Sentinels for Land Applications

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- Krzysztof Mysłakowski (Creotech)

20 June 2017

Introduction

Sentinel status

Example land applications

ESA Regional Initiatives

ESA–DEVELOPED EARTH OBSERVATION MISSIONS

What is Copernicus?

Integrated Earth observation system of systems. European response to global needs, such as

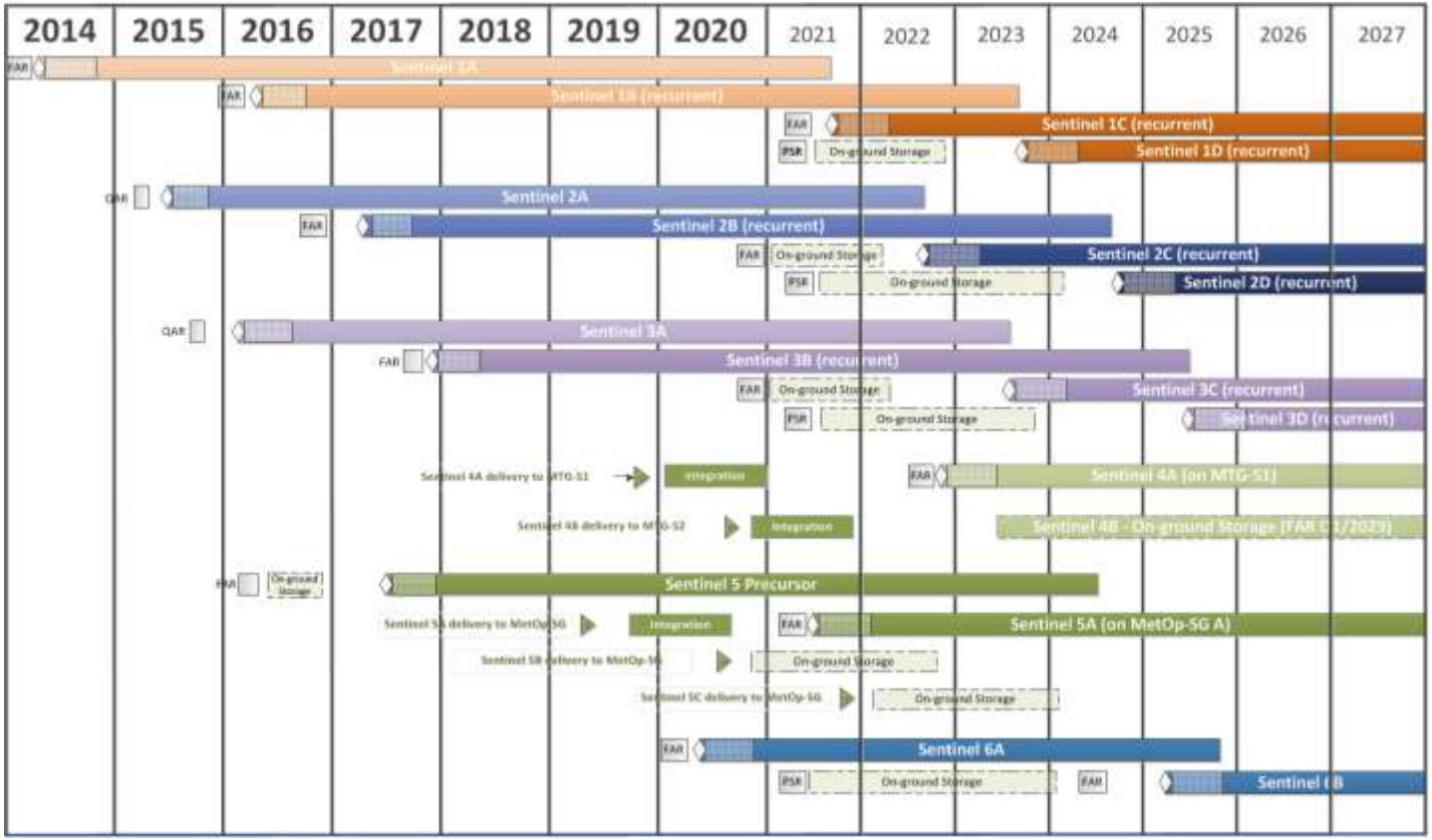
- managing the environment,
- mitigating the effects of climate change and
- ensuring civil security

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

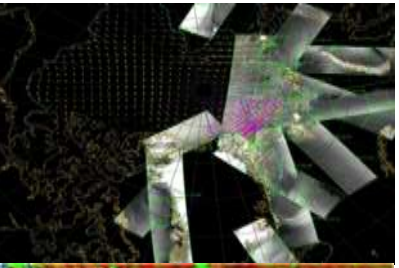
- Copernicus - European space flagship programme, led by the EU
- ESA is responsible for space component, Sentinel development, operation of some Sentinels, data buy from other partners, system evolution
- Sentinels – most comprehensive EO system world-wide for environmental monitoring
- Free and open data policy

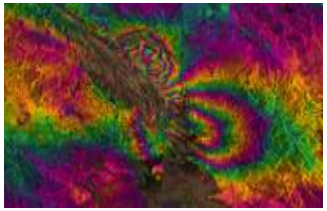
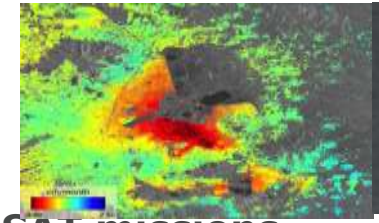
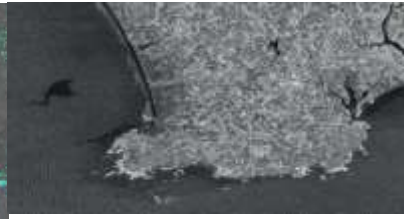
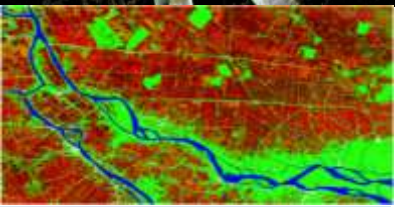
Sentinel - Tentative Launch Schedule

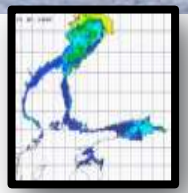


Sentinel-2A: Mount Etna Eruption, Italy

Sentinel–1: C-band SAR mission

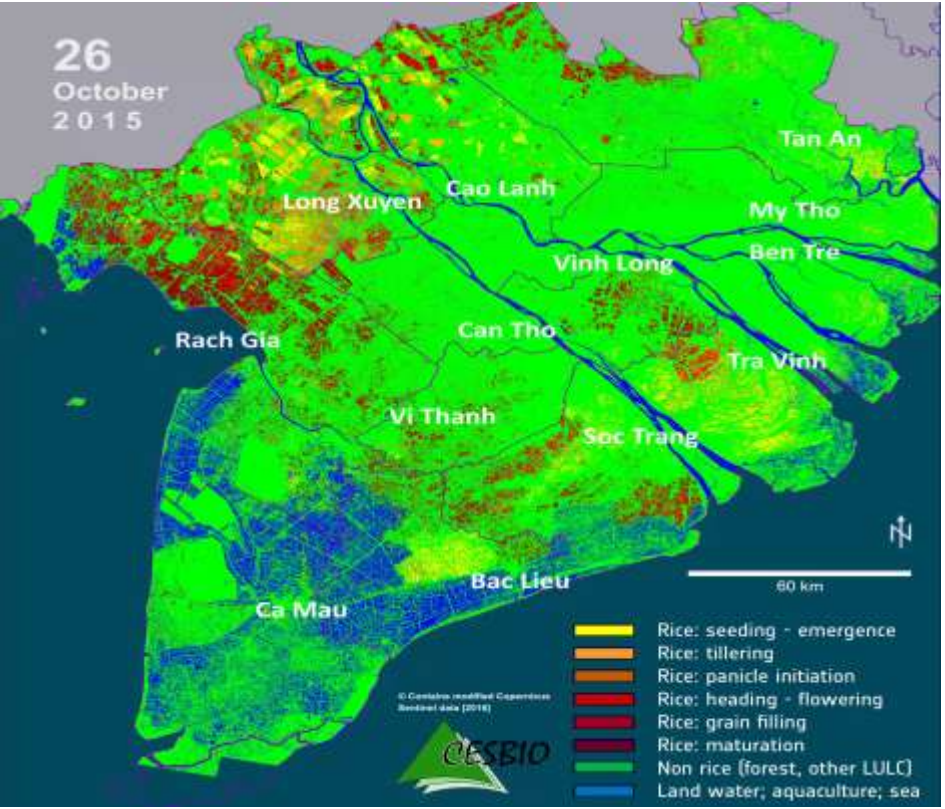




- ✓ **Data continuity of ERS and ENVISAT missions**
- ✓ **Copernicus radar imaging mission for ocean, land, emergency**
- ✓ **Applications:**
  - monitoring sea ice zones and the arctic environment
  - surveillance of marine environment (e.g. oil spill monitoring)
  - maritime surveillance (e.g. ship detection)
  - wind, wave, current monitoring
  - monitoring of land surface motion (subsidence, landslide, tectonics, volcanoes, etc.)
  - support to emergency / risk management (e.g. flooding, etc.) and humanitarian aid in crisis situations
  - mapping of land surfaces: agriculture, forest, water and soil, etc.

