



Copernicus Europe's Eyes on Earth

**Sustainable and Continuous Monitoring
of our Environment**

Space



Copernicus EU



Copernicus EU



Copernicus EU

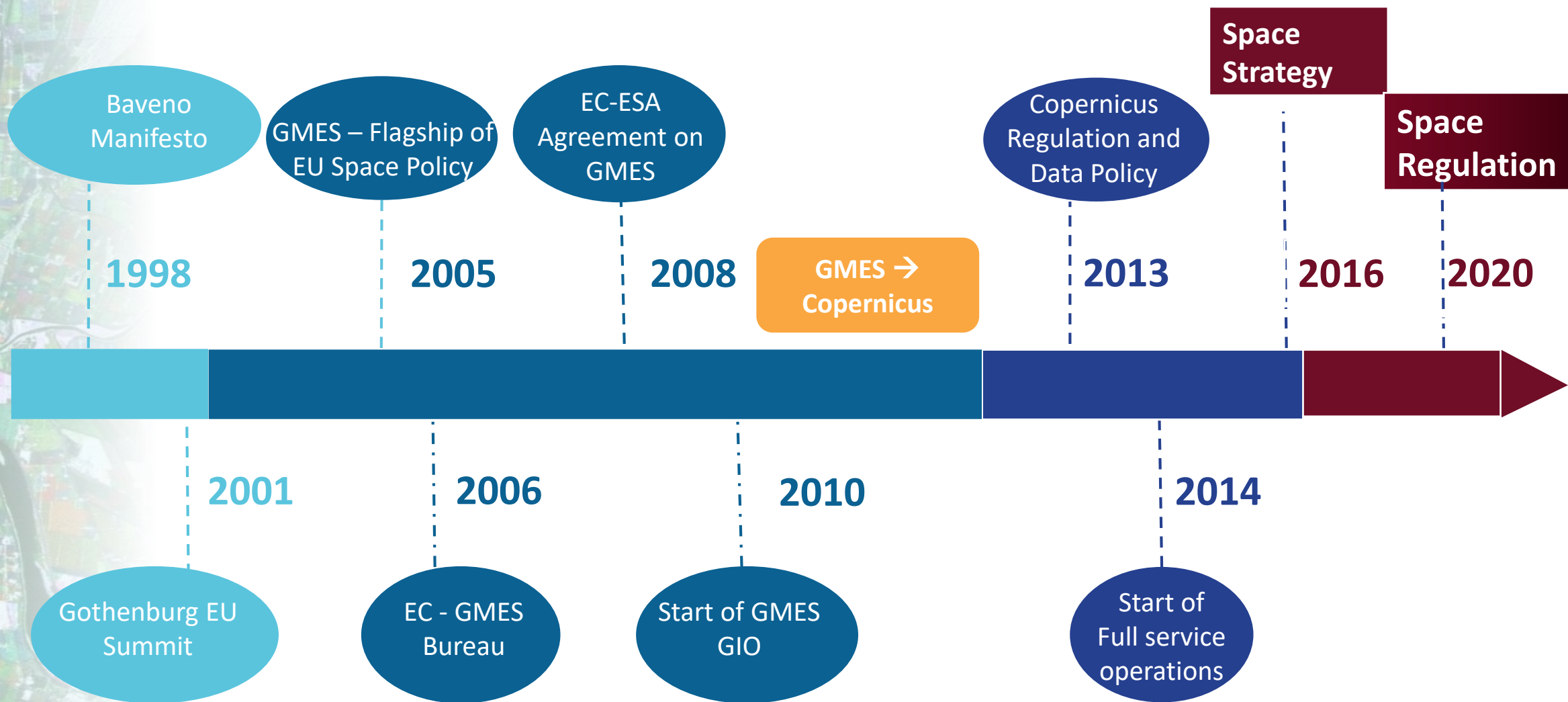


www.copernicus.eu



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COPERNICUS HISTORY

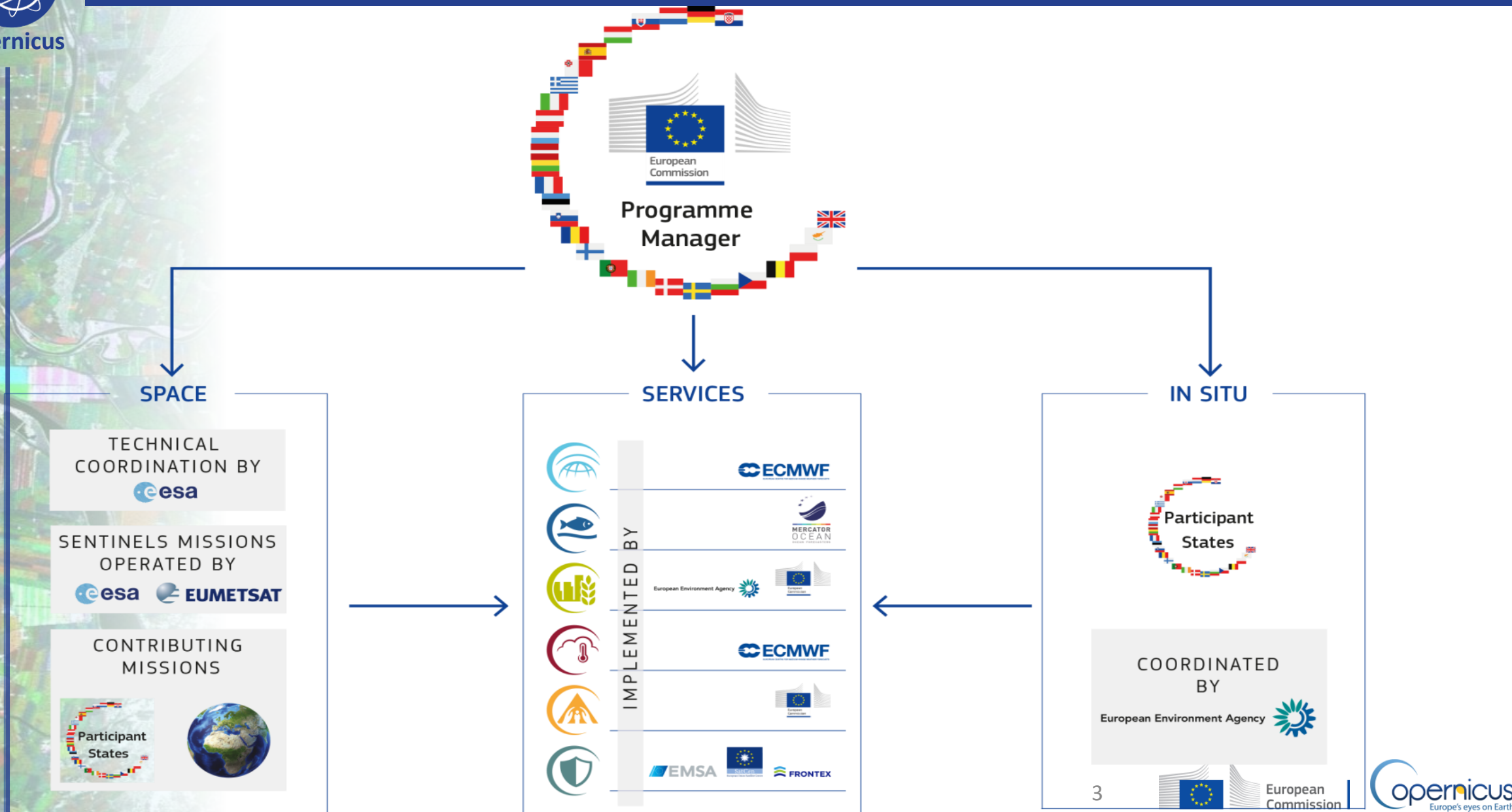


GIO = GMES Initial Operation



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COPERNICUS GOVERNANCE





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COPERNICUS ARCHITECTURE

FULL, FREE
AND OPEN
DATA

6 services use Earth
Observation data to deliver...



