EU perspective on application needs for current climate information

Climate Change

Freja Vamborg and many colleagues in C3S and beyond

ECMWF, Copernicus Climate Change Service (C3S)

EUMETSAT - ROM SAF - C3S Satellite ECVs – Workshop Nov 2020

Copernicus Europe's eyes on Earth | European Commission | ECMWF

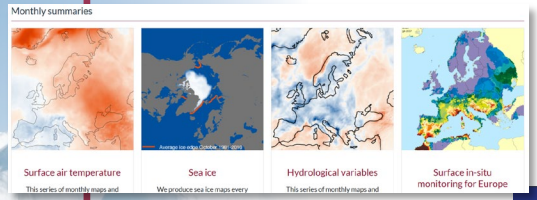
Copernicus EU | Copernicus EU

Copernicus EU | www.copernicus.eu

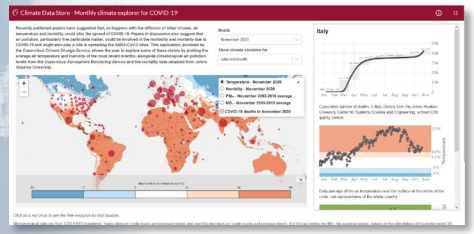
Data-driven climate information for communication

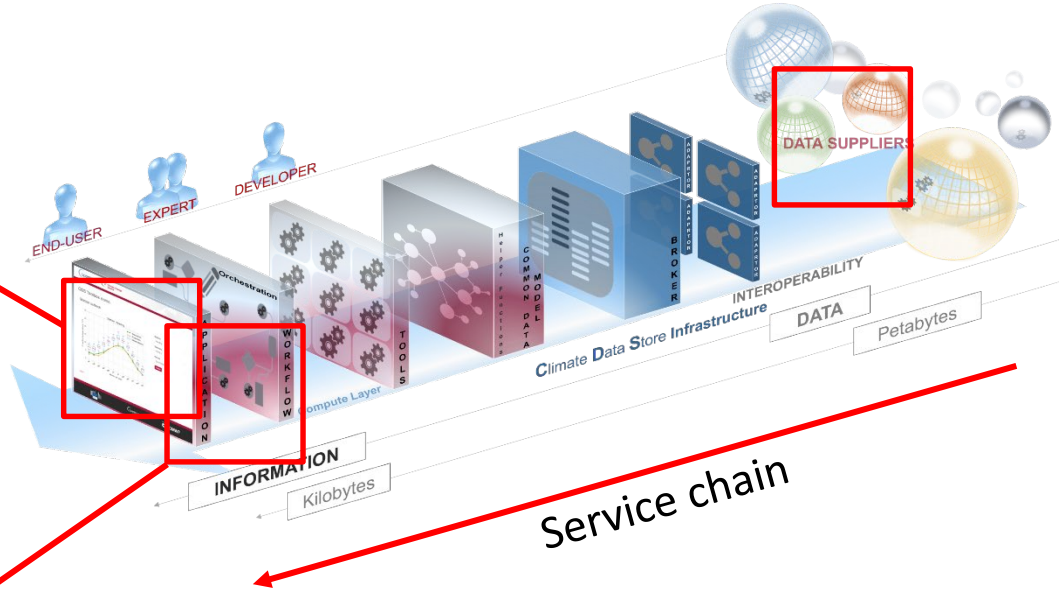
Climate Change

Monthly ~ 5th



Annually ~ April



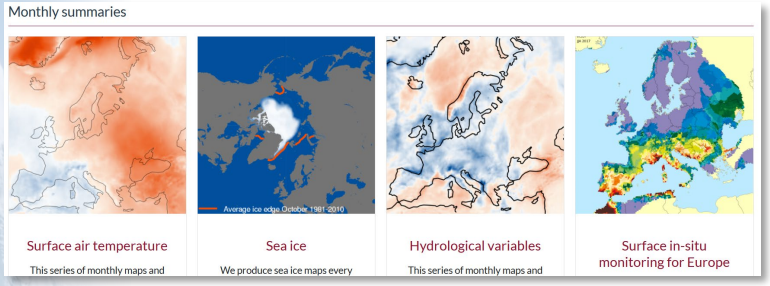


Quality Assured information and tools for users ranging from scientists to practitioners and policy makers.

