

# Measurements and Observations in the 21<sup>st</sup> Century

## Welcome from ESA

Maurice Borgeaud

Head of the Earth Observation  
Science, Applications and Future  
Technologies Department

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# What is Copernicus?

## European response to global needs:

- to manage the environment,
- to mitigate the effects of climate change and
- to ensure civil security

## Space Component

Copernicus

## In-Situ Data

## Services Component

# Copernicus: A success story

- free and open access

**[sentinels.copernicus.eu](https://sentinels.copernicus.eu)**

Users and Products Statistics:  
(status 27 October 2016)

- 51,762 registered users on Sentinel Scientific Data Hub
- more than 6.4 PB of data downloaded



# Copernicus: A New Generation of Data Sources

Sent-1A/B



Sent-2A/B



Sent-3A/B



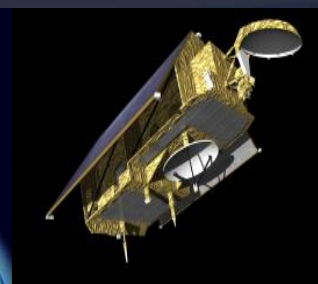
Sent-4A/B



Sent-5/5P



Sent-6A/B



- Copernicus is a European space flagship programme led by the European Union
- ESA coordinates the space component
- Copernicus provides the necessary data for operational monitoring of the environment and for civil security
- Free and open data policy