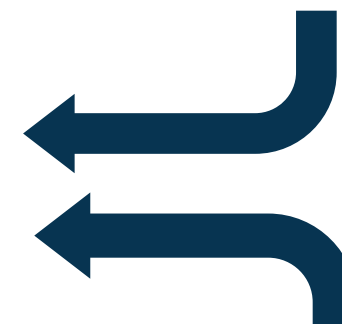
Sentinels



...added-value products



Contributing missions



In Situ












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THE SENTINELS

Sentinel Mission and Status

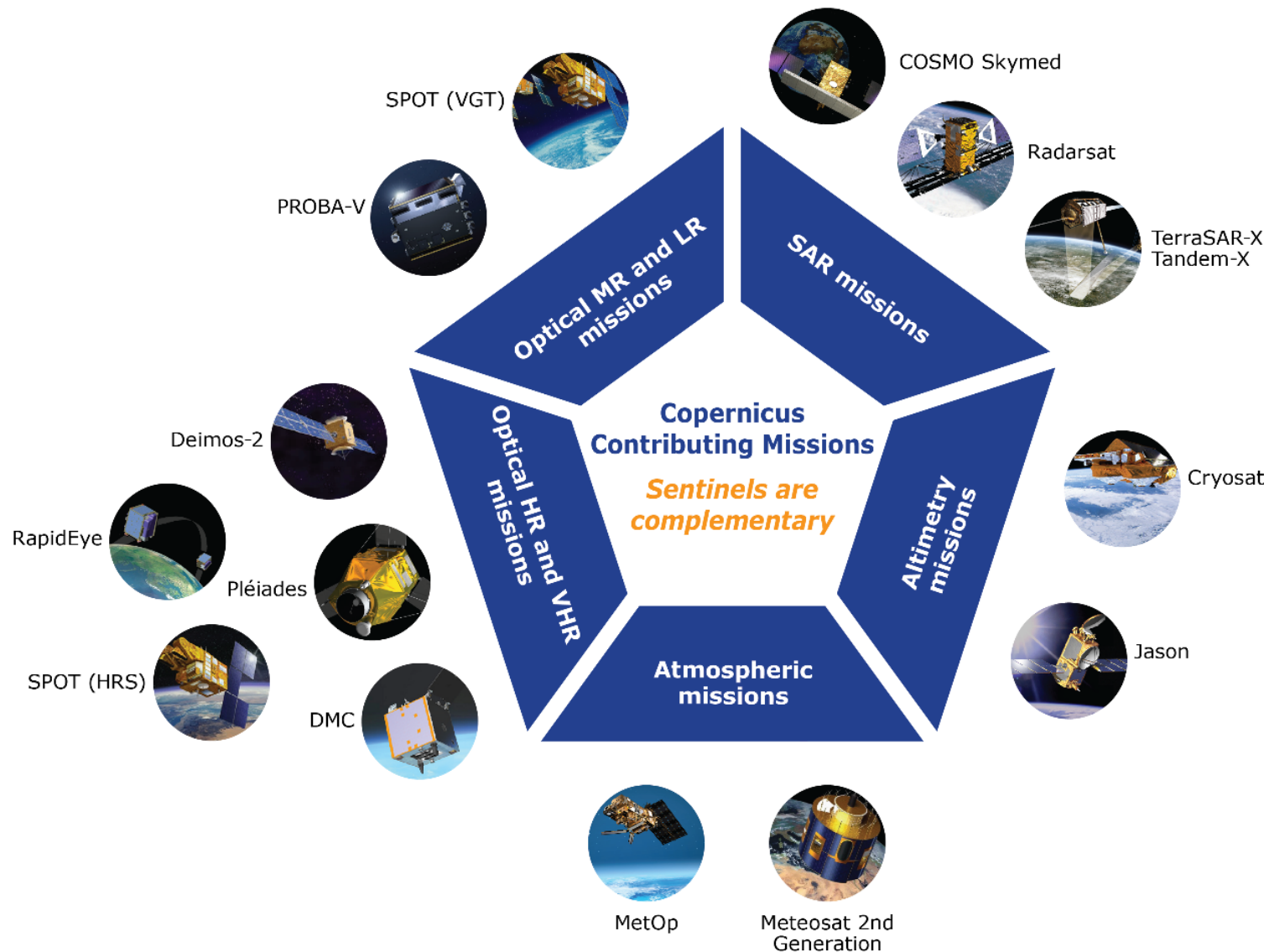
Key Features

	SENTINEL-1: 4-40m resolution, 3 day revisit at equator	<i>2 Sats in orbit</i>	▶ Polar-orbiting, all-weather, day-and-night radar imaging
	SENTINEL-2: 10-60m resolution, 5 days revisit time	<i>2 Sats in Orbit</i>	▶ Polar-orbiting, multispectral optical, high-res imaging
	SENTINEL-3: 300-1200m resolution, <2 days revisit	<i>2 Sats in Orbit</i>	▶ Optical and altimeter mission monitoring sea and land parameters
	SENTINEL-4: 8km resolution, 60 min revisit time	<i>1st Launch in 2022</i>	▶ Payload for atmosphere chemistry monitoring on MTG-S
	SENTINEL-5p: 7-68km resolution, 1 day revisit	<i>1 Sat in Orbit</i>	▶ Mission to reduce data gaps between Envisat, and S-5
	SENTINEL-5: 7.5-50km resolution, 1 day revisit	<i>1st Launch in 2022</i>	▶ Payload for atmosphere chemistry monitoring on MetOp 2 nd Gen
	SENTINEL-6: 10 day revisit time	<i>1st Launch in 2020</i>	▶ Radar altimeter to measure sea-surface height globally



Space
Component

THE CONTRIBUTING MISSIONS





In situ

IN - SITU : OVERVIEW

- *In situ* data = observation data from ground-, sea-, or air-borne sensors, reference and ancillary data licensed for use in Copernicus
- Use of *In situ* data:
 - Validate & calibrate Copernicus products
 - Reliable information services
- Implementation in two tiers:
 - Tailored *in situ* data for each Copernicus service level
 - Cross-cutting coordination across services by the EEA