S1 for Rice Monitoring
Monitoring of Crop Stages



Winter-Spring Rice 2015/16

- March 2016: 1.4 Million ha rice
- March 2015: 1.7 Million ha rice
- **16.5% loss in rice area** due drought and salt water intrusion caused by El Nino
- 976.000 people affected, 67 Mil. $ estimated damage
- Based on unprecedented S1 timeseries

GEOGLAM Global Agricultural Monitoring

V.A.S.T

Asia-RiCE Crop Estimation and Monitoring

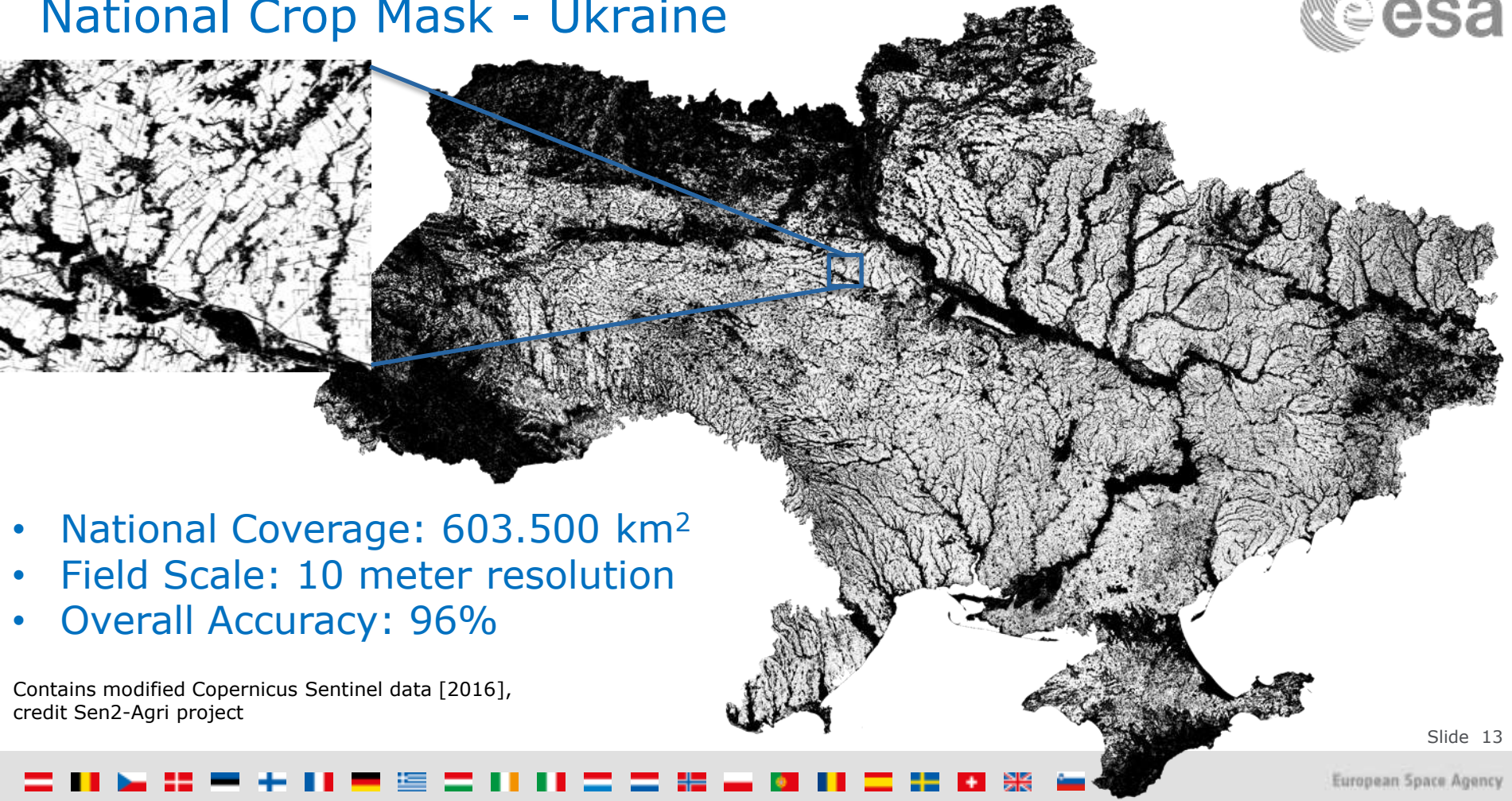
Contains Copernicus data (2016)

Sentinel-1 & -2 crop type mapping

Sen2Agri: National Crop Monitoring at Field Scale

- GEOGLAM Global Agricultural Monitoring – international R&D cooperation
- Open Source system for up-scaling and transfer

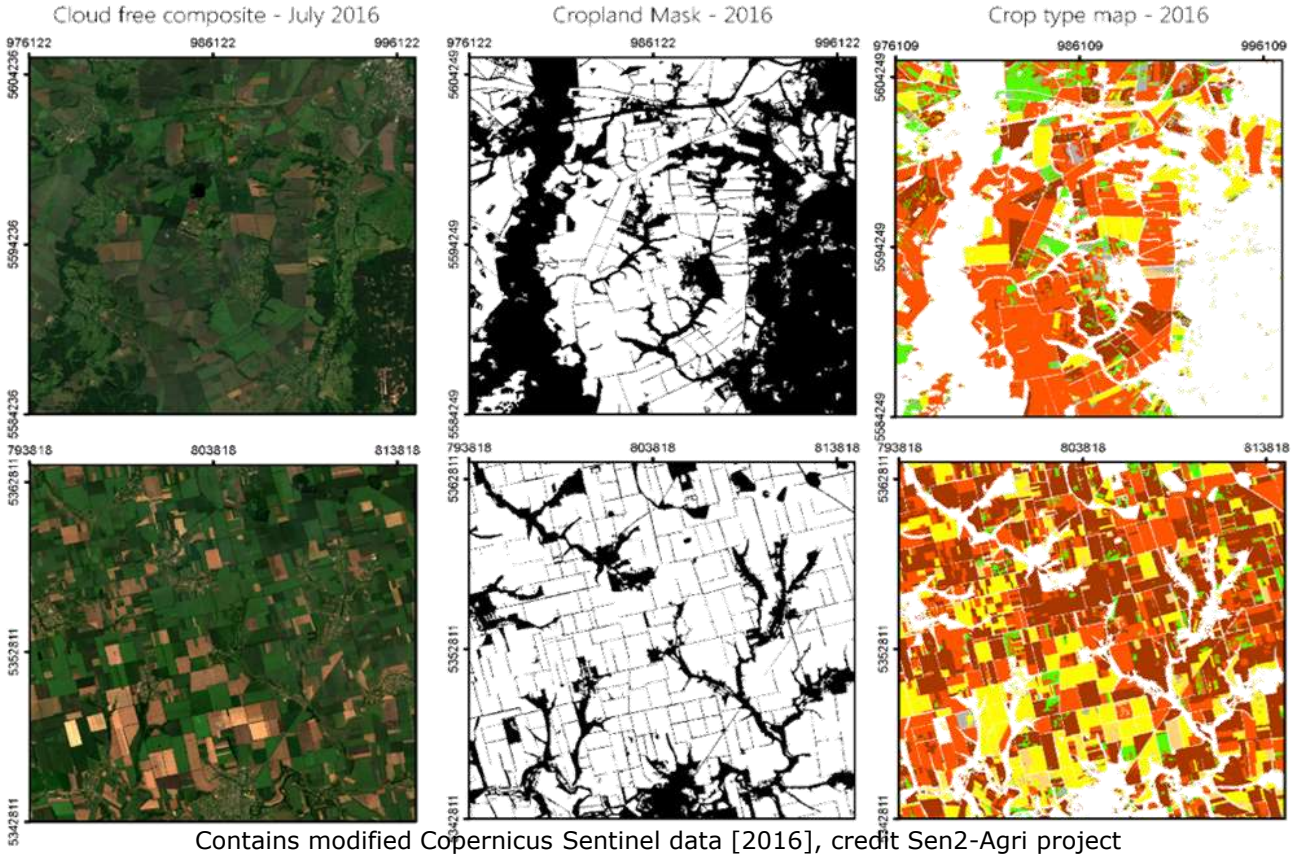
National Crop Mask - Ukraine



- National Coverage: 603.500 km^2
- Field Scale: 10 meter resolution
- Overall Accuracy: 96%

