



# Copernicus Programme Status

Copernicus Committee #19  
1 October 2018, Brussels



Copernicus EU



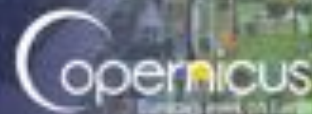
Copernicus EU



Copernicus EU



[www.copernicus.eu](http://www.copernicus.eu)





Copernicus

# Overview - Copernicus Services & Components



Land Monitoring Service (pan-EU & local)

Land Monitoring Service (global)



Marine Environment Monitoring Service



Atmosphere Monitoring Service



Climate Monitoring Service

Emergency Management Service



Security Service (Border surveillance)



Security Service (Maritime Surveillance)



Security Service (Support to External Action)



In-situ Coordination



Land Monitoring

# Copernicus Land Monitoring Service (CLMS)

Pan-european and local land  
monitoring



Land  
Monitoring

## Local component

- Urban Atlas contract finalised:
  - Geographic extension to EEA39: completed
    - 850 FUAs published
    - 601 FUAs Street Tree Layers published
  - 3D information of 32 core city areas for EU capitals published
  - Mapping of revised FUA2012 published.
- Riparian Zones:
  - 50% of AoI delivered in April 2018 (100% planned 10.2018)
- Natura2000 sites:
  - 250.000 km2 delivered
  - slight delay on last 110.000 km2: planned delivery 28.09.2018





Land Monitoring

## Global Land Service:

- Global Land Operations (CGLOPS)
- Ground Based Observations for Validation (GBOV)
- Hot-Spot Monitoring (CHSMS)
- Sentinel-2 Global Mosaic (S2GM)



Land  
Monitoring

# Product Portfolio -

## From medium to high resolution

Theme	Variable	Spatial Resolution
Vegetation	Land Cover	Moderate 100m
		In production

## From coarse to medium resolution

Theme	Variable	Spatial Resolution	Spatial Resolution
	Fraction of photosynthetically active radiation absorbed by the vegetation	In production	In production
	Fraction of green vegetation cover	In production	In production
	Leaf Area Index	In production	In production
	Normalized Difference Vegetation Index	In production	In production
Vegetation	Vegetation Condition Index	In production	In production
	Vegetation Productivity Index	In production	In production
	Dry Matter Productivity	In production	In production
	Burnt Area	In production	In production
	Soil Water Index	In production	In production
	Surface Soil Moisture	In development	In development
Energy	Land Surface Temperature	In production	In production
	Top Of Canopy Reflectance	In production	In development
	Surface Albedo	In production	In development
	Downward Short- and Longwave Fluxes at the surface	In development	In development
	Water Bodies	In production	In production
Water	Lake Surface Water Temperature	In development	In development
	Lake Water Quality	In development	In development
	Lake Ice Extent	In development	In development
Cryosphere	Snow Cover Extent	In development	In development
	Snow Water Equivalent	In development	In development

Portfolio now completely operational since last CUF

## From coarse to medium resolution

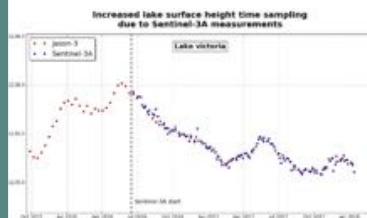
Theme	Variable	Spatial Resolution	
		Coarse >=1km	Medium 300m
Vegetation	Fraction of photosynthetically active radiation absorbed by the vegetation	In production	In production
	Fraction of green vegetation cover	In production	In production
	Leaf Area Index	In production	In production
	Normalized Difference Vegetation Index	In production	In production
Vegetation	Vegetation Condition Index	In production	In production
	Vegetation Productivity Index	In production	In production
	Dry Matter Productivity	In production	In production
	Burnt Area	In production	In production
	Soil Water Index	In production	In production
	Surface Soil Moisture	In production	In development
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	Top Of Canopy Reflectance	In production	In production
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Cryosphere	Snow Cover Extent	In production	In production
	Snow Water Equivalent	In production	In production

## Non-gridded products

Theme	Variable	Rivers and Lakes
Water	Water Level	In production

## Non-gridded products

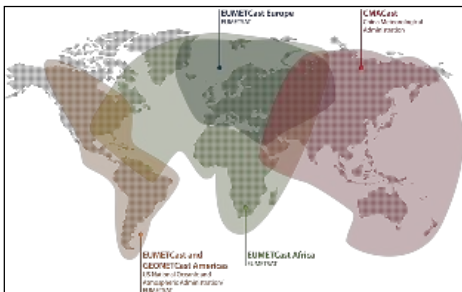
Theme	Variable	Rivers and Lakes
Water	Water Level	In production



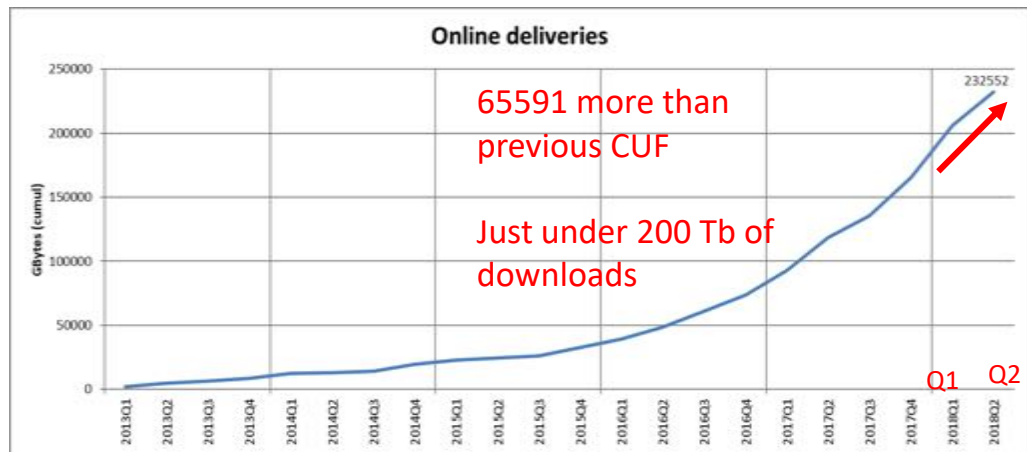


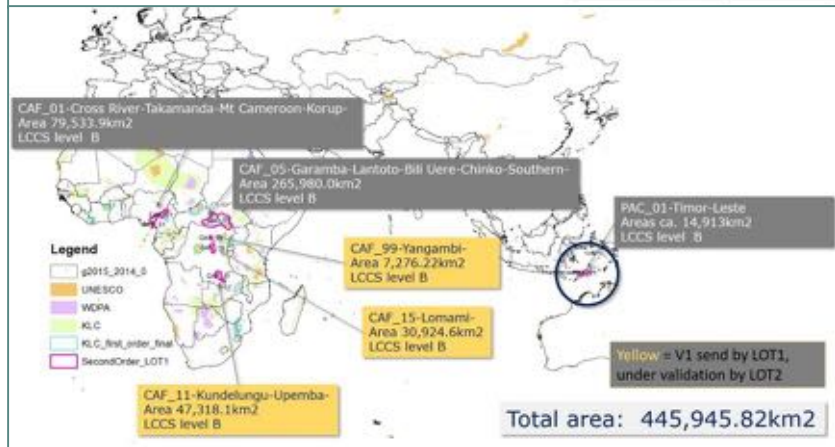
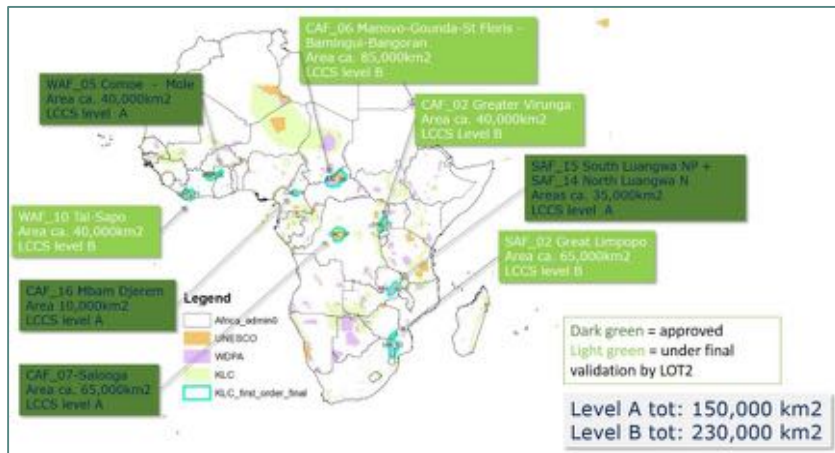
## Land Monitoring

- More than 3184 users are registered,
- Additional 3.8% are not confirmed by email, users through Eumetcast are potentially close to 3000 as well: Eumetcast distribution of 300m products is prepared and started in summer (in Q3)



- Mailing list users grow constantly.





