



Reflections on Open EO (Data)

A focus shift from data to services in global development

Christoph Aubrecht

Directorate of Earth Observation Programmes

Science, Applications and Future Technologies Department

European Space Agency ESA/ESRIN

Senior Geospatial Specialist | ESA Representative at the World Bank

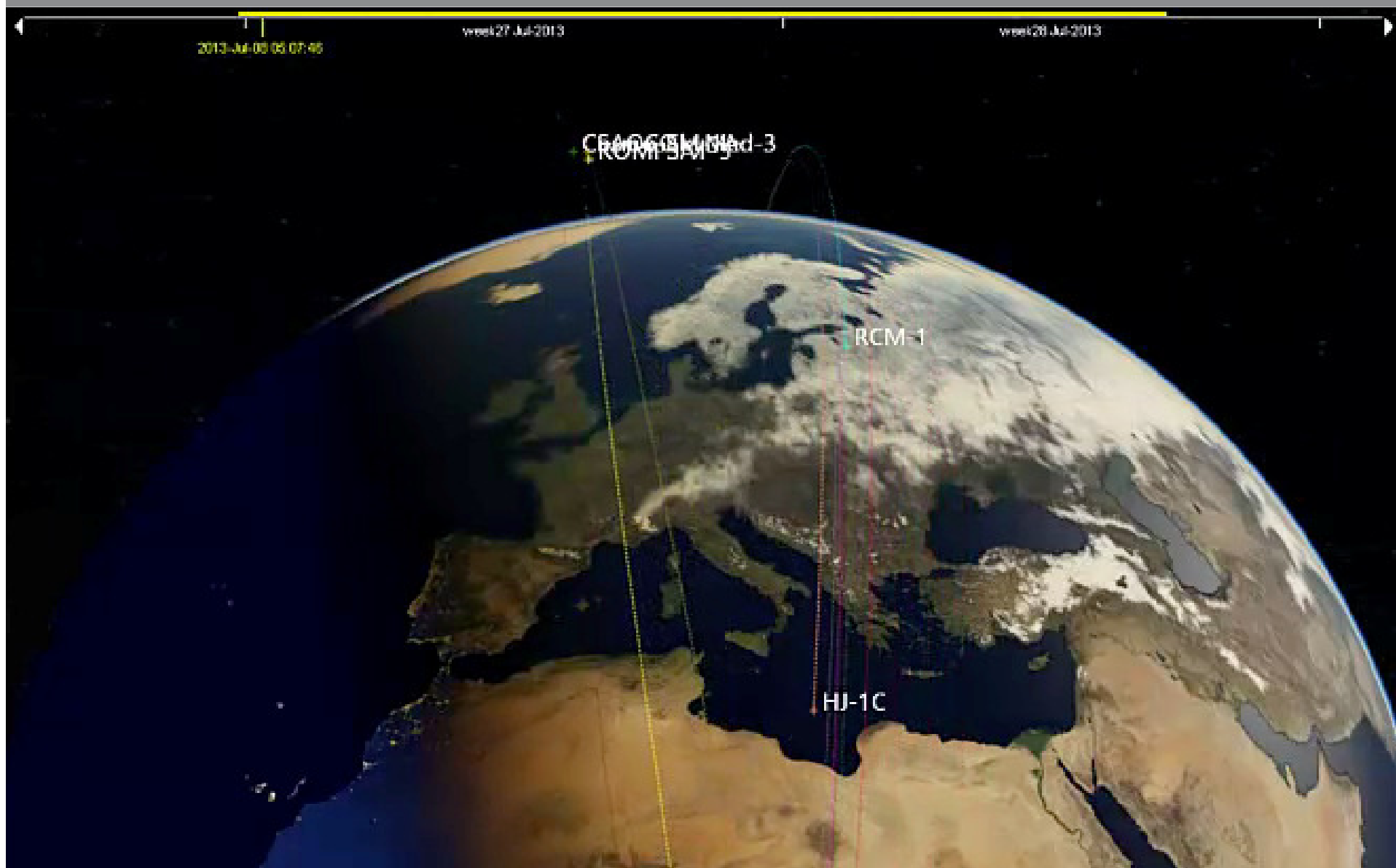
#SatSummit 2017 – Washington DC, 31 January 2017