Copernicus Europe's eyes on Earth | European Commission | ECMWF

Data-driven climate information for communication

Climate Change



Key

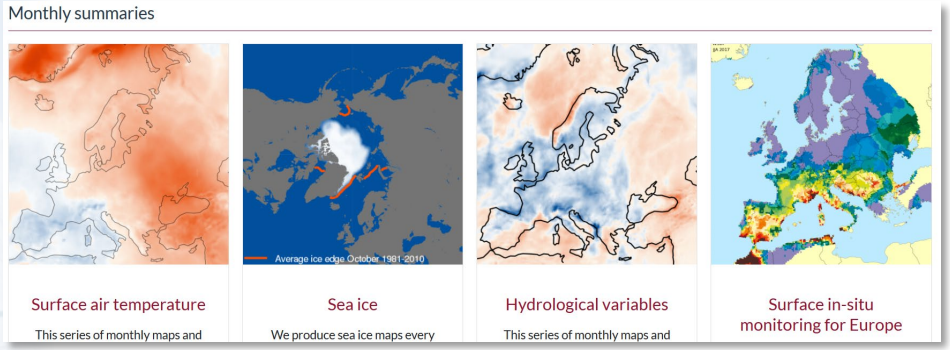
- timeliness
- the current as compared to the long-term (stable & consistent)
- fitness for purpose
- For C3S: Global, Europe, Arctic

Copernicus Europe's eyes on Earth | European Commission | ECMWF

C3S monthly climate bulletin

Climate Change

published ~5-7 of every month, with additional products around 24th



Reanalysis
Using a combination of observations and computer models to recreate historical climate conditions.

In situ
Measurements from an instrument located at the point of interest, such as a land station, at sea or in an aeroplane.

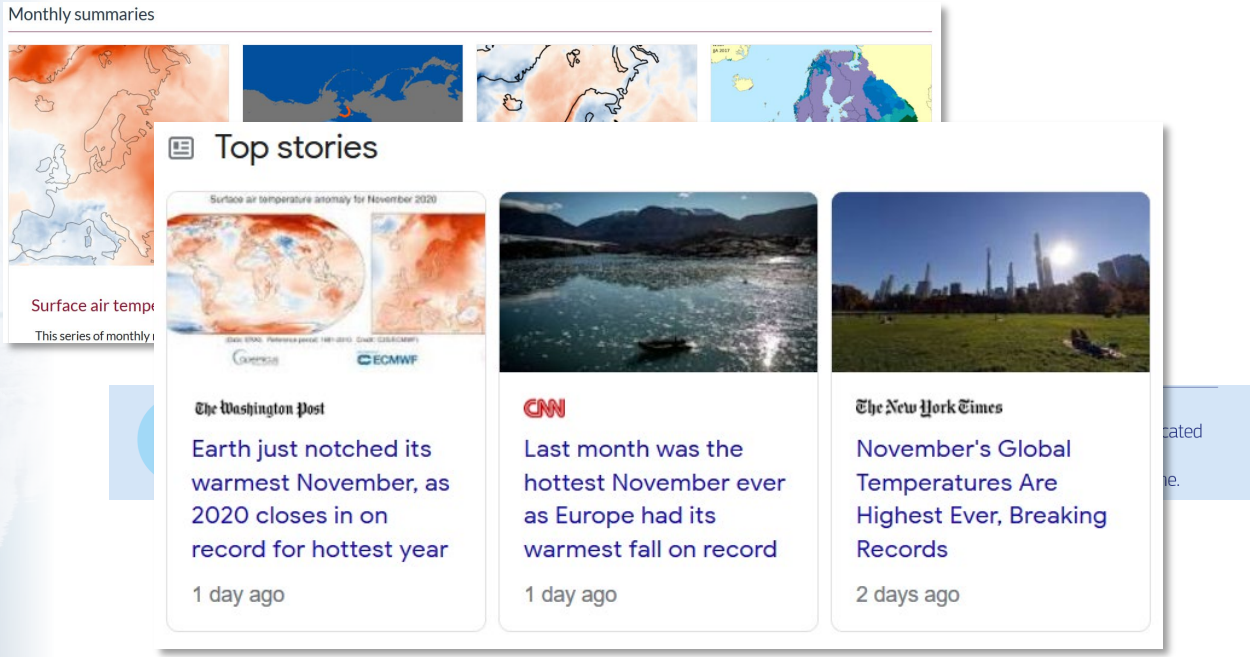
➢ climate.copernicus.eu/climate-bulletins

