In situ

In Situ Component

Copernicus services' requirements for observations from the Arctic region

Copernicus Europe's eyes on Earth

European Commission

In situ

Copernicus will benefit from INTAROS

INTAROS' overall objective is to build an efficient integrated Arctic observation System by extending, improving and unifying existing systems in the different regions of the Arctic.

Copernicus Europe's eyes on Earth

INTAROS

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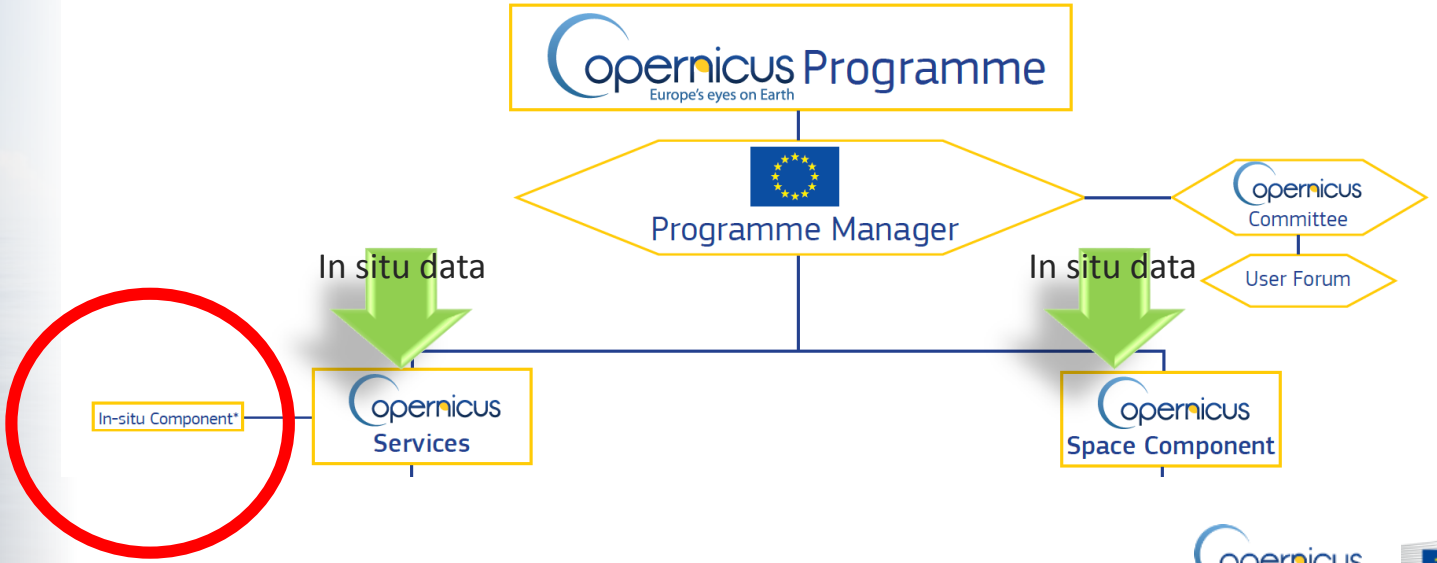
The Copernicus in situ component

Observation systems constitute an essential part of the Copernicus in situ component



In situ

The Copernicus in situ component

- Provides reliable and sustainable access to in situ data, relying on existing capacities operated at national and European level, and global observing systems;

- Is implemented by the services, and by the EEA when overall coordination is required;

- Member states' in situ infrastructures and data are essential contributions to Copernicus.

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EEA's main cross-cutting activities