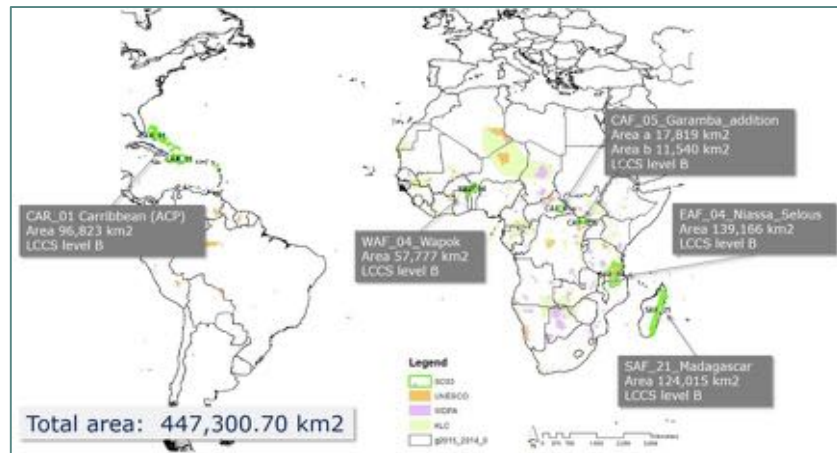
19 Key landscape areas mapped at high resolution detail.

4 fully quality approved

7 under validation

8 in advanced stage of production

Website with quality approved products to be opened in Autumn







Land  
Monitoring

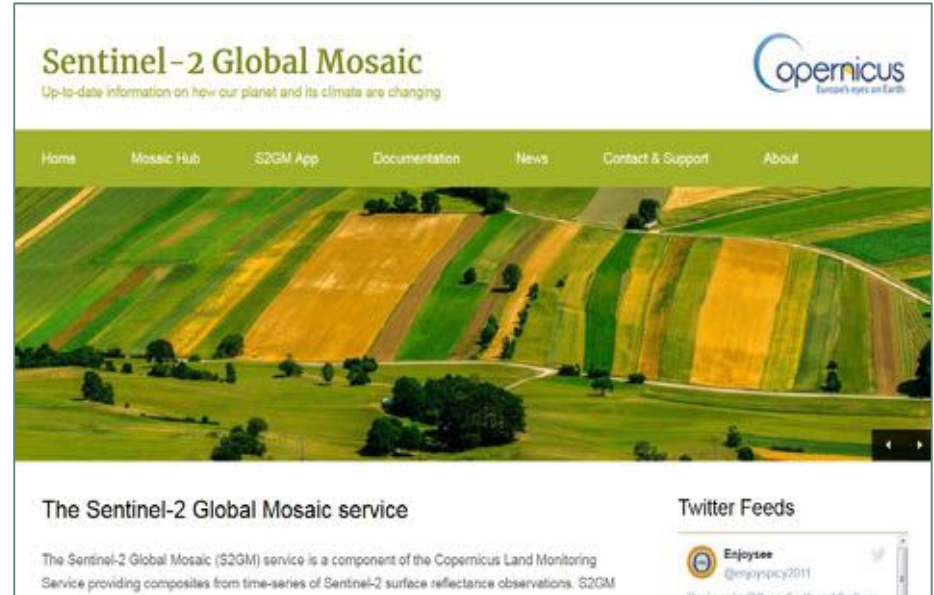
# Sentinel 2 Procurements

First production over **Europe**  
ready since March 2018

(Sentinel 2 surface reflectances (Level 2A provided by ESA)  
only available.)

Second phase (QA4 2018) will  
move to global scale.

Direct distribution (*https and  
advanced web portal*) of time  
compositing data covering for  
global users.



S2-GM Website interface



Marine Monitoring

# Copernicus Marine Environment Monitoring Service (CMEMS)

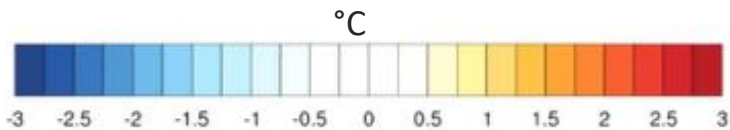
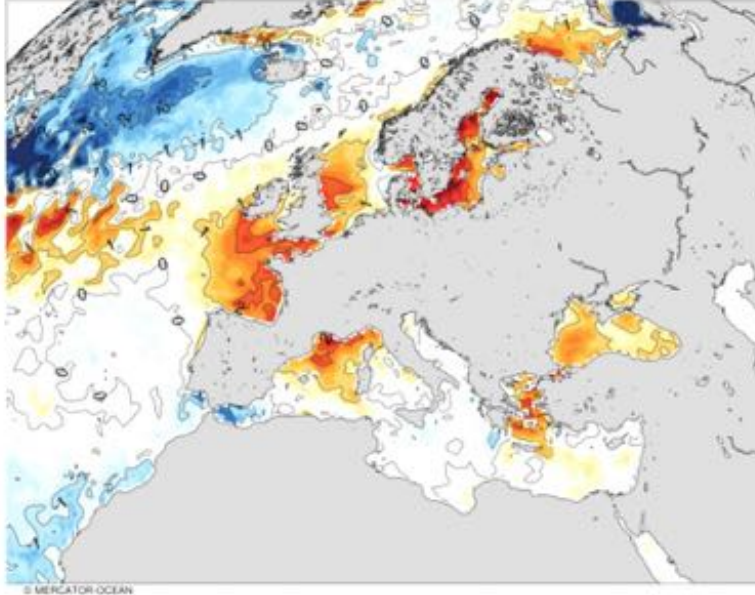


Marine  
Monitoring

# Summer 2018 : Sea surface temperature

## CMEMS product: global 1/12°

Sea Surface Temperature Anomaly of July 2018



*Comparison of the average sea surface temperatures for July 2018 to the average for all the months of July from 2007 to 2017.*

*In July 2018, average temperatures were 1°C higher than the 10 years past and even exceeded 2°C in some places !*



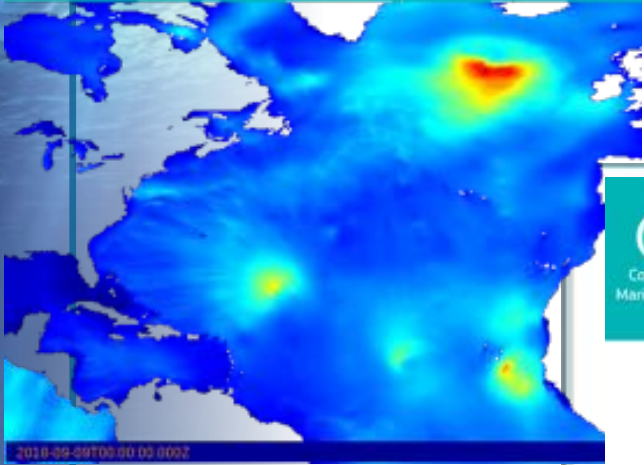


# Hurricane and typhoon signatures on the oceanic surface



## HURRICANE FLORENCE SIGNATURE ON THE OCEANIC SURFACE

Copernicus Marine Service  
European Centre for Medium-Range Weather Forecasts  
https://www.ecmwf.int/en/forecasts/products/global-ocean-waves-analysis-forecast

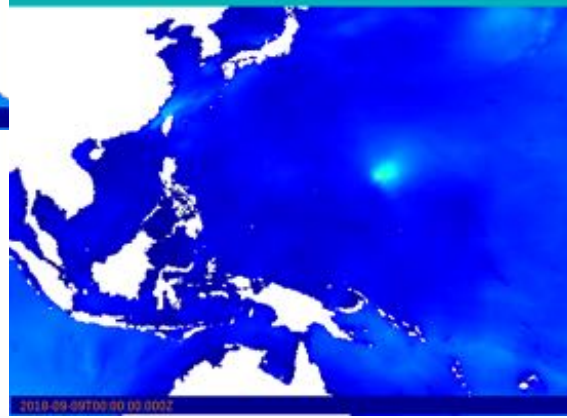


*This shows the three storms as they make their way across the Atlantic Ocean, using Copernicus Marine Service product “Global Ocean Waves Analysis and Forecast updated Daily” to track the wave height (in meters). There is hindcast (historical data) starting on September 9th with a forecast up to September 15<sup>th</sup>, 2018. In the figure the black represents a wave height of more than 7 meters (sometimes even reaching 10 meters) and the yellow, for example, is around 4.5 meters.*



## TYPHOON MANGKHUT SIGNATURE ON THE OCEANIC SURFACE

Copernicus Marine Service  
European Centre for Medium-Range Weather Forecasts  
https://www.ecmwf.int/en/forecasts/products/global-ocean-waves-analysis-forecast

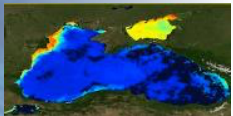
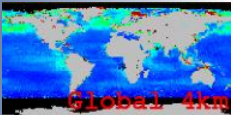
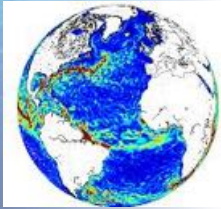


*Wave trains produced by Mangkhut are reshaped when entering the Taiwan Strait due to interactions with the local ocean current systems. As a consequence, an increase in significant wave height (SWH) and a change in wave direction are expected (as seen in the animation). Those processes of interaction between currents and waves are taken into account in the CMEMS global wave products since April, 2016.”*



Marine  
Monitoring

# Selected highlights of production



- Activation of **Jason 2G mission in SEA LEVEL** NRT products
- Addition of **NRT Wave L3 SAR** products from Satellites **Sentinel-1A and Sentinel-1B**
- Addition of **Total Surface and 15m Current** from Altimetric Geostrophic Current and Modeled Ekman Current Processing/Reprocessing for **Multi Observations Global** products
- Improvement of **Satellite Ocean Colour** daily chlorophyll interpolated products at Global Level (4km) and over the Atlantic (1km) thanks to **Sentinel-3A (OLCI sensor) and last NASA R2018 reprocessing**
- Addition of Satellite **Ocean Colour SeaWiFS daily climatology** data for Mediterranean and Black seas
- A switch to new orbit standards version "F" for **J3 mission SEA LEVEL** NRT products

