



Climate Change

# Copernicus Climate Change Service and the operationalisation of climate service provision

Conference Climate Science from Space

April 2021

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ECMWF



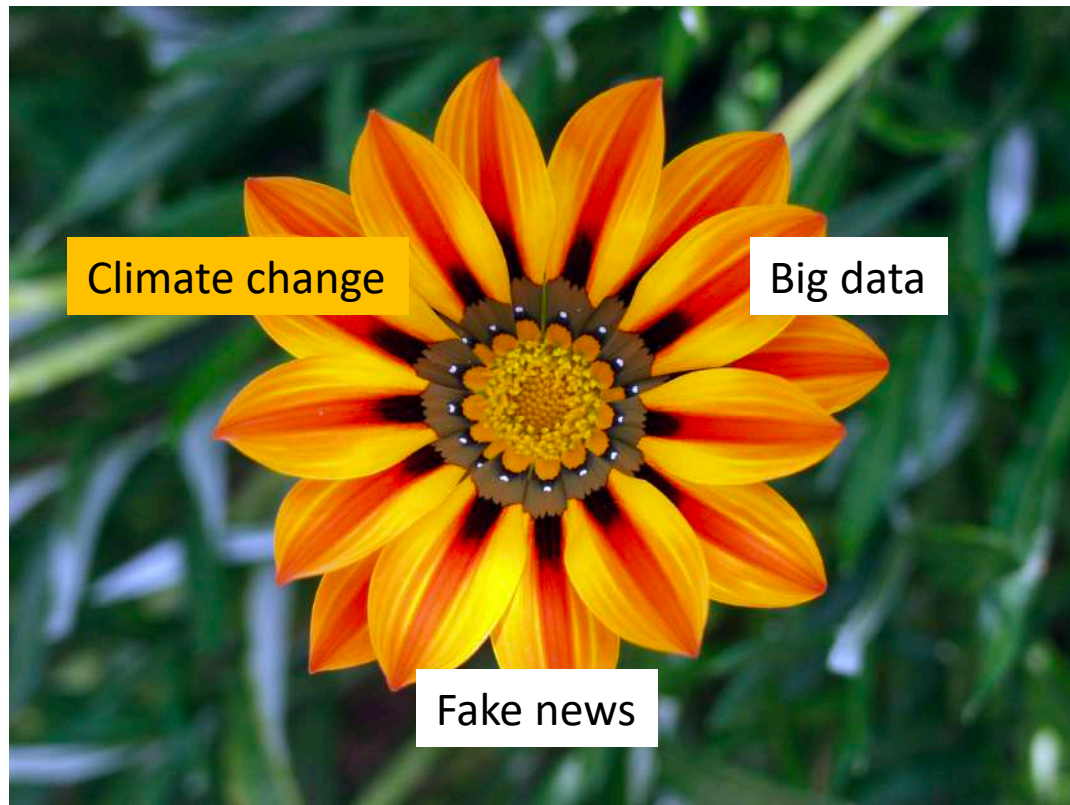
European  
Commission





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## Challenges...