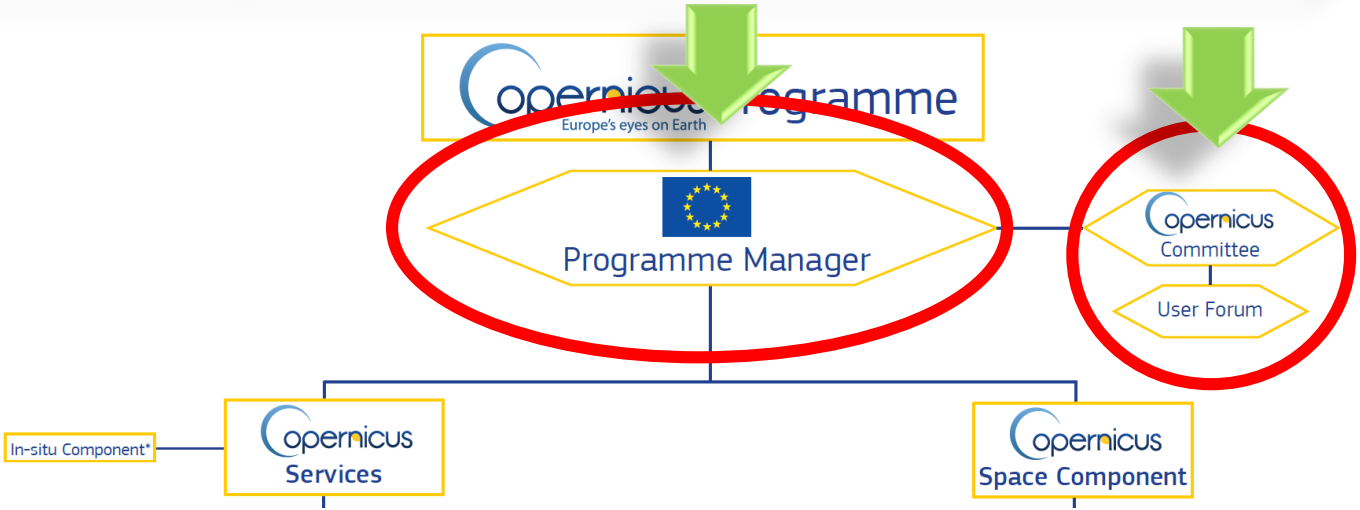
Maintain an overview of the Copernicus in situ component

Improve access to selected in situ data

Raise awareness about the Copernicus in situ component

The Copernicus in situ component

The EEA is delivering information to Copernicus' governance bodies.



In situ

Contractors supporting the EEA

- Two consortia are supporting the EEA's cross-service in situ data coordination activities:
  - In Situ Observations: EUMETNET (lead), EuroGOOS, and the University of Lund;
  - Spatial Reference Data: e-geos (lead), ISPRA, ITHACA, and Evenflow;