# Sentinel-1

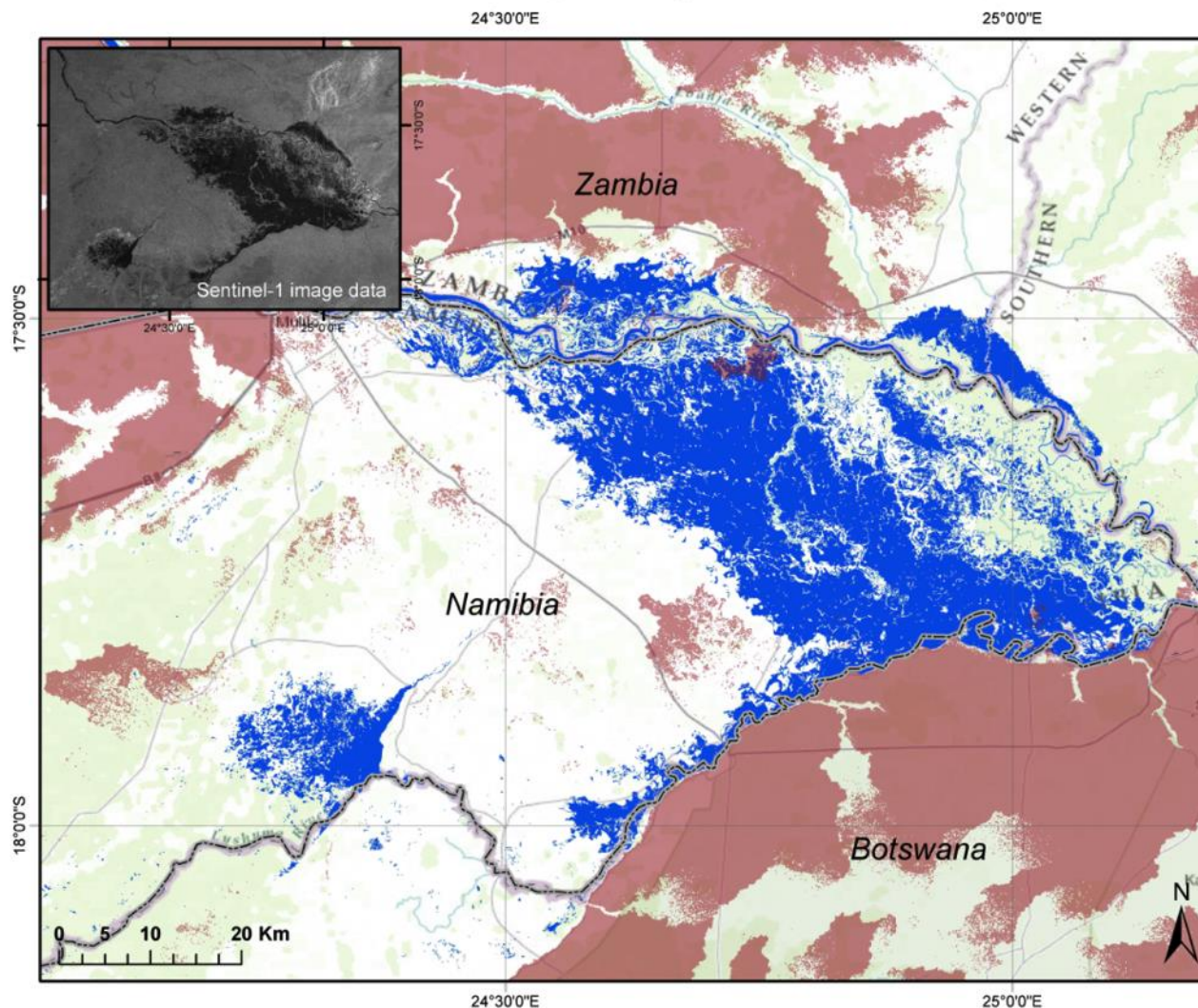
→ RADAR VISION FOR COPERNICUS



# Copernicus Sentinel-1: Zambesi River (13/4/2014)



## Sentinel-1 Flood Monitoring of Caprivi Flood Plain, Namibia



### Legend

- Country border
- Derived HAND Index > 10 m
- Flooded areas

### Description:

This map shows the flooding situation in the Caprivi flood plain of Zambezi River on 13th of