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COPERNICUS SIX SERVICES





Land
Monitoring

Benefit areas and products examples

Ecosystems

Biodiversity

Agriculture

Forestry

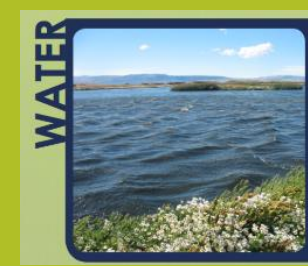
Energy

Natural Resources

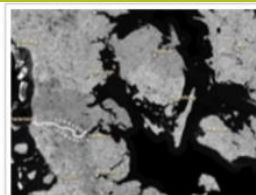
Water

Urban planning

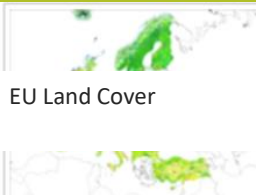
Global



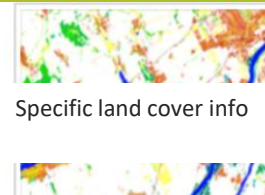
Pan-European



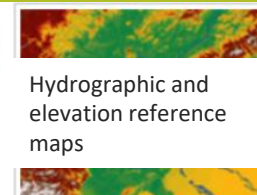
[Image Mosaics](#)



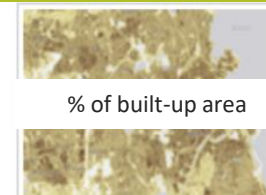
[CORINE Land Cover](#)



[High Resolution Layers](#)



[Reference Data](#)

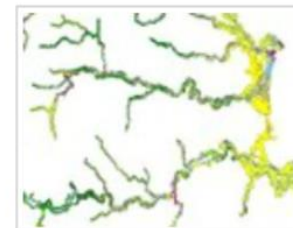


[Related Pan-European products](#)

Local



[Urban Atlas](#)

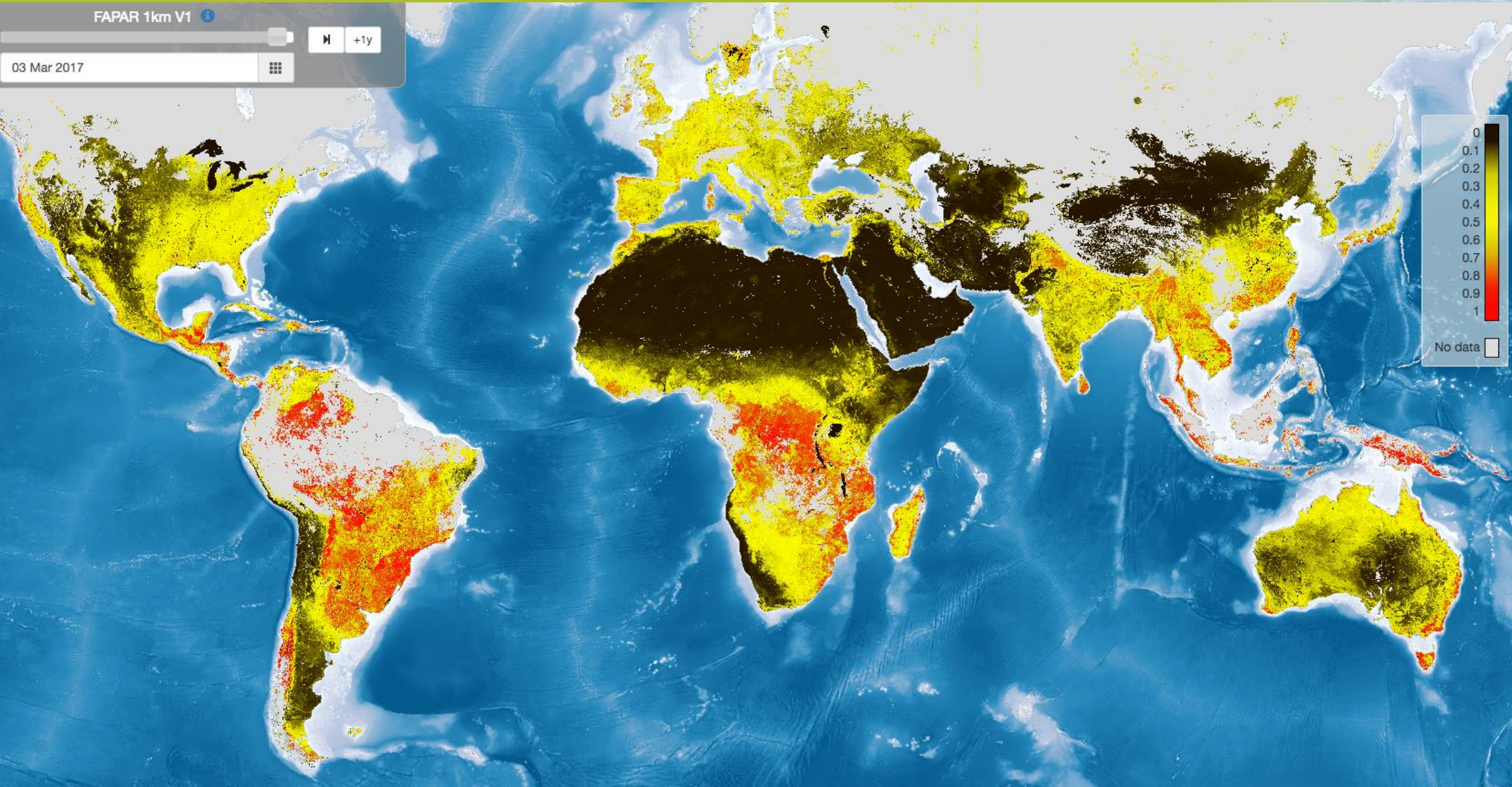


[Riparian Zones](#)



[Natura 2000 \(N2K\)](#)

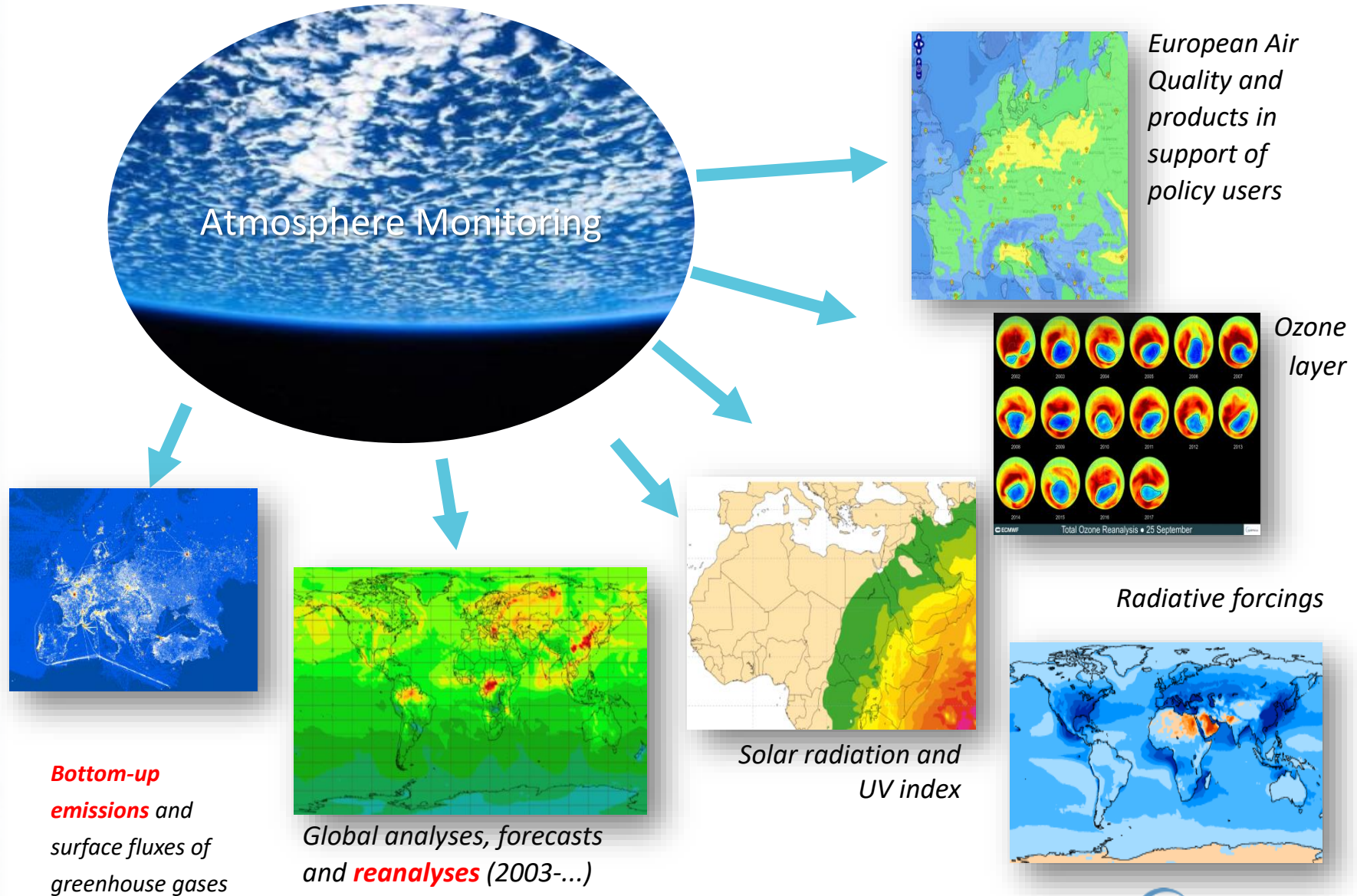
BIOPHYSICAL PRODUCTS - Vegetation status (FAPAR)





