7th Annual UN-SPIDER Conference in Beijing

United Nations International Conference on Space-based Technolog es for Disaster Risk Reduction - "Building resilience through Integrated Appl ations"

In situ

Access and availability of in-situ data: the EU Copernicus In Situ component

Fabio Giulio-Tonolo, ITHACA

Slides jointly prepared with EEA, e-GEOS and evenfLow

Plenary Session 2

Integration of space and in-situ data for disaster risk reductio

24 October 2017

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European Commission

Implemented by

European Environment Agency

ITHACA

Non-Profit association, Italy

Mission

Use of Geomatics techniques in support of emergency management, with a focus on disaster preparedness and response

Founders and donors

Compagnia di San Paolo

POLITECNICO DI TORINO

In cooperation with:

WFP World Food Programme wfp.org

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ITHACA AND COPERNICUS

Why is **ITHACA** presenting the EU Copernicus In Situ component today?

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Ithaca is part of the Consortium - led by e-GEOS - providing **consultancy services supporting the European Environment Agency in the Spatial data themes domain**, with e-GEOS, ISPRA, ITHACA (Italy) and EVENFLOW (Belgium) and the support of Planetek Italia s.r.l., Telespazio Vega UK ltd, EOXPLORE UG, GAF AG, ARPA - Emilia – Romagna, EUROGEOGRAPHICS

e-geos AN ASI/TELESPAZIO COMPANY

ISPRA Istituto Superiore per la Protezione e la Ricerca Ambientale

ITHACA

evenflow

planetek italia

GAFAG

Telespazio A Finmeccanica/Thales Company

EuroGeographics

arpae emilia-romagna

EOXPLORE

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OUTLINE

As highlighted in the Conference information note:

- ***space based information*** *alone* ***is not enough*** *for disaster risk reduction.*
- ***Integrating space data with in-situ data*** *is an effective way for better utilization of the data for supporting* ***risk reduction decision making****.*

In the context of **access and availability of in situ data**, the **European Environment Agency** coordinates the **Copernicus In Situ Component**, that:

- maps the **landscape of in situ data availability**,
- identifies **data access gaps** or bottlenecks,
- supports the **provision of cross-cutting data** and
- manages **partnerships with data providers** to improve access and use conditions.

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COPERNICUS: EUROPE'S EYES ON EARTH

is a European Union Programme, coordinated and managed by the European Commission, aimed at **developing European information services based on satellite Earth Observation and in situ (non-space) data**.

It is implemented in partnership with:

- the Member States
- the European Space Agency (ESA)
- the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT)
- the European Centre for Medium-Range Weather Forecasts (ECMWF)
- EU Agencies and
- Mercator Océan

THE COPERNICUS COMPONENTS

Copernicus
Europe's eyes on Earth

Space

Services

Atmosphere
(CAMS)

Marine
(CMEMS)

Land
(CLMS)

Climate
(C3S)

Emergency
(EMS)

Security
(CSS)

In situ

In Situ

Today's focus

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THE COPERNICUS IN SITU COMPONENT

In Situ

https://insitu.copernicus.eu/

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European Environment Agency

Cross-cutting tasks:

- Maintain an **overview** **of the Copernicus in situ component**
- Identify **data access gaps** or bottlenecks,
- Support the **provision of** **cross-cutting data**
- Manage **partnerships** **with data providers** to improve access and use conditions
- **Raise awareness** about the Copernicus in situ component

THE COPERNICUS IN SITU COMPONENT

In situ

In Situ

"In situ data" means

- **observation data from ground, sea or air-borne sensors** as well as
- **reference and ancillary data** licensed or provided for use in Copernicus

- **Day-to-day access to in situ data is in the hands of the Copernicus Services**
  - Works well if data are available and meet requirements (quality, timeliness, etc.)

- **The EEA intervenes when:**
  - More than one service has similar requirements (e.g. for pre-processing)
  - Actions are required beyond the capacity of individual Entrusted Entities
  - Barriers to the availability of data require a higher-level intervention
  - Innovative solutions must be brokered with services, providers or national authorities.