Panel: Open Data Roundtable

www.esa.int

Observing our planet

[Open Sky]



→ THE ESA EARTH OBSERVATION PROGRAMME



Sentinel-3 scanning Earth's color

The Sentinel Family

-  S1A/B
-  S2A/B
-  S3A/B
-  S4A/B
-  S5P
-  S5A/B/C
-  S6 J-CS A/B



Meteorological Missions

driven mainly by Weather forecasting and Climate monitoring needs. These missions developed in partnership with EUMETSAT include the Meteorological Operational satellite programme (MetOp), forming the space segment of EUMETSAT's Polar System (EPS), and the new generation of Geostationary Meteorological satellites (MSG & MTG satellites).

Copernicus Sentinel Missions

driven by Users needs to contribute to the European Global Monitoring of Environment & Security (GMES) initiative. These satellite missions developed in partnership with the EU include C-band imaging radar (Sentinel-1), high-resolution optical (Sentinel-2), optical and infrared radiometer (Sentinel-3) and atmospheric composition monitoring capability (Sentinel-4 & Sentinel-5 on board Met missions MTG and EPS-SG respectively).

Earth Explorer Missions

driven by Scientific needs to advance our understanding of how the ocean, atmosphere, hydrosphere, cryosphere and Earth's interior operate and interact as part of an interconnected system. These Research missions, exploiting Europe's excellence in technological innovation, paved the way towards new development of future EO applications.

Missions With Partners

EO Operated Missions

Long-term (decadal) continuous, consistent data



Flavio Sabbattini, Lupacchino school, Frascati, Sentinel School Contest (c) 2015






Space & Time: An EO paradigm shift





0 days 00 hours 00 minutes
Sentinel-2 constellation:
summer solstice

Towards efficient **data access**







Sentinels Scientific Data Hub





Welcome to the Sentinels Scientific/Other use Data Hub


The [Sentinels](#) Scientific Data Hub provides complete, free and open access to [Sentinel-1](#) and [Sentinel-2](#) user products, starting from the In-Orbit Commissioning Review (IOCR).


Scientific Hub



API Hub



S-3 PreOpsHub



User Guide


Roadmap

Statistics


6273
products published
in the last 24h
(S1 + S2 + S3)


52000
products downloaded
in the last 24h
(SciHub + API Hub +
S3 PreOps)


201
queries responded
in the last 24h
(SciHub + API Hub +
S3 PreOps)
Data updated hourly

Towards efficient **data access**



Preview of Sentinel-2 imagery ([Sentinel Image browser](#)) for access via AWS

The screenshot displays the 'Sentinel Image browser' web application. The main area is a map showing Sentinel-2 satellite imagery of a coastal region, with a grid of green tiles. A specific tile is highlighted with a red border. On the left, there are two sliders: 'Date range' with a 'Manual' button and a date range from 2016-12-06 to 2017-01-17, and 'Cloud coverage' with a range from 0 to 40. The top bar includes a 'Refresh' button and a 'Go to location' search bar. On the right, a sidebar shows '3 search result(s)' for 'Sentinel2 tiles'. The first result is '18SUJ - 2016-12-20', with details: Cloud coverage [12], Data coverage [0.41], Sensing time [2016-12-20, 10:06], UTM zone [18N], and Processing level [Level-1C]. Below this is a 'Preview' section showing a small thumbnail of the selected tile. At the bottom of the sidebar, two more results are listed: '18SUJ - 2016-12-10' and '18SUJ - 2016-12-07'. A 50 km scale bar is visible in the bottom left corner of the map area.