*June 2018*

*July 2018*

*Sept. 2018*



Copernicus  
Europe's eyes on Earth

Implemented by  
**MERCATOR  
OCEAN  
INTERNATIONAL**



Marine Monitoring

14 300 Subscribers

- 4560 Different Entities among which 1176 Business Companies

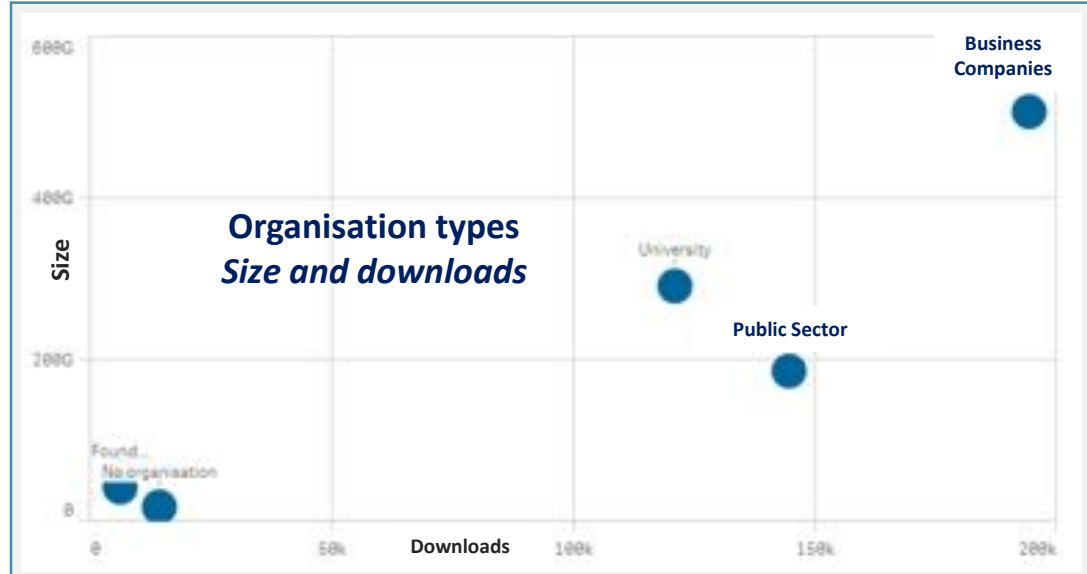
During the last 12 months :

- Downloads/month: 40 000  
*Download = Pair User/Dataset per Day*
- Volume/month: 87 Tb
- 97% products on time
- Satisfaction of Users: 4,7/5

Management of **GDPR** :  
*online SLA updated + message sent to subscribers to obtain their consent to continue to receive information from CMEMS.*



# Uptake of products



During the last 12 months, 200 000 downloads from Business Companies for a total amount of 500Gb.





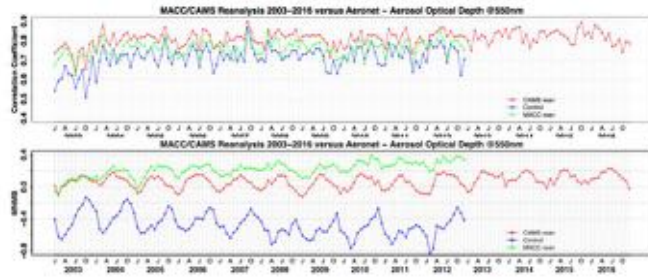
Atmosphere Monitoring

# Copernicus Atmosphere Monitoring Service (CAMS)



# CAMS HIGHLIGHTS

Atmosphere  
Monitoring



The CAMS reanalysis of global atmospheric composition (2003-2017) has been completed. Evaluation by an external international consortium has concluded that this dataset of **high quality** and an improvement over the previous (highly successful) MACC reanalysis, which has had over **3000 users**. The assimilation of satellite data is very beneficial compared to the model-only simulations. **Data has been released to users on 17/09.**

CAMS pollen forecasts have received lots of attention in **media** and **social media**.

During its first months of existence, the Météo Pollen app (by Weatherforce, France) has been **downloaded more than 30.000 times**.



Ragweed (29/08/2018)



**New: ragweed pollen** (occurring in late summer/autumn species) is available since 01/08/2018.



The Head of CAMS co-authored with 3 US colleagues a **comment paper in Nature** (issue 06/09) urging to take worldwide action on air quality, in particular based on information now available at the global scale e.g. with Copernicus. Training is also mentioned (in particular the upcoming Copernicus MOOC).





Atmosphere  
Monitoring

# OZONE LAYER MONITORING PAGE

INTERNATIONAL DAY FOR THE PRESERVATION OF THE OZONE  
LAYER

KEEP COOL AND CARRY ON: MONTREAL PROTOCOL – 16  
SEPTEMBER 2018

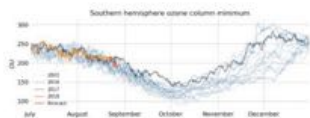


## Monitoring of the ozone layer

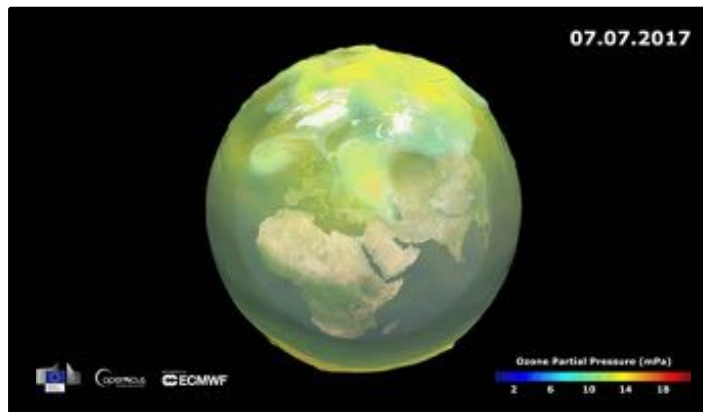
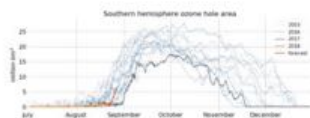
The Copernicus Atmosphere Monitoring Service (CAMS) combines measurements from satellite instruments and in-situ sensors with numerical models to provide a series of ozone products which are a result of processing raw data to create useful information. This page gives an overview of the latest status of the ozone layer over the Antarctic, including the extent of the ozone hole, ozone vertical measurements and ozone forecast charts.

[OZONE HOLE AREA](#) [OZONE COLUMN MINIMUM](#) [MINIMUM SHPPA TEMPERATURE](#) [OZONE FORECAST CHARTS](#) [VERTICAL CROSS-SECTION ANIMATION](#)

### Ozone column minimum



### Ozone hole area



- This page has opened on 16 September
- Having highest quality data is not enough
- Contents as discussed with DG-CLIMA
- Put current ozone hole in the longer term context
- Explanatory animation to explain what to look for

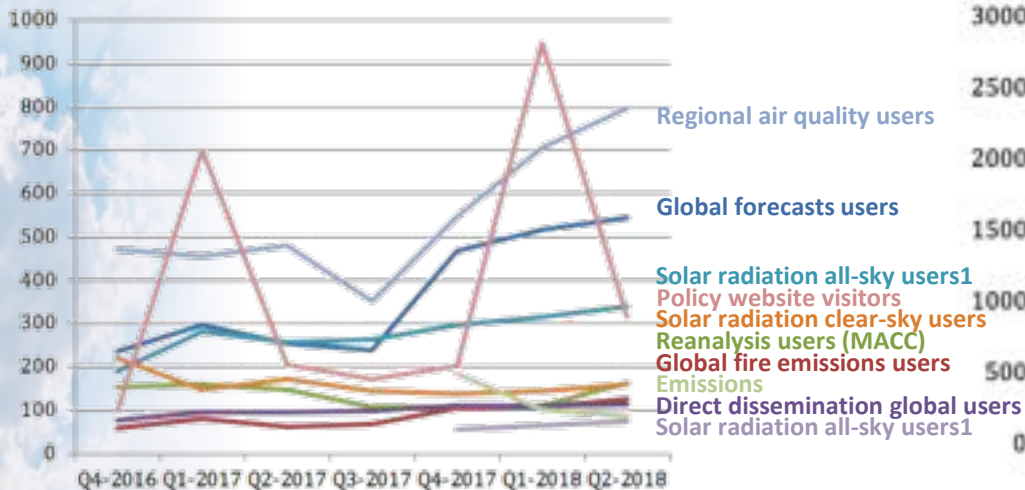


# CAMS DIRECT USERS IN Q2 2018

The two products with largest number of **active** direct users are the daily regional air quality forecasts (~800) and daily global forecasts (~550). Growth rate is about +10% per quarter or **+50% per year**.