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IN SITU CHALLENGES

In situ data are crucial to the Copernicus programme:

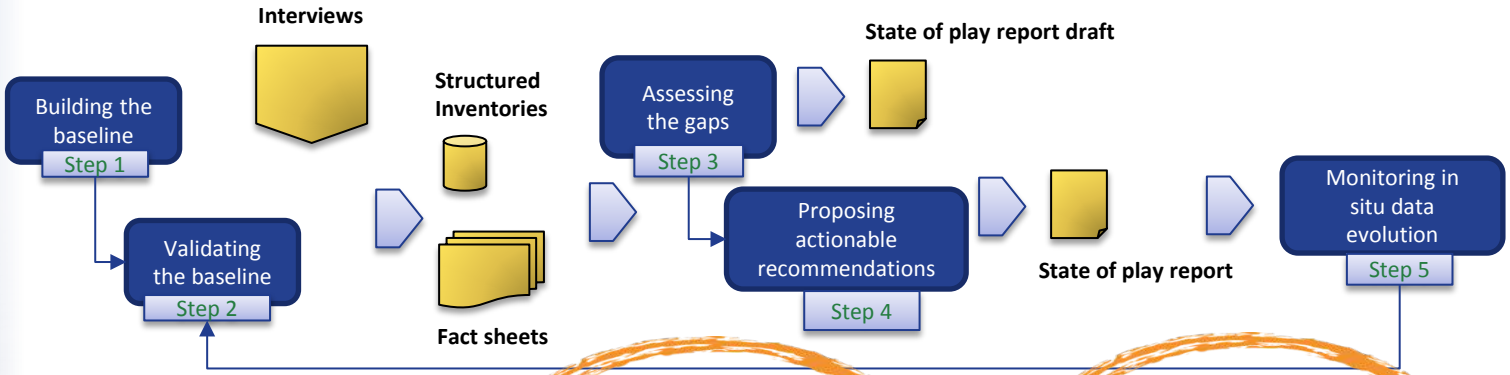
- They are essential for **product generation**, **calibration** and **validation**
- Satellite imagery needs ground truth and complementary data
- Required to **develop and improve** processing **algorithms**
- Missing or insufficient in situ data can result in
  - **Delays to product delivery**
  - **More effort expended during production**
  - **Lower quality**
  - **Lack of validation**

IN SITU CHALLENGES

- Space and Service components are managed and **funded** at EU level, in situ at **national and regional** level
- A significant part of the data and monitoring infrastructure is owned and operated at Member State level
- The landscape is extremely complex:
  - Numerous in situ products
  - Data holders and managers vary widely in scale and organisation across MS
  - Numerous stakeholders with distinct but overlapping roles
- Some Copernicus Services (CEMS, CSS, CLMS Global, C3S) have **global coverage** and face the challenge of **acquiring information outside the EU territory**

STATE OF PLAY

Objective: to map the **main requirements** and **criticalities** in terms of In situ data for each Copernicus service and identify **cross-cutting issues** which the EEA is examining as part of its mandated tasks as Entrusted Entity for the Copernicus In Situ Component



FACT SHEETS ON COPERNICUS IN SITU DATA REQUIREMENTS

In situ

The EEA has produced a series of **fact sheets** detailing in situ data requirements at Copernicus service component level.

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STATE OF PLAY

To identify the main criticalities for each Copernicus Services:

Assessment of:

- **Level of detail:** Scale and/or resolution of the required product;
- **Data Quality:** (Accuracy, Completeness): Geometric or thematic accuracy and completeness in terms of categories/attributes;
- **Spatial coverage:** The geographical area of interest, i.e.:
  - Local/National: Single EU country;
  - European: EU countries;
  - Global: refers to all areas outside Europe;
- **Temporal coverage:** The time period to which the data in the dataset refers;
- **Update frequency:** The time period between two consecutive releases of a dataset;
- **Timeliness:** Time period between the data request and data access;
- **Data type:** Data format e.g. vector, raster, ascii, etc.;
- **Data Policy and Accessibility:** Whether it is possible to only view the dataset or to download it
- **Dataset INSPIRE compliance:** Reference INSPIRE theme
- **Dataset Sustainability:** Expectation of dataset's sustainability

For the following In Situ data themes:

- Settlements
- Hydrographic network
- Land cover
- Digital Elevation Model
- Transportation network
- Administrative boundaries
- Aerial Ortho-imagery
- Industry and Utilities
- Large scale population information
- Physiography
- Meteorological forecast data
- Toponyms
- LPIS data