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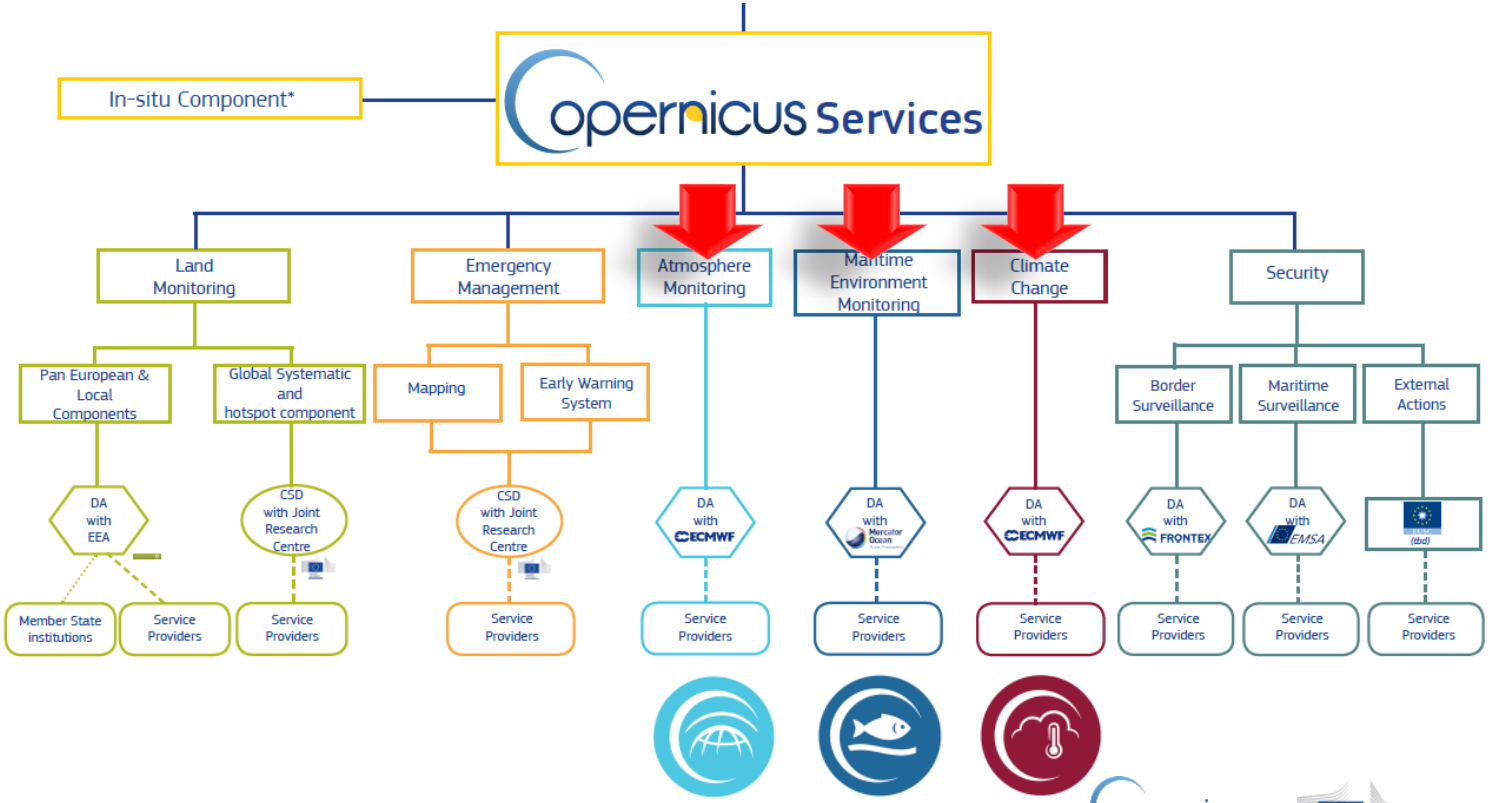
Services with an interest in the Arctic

In situ



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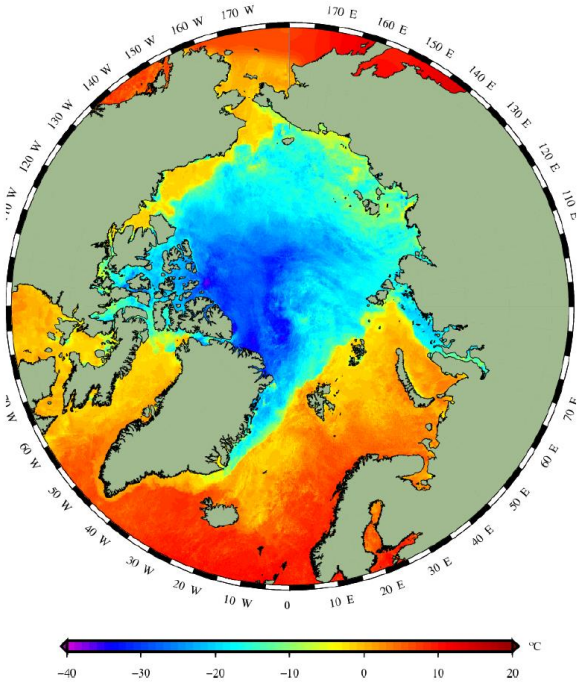
In situ

By monitoring the evolution of sea ice in the Arctic, the service provides a major indicator for studying global warming

Marine
(CMEMS)