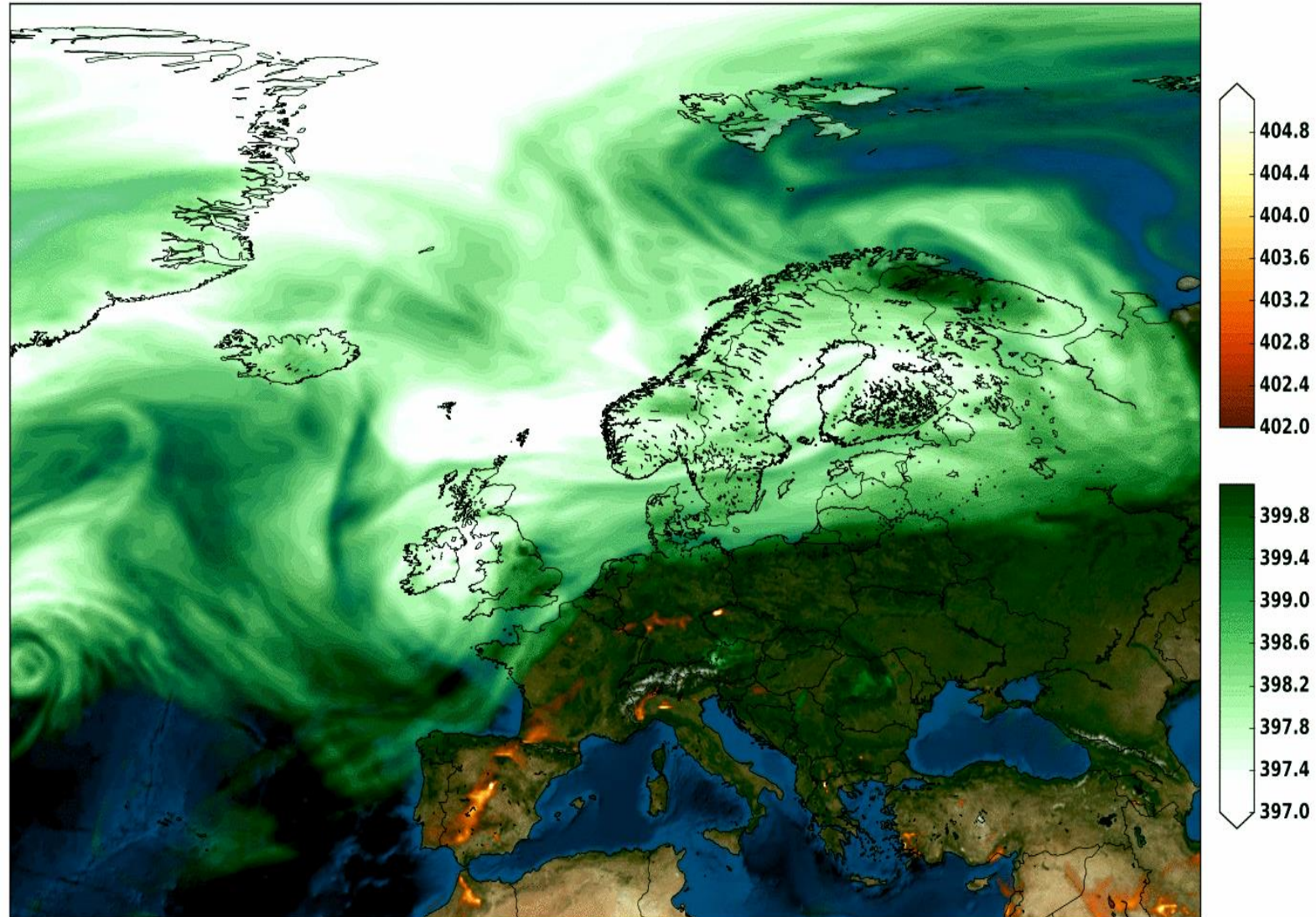
Copernicus

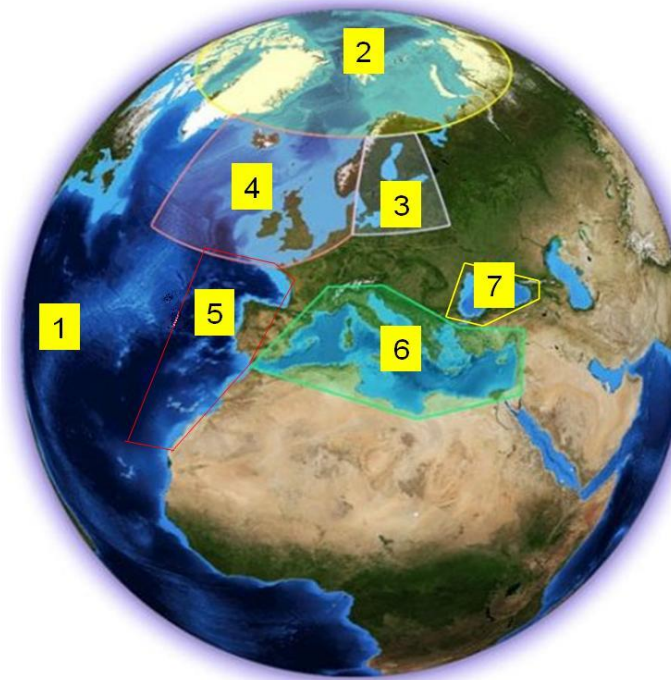
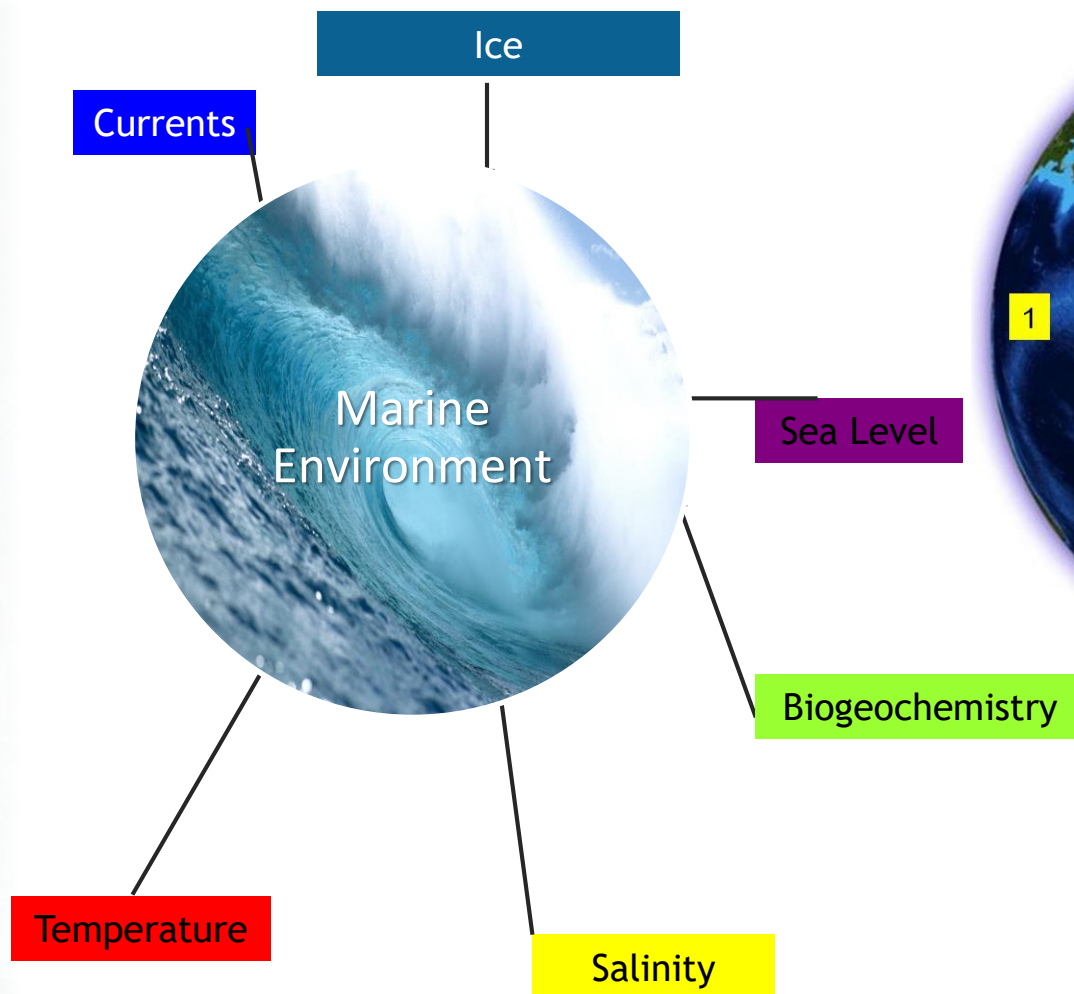
Copernicus Atmosphere Monitoring Service