April, 2014. The flood was delineated with the Water Observation and Information System (WOIS) based on SENTINEL-1A satellite data. The flood map is overlaid on the World Topographical layer.

### Source data:

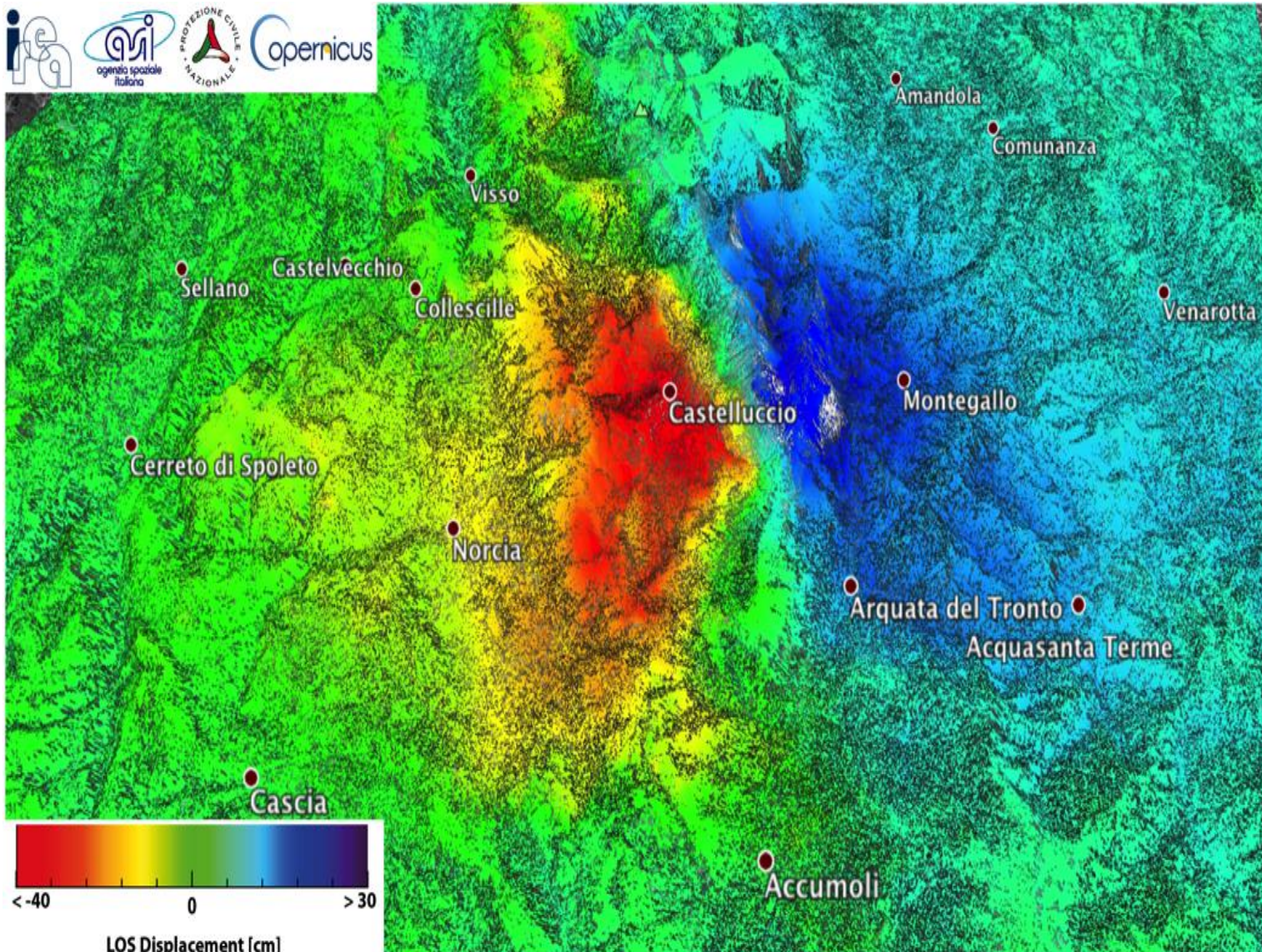
SENTINEL-1A IW mode, 20 m resolution, acquired on 13th of April, 2014 at 03:50 GMT.  
SENTINEL-1 image was provided by the European Space Agency.