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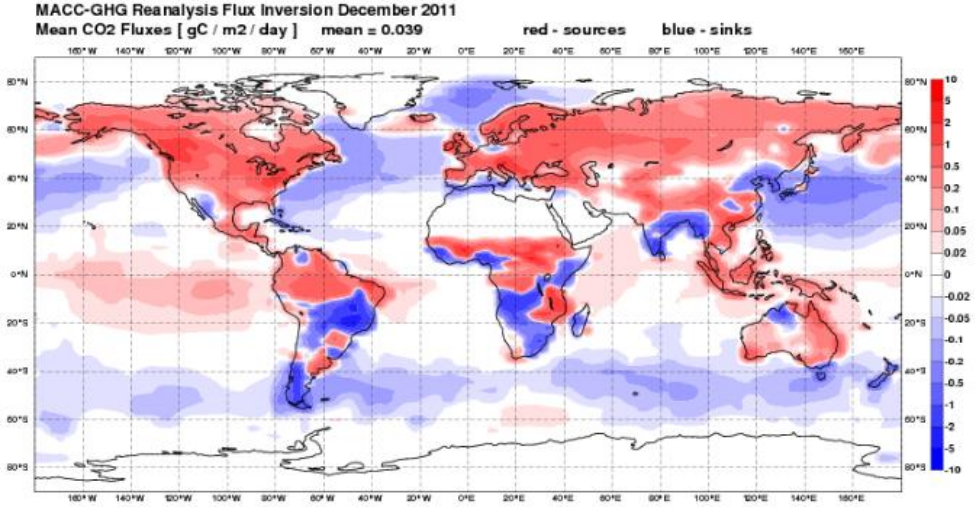
CMEMS - Selected needs and challenges

In situ

- In-situ data to validate all variables produced by the models, for assimilation into ocean forecasts and for use in multi-year gridded products;
- There is a general lack of real time/near real time data in the Arctic, in particular wave data. In situ data from this region is becoming more significant as human activities expand there;
- About 10% of measurements in the ocean observing networks are biogeochemical observations. A steady increase in the number of biogeochemical measurements in European seas and globally is required;
- Maintenance of Argo core mission (physical variables) at the present level and increased proportion of biologically equipped Argo profiling floats (Bio-Argo);
- Provision of tidal data, more accurate bathymetric maps, river outflow data (volume, nutrients and sediments);
- The interface between the ocean and atmosphere is also a critical area where additional in situ data need to be collected to enhance models and understanding of air-sea interaction processes;
- Extension of relevant in situ time series data to periods exceeding 20 years.

Copernicus Atmosphere Monitoring Service

In situ



Atmosphere
(CAMS)

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CAMS-Selected needs and challenges

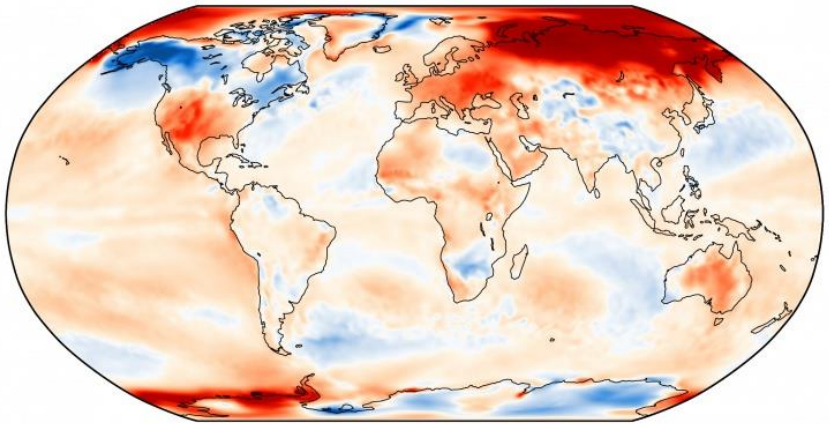
In situ

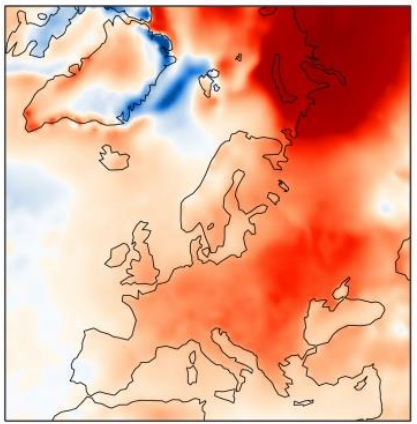
- For model evaluation and improvement In situ data needs to be available from locations that are representative for the air quality at the exposure level and that can be represented well in the global and the regional air pollution models;
- More information on aerosol size distribution is needed and is lacking from standard air quality networks;
- More information on (size resolved) aerosol composition is needed and is lacking from standard air quality networks;
- More vertical profile information on all components would help to improve the model evaluation and assimilation;
- In situ greenhouse gas concentration levels are even more ideal for model evaluation due to the high precision and accuracy of the measurements and the more representative location of the observing sites;
- Issues with (NRT) data availability from scientific networks and data licensing and attribution to providers need improvement.