Contains modified Copernicus Sentinel data [2016],
credit Sen2-Agri project

National Crop mask and type mapping at field scale Ukraine 2016



sentinel-2

→ AGRICULTURE

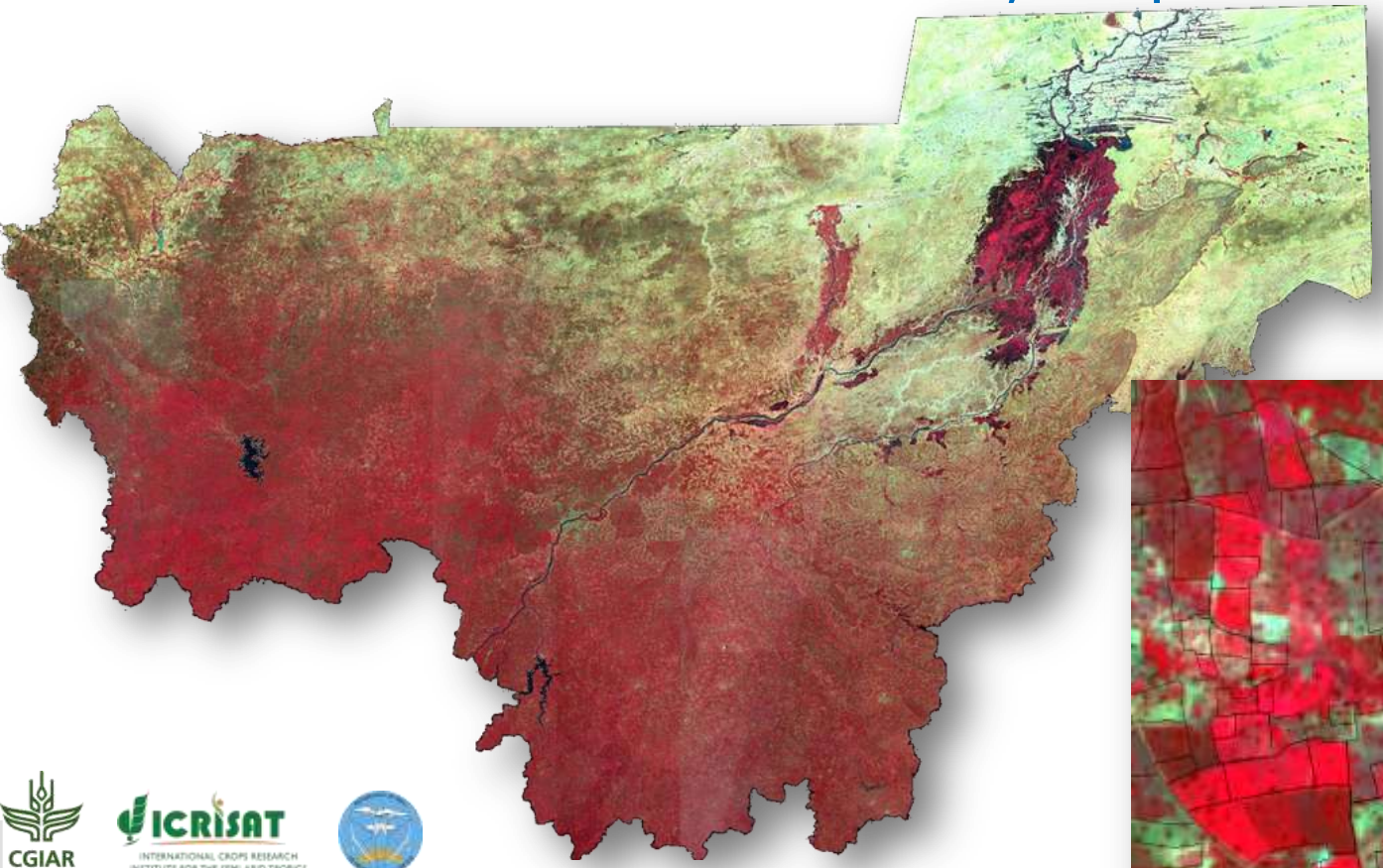
Contains modified Copernicus Sentinel data [2016], credit Sen2-Agri project