Cartographic Reference  
Projection: EPSG:4326  
Datum: WGS 84





# Copernicus: Earthquake Italy 30 Oct 2016



ESA UNCLASSIFIED - FOR OFFICIAL USE



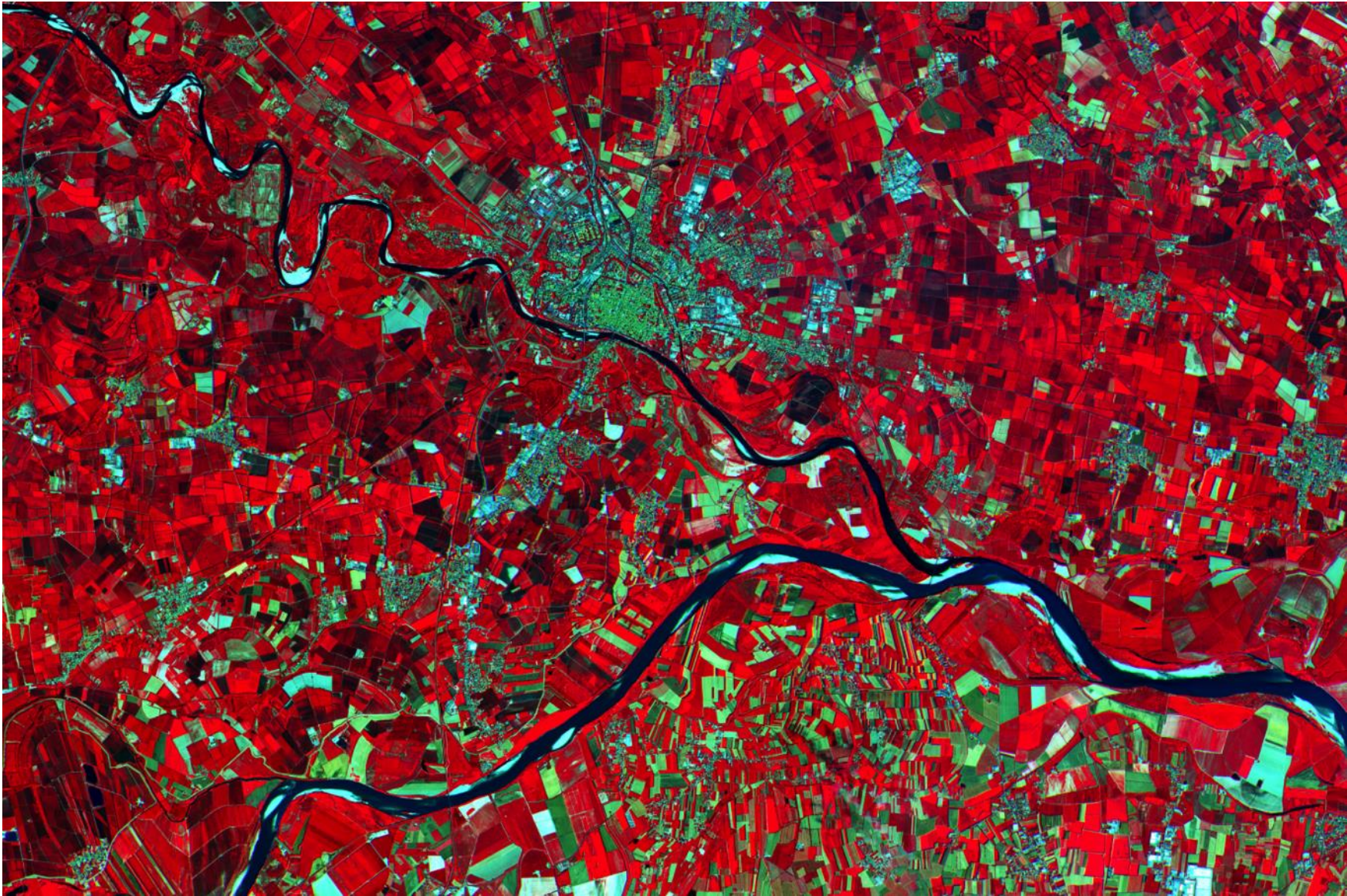