CO₂ concentration - Europe

20161001 03 UTC





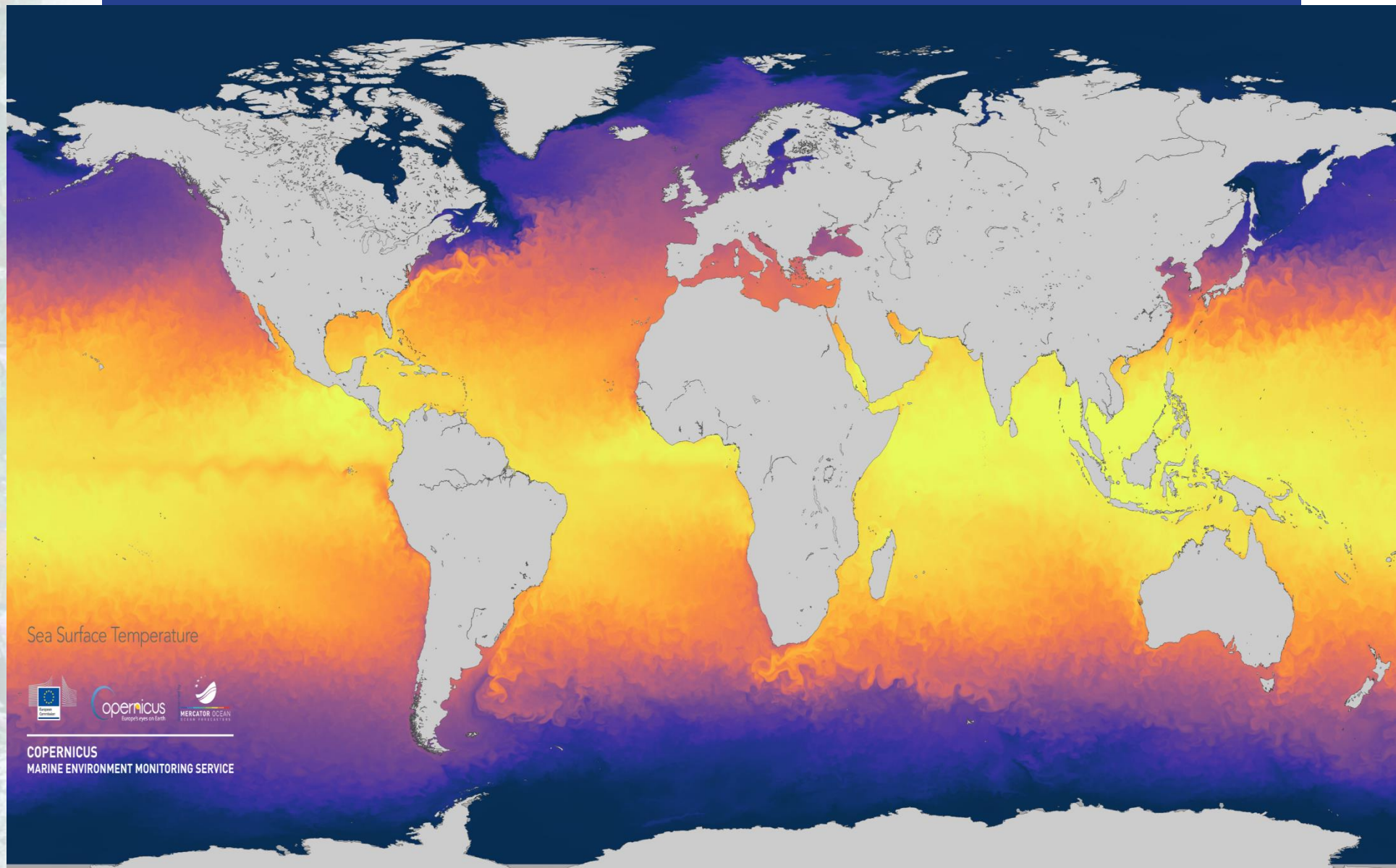
- 1. Global
- 2. Arctic
- 3. Baltic
- 4. NWS
- 5. IBI
- 6. Med Sea
- 7. Black Sea