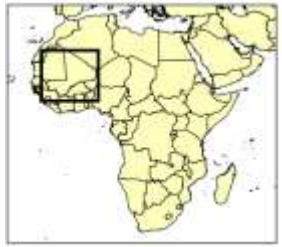
sentinel-2

→ AGRICULTURE

Mali: Food Insecure Country national statistics, crop damage

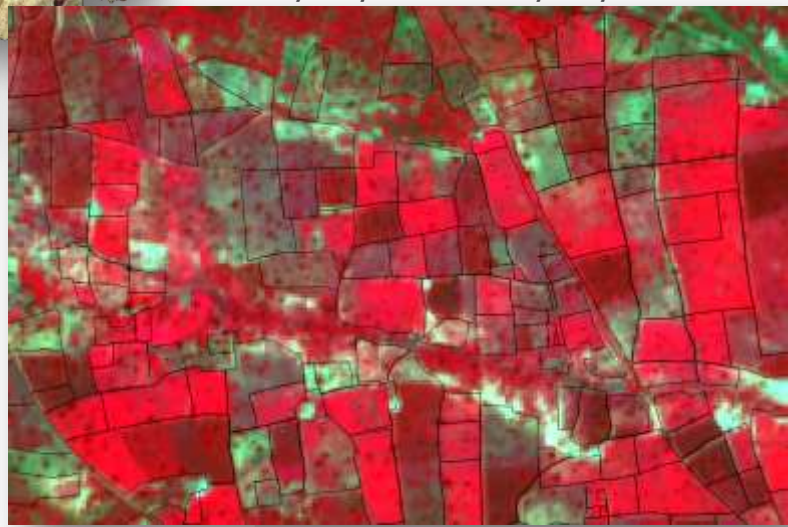
esa





November 2016

5/10/2016-25/11/2016

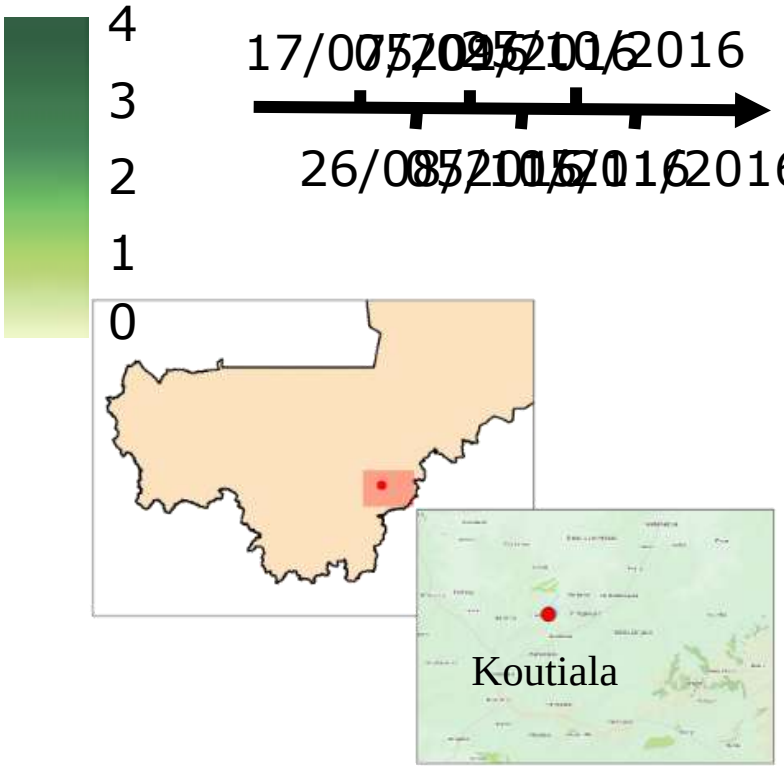


CGIAR

ICRISAT

INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS

Growth Monitoring of Cotton



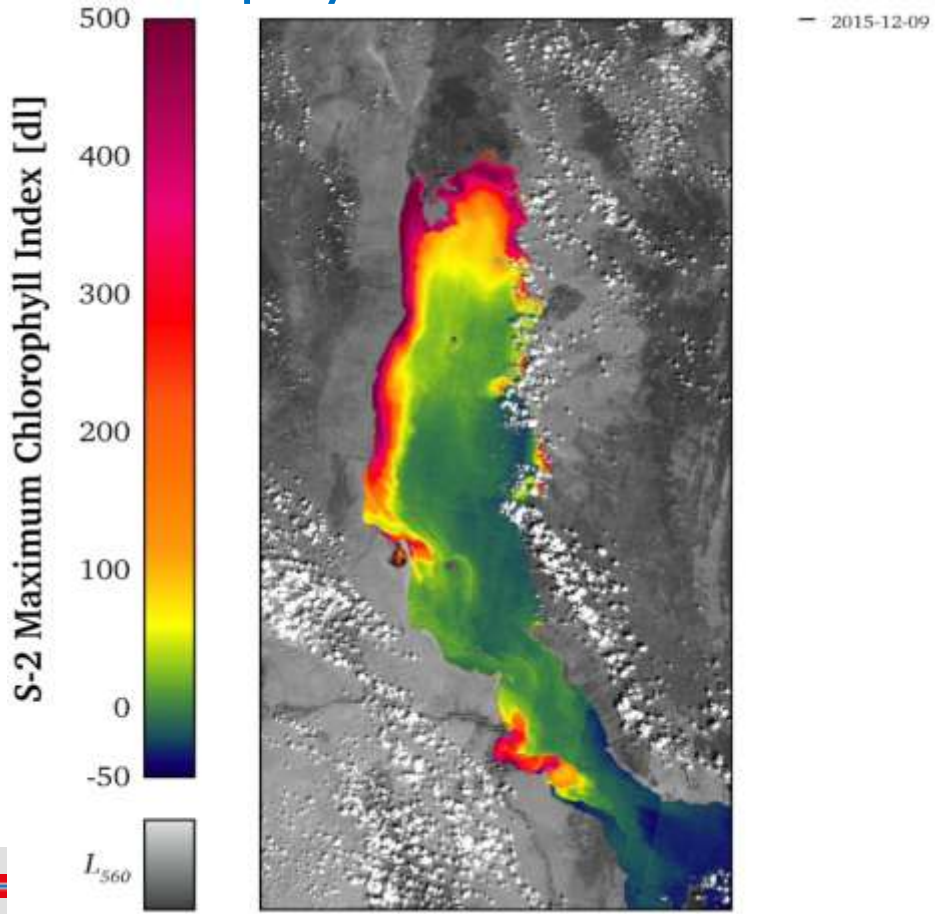
Water Quality Monitoring
Lake Turkana, Maximum Chlorophyll Index

Getintravel

UNEP United Nations Environment Programme

GEMS Water

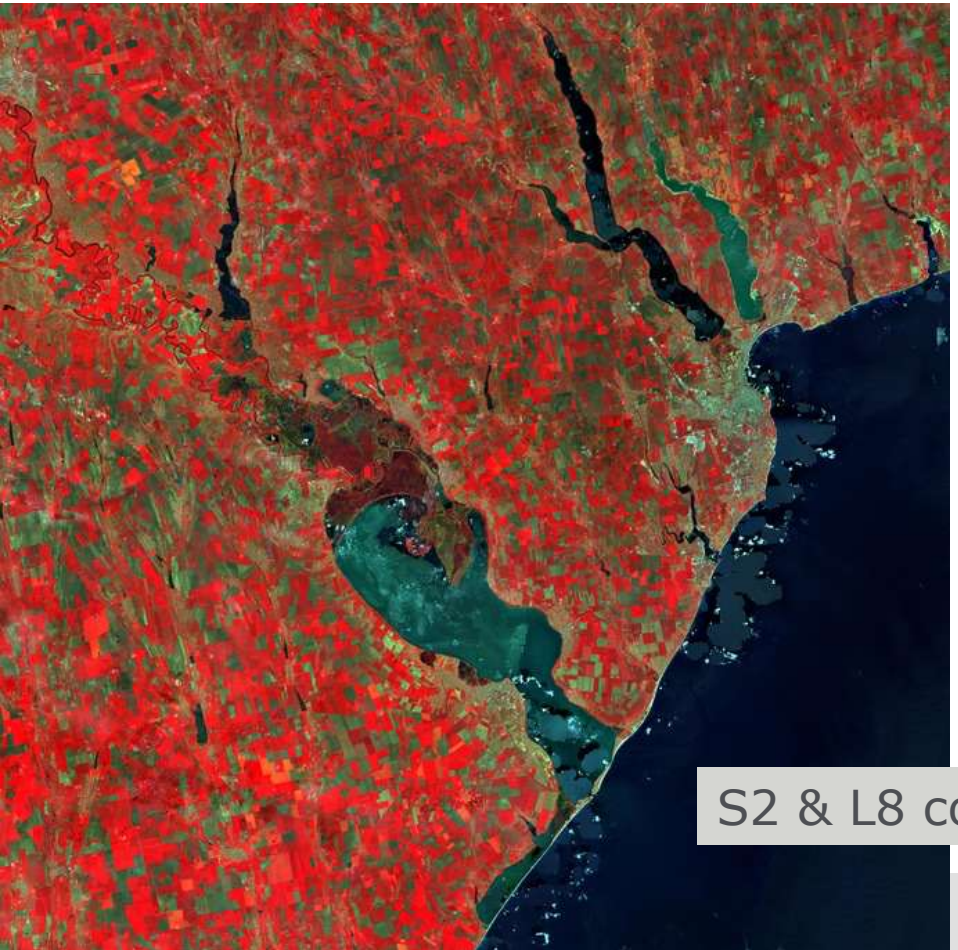
innovators sponge



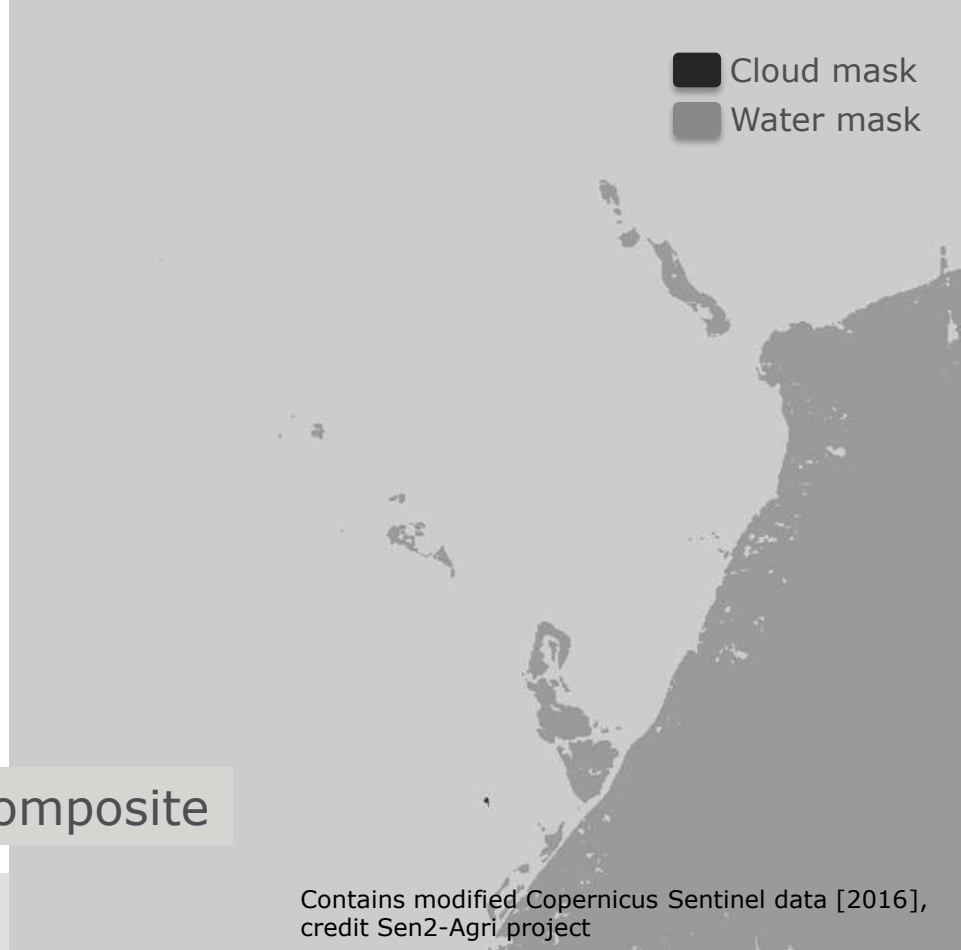
Contains modified Copernicus Sentinel data [2016]