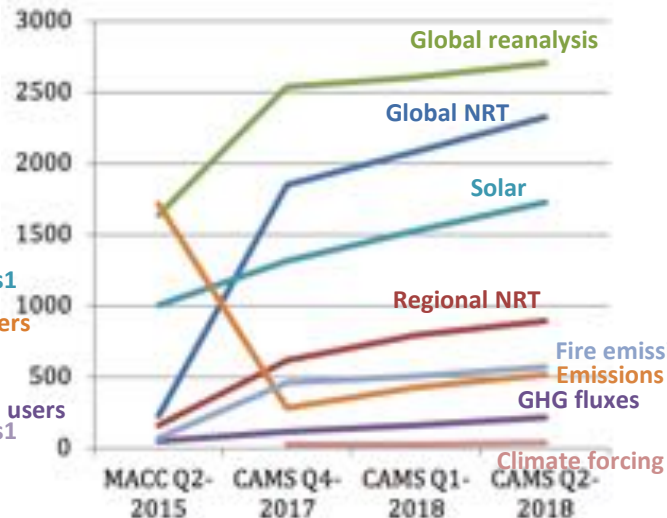
## ACTIVE USERS DURING Q2

Total: 2397



## CAMS REGISTERED USERS

Total: 8986



\* CAMS emissions product since 09/2017 only (user numbers were reset to 0)



Climate Change

# Copernicus Climate Change Service (C3S)



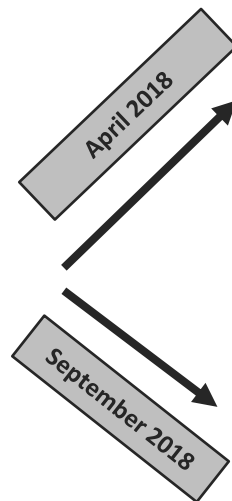


# C3S Production Highlights

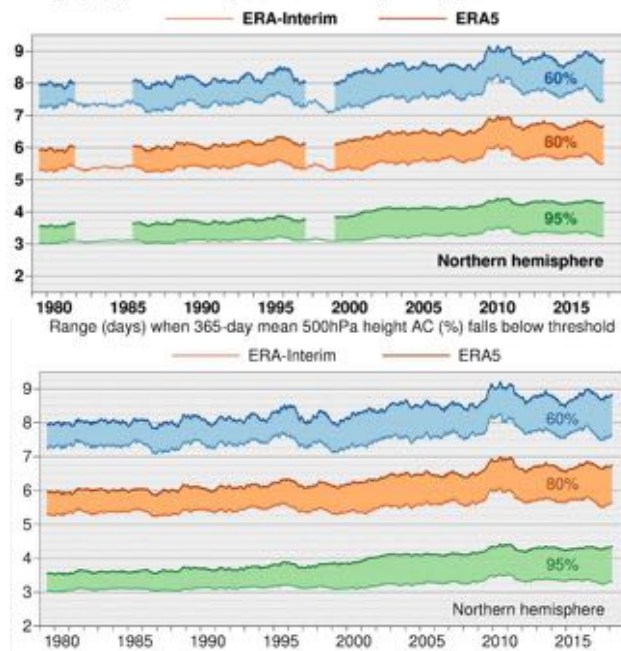
Climate Change

**Climate Data Store opened on 15 June 2018!**

- Incremental improvements ongoing, and more datasets progressively included. 2230 registered users by 16 September 2018



Range (days) when 365-day mean 500hPa height AC (%) falls below threshold



**ERA5: Job (almost..) done!**

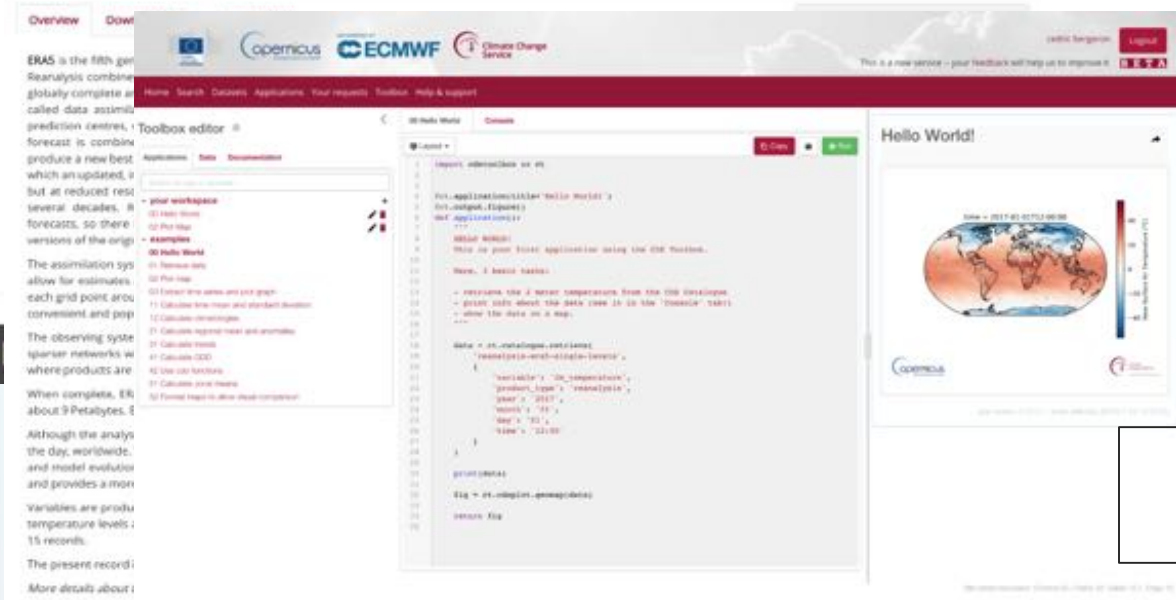


Climate Change

# The Climate Data Store



The CDS portal



Accessing ERA5 from CDS catalogue

The CDS toolbox editor





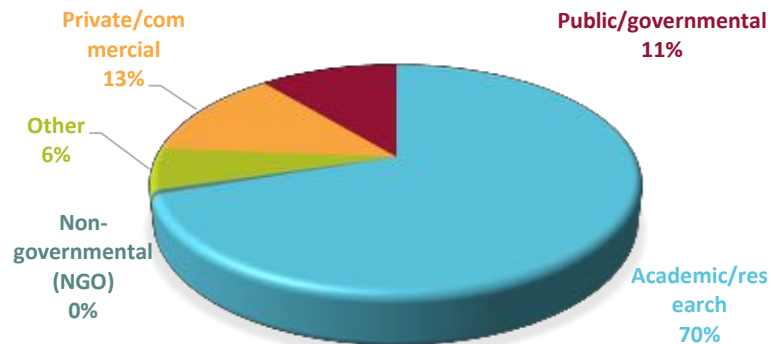
Climate Change

# Overall C3S usage

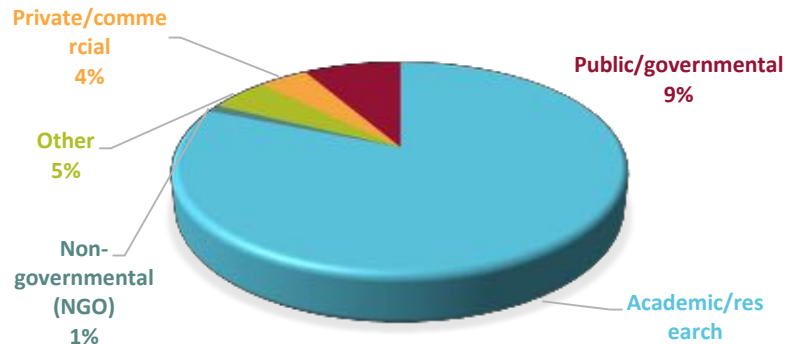
- Active users (1JUN-20AUG18)
  - Global reanalysis: 8,006
    - ERA5: 1,288 (new: 537)
    - ERA-Interim: 6,718 (new: 1,830)
  - Seasonal forecasts
    - Web chart users: 1,454
    - Data users: 78 (new: 41)
- Data delivery (1JUN-29AUG18)
  - Global reanalysis data delivery
    - ERA5: 766 TB
    - ERA-Interim: 308 TB
  - Seasonal forecasts: 2 TB



## ERA5 ACTIVE USERS



## ERA-INTERIM ACTIVE USERS





## C3S Press Activities

- 2 press releases, and regular monthly C3S media briefings distributed to national media
- Extensive online, print and broadcast coverage by national media including:
  - [Washington Post](#) (reach each 42M), [Scientific American](#), [BBC](#), [Nature](#) (reach 8M), [NRC](#) the Netherlands (reach 1M), [finanzen.net](#) (reach 2M) [Sueddeutsche Zeitung](#), [Focus Magazin & ARD \(Germany\)](#), [Metro \(Belgium\)](#)
  - Euronews monthly C3S Climate Updates for April, May, June, July in 156 countries and in several languages: [English](#), [French](#), [German](#), [Hungarian](#), [Italian](#), [Portuguese](#), [Russian](#), [Spanish](#), [Turkish](#)
- Interviews with national science journalists

Europe never had such a warm month of August

It has never been so hot in Europe during August in this year. This is shown by analysis of the Copernicus Climate Change Service, a new service of the European Commission. Since the beginning of this millennium the annual temperature has steadily increased.

If you feel that you have been searching for a long time in August, then feel free for you were not alone. Mercury rose to higher temperatures than usual in Europe. This confirms new analysis of the Copernicus Climate Change Service, a new research service of the European Commission. It compared the heat of the past month with data from 1981 to 2010 and did not find a warmer one in summer.

Surface air temperature anomaly for August 2014 relative to 1981-2010

Temperatures are measured against the average for the period 1981-2010  
Source: Copernicus Climate Change Service, European Centre for Medium-Range Weather Forecasts

**Nature**

Droughts, heatwaves and floods: How to tell when climate change is to blame

Weather predictions will soon provide broad assessments of global warming's influence on extreme events.