# Sentinel-2

→ COLOUR VISION FOR COPERNICUS



# Sentinel-2: Po River

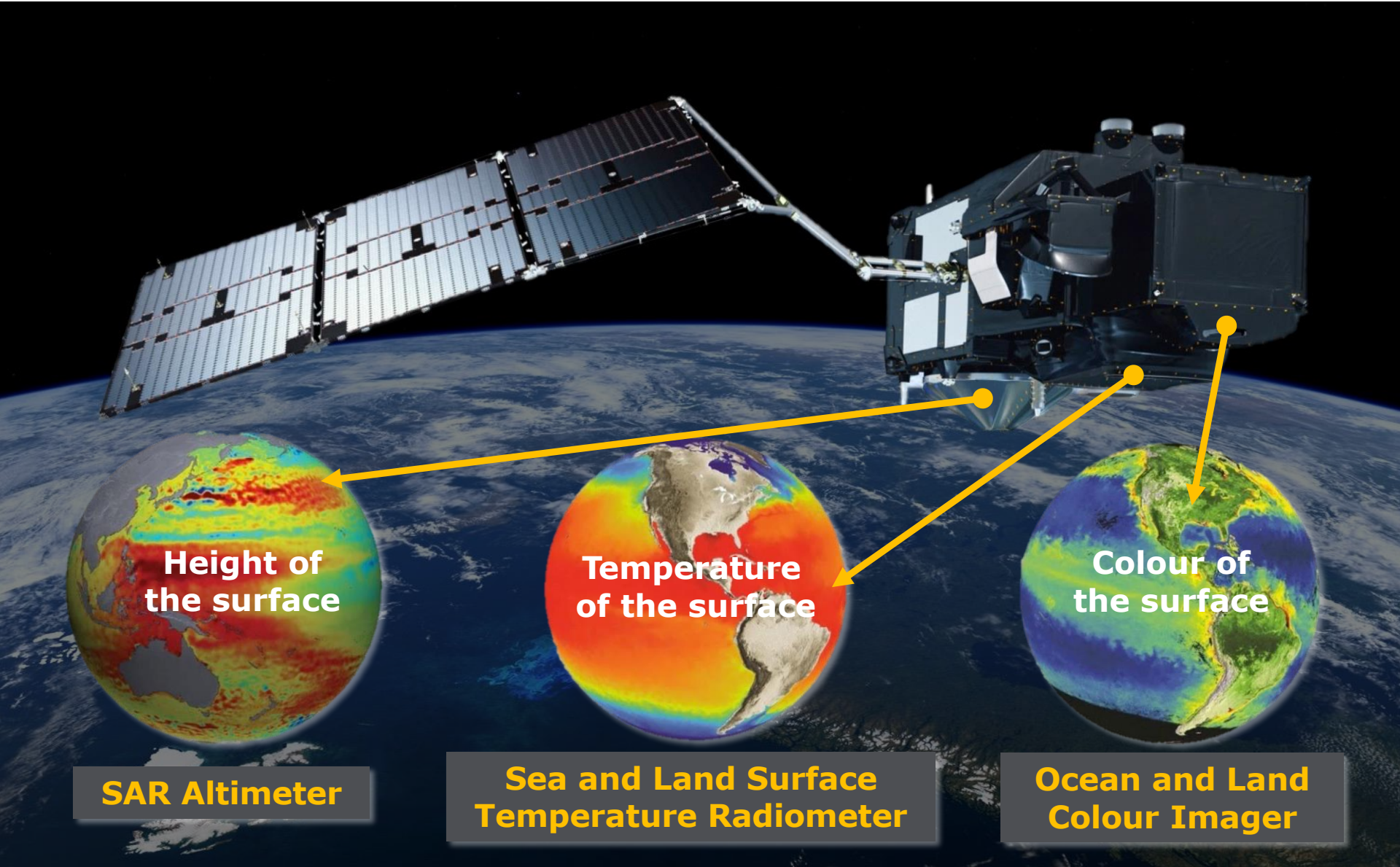


ESA UNCLASSIFIED - For Official Use

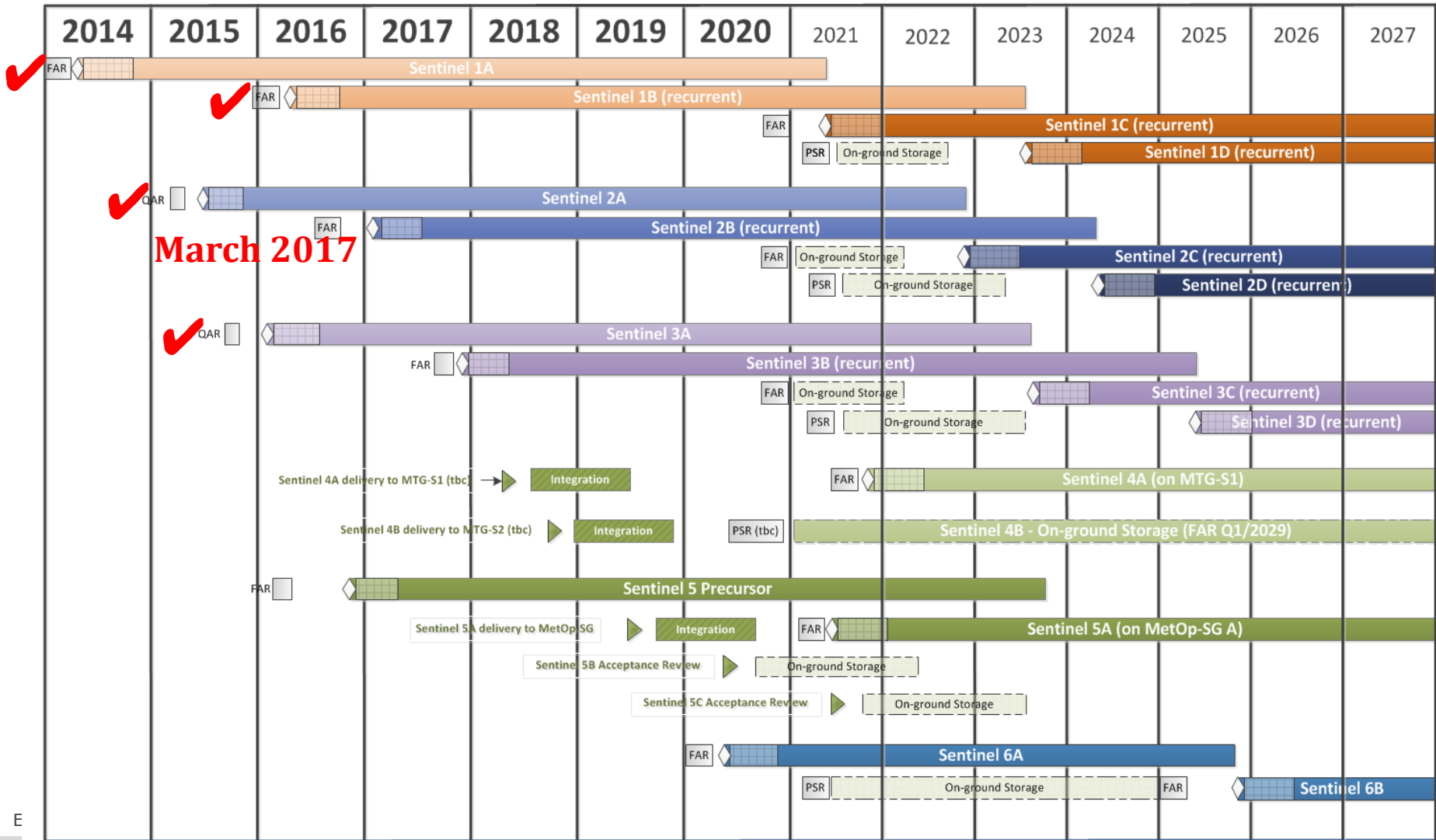




# Sentinel-3A: The Bigger Picture



# Tentative