Agency

S2 & L8 cloud free composite – improved coverage



S2 & L8 composite

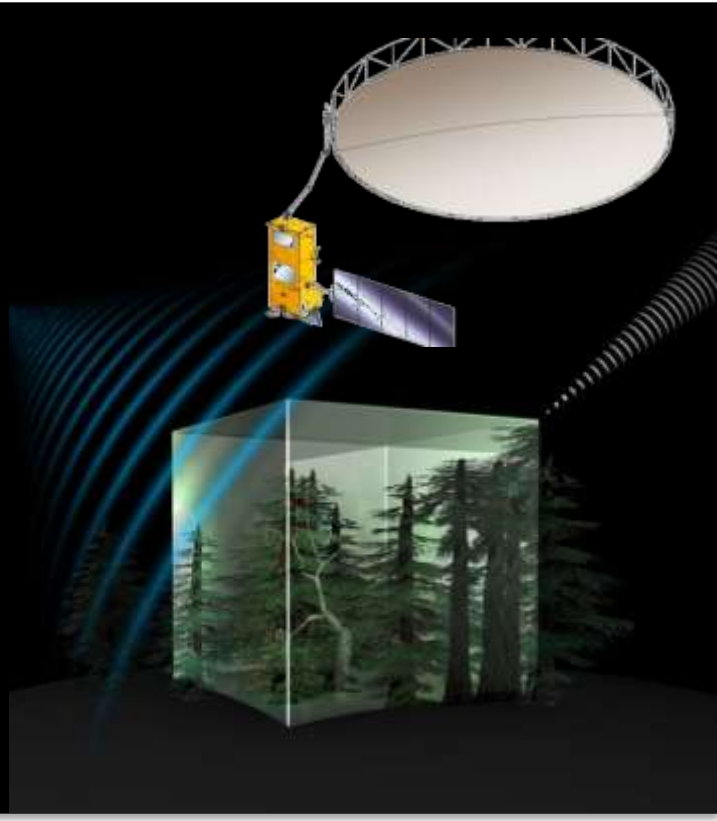


Contains modified Copernicus Sentinel data [2016], credit Sen2-Agri project

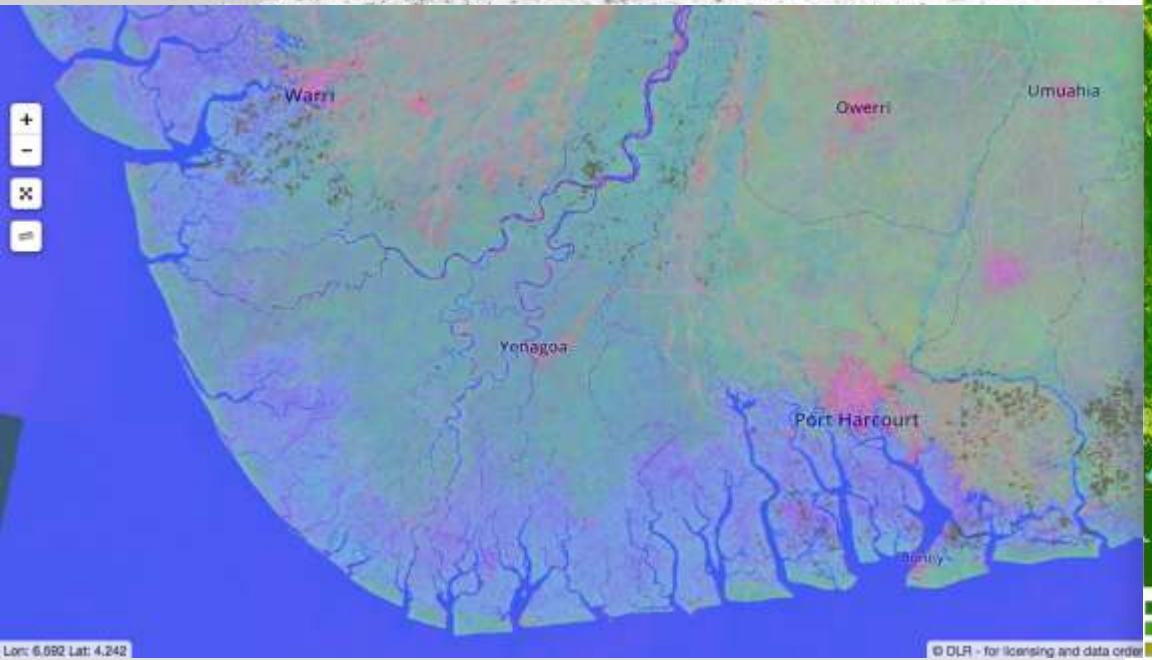
Further Earth Explorer Missions

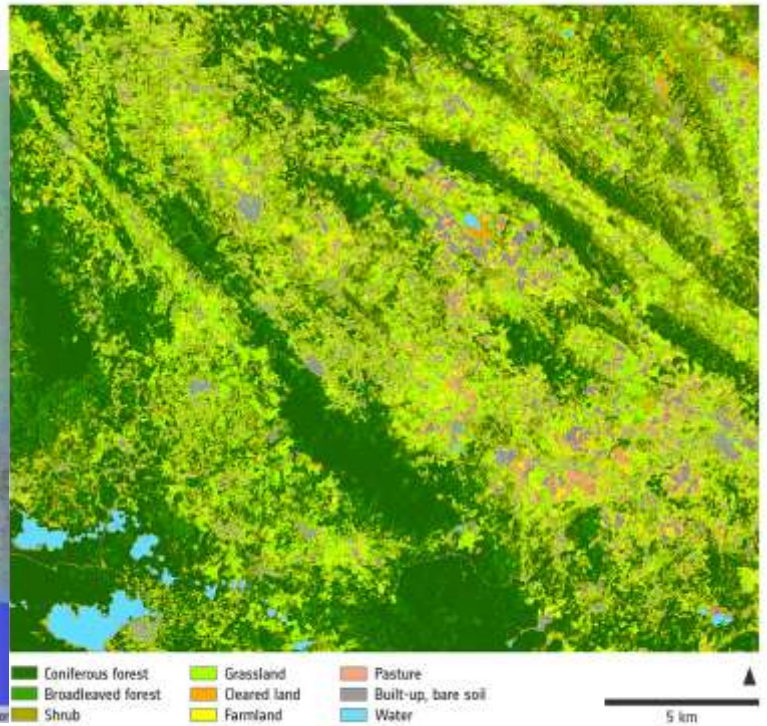
- 7th Earth Explorer: Biomass
  - Biomass estimates based on global interferometric and polarimetric P-Band Radar observations

- 8th Earth Explorer: FLEX
  - global maps of vegetation fluorescence, which can be converted into an indicator of photosynthetic activity