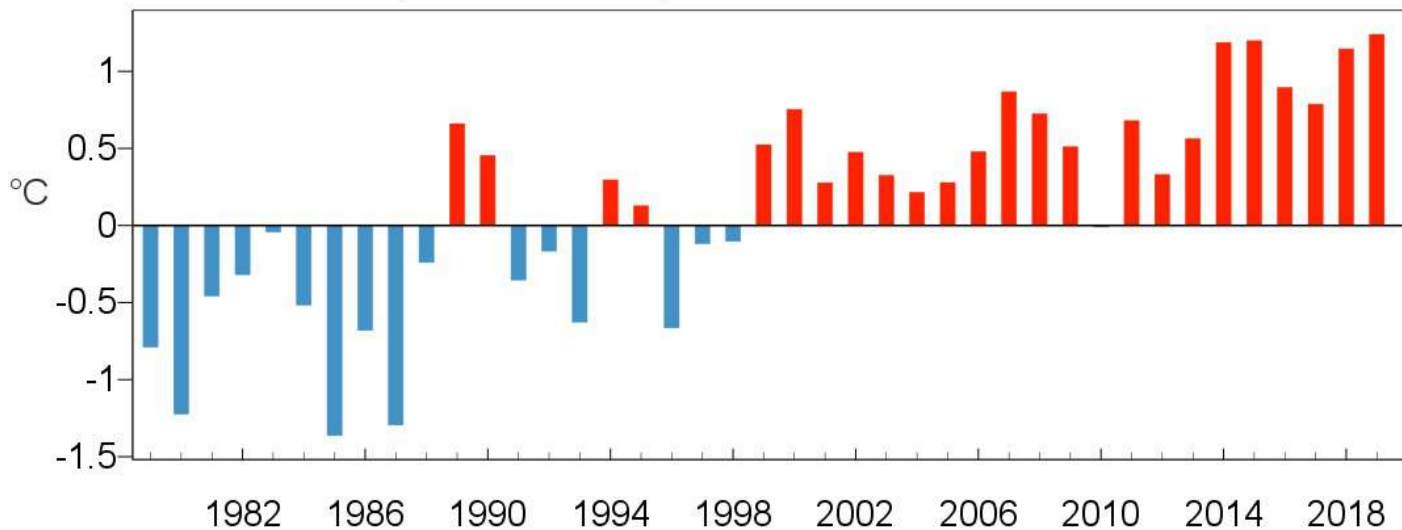




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# A changing climate ...

## Europe annual temperature anomalies 1979-2019



Data source: ERA5 Reference period: 1981-2010



Copernicus Climate Change Service  
European State of the Climate | 2019



Copernicus  
Europe's eyes on Earth

IMPLEMENTED BY  
ECMWF



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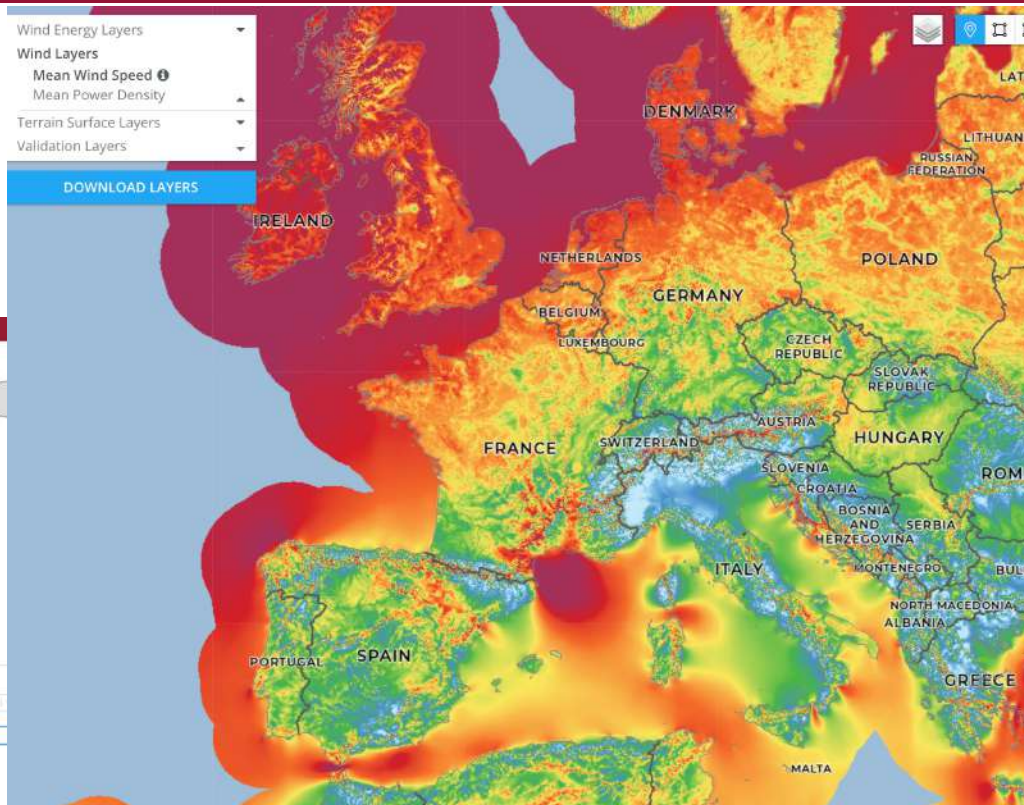
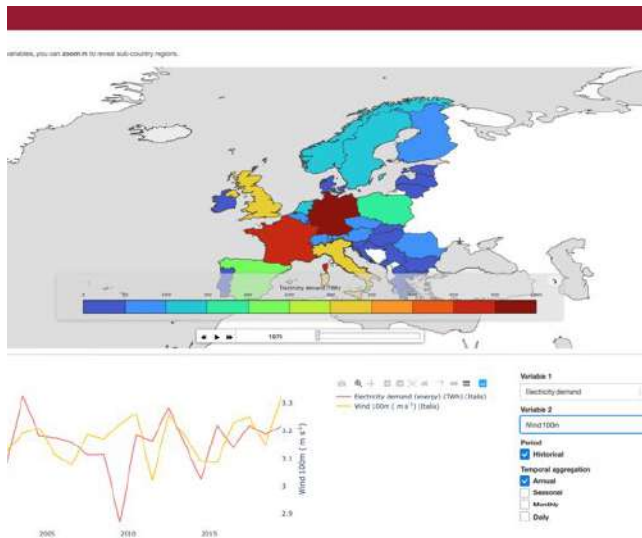
European  
Commission