Sentinel Schedule



Legend:



Status: 22 March 2016



# Copernicus: A success story

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# Cryosat – the Ice Mission

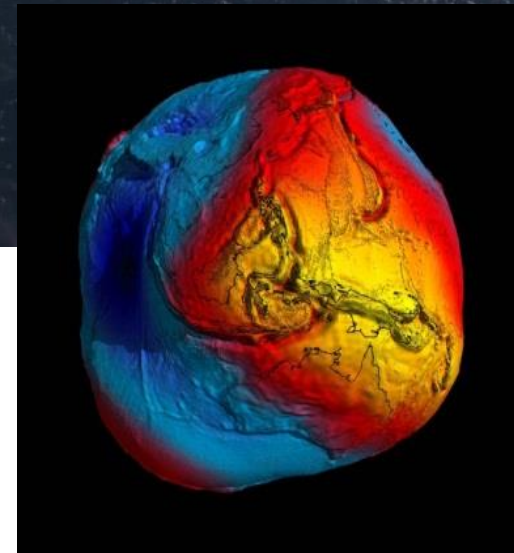
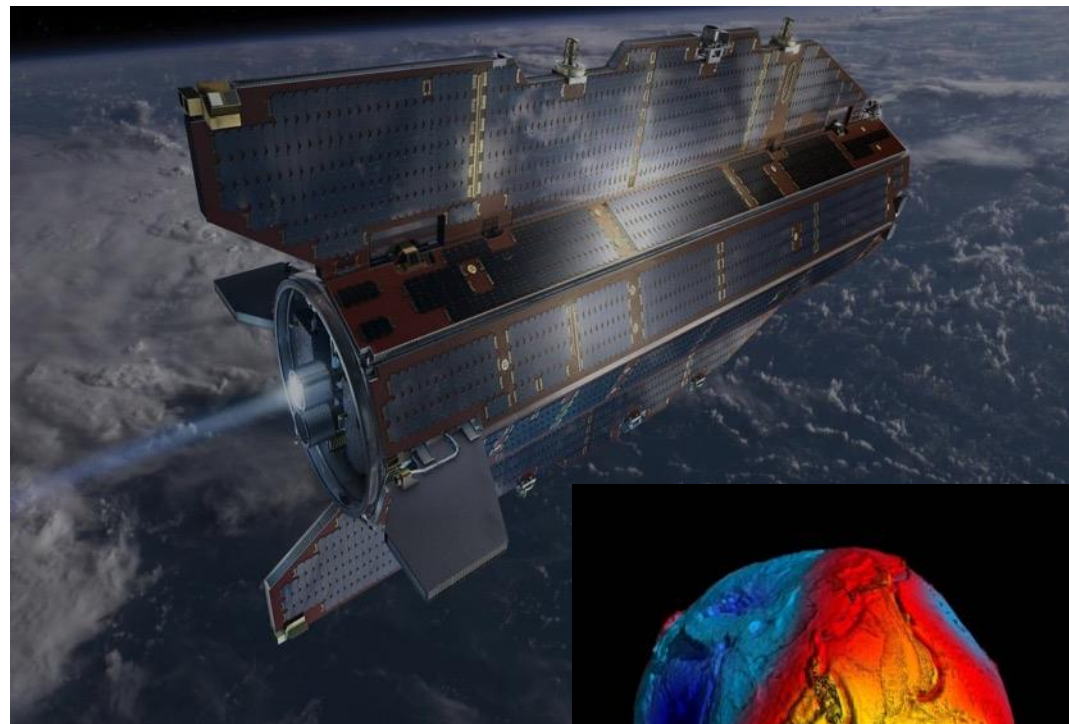
- First interferometric altimeter in space
- Global sea ice thickness measurements
- Data used for ice research,  
but increasingly also for  
oceanography and  
**Inland Water**