Towards efficient **data access**



www.geoportal.org



GOSS Portal



sentinel 2a

Search Results Number of results: 4

Filters SOURCE ORGANISATION

Sentinel2A_20160616_Yamal
(Organization: ArcGIS Online ESRI)
Sentinel 2A image of Yamal coastal zone. Image acquired at 16-6-2016. The image in this web mapping application consists of four 10 meter spectral bands (B, G, R and NIR). Presentation in false colour (NIR-R-G in R-G-B).
0 recent views

Sentinel2A_Netherlands_wm
(Organization: ArcGIS Online ESRI)
Sentinel2A mosaic of The Netherlands. Composed of S2A acquisition dates 1 May 2016 (western part) and 8 May 2016 (eastern part). Within country border: natural colour combination of S2A spectral bands 4,3,2 (R,G,B). Outside country border: black&white presentation of near infr ...
0 recent views

Visible 1-4 of 4

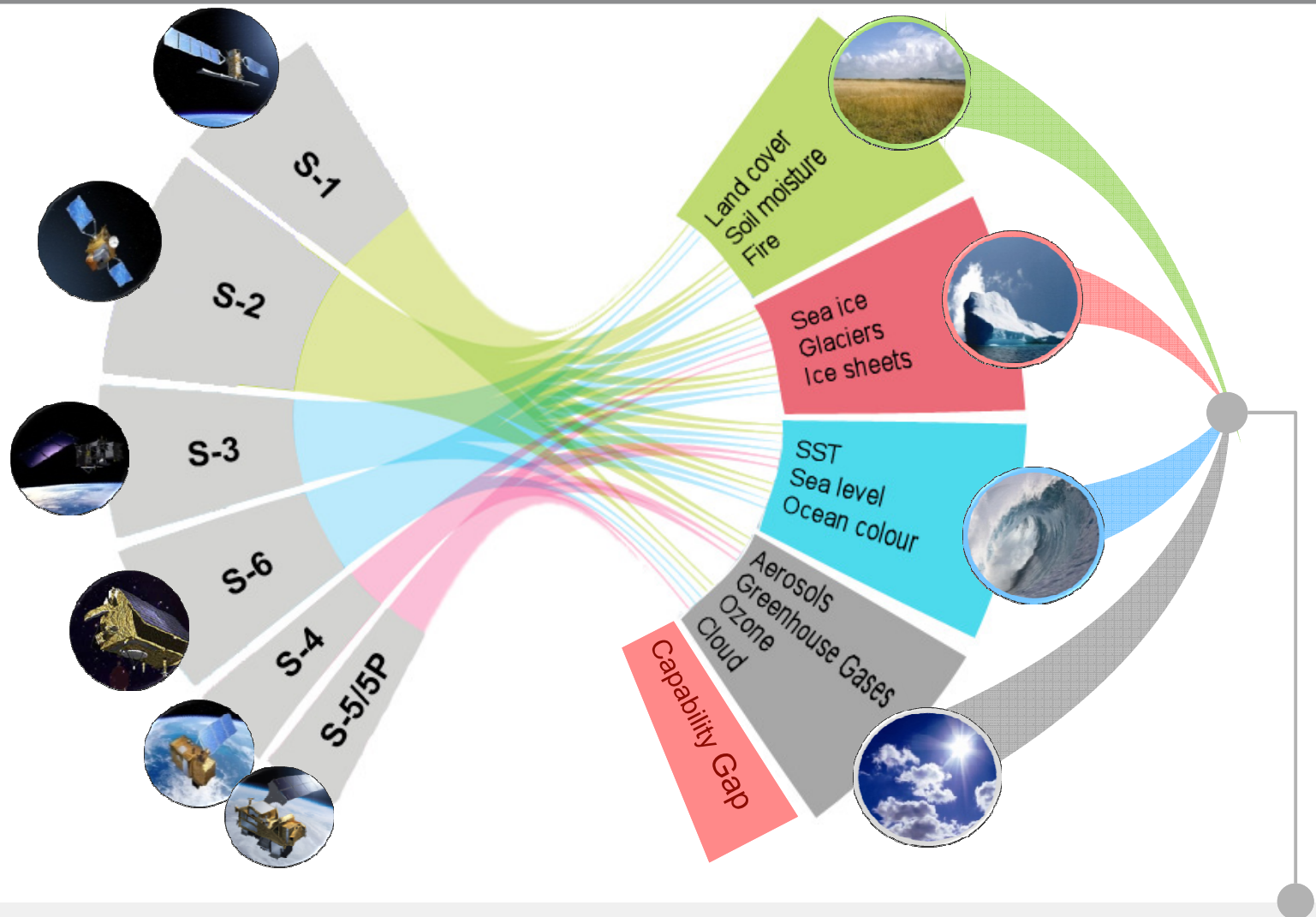
Send Feedback Terms & Conditions

ESA Presentation | DD/MM/YYYY | Slide 8

ESA UNCLASSIFIED – For Official Use

European Space Agency

From **data** to **products** to **services**



Monitoring

Prediction

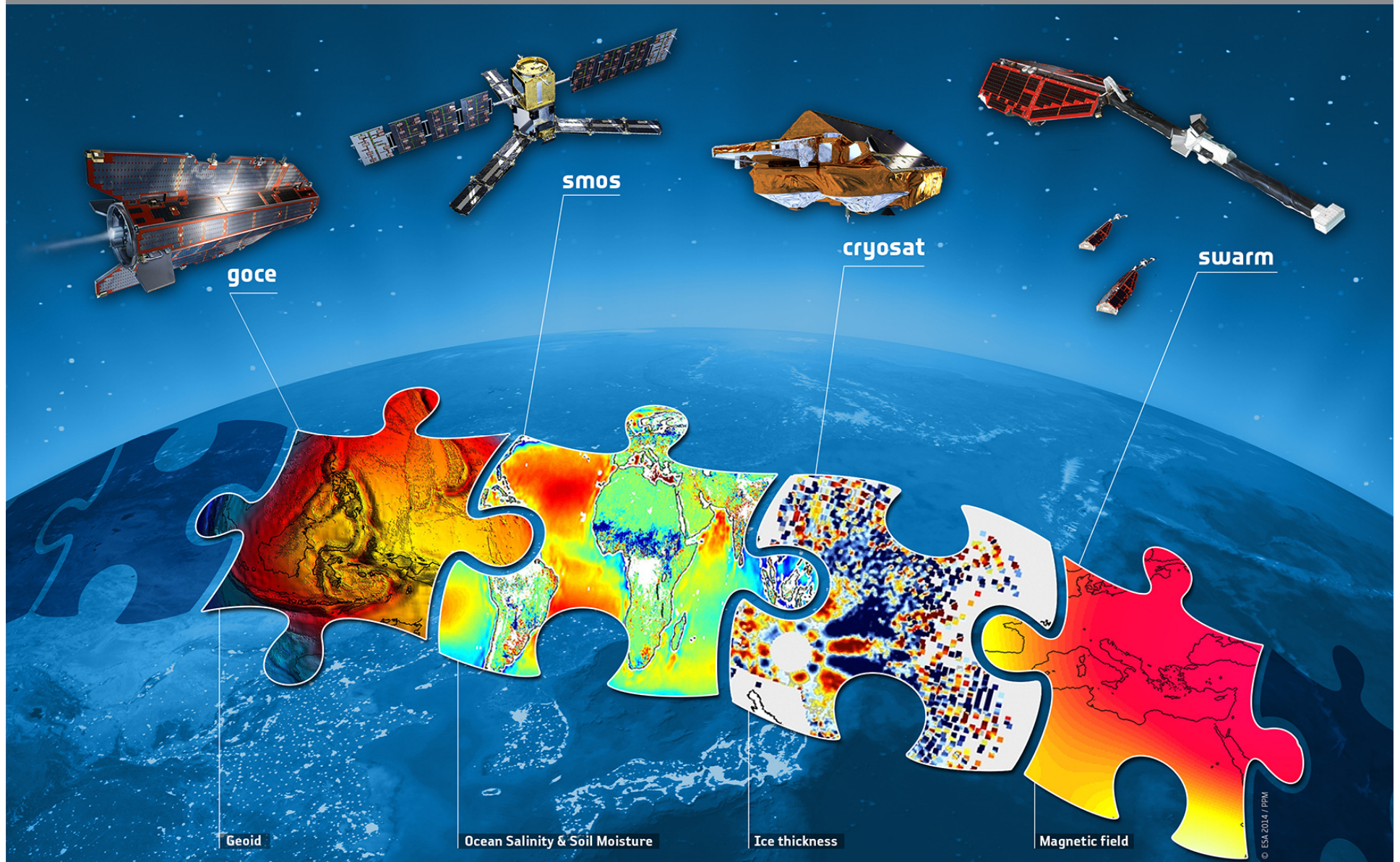
Projection

Re-analysis

Informing Decision

Understanding

From **data** to **products** to **services**



Towards efficient **data/product access**



climate change initiative