Copernicus Europe's eyes on Earth | European Commission | ECMWF

C3S monthly climate bulletin

Climate Change

published ~5-7 of every month, with additional products around 24th

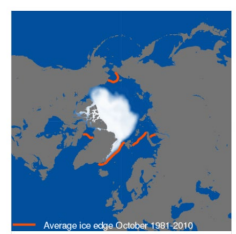


➢ climate.copernicus.eu/climate-bulletins

Copernicus Europe's eyes on Earth | European Commission | ECMWF

C3S monthly climate bulletin – sea ice

Climate Change



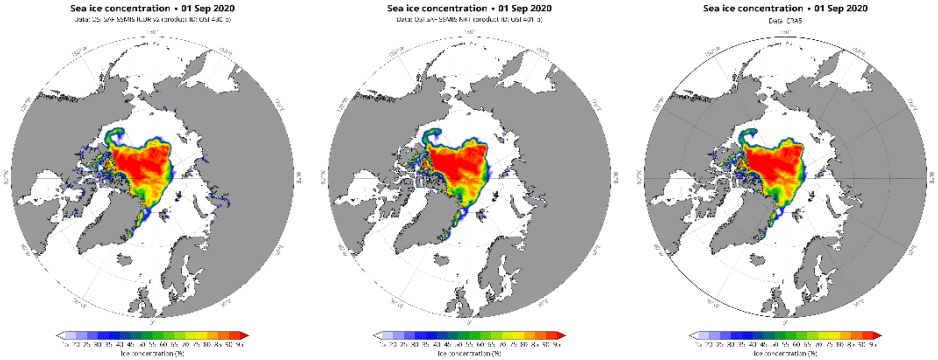
Sea ice

We produce sea ice maps every

Reanalysis
Using a combination of observations and computer models to recreate historical climate conditions.

Satellites
Providing information about the Earth's surface and its atmosphere from spaceborne orbit.

- Arctic
- The Antarctic
- Monthly average extent
- Qualitative



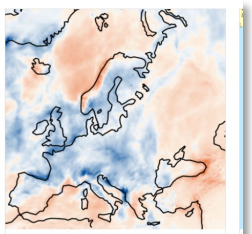
climate.copernicus.eu/climate-bulletins

Thanks to Julien Nicholas for graphics!

Copernicus Europe's eyes on Earth | European Commission | ECMWF

C3S monthly climate bulletin – precipitation

Climate Change

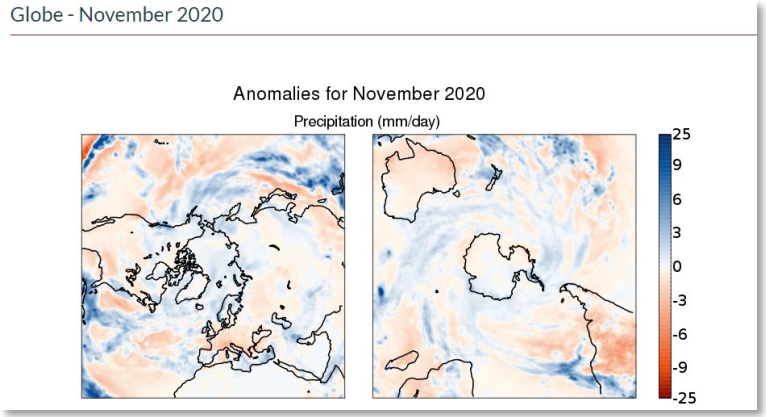


Hydrological variables

This series of monthly maps and

Reanalysis
Using a combination of observations and computer models to recreate historical climate conditions.

Satellites
Providing information about the Earth's surface and its atmosphere from spaceborne orbit.



- Europe
- Global: extra-tropics
- Monthly average anomalies
- Qualitative

>> Move towards combined product?

➢ climate.copernicus.eu/climate-bulletins

Copernicus Europe's eyes on Earth | European Commission | ECMWF

European state of the climate

Climate Change

published annually in April since 2018

Three periods of exceptionally warm weather led to record-breaking high temperatures

11 of the 12 warmest years have occurred since 2000

One of the wettest Novembers on record brought precipitation of up to four times the normal amounts

Heat and cold stress

The number of days with high heat stress levels are increasing in both northern and southern Europe.

Greenhouse gas concentrations

The amount of a gas contained in a certain volume of air.

CO_2 increase by about

0.6% per year ▲

in atmospheric concentrations

CH_4 increase by about

0.4% per year ▲

in atmospheric concentrations

Concentrations (column-averaged mixing ratios) estimated from satellite data for CO_2 and CH_4 covering 2003–2019

Reanalysis
Using a combination of observations and computer models to recreate historical climate conditions.

In situ
Measurements from an instrument located at the point of interest, such as a land station, at sea or in an aeroplane.