# GOCE: Gravity and Ocean Circulation Explorer

- First gradiometer in space
- Best geoid ever
- 5<sup>th</sup> version of geoid was released in July 2014, including all GOCE measurements
- End of mission declared 21 October 2013 following depletion of Xenon fuel
- Re-entry 11 November 2013
- **Application for Inland Water**



# ADM-Aeolus and EarthCARE

## ADM-Aeolus

- Global observations of wind profiles for analysis of global 3D wind field
- Launch planned for 2017



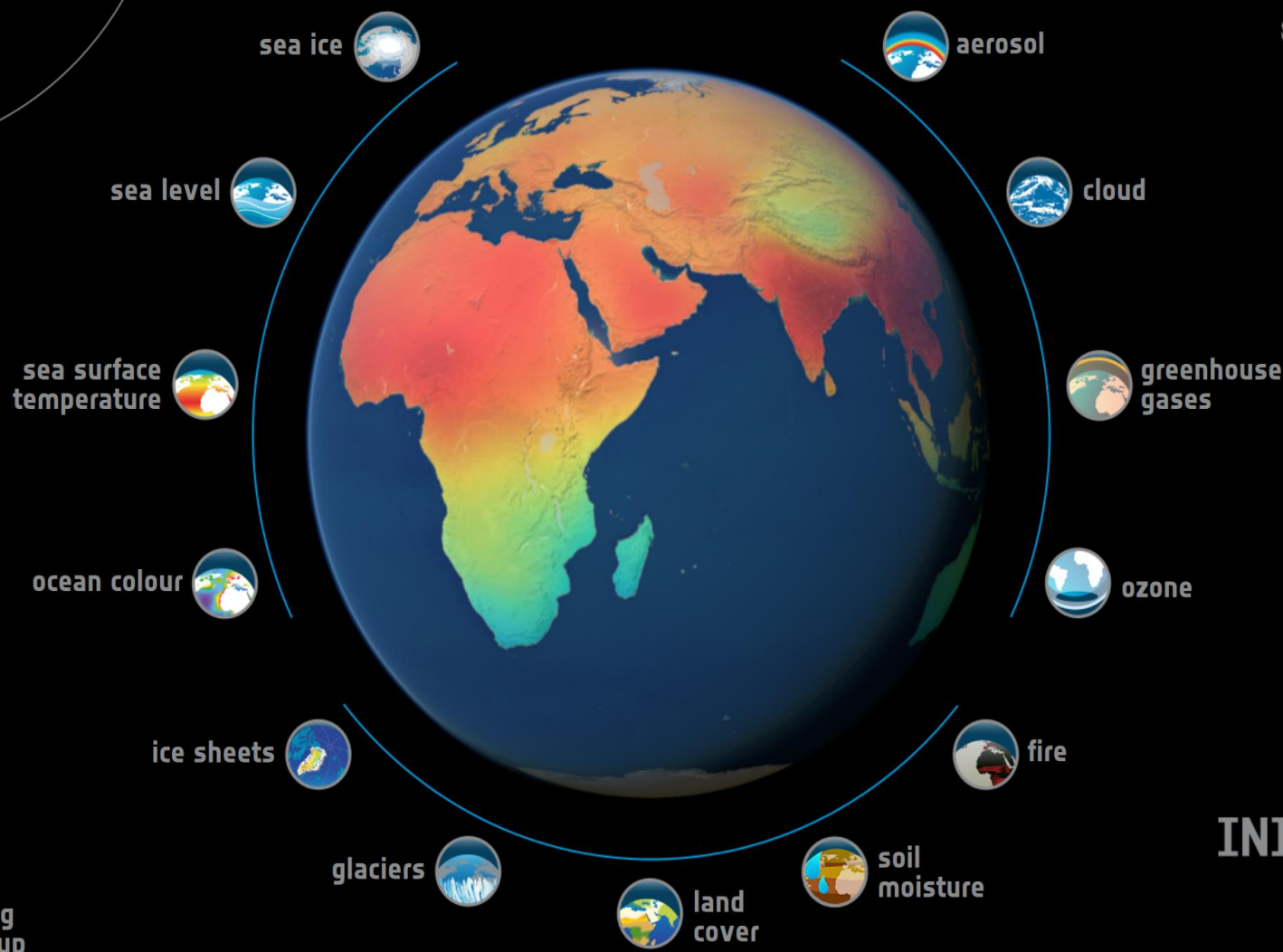
## EarthCARE

- Global observations of clouds, aerosols and radiation
- Launch planned for 2019





# CCI: Essential Climate Variables



CLIMATE  
CHANGE  
INITIATIVE



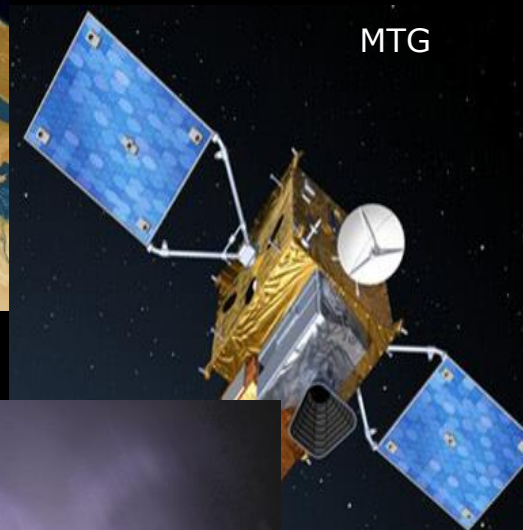
climate  
modelling  
user group

CREDITS



# Meteorological Missions

- ESA develops prototype satellites and, on behalf of EUMETSAT, procures recurrent satellites
- EUMETSAT operates the satellites
- Currently Meteosat Second Generation (MSG) missions in GEO and MetOp missions in LEO
- MeteoSat Third Generation (MTG) and MetOp Second Generation under development
- MSG-4 launched 15 July 2015





# Evolving IT Possibilities

- Easy Data Access
- 7B cell phones world wide
- Wide availability of mobile broadband subscriptions
- Social media and networks
- Crowd Sourcing/Mapping
- “Big Data”
- Cloud Computing
- Exploitation Platforms

↳ Great potential for Measurements and Observations in the XXI<sup>st</sup> century





→ MEASUREMENTS AND OBSERVATIONS  
IN THE 21st CENTURY CONFERENCE



21 November 2016 | ESA-ESRIN | Frascati, Rome (Italy)

**Welcome and best wishes for a successful  
First MOXXI Topical Conference!**

**[www.esa.int](http://www.esa.int)**