- **Global and Regional**
- Real time and **Reanalyses**
- **Satellite & In Situ obs. and Models**



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Sea surface temperature



Sea Surface Temperature



COPERNICUS
MARINE ENVIRONMENT MONITORING SERVICE



Copernicus Emergency Service

Emergency
Management



Floods



Fires



Earthquakes



Tsunami



Industrial
accidents



Volcano
eruptions



Other urgent
events



Landslides



Hurricanes



Conflicts



Emergency Mapping Services
Geoinformation on demand



Climate
Change

Benefit areas and products examples

Climate change

**Mitigation and
adaptation**

Weather forecast

Pollution

Environment

Health

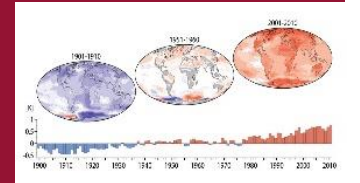
**Consistent Estimates of the
Essential Climate Variables (ECVs)**



**Support to Mitigation and
Adaptation Strategies**



**Global and Regional
Reanalyses**



**Seasonal Forecasts
And Climate Projections**

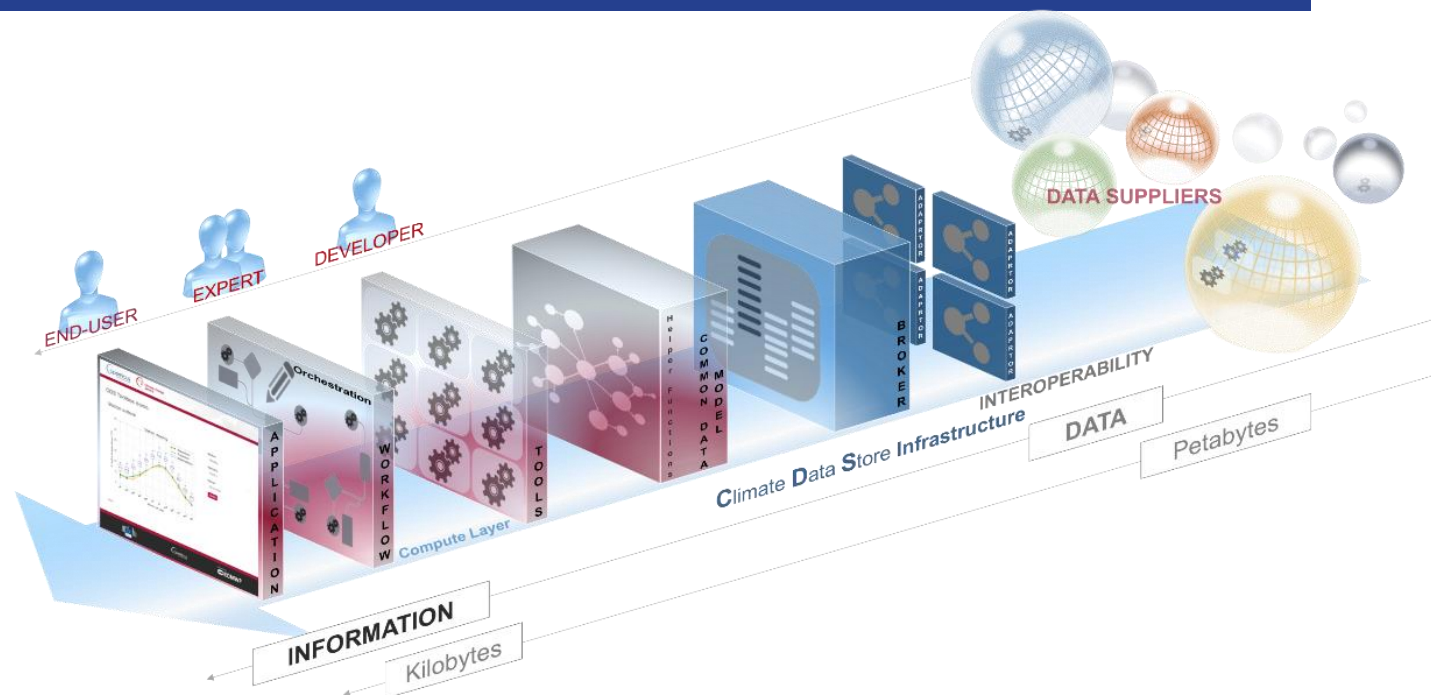
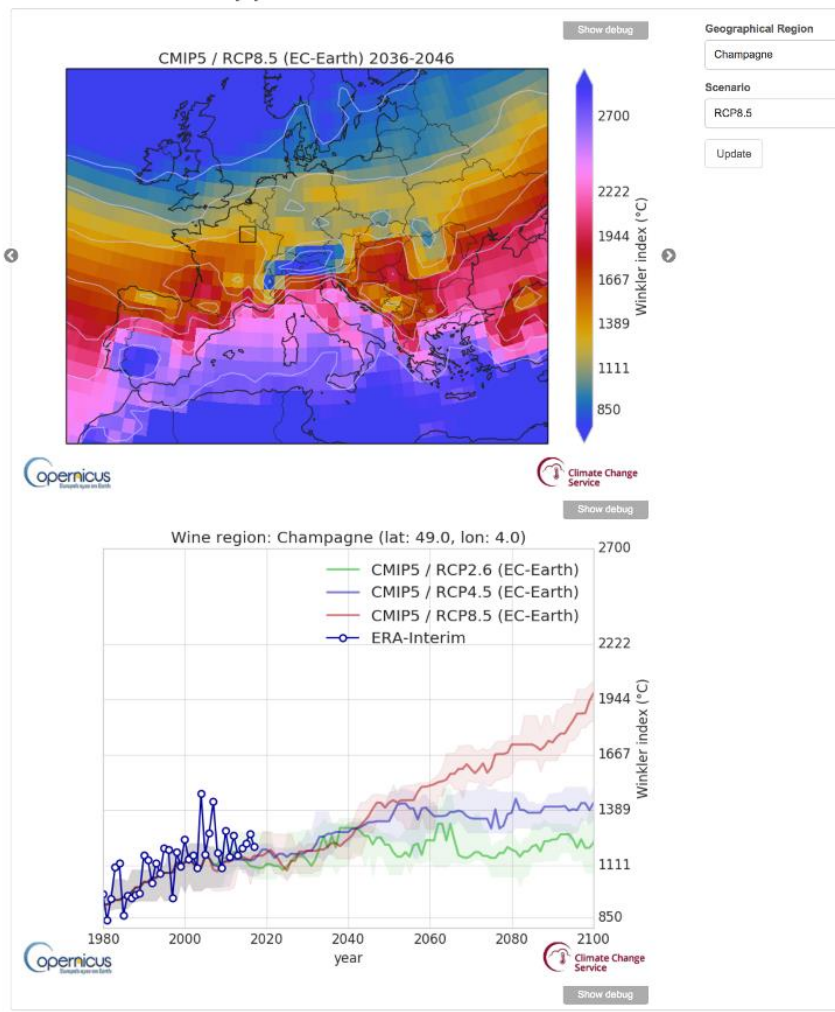




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From Data to Actionable Information

CDS Toolbox App.