Satellites
Providing information about the Earth's surface and its atmosphere from spaceborne orbit.

Model-based estimates
Using the laws of physics and statistics to build large-scale models of environmental indicators.

➢ climate.copernicus.eu/ESOTC

Copernicus Europe's eyes on Earth | European Commission | ECMWF

Climate Change

European state of the climate

published annually in April since 2018

- Europe + sub-regions
  - Past year (seasons, averages, extremes)
- Global and European indicators – long-term trends

Reanalysis
Using a combination of observations and computer models to recreate historical climate conditions.

In situ
Measurements from an instrument located at the point of interest, such as a land station, at sea or in an aeroplane.

Satellites
Providing information about the Earth's surface and its atmosphere from spaceborne orbit.

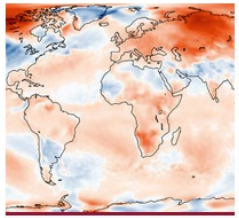
Model-based estimates
Using the laws of physics and statistics to build large-scale models of environmental indicators.

➢ climate.copernicus.eu/ESOTC

Copernicus Europe's eyes on Earth | European Commission | ECMWF

Climate Change

Increasing relevance for target stakeholders


Surface temperature


Greenhouse gas concentrations


Greenhouse gas fluxes


Vegetation


Wildfires


Sunshine duration and clouds


Sea ice


Glaciers


Glaciers and sea level


Lake surface temperatures


River discharge


Heat and cold stress


Sea level


Ice sheets


Greenland ice sheet

Inclusion of dataset and products shown based on maturity

Copernicus Europe's eyes on Earth | European Commission | ECMWF

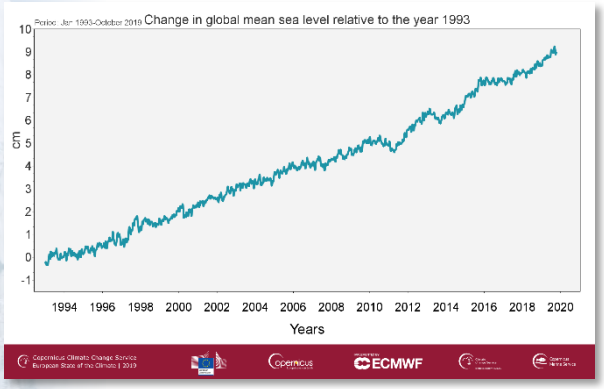
Climate Change

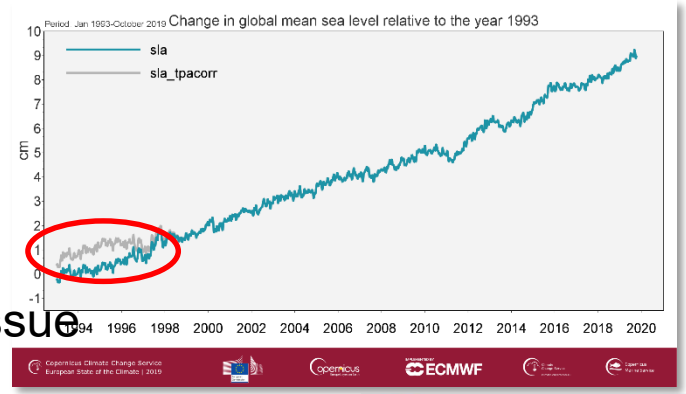
Sea level

C3S (i)CDR >> CMEMS ocean monitoring indicator

Includes post-glacial adjustment

Sea level data record covering
January 1993 to October 2019





Globally around

3.3 mm per year ▲

mean sea level increase

In Europe by

2–4 mm per year ▲

mean sea level increase

But not correction for TOPEX-A issue

➢ climate.copernicus.eu/ESOTC/2019/sea-level

Copernicus Europe's eyes on Earth | European Commission | ECMWF

Climate Change

CDRs/ iCDRs, assessment vs 'NRT' monitoring

Now: iCDR: the 'best' information at the time of release (monitoring, NRT producti

- reprocess CDR → assessment of fitness-for-purpose (uncertainties etc.)
- Uptake of CDR in climate assessments

→ iCDR usable for e.g. these monitoring activities

Copernicus Europe's eyes on Earth | European Commission | ECMWF

Climate Change

Contact information

For user support:
climate.copernicus.eu/help-and-support

Find us: climate.copernicus.eu @CopernicusECMWF @CopernicusEU @ECMWF

freja.vamborg@ecmwf.int
@FrejaandTIH

Copernicus Europe's eyes on Earth | European Commission | ECMWF