open data portal

Home

Data
Submitted by Cat Downy on Wed, 13/04/2016 - 23:55

**open data
portal
cci**

Welcome to the **CCI Open Data Portal**.
A single point of entry to CCI data.
Open, free and easily accessible.

CCI Dashboard
The big picture.

CCI Search
Simple & faceted.

CCI FTP
Quick & simple.

CCI Viewer
View. Draw. Catch.

▼ About CCI

- CCI Objective
- CCI Projects
- CCI Users
- CCI Achievements
- ESA Climate Office

◦ Data

► Resources

► CCI Collocation Meetings

◦ Contact Us

Search

aerosol
cci

cloud
cci

fire
cci

ghg
cci

glaciers
cci

antarctic
ice sheet
cci

ice sheets
greenland
cci

land cover
cci

ocean colour
cci

Towards efficient **data exploitation**



thematic exploitation platform

geohazards-tep.eo.esa.int

[Sign in](#) [Register](#) [Contact](#)



[Home](#)

[Observations & Measurements](#)

[Information Processing](#)

[Community](#)

[EO sector Collaboration](#)

Central Italy Earthquake

On 24 August 2016, a 6.2 magnitude earthquake struck central Italy. Check interferograms from GEP community processed just few hours later the acquisition availability.

[View Community](#)



Background



Geo Browser



Activities

Towards efficient data exploitation



Towards efficient **data exploitation**



step