Emergency Management

# Copernicus Emergency Management Service (CEMS)







## EMS - Events

### Past events

June-  
Sept

- 11-12, De Bilt Workshop on Copernicus C3S Climate attribute service
- 25-27, Delft Global Flood Partnership meeting
- 26-27, Copenhagen KO meeting Corda
- 2-4/7, Vienna IUFRO & World Bank Global Fire Expert Network meeting on forest fires & climate change
- 25/8, Stockholm Integrated Drought Management Programme AC meeting
- 27/8-1/9, Tansania FOSS4G2018 (annual meeting of the open source community)
- 13/9, Brussels Copernicus & unmanned aerial platforms

### Future events

Oct

- 1-2/10, Maryland 3<sup>rd</sup> Global Wildfire Information System (GWIS) network & GOFC Fire IT meeting
- 11-12/10, Ispra 2<sup>nd</sup> EDO User Meeting
- 11-12/10, Vienna Risk Data Hub & Austrian Disaster Network Days
- 18-19/10, Frascati Data Availability Timeliness to Copernicus Emergency Management Service (EMS) (ESA)
- 16-17/10 Working group Floods

Nov-  
Dec

- Tbc/11 Brussels Civil Protection Wildfires – Lessons learned meeting (ECHO) – EFFIS eval. 2018 wildfire season
- 19-20/11, Leon (ES) 38<sup>th</sup> Expert Group on Forest Fires (EFFIS network)
- 15/11, Copenhagen Copernicus Working Group on Geospatial Reference Data
- 5-6/12, Koblenz Großräumiges Hochwassermonitoring – Möglichkeiten, Grenzen, Chancen der Fernerkundung
- 11-13/12, Munich Humanitarian Panel@EUSPACEIMAGING



## EFAS & GloFAS output since the last CC meeting (20 June) :

**29 EFAS flood notifications** were send out to the national partners, and **daily overviews** to the ERCC.



## Four studies/reports were published

- 1) Feedback on flood notifications** sent between May 2017 and April 2018 was evaluated
- 2) Review on the EFAS seasonal outlook** using the C3S seasonal forecast for the summer 2018 low river flows in Europe.
- 3) Analysis of various flash flood events** that have occurred in autumn 2017 over Latvia, Croatia and Norway
- 4) Analysis on the CEMS hydrological data** collected throughout 2017

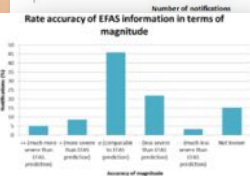
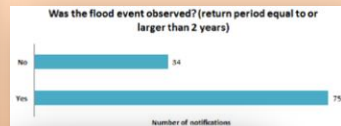
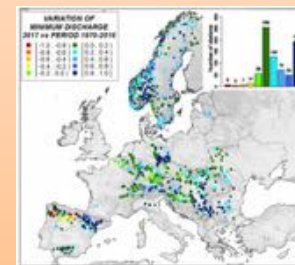


Figure 18. Forecasts in EFAS-ES on: (a) September 2<sup>nd</sup> 00:00 UTC, (b) September 3<sup>rd</sup> 00:00 UTC, (c) September 3<sup>rd</sup> 00:00 UTC, and (d) September 3<sup>rd</sup> 00:00 UTC



(1 & 2 found under: [https://www.efas.eu/download/efasBulletins/2018/bulletin\\_jun\\_jul\\_18.pdf](https://www.efas.eu/download/efasBulletins/2018/bulletin_jun_jul_18.pdf))

3 & 4 found under <https://www.efas.eu/home.html>)

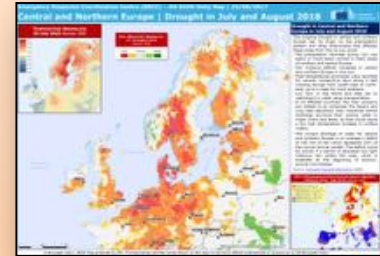


## EDO & GDO Progress since the last CC meeting (20 June 2018) :

- **Data exchange between EDO and national/regional/river basin drought monitoring systems:**
  - Data from the Czech and Slovakia Drought Monitor ([www.intersucho.cz](http://www.intersucho.cz)) published in EDO
  - EDO soil moisture data delivered to Czech and Slovakia Drought Monitor

- **Monitoring and assessment of drought in Central and Northern Europe:**

- ★
  - EDO Drought News published 17 July 2018 and 10 August 2018
  - Daily Map on Drought in Central and Northern Europe published 24 August 2018



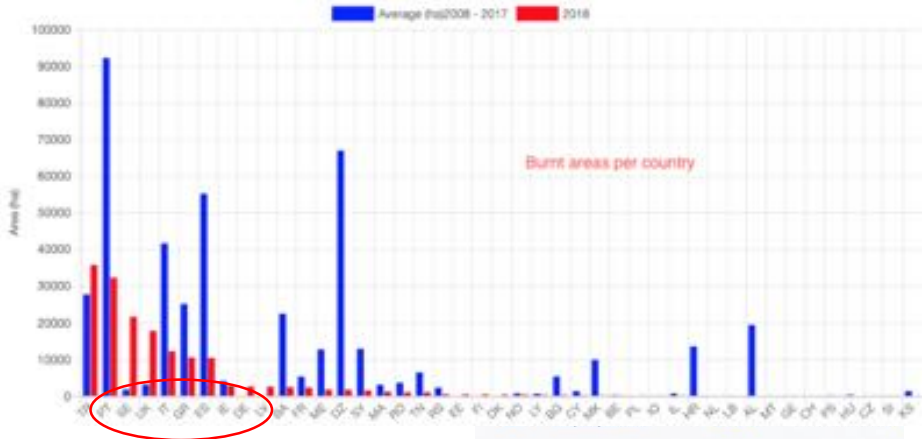
- **Technical improvements:**

- New soil moisture data covering extended EDO window processed and quality checked.
- Graphical display & analysis tools for a global database of drought events (1950-2016) developed.
- First version of drought forecasting module tested.
- Information and tools for regular injection of drought information into GDACS+ developed and tested.



## EFFIS & GWIS Output & highlights since last CC meeting June 2018

- 574 fires larger than 30 ha mapped in the EU by EFFIS since the 1<sup>st</sup> of Jan. 2018 with a total burnt area of 118.053 ha, below the average of the last decade (see line graph of seasonal burnt area in the EU below - left).
- Much of the fire activity took place in central and northern Europe, affecting SE, UK, IE, DE, LV, FI, countries that normally are not affected by forest fires (see EFFIS burnt areas per country below - right).
- GEO GWIS NASA Webinar on July 19<sup>th</sup> [https://arset.gsfc.nasa.gov/sites/default/files/land/webinars/18-advwild/AdvancedWildfires\\_Presentation2\\_Final.pdf](https://arset.gsfc.nasa.gov/sites/default/files/land/webinars/18-advwild/AdvancedWildfires_Presentation2_Final.pdf).
- Ongoing implementation of GEO NASA projects supporting GWIS, including global wildfire tools & statistics. New projects to be funded by GEO Secretariat in 2019, in order to showcase GWIS at the GEO Plenary 2019.





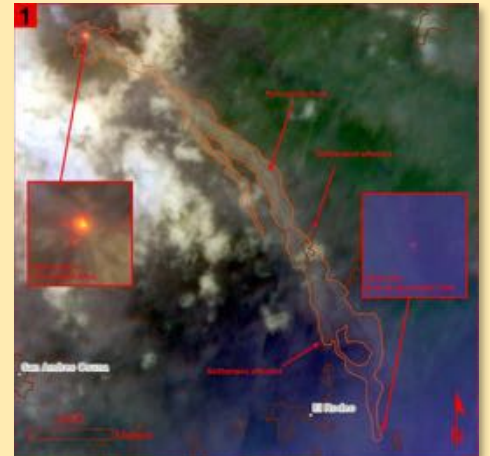
## Update since June CC

- 311 activations since 04/2012
- Trend of high activation volume continues: Q2 16 (Q2/2017: 9), Q3 18 (Q3/2017: 43)
- Activation highlights June to mid-September:
  - Support to managing forest fires in the Mediterranean and northern Europe (12 activations)
  - Very high production volume (record) to monitor the Algae Bloom in the French Antilles during May-July
  - Collaboration with International Charter for Indonesia Earthquake (August) & tropical cyclones in Pacific, Atlantic (Sept.)

## Eruption of Fuego volcano, Guatemala (June, EMSR289)

- **Sentinel-2 proves essential for first impact assessment!**
- S-2B acquisition of 4/6 is the first available optical image for this disaster (volcano eruption 3/6)
- Despite significant cloud coverage a first impact assessment could be performed with the SWIR band => grading map delivered on 5/6
- With future upgrade of S-2 delivery for emergencies (upgrade to NRT), the map delivery times can be significantly reduced (e.g. by half a day)

*Detail of the Grading Map highlighting active fires/fire front, pyroclastic flow and affected settlements*





Security

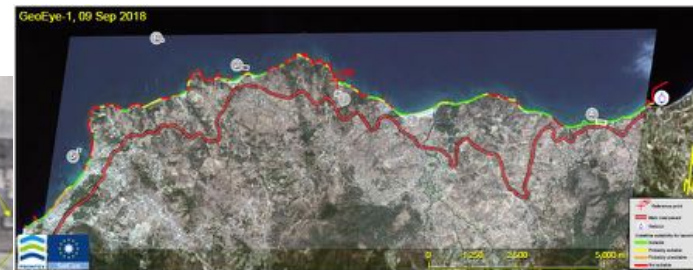
# Copernicus Security Service (CSS) Border Surveillance





## Service uptake (June- September):

- 78 Imagery Analysis Reports delivered to MS
- 4 Reference Mapping services delivered to Polish NCC and 5 in support of vulnerability assessments carried out by Frontex
- 1 ProDetect service under the evolution phase delivered in support of vulnerability assessment
- 615 Vessel Detection Service products based on SAR images were delivered. Vessel detections were present in 84% of the images. Also for the surveillance purposes 304 optical imageries were delivered.