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# Energy

<https://climate.copernicus.eu/operational-service-energy-sector>



<https://globalwindatlas.info/>



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# Finance

To identify, gather and process data on **climate hazards** to develop high-quality financial disclosures aligned with the **Task Force on Climate-related Financial Disclosures**

Climate hazards data include “acute” and “chronic” hazards

Definition of relevant climate indicators

*The Climate Data Factory*

<https://climate.copernicus.eu/climate-hazards-data-prepare-financial-institutions-future>

<https://financial-disclosures.climate.copernicus.eu/>

Implemented by ECMWF as part of The Copernicus Programme

Climate Change Service

News Events Press Tenders Help & Support

ABOUT US WHAT WE DO DATA SEARCH

European Commission

Copernicus Europe's eyes on Earth

ECMWF

close

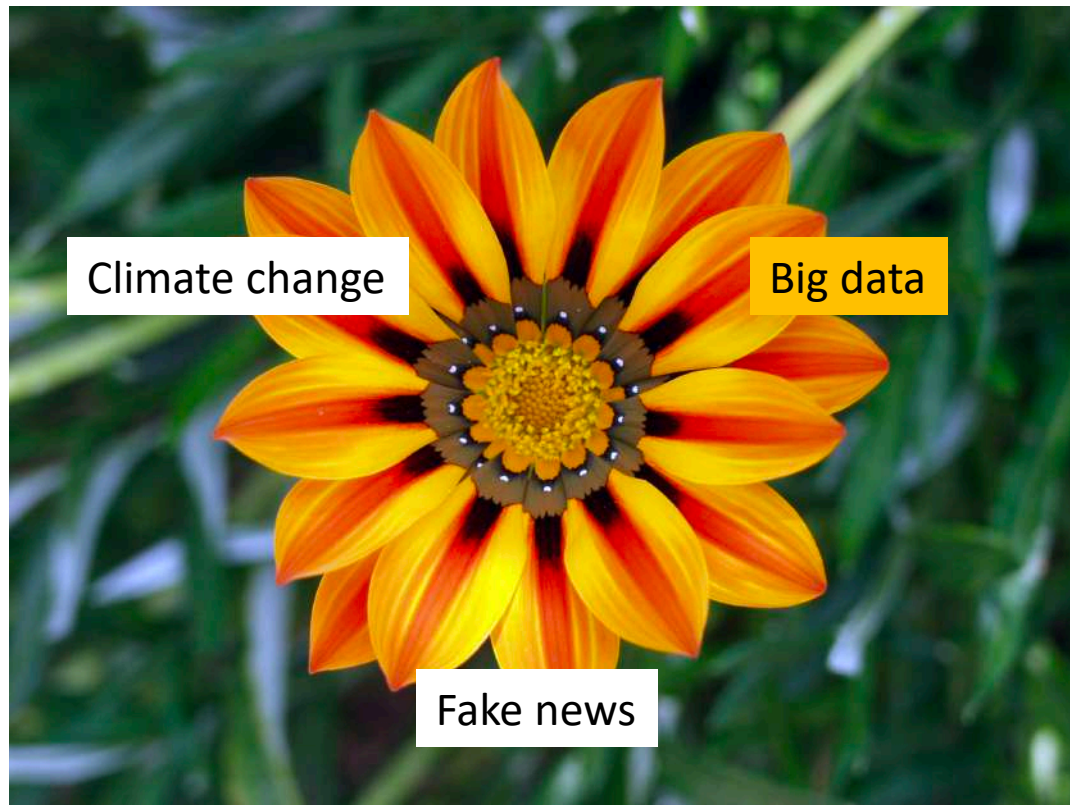
WHAT WE DO ► SECTORAL IMPACTS ► DATA IN ACTION ► CLIMATE HAZARDS DATA TO PREPARE FINANCIAL INSTITUTIONS FOR THE FUTURE