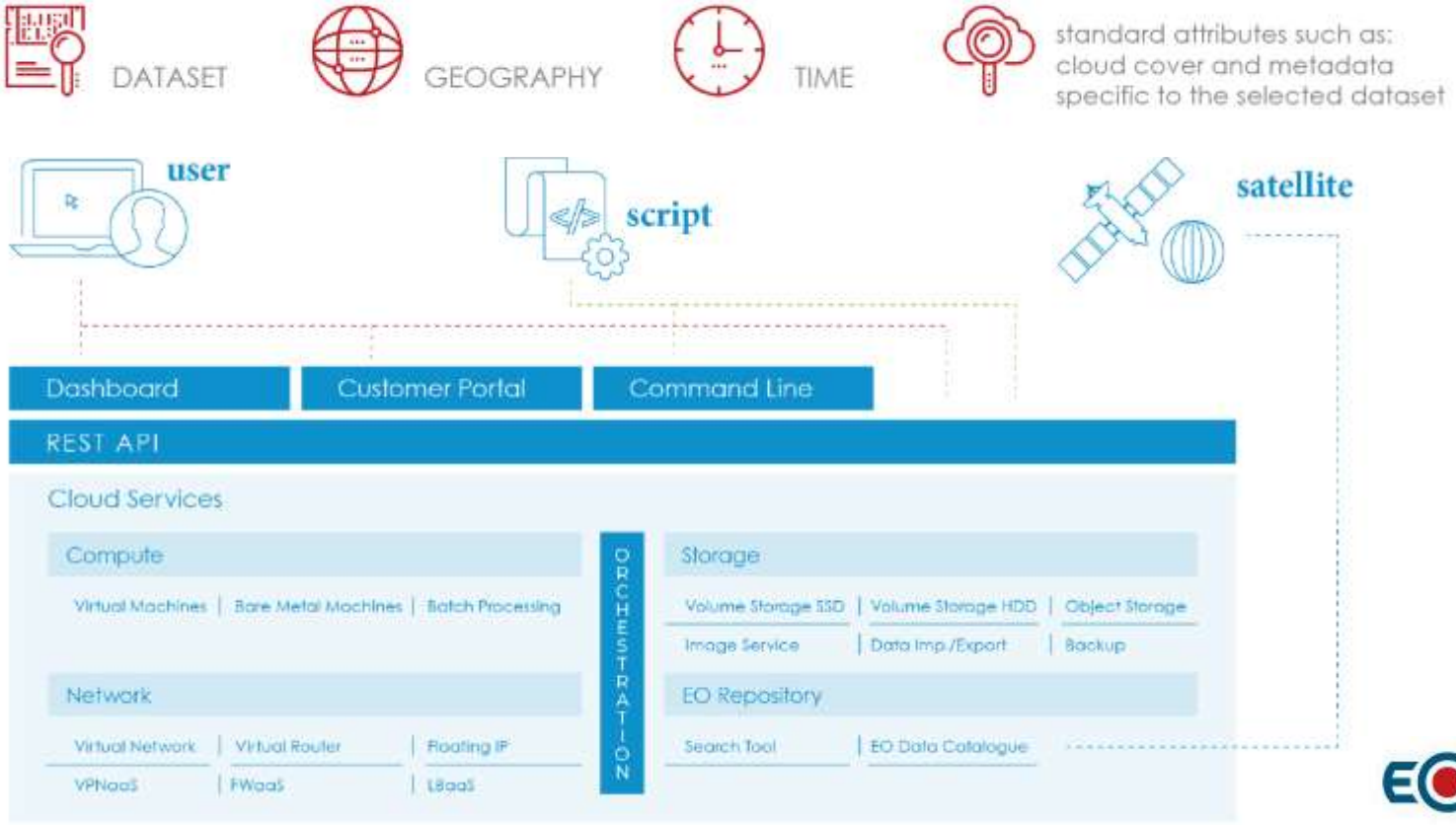


Supporting Science and Application Development



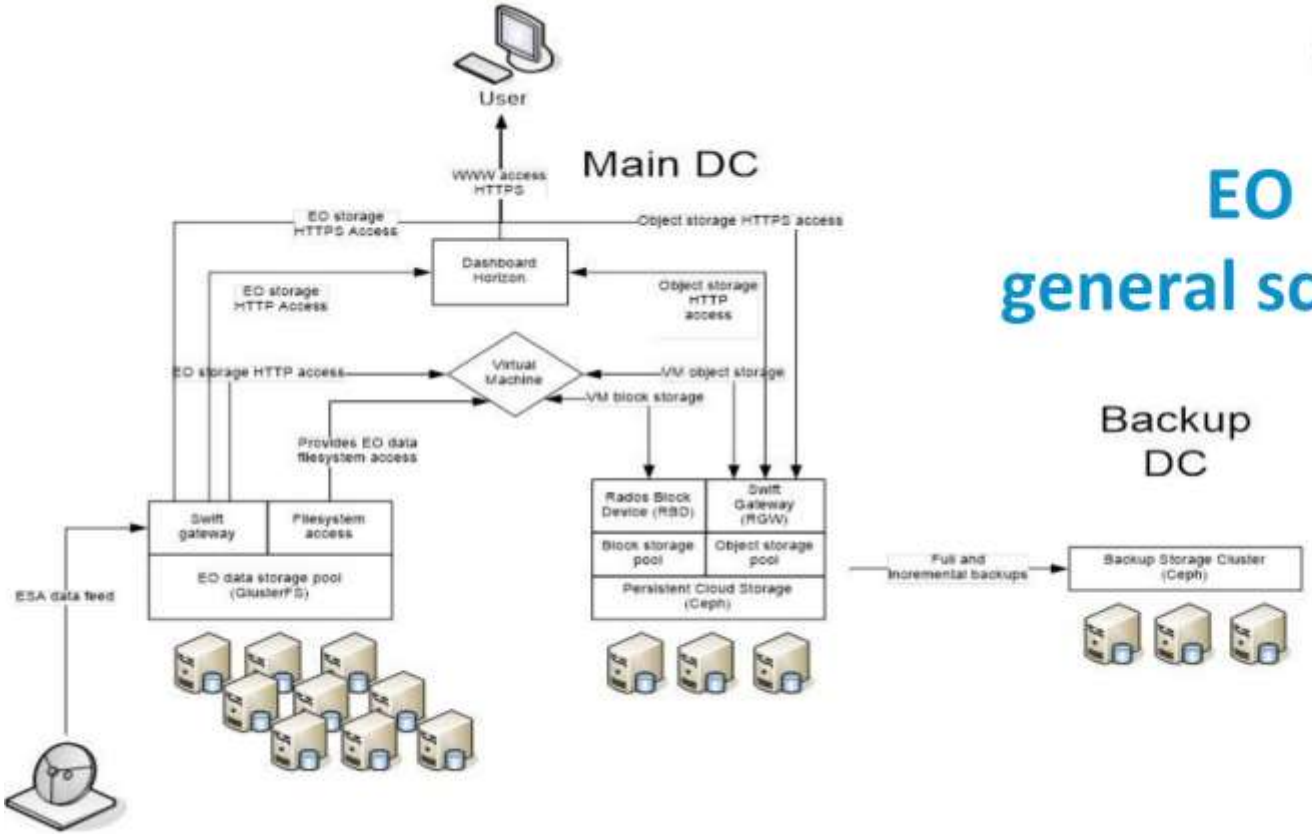


Sentinel (and other data access) via IPT Poland



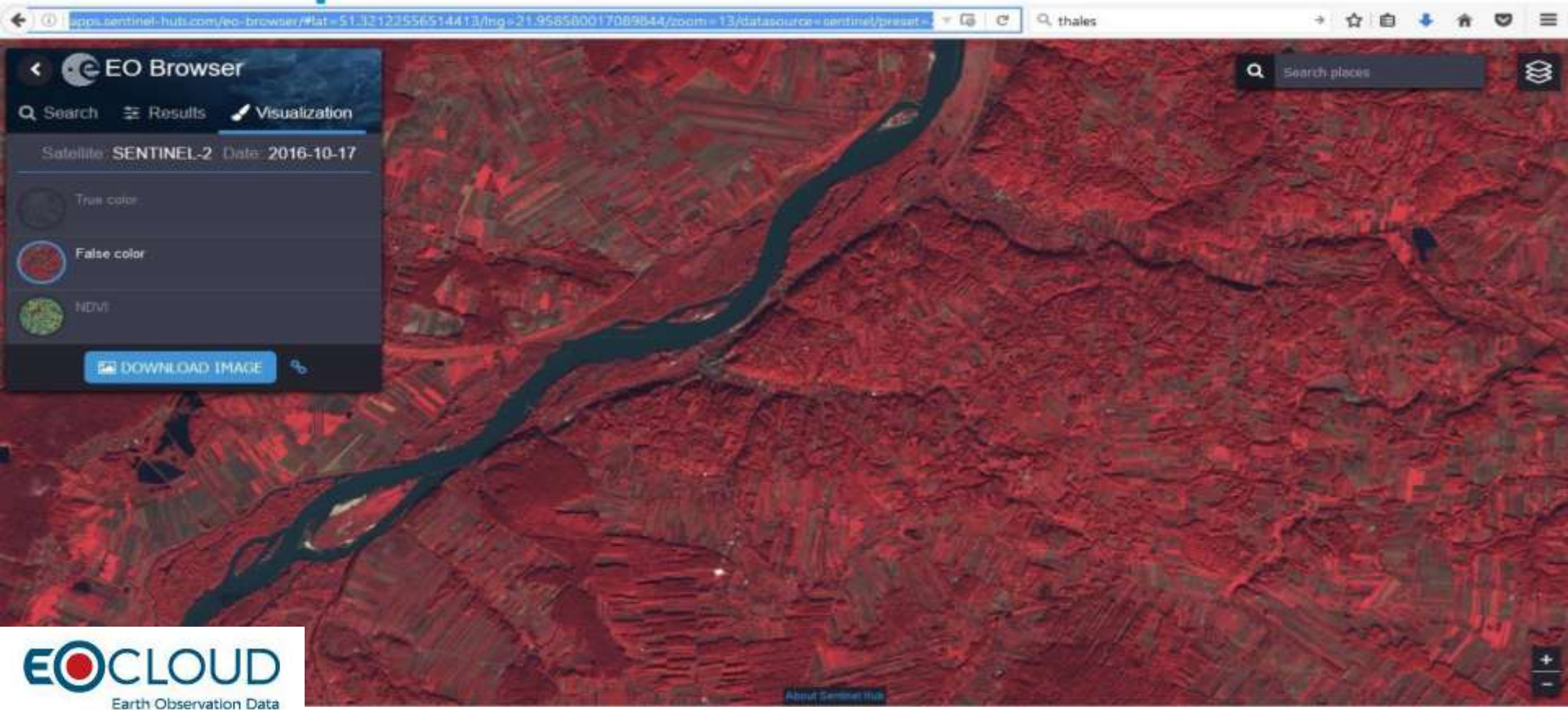
EOCLOUD
Earth Observation Data

Technical implementation



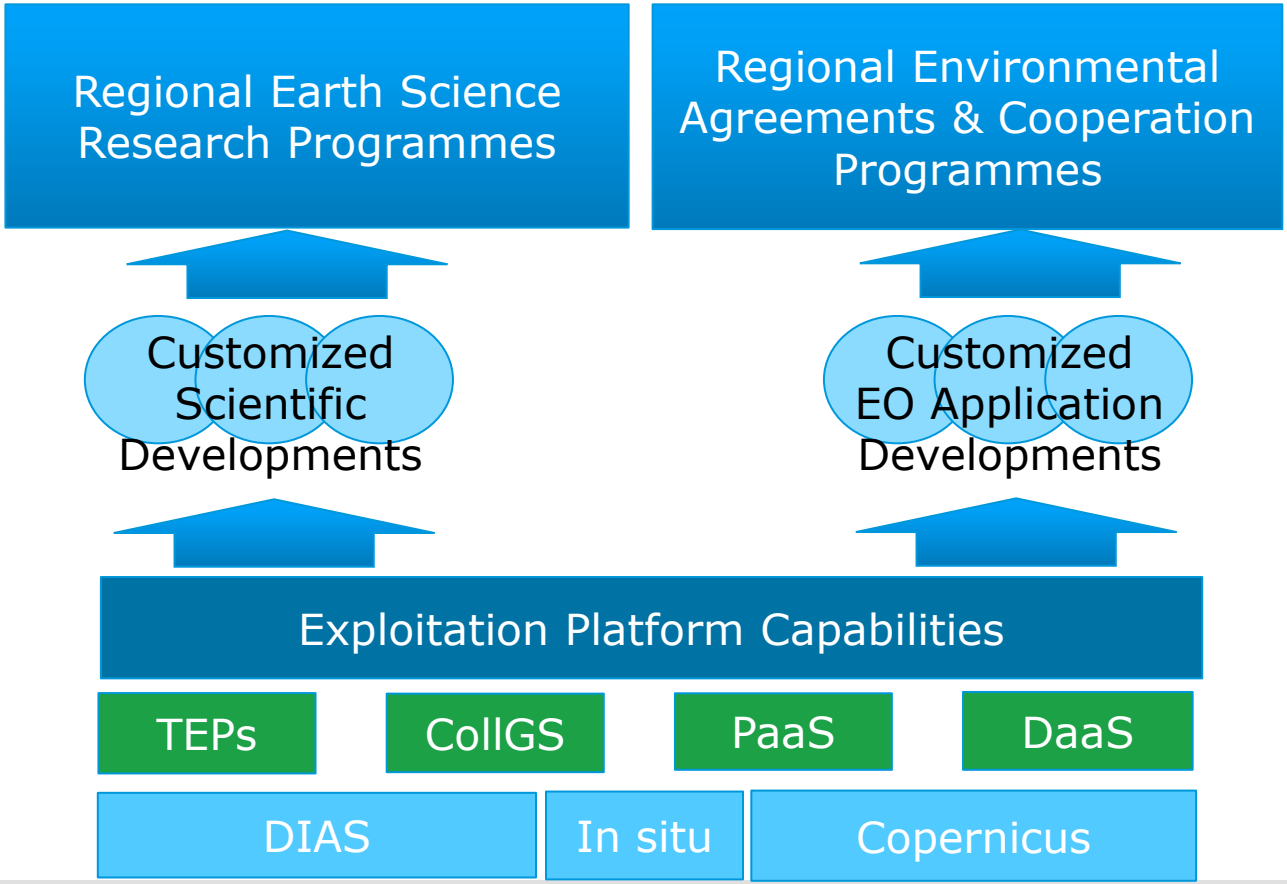
EO general scheme

Use case example



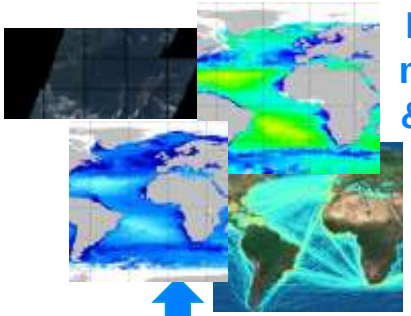
EOCLOUD
Earth Observation Data