science toolbox exploitation platform

esa

ESA

STEP

TOOLBOXES

DOWNLOAD

GALLERY

DOCUMENTATION

COMMUNITY

THIRD PARTY PLUGINS

• SNAP

• Sentinel 1 Toolbox

• Sentinel 2 Toolbox

• Sentinel-3 Toolbox

• SMOS Toolbox

• Download

• Community

• Useful Links

→ SNAP

SURVEY

Home > Scientific Toolbox Exploitation Platform

multimission scientific toolboxes

ESA is developing **free open source toolboxes** for the scientific exploitation of **Earth Observation missions** under the the Scientific Exploitation of Operational Missions (SEOM) programme element. **STEP** is the ESA **community platform** for accessing the software and its documentation, communicating with the developers, dialoguing within the science community, promoting results and achievements as well as providing tutorials and material for training scientists using the Toolboxes.

The ESA toolboxes support the **scientific exploitation** for the **ERS-ENVISAT** missions, the **Sentinels 1/2/3** missions and a range of **National** and **Third Party** missions. The three toolboxes are called respectively Sentinel 1, 2 and 3 Toolboxes and share a common architecture called **SNAP**. They contain some functionalities of historical toolboxes such as BEAM, NEST and Orfeo Toolbox that were developed over the last years.