## Climate hazards data to prepare financial institutions for the future



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# Challenges ...



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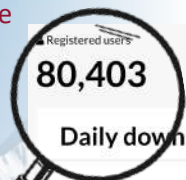
Big data

Fake news



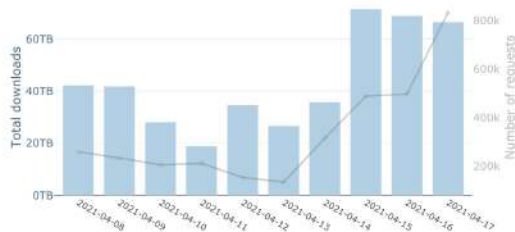
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# Dealing with large data



Registered users <b>80,403</b>	Running users <b>181</b>	Queued users <b>19</b>	Running requests <b>270</b>	Queued requests <b>1,192</b>	At <b>16:33</b> <small>UTC   18/04/2021</small>
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## Daily downloads in Terabytes



## Requests completed

Last 1h	49,601	3.8TB
Last 2h	93,296	7.4TB
Last 3h	131,068	10.2TB
Last 6h	269,925	19.7TB
Last 12h	430,044	30.8TB
Last 24h	660,105	44.2TB

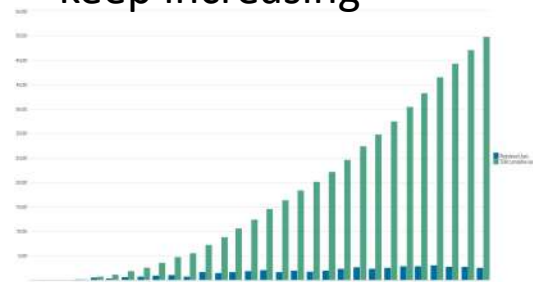
## Countries (Running or queued)