Climate data for sectoral policies and businesses:

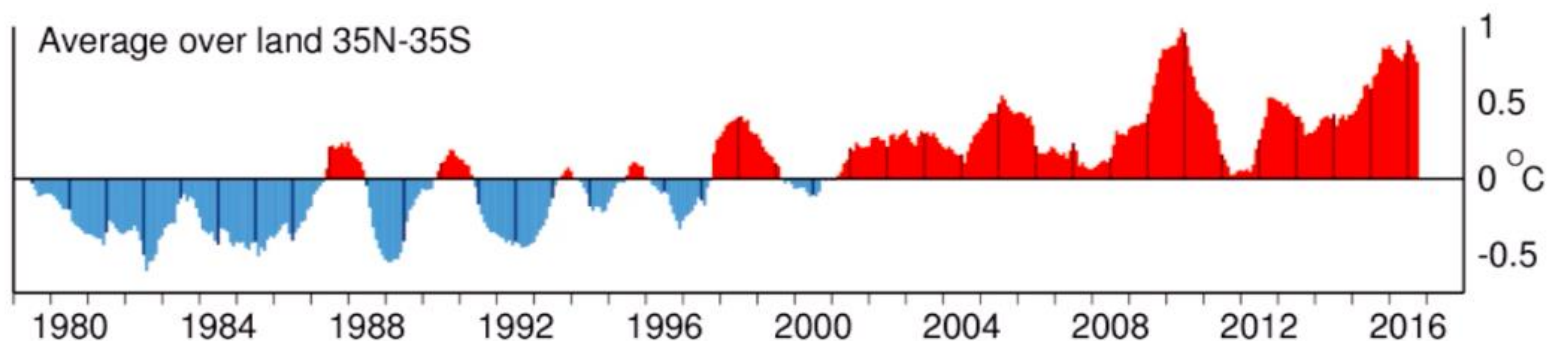
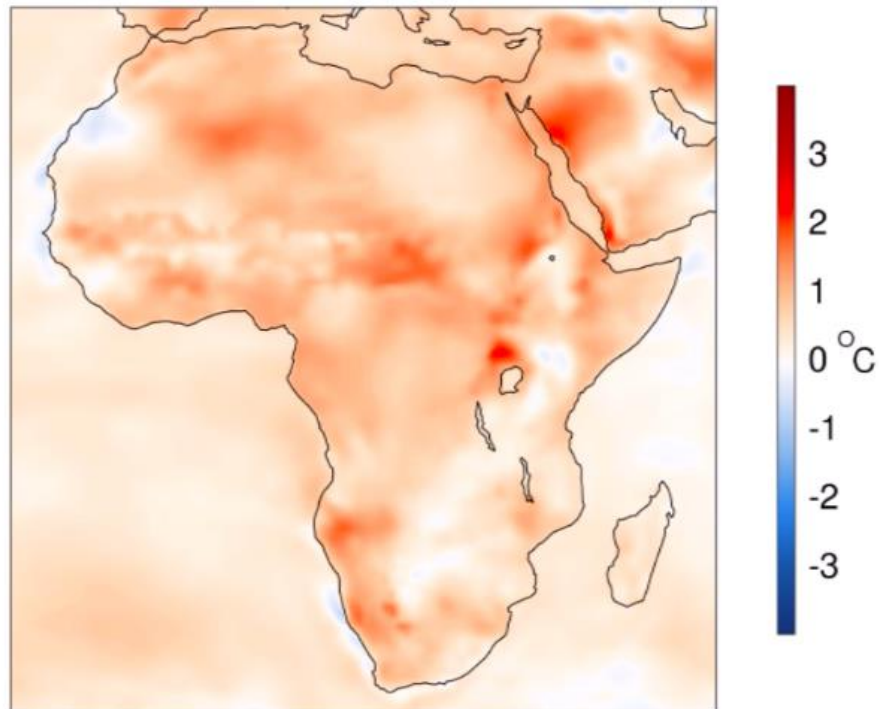
Water management, Energy, Insurance, Tourism, Agriculture, Health, Coastal Areas, Biodiversity, etc.



Climate
Change

A source for essential climate variables

Surface air temperature averaged from 201604 to 201703
relative to its 1981-2010 average



**How is the
climate
changing?**

*Observations &
Re-analysis*

**What are the
societal
impacts?**

*Climate
indicators &
Sectoral
information*

**What is the
rate of
change?**

*Forecasts &
Projections*



Climate
Change

Sectoral Information System

WHAT WILL THE INFORMATION BE USED FOR?

The wealth of climate information will be the basis for generating a wide variety of climate indicators aimed at supporting adaptation and mitigation policies in Europe in a number of sectors. These include, but are not limited to, the following:



**WATER
MANAGEMENT**



**AGRICULTURE &
FORESTRY**



TOURISM



INSURANCE



TRANSPORT



ENERGY



HEALTH



INFRASTRUCTURE



**DISASTER RISK
REDUCTION**



COASTAL AREAS

C3S WILL DELIVER SUBSTANTIAL ECONOMIC VALUE TO EUROPE BY:

1

INFORMING

POLICY DEVELOPMENT TO PROTECT
CITIZENS FROM CLIMATE-RELATED
HAZARDS SUCH AS HIGH-IMPACT
WEATHER EVENTS

2

IMPROVING

PLANNING OF MITIGATION AND
ADAPTATION PRACTICES FOR KEY
HUMAN AND SOCIETAL ACTIVITIES

3

PROMOTING

THE DEVELOPMENT OF NEW
SERVICES FOR THE BENEFIT OF
SOCIETY



European
Commission





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Copernicus Security Service

Border Surveillance

- Coastal monitoring
- Pre-frontier monitoring
- Reference mapping



Maritime Surveillance

- Maritime surveillance of an area interest
- Vessel detection
- Vessel tracking and reporting
- Vessel anomaly detection



Support to EU External Action

- Road network status assessment
- Conflict damage assessment
- Critical infrastructure analysis
- Reference map
- Support to evacuation plans
- Crisis situation map
- Border map
- Camp analysis





Copernicus

THE BIG DATA CHALLENGE

- **Massive amounts of data**
- **Full, open and free-of-charge**
- **Ease of access and use**