SNAP Features

Download

Tutorials

Community

Documentation

Developers

Gallery

Blog

Search...

seom

scientific exploitation of operational missions

2017

• POLINSAR 2017 WORKSHOP

ESA POLINSAR 2017 Workshop

2016

• COLOUR AND LIGHT IN THE OCEAN FROM EO WORKSHOP

Colour and Light in the Ocean from Earth Observation

• EO OPEN SCIENCE 2016

Earth Observation Open Science 2016 Conference

• EARTH OBSERVATION SUMMER SCHOOL

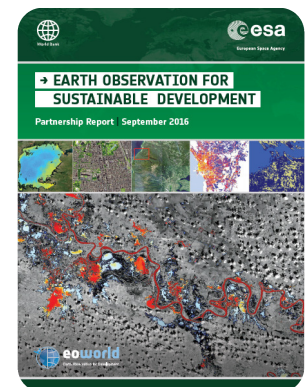
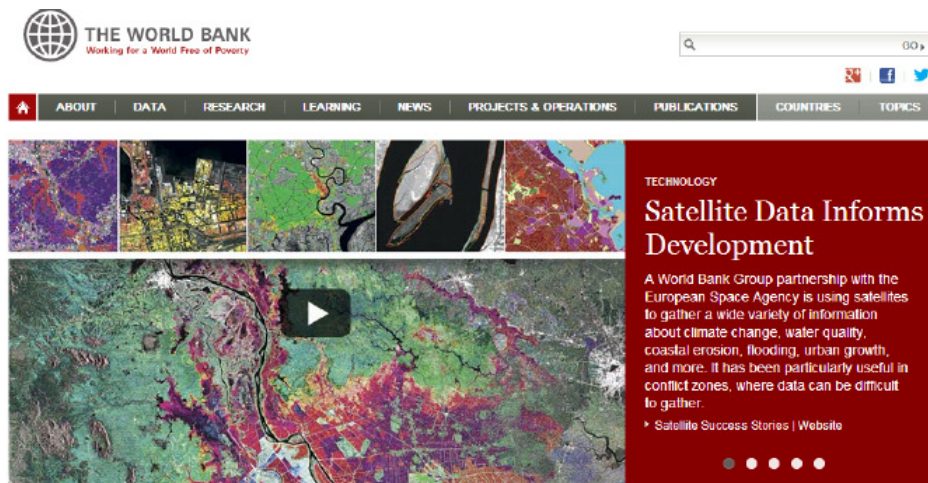
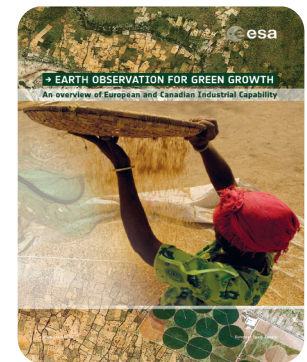
Earth System Monitoring & Modelling

“Open source toolbox development for scientific exploitation of EO missions”

Promoting data literacy and use in **international development**



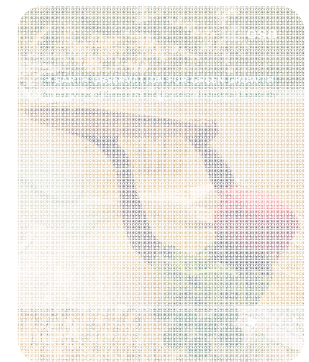
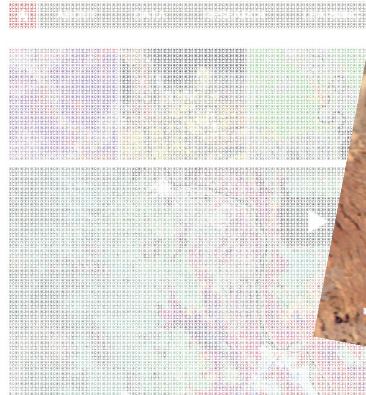
- 65 small-scale demonstrations of EO services in support of IFI projects since 2008



Promoting data literacy and use in **international development**



- 65 small-scale demonstrations of EO services in support of IFI projects since 2008



Longer-term vision

The background of the slide features a blue-toned image of a satellite in orbit over a globe. Overlaid on the right side is a word cloud with terms such as 'VISUALISATION', 'TOOLBOXES', 'BLOGS', 'COLLABORATION', 'TUTORIALS', 'E-LEARNING', 'SCIENCE', 'CLOUD', 'CITIZENS', and 'MOOC'.