Copernicus Climate Change Service

In situ

Climate
(C3S)





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Climate
Change Service
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In situ

C3S - Selected needs and challenges

- The service requires high-quality observational records of variables that critically contribute to the characterisation of Earth's climate: the so-called Essential Climate Variables (ECVs);
- There are three main applications of in situ data in the climate service:
  - **Calibration and validation** of long satellite records;
  - **Evaluation** of climate models by comparing model output with observations of the current and past climate, using historical forcings;
  - **Assessment**s of climate variability and change in recent decades by analysing long historical climate records. Before the 1970s, these assessments relied fully on in situ data. Reanalysis systems assimilate these observations enabling comprehensive reconstructions of past climate.

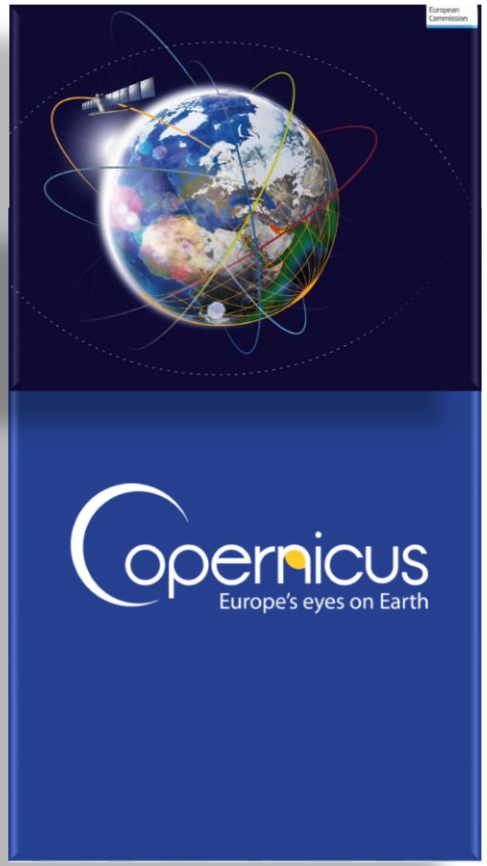
- Long, consistent data series are needed to detect climatic trends of, for example, the frequency of extreme climatic events that may have a severe impact on society;
- Problems for climate can be encountered over a long-period record through changes in measurement environment and observing practices, including instrumentation;
- Homogenisation and harmonised QA/QC and gridding procedures applied to historical time series of observations are needed to avoid spurious trends and incorrect statistics of extremes;
- Historical in situ observations are not always documented according to modern standards which makes quality assessment difficult;

Copernicus – some boundary conditions

In situ

- Copernicus services are operational;
- Continuity of service is important for end users;
- Copernicus services will evolve based on end user requirements;
- The Copernicus programme offers currently very limited budget specifically for in situ data;

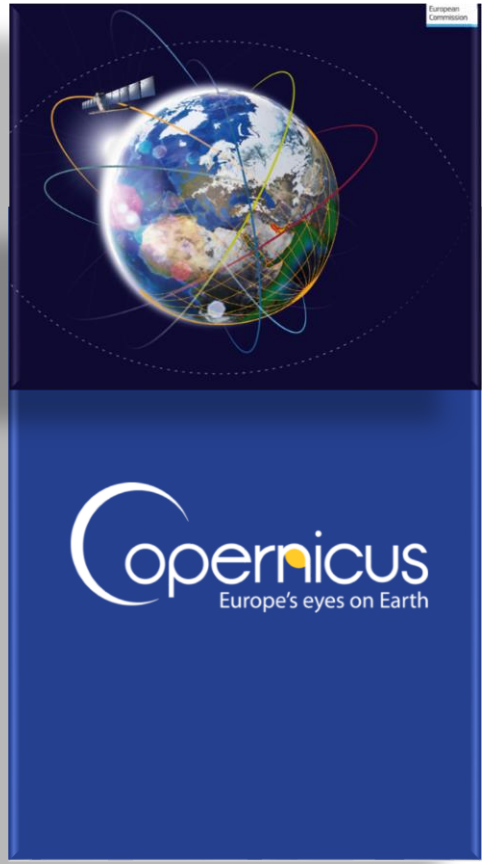
- New Copernicus regulation and budget 2021-2027 will be prepared during the coming months (target date: spring 2018).