## EU/EFTA (Running or queued)



## User registrations keep increasing



**Most popular dataset**  
**~8PB**

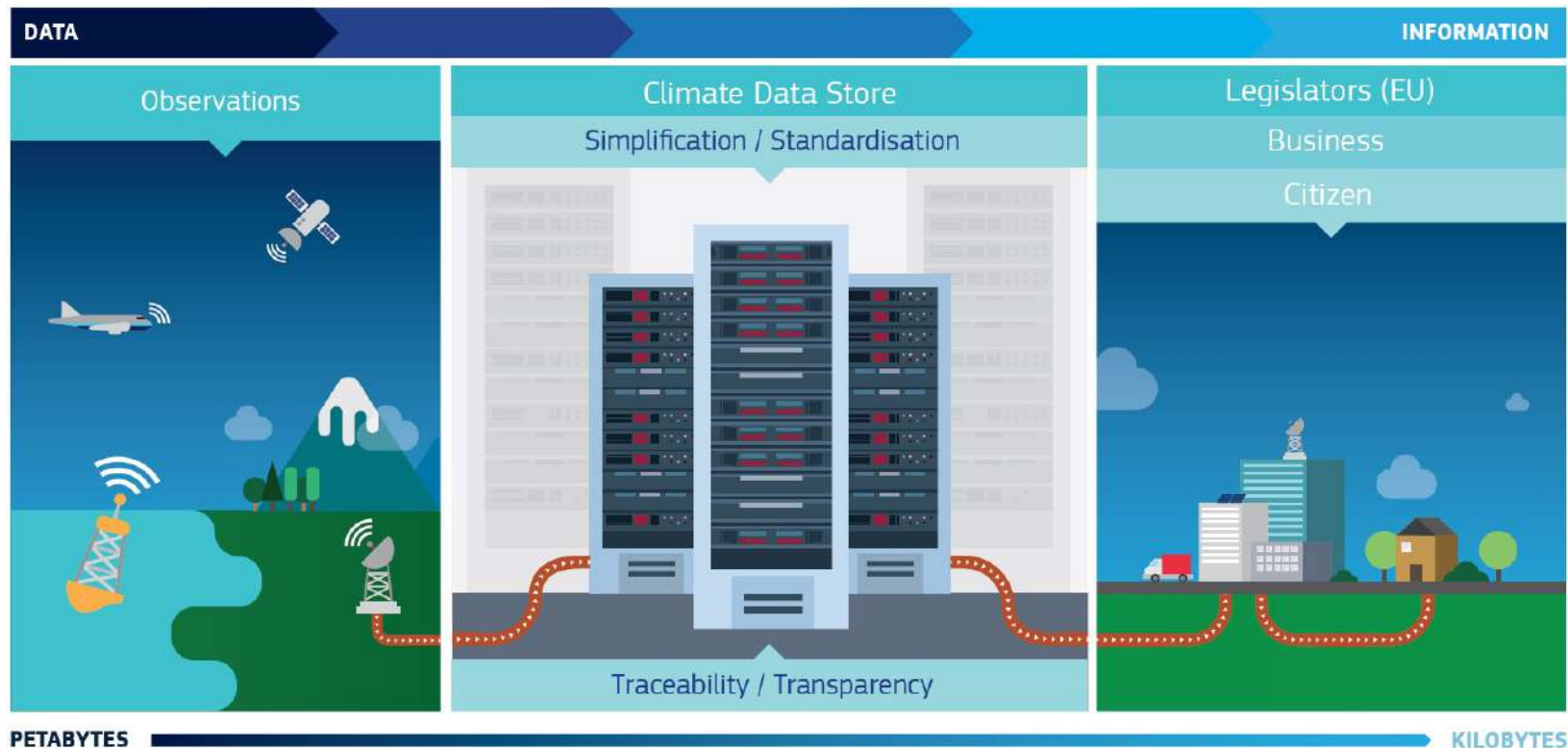
**Current record download:**  
**105 TB /day**

**~100 datasets**  
currently available



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# What is C3S?



[cds.climate.copernicus.eu](https://cds.climate.copernicus.eu)





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# State of the climate report

Climate data is being used in the European State of the Climate, as climate indicators and as a measure of the state of health of our environment.

## Glaciers

Both globally and in Europe, glaciers are seeing a substantial and prolonged loss of ice mass.

Over most of the 20th century, the rate of mass loss was low and some periods of mass gain were observed at both regional and decadal scales. Since 1997, the monitored glaciers in Europe have lost 10 to 29 m of mass, with a regional average loss of around 16 tonnes of freshwater per square metre, of around 16 tonnes of freshwater per square metre.