Elements of a Regional Initiative



What does a Regional Initiative enable?

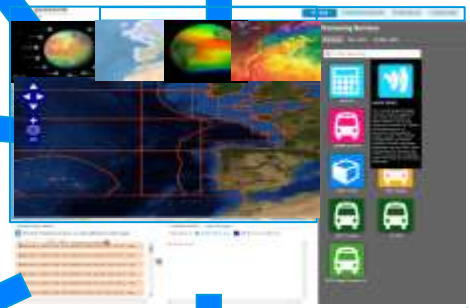
Support to National Reporting



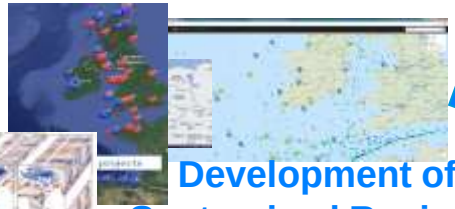
Data access, management & processing

Routine Monitoring & Analysis/ Reference Datasets

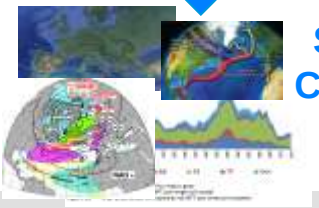
Communication, Education and Citizen Engagement



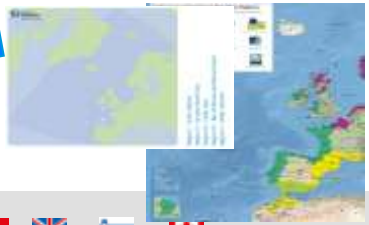
Support to Regional Management Actions/Plans