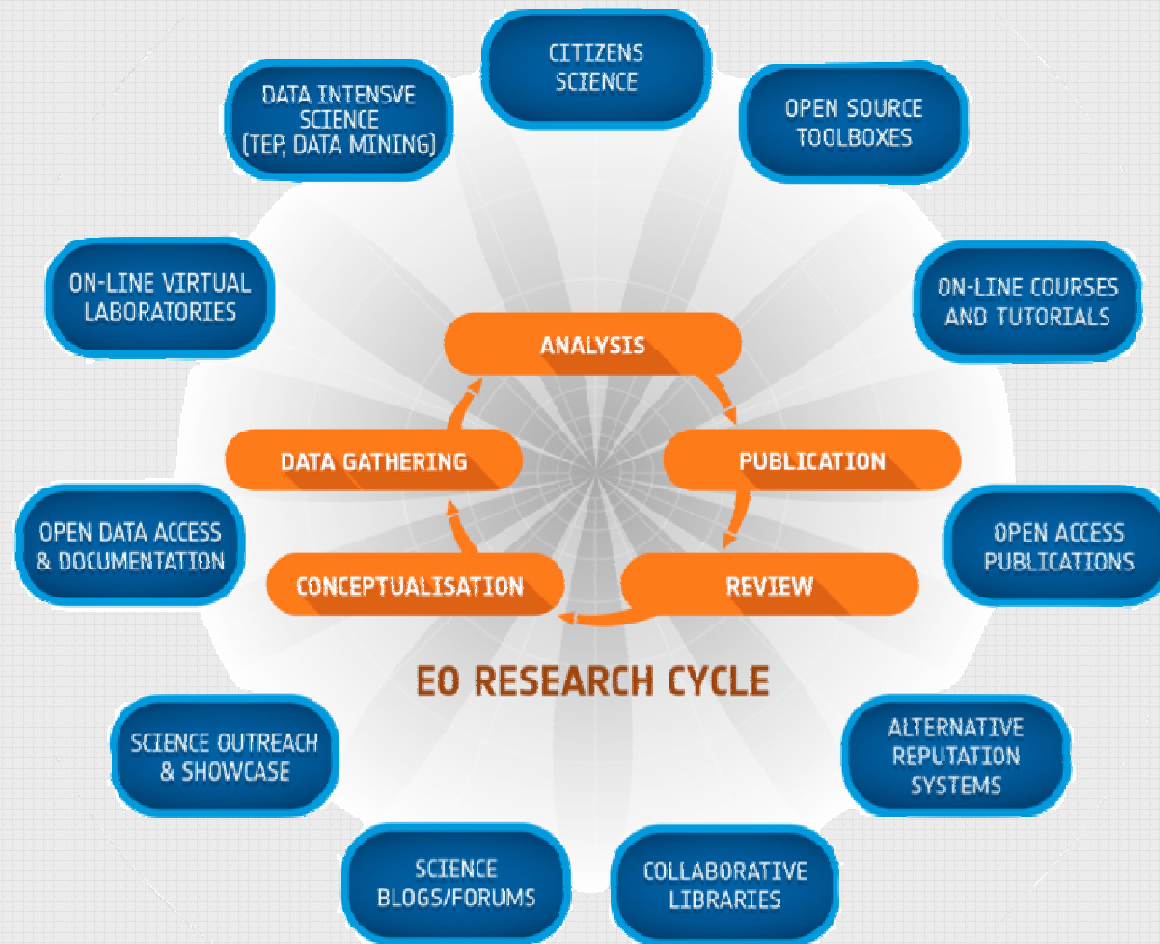
→ EO OPEN SCIENCE 2016

**12–16 September 2016 | Esa–Esrin
Frascati (Rome) Italy**

EO Open Science



OPENING UP THE EO RESEARCH PROCESS



EO SCIENCE 2.0



Earth Observation: A Necessity

Christoph Aubrecht | caubrecht@worldbank.org

ESA/ESRIN – World Bank



Sat-puccino

The Future is here, it is just not evenly distributed.
William Gibson