### Ice thickness loss



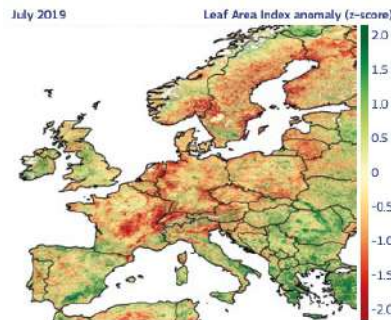
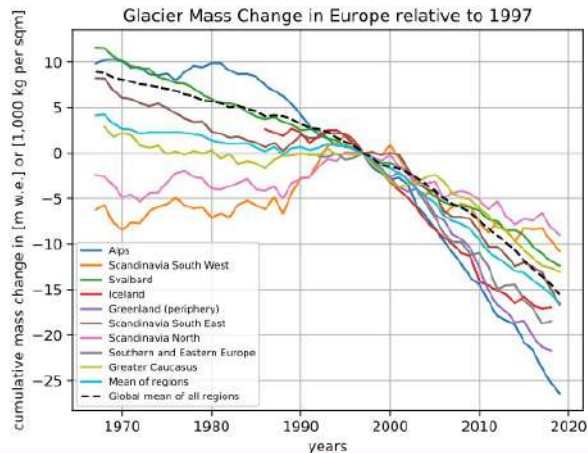
Globally around  
**30 m loss** ▼

in ice thickness since 1957

In Europe observed  
**4–35 m loss** ▼

in ice thickness in southwestern Scandinavia and the Alps respectively, since the 1960s

Reference glacier network with more than 30 years of ongoing observations



Leaf Area Index anomalies for July 2019 as estimated from satellites  
Data source: VGT/PROBA-V (PROBA-V\_2018 anomaly given a climatology from VGT). Credit: ESA/ESA/ESA

## Sea ice

In the Arctic, sea ice extent has decreased by 3.2% per decade since 1979. The time of the year when the ice reaches its annual minimum has advanced by 1.5 days per decade.

Sea ice retreat has been levelling off since the late 1990s and early 2000s. In the Antarctic, the total sea ice extent has shown no clear long-term trend since 1979, although more prominent changes have occurred in certain sectors of the Southern Ocean.

Sea ice data record covering 1979–2019



## Vegetation

Drought conditions across Europe became noticeable in June, bringing an impact on vegetation, as shown by below-average Leaf Area Index (LAI) values, particularly in northern Germany.

As the dry conditions persisted through the summer, LAI was below average in several regions of western Europe, the Balkans and Scandinavia. By autumn, vegetation had started to recover in western Europe, other than in central Europe and the Iberian Peninsula. However, in southeastern Europe (the Aegean Sea) LAI started to show a slight decline.

In the Arctic, March sea ice extent has decreased by **-3.2 ± 0.2%** ▼ per decade during 1979–2019 (relative to the 1981–2010 average)

In the Arctic, September sea ice extent has decreased by **-14.5 ± 1.2%** ▼ per decade during 1979–2019 (relative to the 1981–2010 average)

In the Antarctic, no clear trend in total sea ice extent

Thursday: <https://climate.copernicus.eu/ESOTC/2020>





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# Challenges ...



Climate change

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# October 2020: Launch of EQC framework



Home / News

1st October 2020



Data quality has always been important for Copernicus (C3S\*), and now a new quality assurance framework is becoming operational. At a time when Copernicus is a trusted source, delivering quality data that are traceable and reproducible, the new quality assurance features that will play an important role in ensuring the service is starting to go live.

\*One of the issues around climate services



A new quality assurance framework for the #CopernicusClimate Change Service is now operational. The new features distinguish #C3S from other climate services & cover datasets, the service as a whole & the #CDS Toolbox.

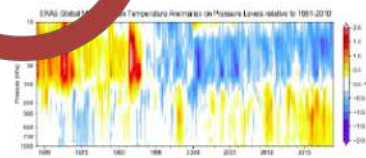
Learn more [bit.ly/3ih1kKX](https://bit.ly/3ih1kKX)



## ERA5 monthly averaged data on pressure levels from 1979 to present

Overview Download data Quality assessment Documentation

ERA5 is the fifth generation ECMWF reanalysis for the global climate and weather for the past 4 to 7 decades. Currently data is available from 1979. When complete, ERA5 will contain a detailed record from 1950 onwards. ERA5 replaces the ERA-Interim reanalysis.



Finding your way to the right data

<https://climate.copernicus.eu/ensuring-quality-performance-c3s>



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Thank you for your attention