Development of Customized Regional Applications & Services

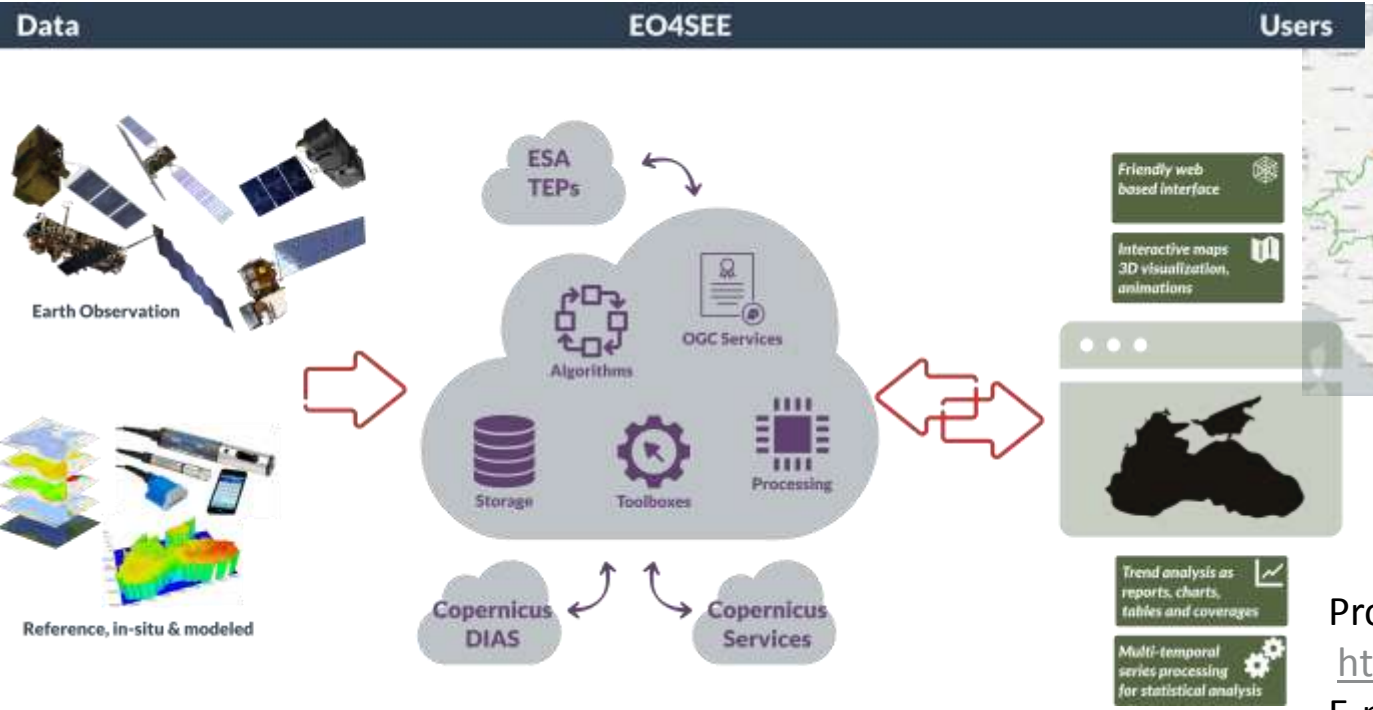


Support to Cooperative Regional Research



Support to Regional & Strategies

EO4SEE concept

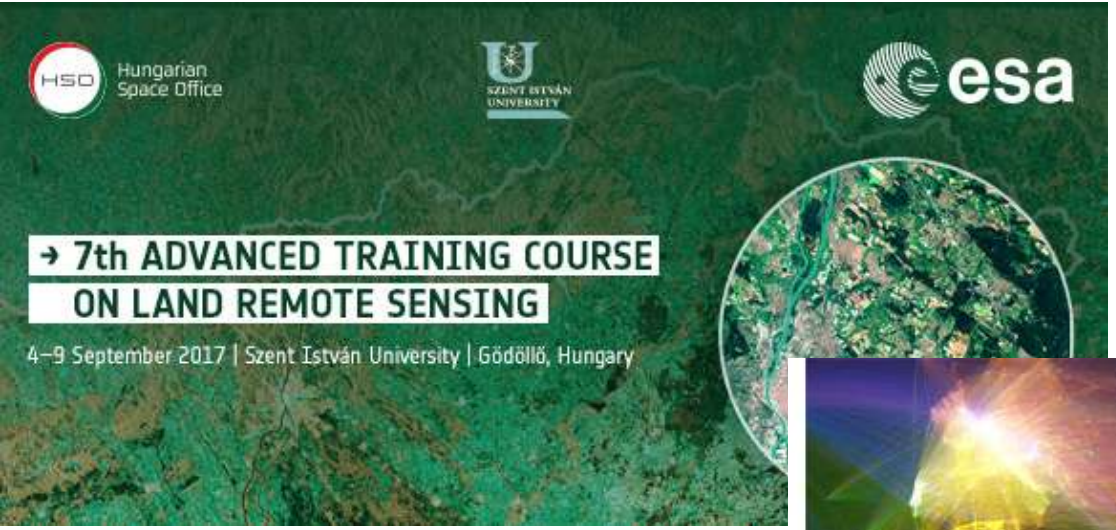


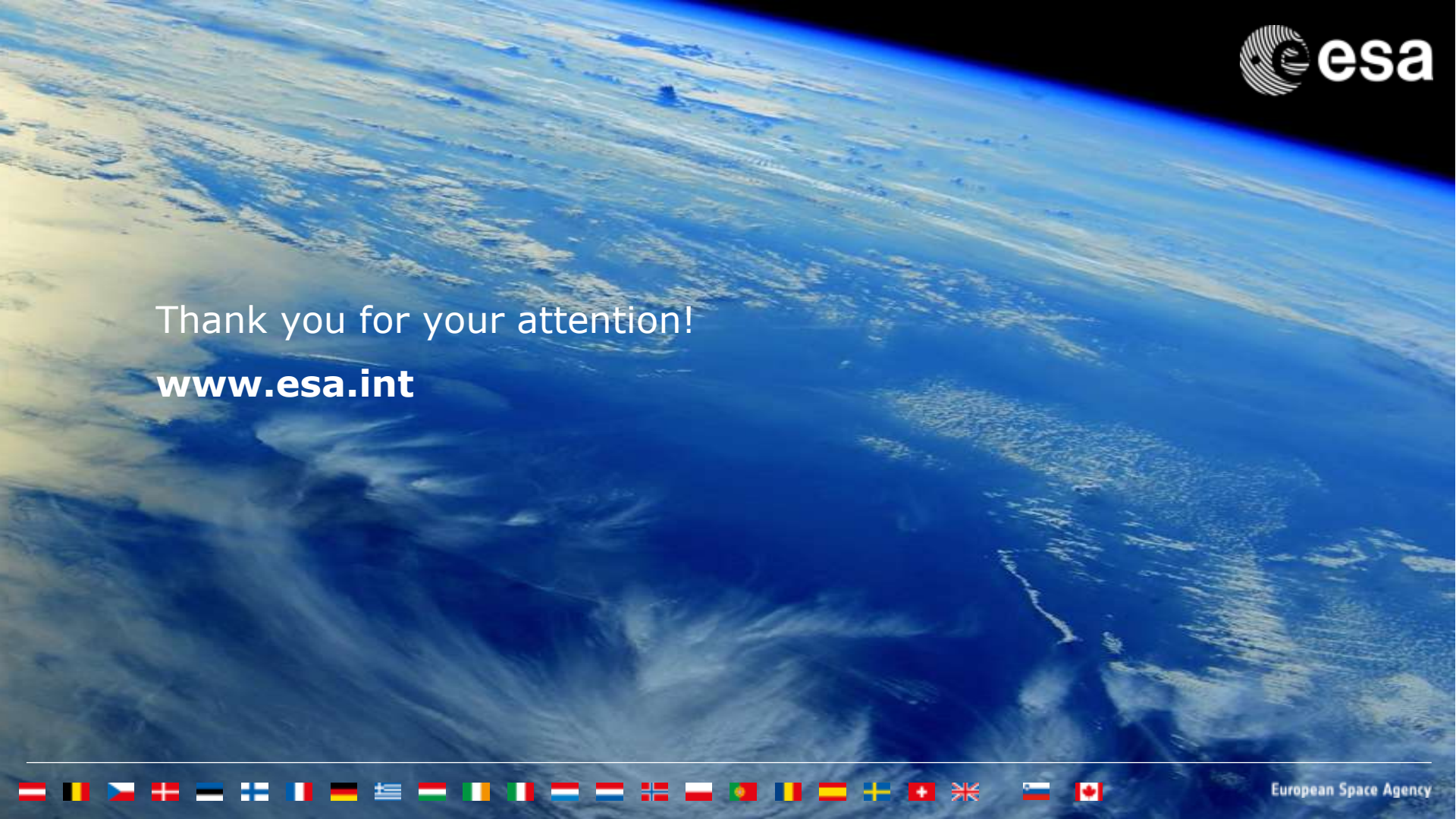
West University of Timisoara CLEVER°MAPS' gisat TERRASIGNA wasat

Project website:
http://eo4see.terrasigna.com
E-mail:
infoeo4see@terrasigna.com

Example outputs so far

Dates for your diary

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