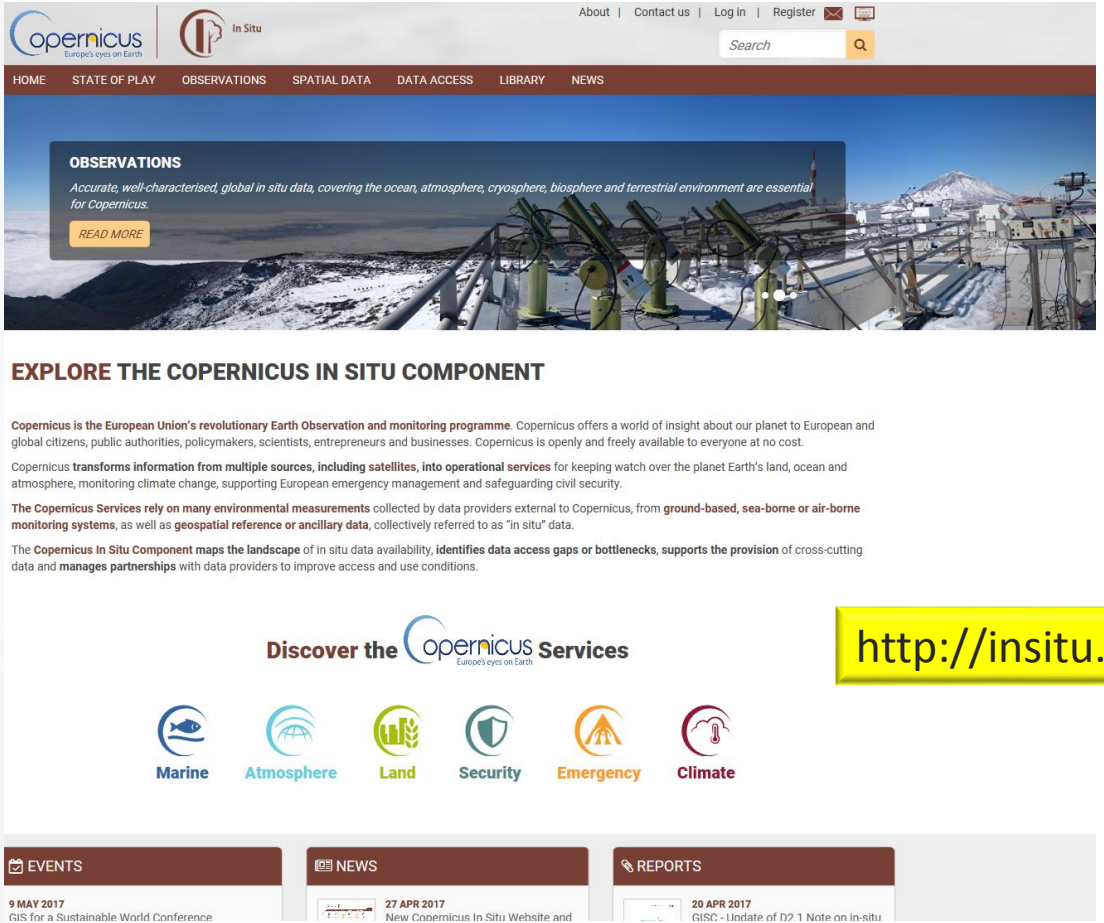
Copernicus-needs for harmonisation

High level cross-cutting needs

- Access protocols;
- Data formats;
- Metadata standards;
- Use conditions, data policies;
- Service level agreements.



More information available at



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Thank your for your attention