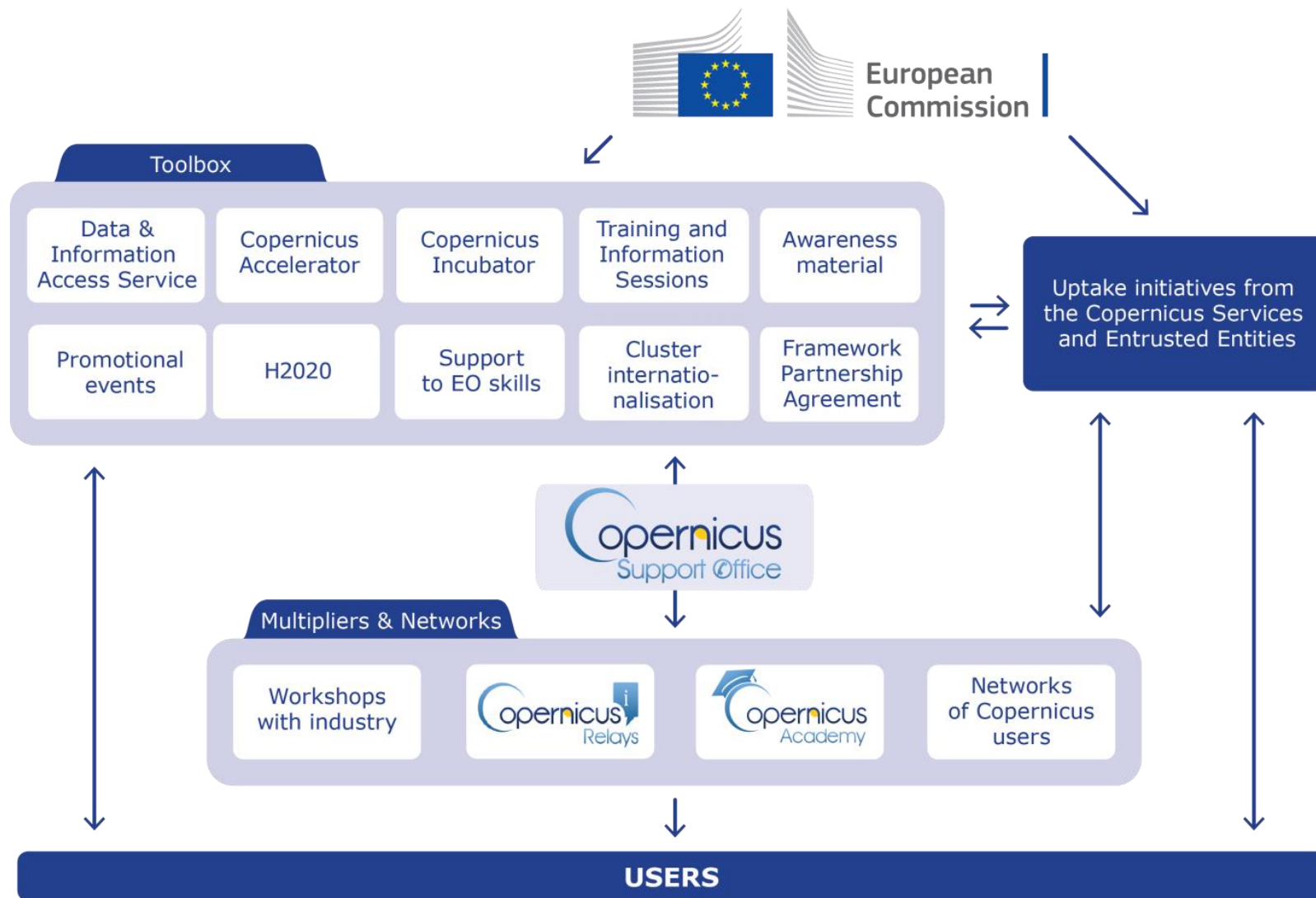
Over 16 TB data / day

- Different types of **dissemination** infrastructures
- Member States Collaborative Ground Segment
- **New technology** developments
- ICT and EO **cross-fertilisation**
- **Interoperability** with non-EO datasets
- Public programmes as enablers
- Growth and jobs in **downstream** sector



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COPERNICUS USER UPTAKE INITIATIVES



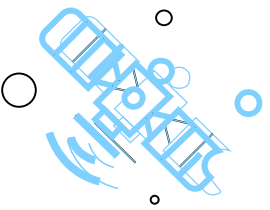


#vdLcommission



Political Priorities for the next European Commission 2019-2024

1. A European Green Deal
2. An economy that works for people
3. A Europe fit for the digital age
4. Protecting our European way of life
5. A stronger Europe in the world
6. A new push for European democracy





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Future and Evolution

• The European Green Deal

Copernicus services and products enable the full implementation :

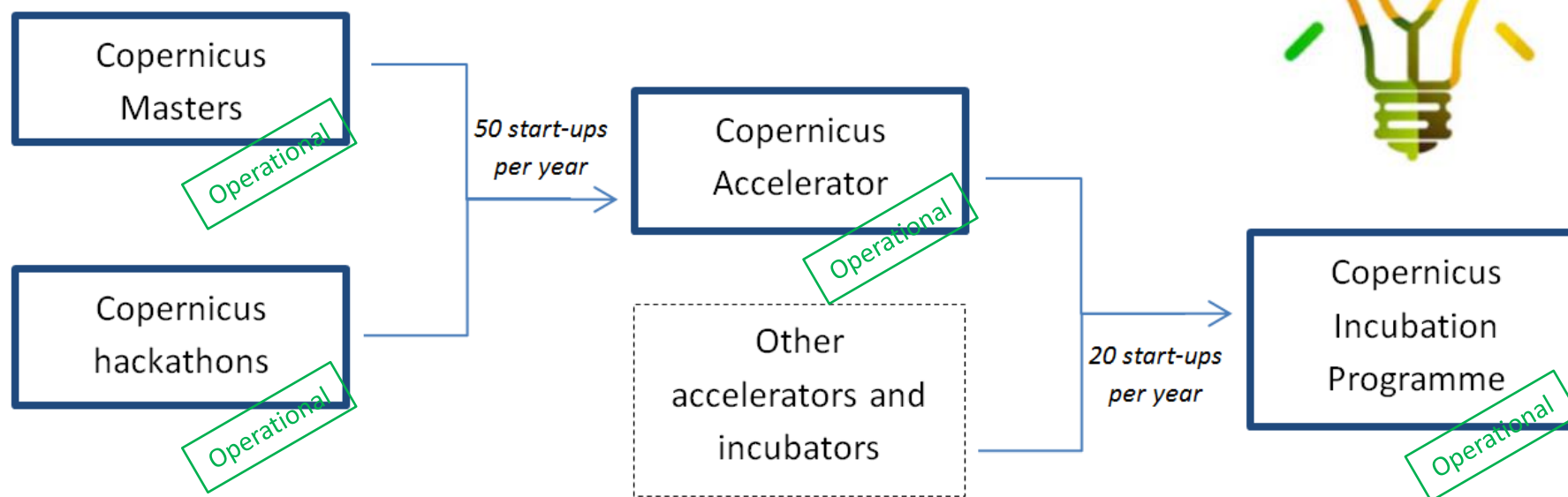
- **tackling climate change issues** (including soil erosion and drought for agricultural practices)
- **reducing emissions** (e.g. by monitoring pollution and offering alternative ship routing to save fuel)
- **respecting international commitments** (Paris agreement and various UN conventions) for example through the new CO2 service.
- Controlling the effective **implementation of environmental policy**, the sustainability of **a bio-economy** and the **protection of biodiversity**, including in natural heritage areas.

Source: Climate Action Tracker, Sept 2019

Synergies with environment, climate, agriculture, transport and energy policies.

Data flow guaranteed at least **up to 2030**, with full, free and open data policy

Copernicus start-up programme



Copernicus International strategy

Objectives:

- Maximise the **efficiency of EU investments through cooperation with international partners**
- Promote the **uptake of Copernicus data globally integrating data from international partners** into Copernicus
- Promote **access to international markets for European EO companies**
- **Agreements signed with** USA, Australia, India, Brazil, Chile, Colombia, African Union, Serbia and Ukraine
- **Discussions ongoing** with ASEAN countries, Singapore, Argentina, Canada, Japan, FAO, UNEP, Holy See.





Thank you for your
attention

European Commission
www.copernicus.eu