STATE OF PLAY – COPERNICUS EMS MAPPING

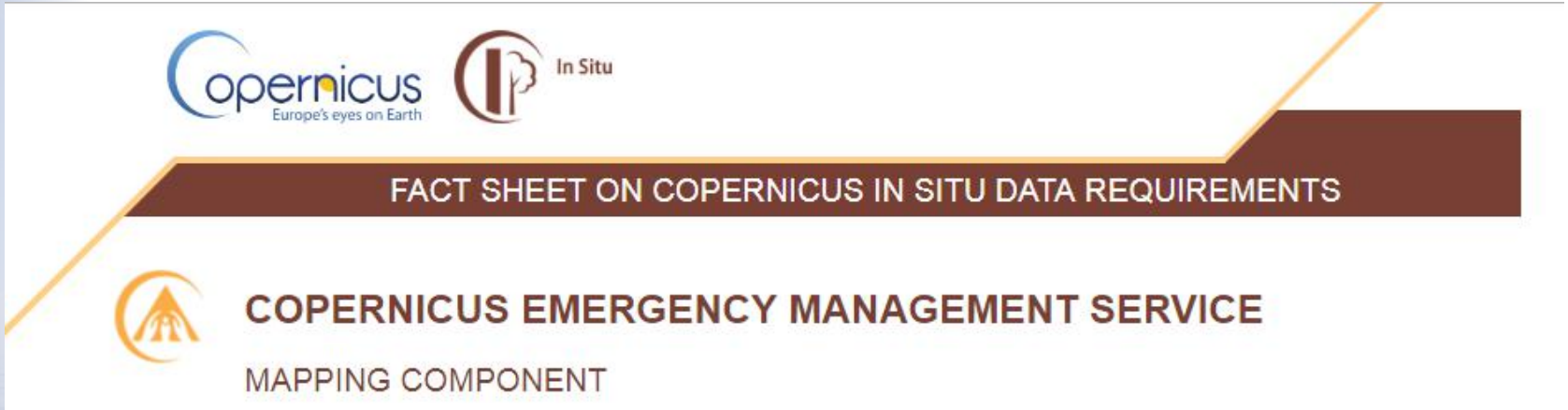
Being **the session targeting DRR**, the focus is on the current **State of Play**, in terms of the In situ data requirement, related to the **Copernicus Emergency Management Service - Mapping** module (presented yesterday during the first Plenary Session), showing:

- examples related to the **Settlement** In Situ data theme
- main **recommendations** at global level

FACT SHEETS ON COPERNICUS IN SITU DATA REQUIREMENTS

In situ

A summary of the analysis of **In Situ data requirements** for the Copernicus Emergency Management Service is available in a dedicated Fact Sheet



Risk-Related Data

Datasets related to the **risk of natural disasters or other hazards, asset vulnerability and other datasets to be used as input to models** are needed in order to generate products for the **Risk & Recovery Mapping Module**.

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STATE OF PLAY – COPERNICUS EMS MAPPING

In situ

Settlements	CEMS Mapping	
	Service requirements	Criticalities
Level of detail	1:1:000/ 1:10:000/ 1:100.000	Depend very much on the Area of Interest of Service
Data quality	High quality, polygon features	Low completeness and accuracy of high scale data in global area
Spatial coverage	National/ European/ Global	Coverage is location dependent for some datasets
Temporal coverage	recent (3 years max)	National data temporal coverage may be older than 3 years
Update frequency	periodic update	no major gap
Timeliness	1 hour	Some datasets (European country NMCAs) require human interaction, that extends the time required for getting the data
Data type	Vector	no major gap
Data policy and accessibility	View and Dowload service	Often data are not available for download (see timeliness)/ Gaps in policy, on a case by case basis. National datasets are generally not accessible
INSPIRE compliance	Annex III: Buildings	no major gaps
Sustainability	Medium term 2-5 years	Uncertainties of sustainability of global initiatives (e.g. OSM)

CRITICALITIES
HIGH
MEDIUM
LOW
NONE
N.A. = Not Applicable

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Example related to the Settlement layer

Requirement:

A **detailed settlements layer** could bring to better evaluate the entity of the loss in terms of human lives and damages to the buildings

Main criticalities:

- **International level: ** datasets exist (OSM-like) but the **spatial completeness is very low**
- **Regional level: most of the European countries are well covered** (high data quality) but **the access** is not always granted and when possible, **doesn't fit the service time requirements** (being often needed human interaction to get authorization).

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Example related to the Settlement layer

Consequences:

- **datasets must be produced** or, at least, **complemented/updated** by the service providers during the Copernicus EMS mapping activities
- a **higher effort** spent and may **potentially lead to delays in the delivery** of the key crisis information.

STATE OF PLAY – RECOMMENDATIONS

Several recommendations supporting specific gap-filling actions have been provided, e.g.

Focusing on the **international level:**

- To analyse ongoing efforts carried out by **international initiatives aimed at developing and making accessible global geospatial information**, e.g.
  - the United Nations initiative on Global Geospatial Information Management UN-GGIM,
  - the Group on Earth Observations (GEO) with a focus on the GEOSS portal, NextGEOSS and EuroGEOSS.