Security

# Copernicus Security Service (CSS)

## Maritime Surveillance







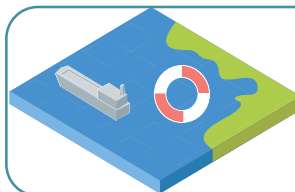
Security

# Uptake of products

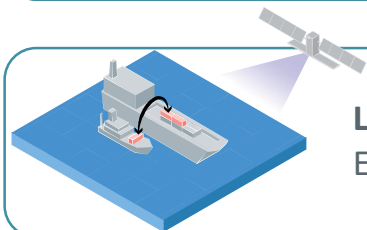
## No of EO Services delivered (1 June – 14 September 2018)



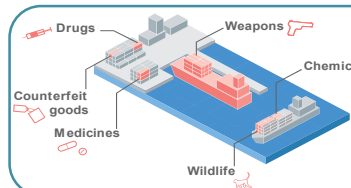
**Fisheries Control**  
EO Services: 101



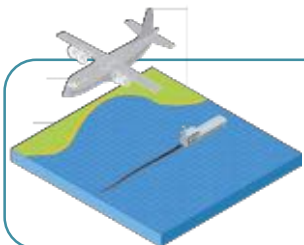
**Maritime Safety and Security**  
EO Services: 9



**Law Enforcement**  
EO Services: 492



**Customs**  
EO Services: 207



**Marine Environment**  
EO Services: 106



**Other (Support to International Organisations)**  
EO services: 40



Security

# SEA – Support to External Action



European  
Commission

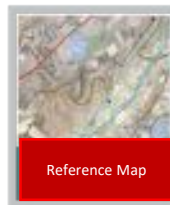




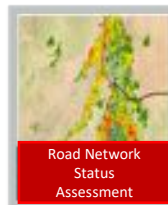
Security

## Type of Products requested:

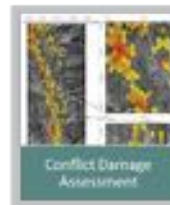
- Reference Map
- Road Network Status Assessment
- Critical Infrastructure Analysis
- Support to Evacuation Plan
- Non EU-Border Map
- Camp Analysis
- Activity Report



Reference Map



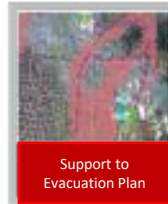
Road Network  
Status  
Assessment



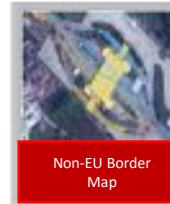
Conflict Damage  
Assessment



Critical  
Infrastructure  
Analysis



Support to  
Evacuation Plan



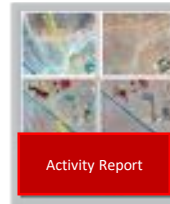
Non-EU Border  
Map



Camp Analysis



Crisis Situation Picture



Activity Report



Space Component

# ESA Status Report

## Copernicus Space Component (CSC) - Development Status of Space Segment





Space

Component

## Sentinel-1

- ★ The production of Sentinel-1C and -1D flight units, i.e. satellite platform, the SAR instrument and the Optical Communication Payload (OCP), is progressing according to plan.
- ★ The delivery dates for Sentinel-1C and Sentinel-1D are stable, despite reported delays at instrument level, i.e. SAR instrument (C-unit).

## Sentinel-2

- ★ The production of the Sentinel-2C/-2D flight units is progressing well, and according to plan, despite delays incurred by the MultiSpectral Instrument (MSI) and the Optical Communication Payload (OCP).
- ★ The delayed delivery of the SWIR detectors from Sofradir (F) for the MSI and the Optical Communication Payload (OCP) remain the major technical risks for the project.
- ★ Improvement to the MSI delivery dates is closely monitored by ESA project team.



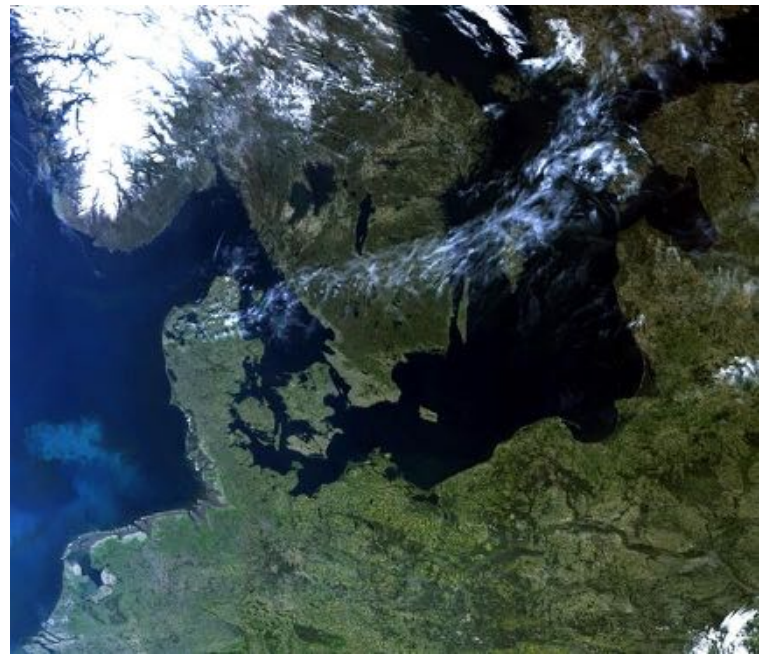
Space  
Component

## Sentinel-3B

- ★ After its successful launch on 25 April 2018 the Sentinel-3B satellite progressed well with its in-orbit commissioning and testing.
- ★ The In-Orbit Commissioning Review (IOCR) is scheduled for 17 October 2018 at ESA/ESRIN, Frascati, Italy.

## Sentinel-3C/D

- ★ The Sentinel-3C/-3D development activities are proceeding as planned at platform and instruments level with Technical Readiness Reviews, and Delta Reviews as required.
- ★ The Sea and Land Surface Temperature Radiometer (SLSTR) and the Ocean and Land Colour Instrument (OLCI) determine presently the critical path for Sentinel-3C, and followed-up closely by the project team.



First Pictures of Sentinel-3B of Northern Europe

## Sentinel-4

- ★ The development of the Sentinel-4 instrument is progressing well with successful testing of several PFM (Proto-Flight Model) subunits (Calibration Mechanism Assembly, Aperture Cover Mechanism Assembly), and manufacturing of critical PFM optics (lenses).
- ★ The Sentinel-4 instrument delivery dates are fully compatible with the MTG requested dates.
- ★ The delivery dates to the MTG programme are: Sentinel-4A June 2021, Sentinel-4B Q1 2022.

## Sentinel-5

- ★ The development of the Sentinel-5B and -5C instruments is progressing according to plan, in parallel to the development programme of the Sentinel-5A instrument.
- ★ However: The delays in the development of the Short-Wave InfraRed (SWIR) detectors by Sofradir is still a concern. The impact on the B&C instruments delivery dates is estimated to be at least 3 months and closely monitored by the ESA Project.
- ★ The delivery dates to MetOp-SG programme are: Sentinel-5A Q1 2020, Sentinel-5B Q2 2021 and Sentinel-5C Q3 2022.



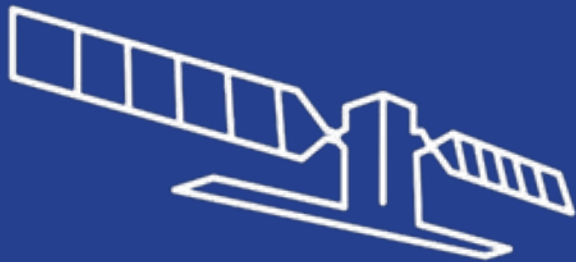
# CSC Development Status: Space Segment

## Space Sentinel-6

Component

- ★ **The main activities were focused on the development of the satellite platform units and the European payloads. In parallel, ESA's Sentinel-6 project team followed closely the progress of the US payloads, such as the Advanced Microwave Radiometer for Climate (AMR-C) and the Laser Retro-reflector Array (LRA), and the GNSS-RO receiver package.**
- ★ **The assembly, integration and test activities of Sentinel-6A are progressing well.**
- ★ **The flight production of the NASA/JPL instruments, Advanced Microwave Radiometer for Climate (AMR-C), the GNSS radio occultation receiver (GNSS-RO) and the Laser Retro-reflector Array (LRA), are progressing according to plan and their delivery for Sentinel 6B in March 2019 is maintained.**
- ★ **Some delay is reported for the Poseidon-4 altimeter flight equipment, however the Sentinel-6A FAR is maintained for April 2020.**





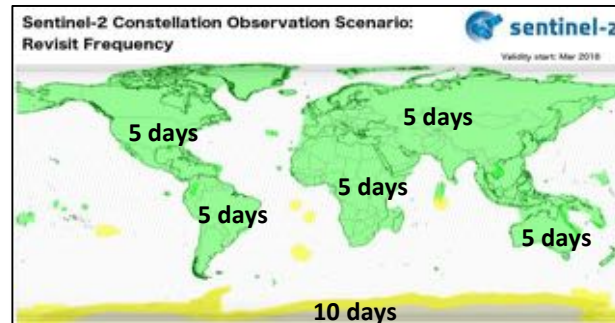
Space Component

# Copernicus Space Component (CSC) - Mission Management Status



## ➤ Sentinel-2 nominal operations continuing

- Since 17 February, Sentinel-2 reached full operational capacity performing global and systematic acquisitions with 5-day revisit.
- In addition to the baseline acquisition areas, other regions are being acquired (e.g. Antarctica every 10 days).
- Level-2A core products availability:
  - Since 26 March 2018, the systematic production of Level-2A core products started over the Euro-Mediterranean region with distribution on the Copernicus Open Access Hub and the Copernicus Services Data Hub.
  - Distribution of the Level-2A global production planned to start in Q4-2018
- EDRS service is nominally contributing to the Sentinel-2A and Sentinel-2B routine operations.
- Sentinel-2 Constellation Mission Operations Review successfully held on 27th June 2018.





