E.g. from SPOT-VEGETATION to Proba-V, Sentinel-3
 - Back-up production in case of failure of the nominal sensor
 - E.g. Metop/AVHRR as back-up to SPOT-VEGETATION
- **Activities:**
 - Adapt the methodologies to new input data
 - Adapt the processing lines according to algorithm evolutions
 - Check consistency between nominal, new and backup products and ensure they reach the quality level compliant with users' requirements

Evolution: moving from Low (1km) to Medium (300m) resolution

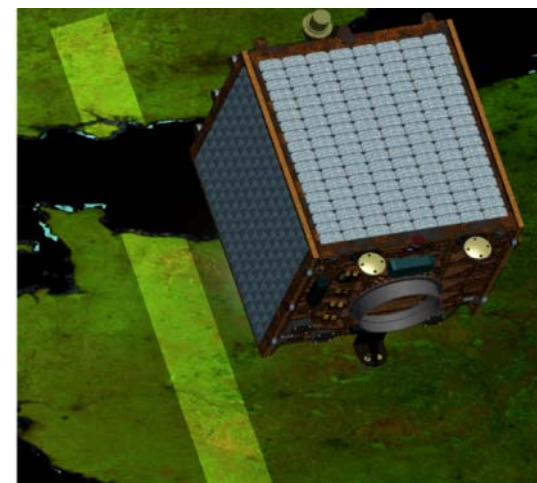
- **Proba-V**

- Ensures continuity between SPOT-VGT & Sentinel3
- Provides orbit segments (P) and synthesis (S) products
- At ~1km (continuity VGT) and 1/3km
- **Launch planned in May 2013**
- 6 months of commissioning (~ Oct 2013)

- **Objective: pre-operational NRT products starting on May 2014 over Europe.**

- **Initial focus on LAI, FAPAR, Fcover**

- **Based upon the achievements of the FP7-ImagineS project**



ImagineS project



- **Objectives:**

1. Producing multi-scale multi-sensors biophysical variables (Proba-V, Sentinel-3 and Sentinel-2)
2. Developing pre-operational processing line global land data production
3. Building an agriculture service based upon a Land Data Assimilation System
4. Demonstrating the added value for users acting at global, European, national and regional scales

- **From November 2012 to February 2016**



ImagineS output



● Products:

- Biophysical variables
 - global at 300m resolution
 - regional at 10m resolution over 14 demonstration sites around the world
- Agricultural indicators
- Crop maps

● Software:

- Pre-operational processing line running at global scale
- Prototype running off-line over demonstration sites

ID	Name	EO sensor	Temporal resolution	Spatial resolution	Spatial coverage
01	LAI, FAPAR, FCover	S3 + PROBA-V	10 days	300 m	Global
02	Albedo	S3 + PROBA-V	10 days	300 m	Global
03	Biomass	S3 + PROBA-V	10 days	16 km (8 km)	Global (Fr,Hu)
04	Drought indicators	S3 + PROBA-V + ASCAT	10 days	16 km (8 km)	Global (Fr,Hu)
05	Carbon fluxes (GPP, RE, NEE) and evapotranspiration	N/A	10 days	16 km (8 km)	Global (Fr,Hu)
06	FAPAR per class	S3 + PROBA-V	10 days	16 km (8 km)	Demo sites
07	Surface reflectance	S2	Instantaneous	10 m	Demo sites
08	FAPAR	S2 + S3 + PROBA-V	10 days	10 m	Demo sites
09	Biomass	S2 + S3 + PROBA-V	10 days	Local simulations	Demo sites
10	Crop map	S1 + S2 + S3	Continuous update	10 m	Demo sites

Links with GEO

- **Global Land Service**

- Aims at consolidating the EU contribution to GEO/GEOSS
- disseminates its products via GEONETCast

- **FP7/ImagineS project can contribute to**

- the Global Agricultural Geo-Monitoring Initiative (GEO-GLAM) by an original agriculture service
 - Assessment of biomass to monitor crop/fodder production together with carbon and water fluxes (drought indicators)
- the Joint Experiment for Crop Assessment and Monitoring (JECAM)
 - Crop maps over JECAM sites in Russia and South Africa

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Global Land consortium



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