- To explore the feasibility of, and to sponsor, at Programme Level, the **activation of specific Task Forces / Working Groups** for the production of specific datasets of common interest to Copernicus Service Operators.

COPERNICUS REFERENCE DATA ACCESS (CORDA)

Example of initiative to streamline the access to In situ data at EU level

Huge amount of data distributed across Europe

Difficulties to find the data required, and to do it quickly

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COPERNICUS REFERENCE DATA ACCESS (CORDA)

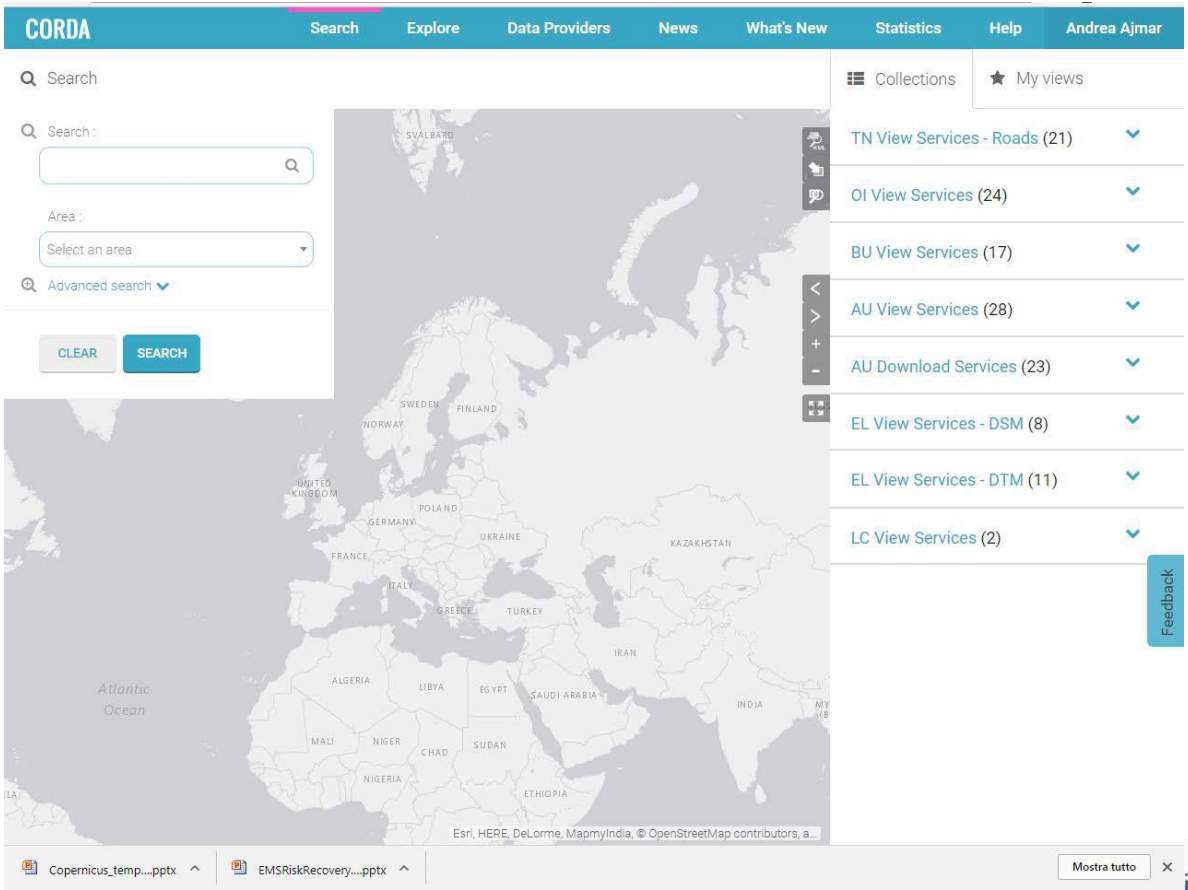
Example of initiative to streamline the access to In situ data at EU level

COpernicus Reference Data Access (CORDA)

- Single entry point node.
- National and regional geospatial data digitally available across Europe.
- Index of URLs to the relevant reference data for Copernicus services.
- Restricted to access by Copernicus services providers.
- High accessibility
- High reliability, efficiency and sustainability through centralization
- Simplicity of use

COPERNICUS REFERENCE DATA ACCESS (CORDA)

In situ



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