# Sentinel-3 Operations Status

## ➤ **Sentinel-3 nominal routine and commissioning operations continuing**

- Sentinel-3A routine operations are on-going nominally.
- Definition and implementation of two new core (Aerosol Optical Depth and Fire Radiative Product) data products are on-going; sample products expected in Q4 2018.
- Sentinel-3A reprocessing campaign, including data from commissioning phase, has been completed for optical and altimetry data. Products will be gradually published from Q4 2018.
- Sentinel-3B in-orbit commissioning phase operations are nominally on-going with planned IOCR in October 2018. Sentinel-3A/3B Tandem phase almost completed, to be followed by a drift phase towards the nominal Sentinel-3 satellite constellation configuration.
- Routine Sentinel-3B operations expected to start beginning of 2019.

## ➤ **Upcoming activities**

- Completion of the Sentinel-3B commissioning operations and start of the constellation operations
- Start of joint ESA-EUMETSAT operations for dissemination of Sentinel-3 land products to Africa in Q4 2018.
- Start of operational distribution of Synergy products in Q4 2018.



Space  
Component

# Sentinel-5 Precursor: Operations Status

## ➤ Sentinel-5P Ramp-up operations progressing nominally

- S-5p operations are proceeding nominally following the successful IOCR on 24<sup>th</sup> April
- Since March 2018, the Cal/Val teams have access to S-5p sample products via the S-5p Expert Data Hub
- Release of first S-5p products to all users started in Summer 2018:
  - First data released on 10 July 2018: Total Columns of Ozone, Nitrogen Dioxide (NO<sub>2</sub>), Carbon Monoxide (CO), as well as Cloud & Aerosol information

## ➤ Upcoming Milestones

- Availability of all S-5p products to users is foreseen by end 2018.



# Copernicus Space Data Access and Dissemination

Data Access



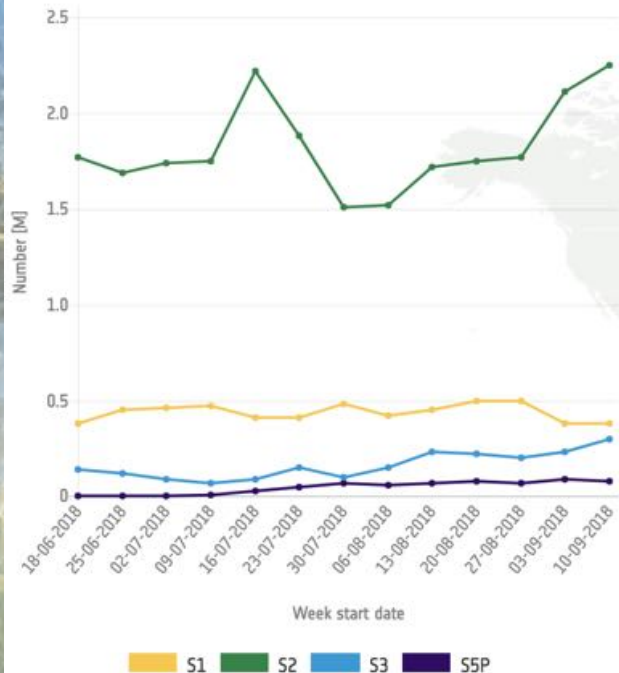


# Sentinel Data Access Overview

Total number of downloads

32,023,495

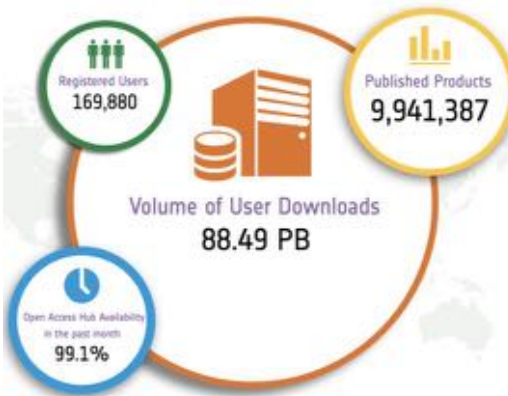
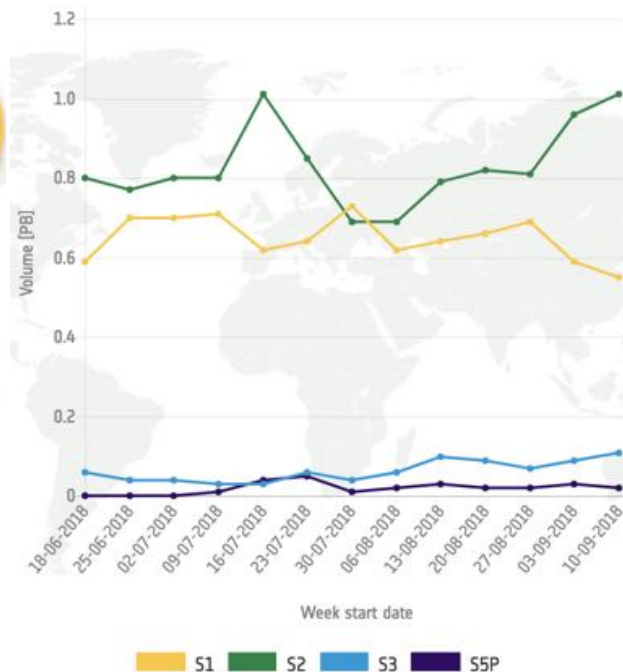
Number of products downloaded per Sentinel



Total volume of downloads (PB)

20.31

Volume of products downloaded per Sentinel



Statistics at mid September 2018

S1 S2 S3 S5P

# Data & Information Access Services (DIAS)



Data  
Access

CREODIAS

<https://creodias.eu/>



sobloo

<https://sobloo.eu/>



mundi  
WEB SERVICES

<https://mundiwebservices.com/>



ONDA

<https://www.onda-dias.eu/>

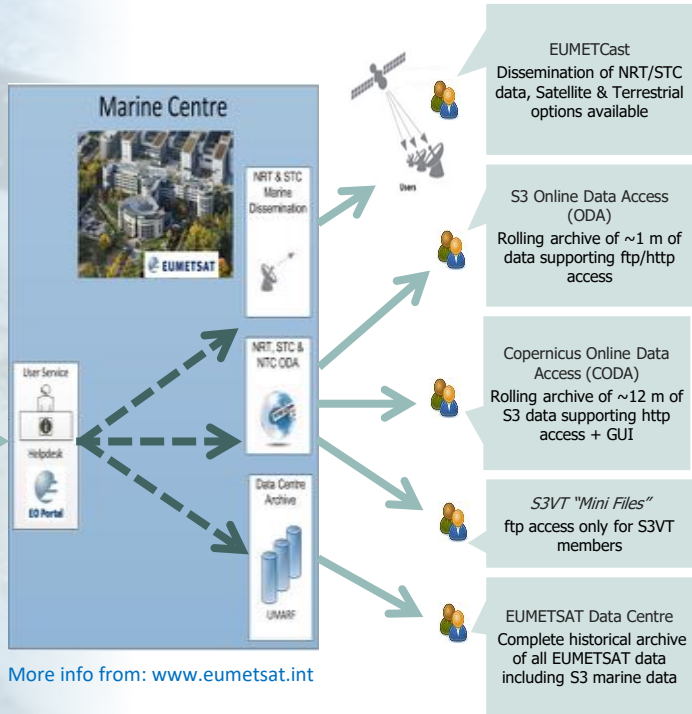




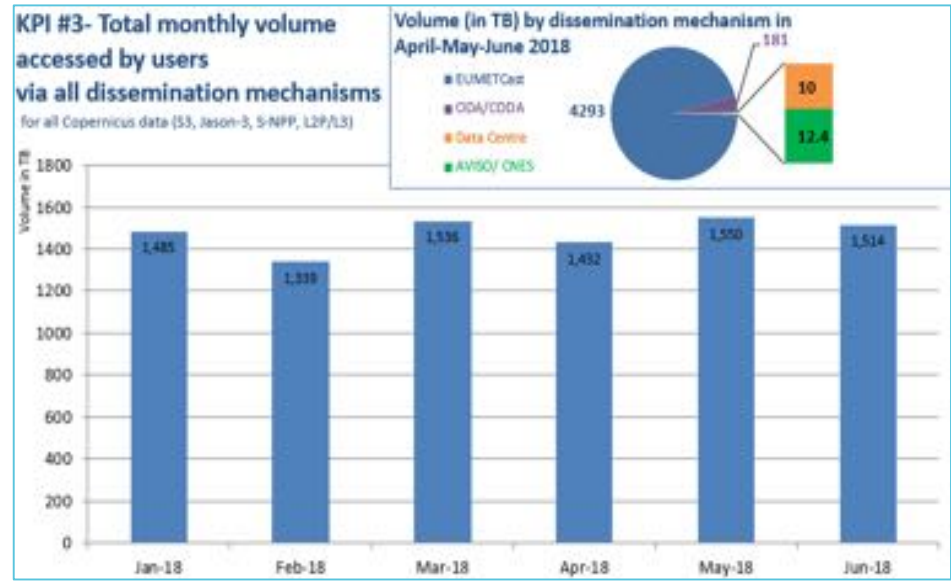
# EUMETSAT Services & Data Access

## Space Component

User Support  
User Registration & Support,  
Product Discovery  
Helpdesk, etc



## 4.4 PB Downloaded in Q2 2018







Space  
Component





User Uptake

# Budget details

Long-term forecasts

Brussels, 01 October 2018

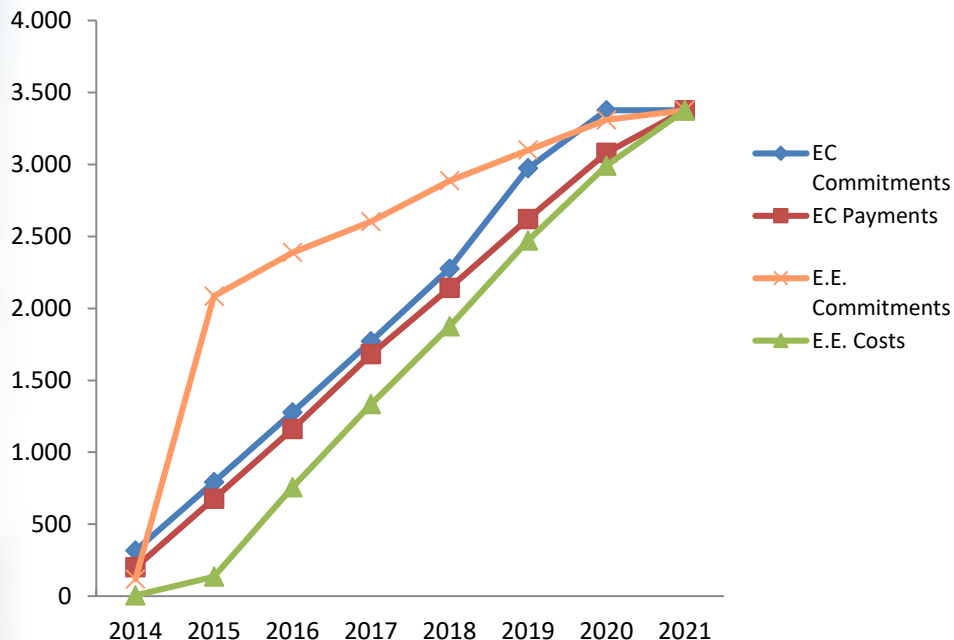


User  
Uptake

# Space component - Long-term forecast 2014 - 2020

(in EUR million)	2014	2015	2016	2017	2018	2019	2020	2021
EC Commitments	316	792	1.277	1.771	2.276	2.973	3.377	3.377
EC Payments	200	677	1.162	1.681	2.141	2.621	3.081	3.377
E.E. Commitments	119	2.085	2.388	2.602	2.886	3.100	3.310	3.377
E.E. Costs	5	136	756	1.334	1.874	2.471	2.992	3.377

**Copernicus Infrastructure (ESA+EUMETSAT) - Financial Forecast  
2014 – 2021 (in M euro)**



- DA ESA = EUR 3.148M
- DA EUMETSAT = EUR 229M
- Slow start in terms of cost 2014-2015 due to:
  - launch delays of the A and B units
  - 6-9 month delay in contract signature for C and D units

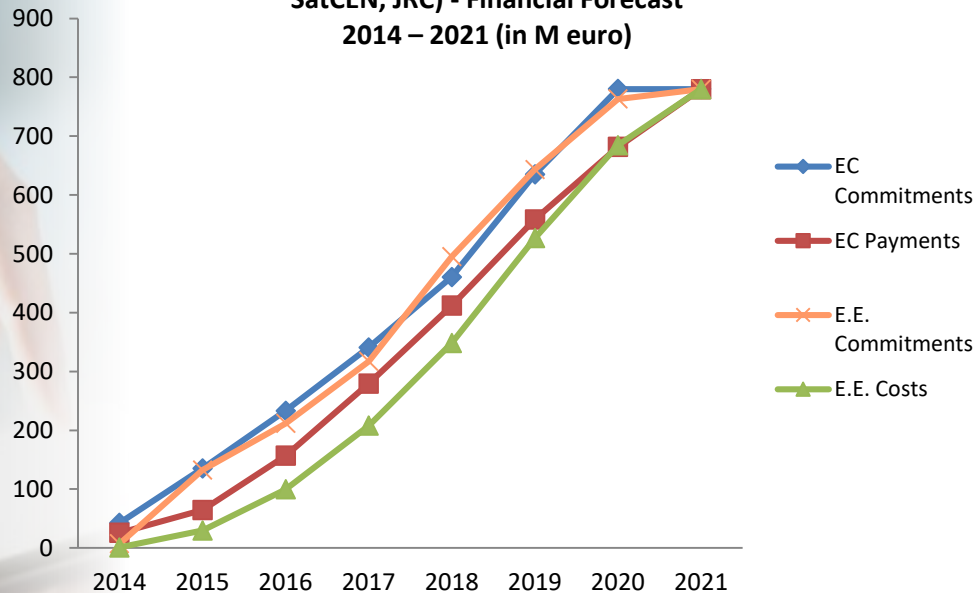


User Uptake

# Copernicus Services - Long-term forecast 2014 - 2020

(in EUR million)	2014	2015	2016	2017	2018	2019	2020	2021
EC Commitments	43	135	233	341	461	635	780	780
EC Payments	26	65	157	279	412	558	682	780
E.E. Commitments	7	132	212	317	495	643	763	780
E.E. Costs	1	30	100	208	348	526	685	780

Copernicus Services (EEA, ECMWF, Mercator, Frontex, EMSA, SatCEN, JRC) - Financial Forecast 2014 – 2021 (in M euro)



- 6 DAs under Services
- 1 Cross-sub delegation to JRC



User Uptake

# User Uptake and communication activities

Cross-cutting activities managed by DG GROW



## Copernicus user uptake strategy

As explained in the Space Strategy, *"The potential of space solutions has not yet been fully exploited (...) The space sector needs to be better connected to other policies and economic areas."*



Strategy: supporting the eco-system of service suppliers that transform Copernicus data and services into the products required by end users



# Copernicus Networks

User  
Uptake

## Copernicus Relays

80 Relays  
33 countries  
4 continents

## Copernicus Academy

125 Academy members  
34 countries  
3 continents





User  
Uptake

# Copernicus Masters

- **A competition for entrepreneurs, start-ups & students**, who develop applications based on Copernicus;
- **13 prizes**, worth €1.5 million (cash, business incubation, technical assistance...);
- **Evaluations of the winners 2018 are now ongoing**



Copernicus  
masters





User  
Uptake

# Copernicus Hackathons

- A hackathon is a **sprint-like event** in which computer programmers and subject-experts collaborate intensively to develop software (in that case based on Copernicus data and services);
- Every year, the European Commission distributes 20 vouchers (20k) to organisations wishing to organise a Copernicus hackathon;
- 10 organisers have been selected in the first round. The first hackathons will be organised **at the end of September**.
- 2<sup>nd</sup> application phase is **open until 31 December 2018**



Copernicus  
hackathons



# Copernicus Accelerator

## User Uptake

- The Copernicus accelerator has supported 100 **start-ups so far**.
- Each start-up receives a mentor for the duration of the programme, as well as regular business online courses.
- The accelerator starts and closes with two BootCamps, where all participants meet their mentor and can network.
- Application to the third Accelerator is open **until 15 September 2018**



Copernicus  
accelerator



User  
Uptake

# Copernicus Incubation Programme

- The European Commission finances the **incubation of 20 start-ups per year**;
- Each start-up receives 50K voucher to spend on **business development**;
- 1<sup>st</sup> applicaiton phase: 50 applications received, 7 start-ups selected
- 2<sup>nd</sup> phase being evaluated
- 3<sup>rd</sup> phase **open until 16 November 2018**





User  
Uptake

## Copernicus Skills Programme

- **H2020:** forthcoming space calls in support of Copernicus user uptake
- **Cooperation with KICs:**
  - Post-doc scholarships awarded in partnership with KIC raw material
  - "Journey": summer course organised in June-July with Climate KIC
- **Ongoing ERASMUS+ sectoral skill alliance for Earth Observation** (with several Copernicus Relays)
- **Forthcoming Copernicus awareness campaign in universities** (in partnership with COSME)



Thank you



Copernicus EU



Copernicus EU



Copernicus EU



[www.copernicus.eu](http://www.copernicus.eu)

