Climate Change

Actionable data for climate change communication: beyond temperature

Carlo Buontempo & Julien Nicolas

International Weather Forum: media workshop on climate
21/06/2022

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C3S in numbers

C3S is presented as an **exemplar of climate service in IPCC AR6 WG1** report where **ERA5 is mentioned over 240 times**.

119 Datasets | **22** public applications
~140.000 data users

92.3 TB /day **500k** Daily requests

Paper by Hans Hersbach et al. about ERA5 published in 2020 and as of March 1st had **2445 citations** (3230 according to Google Scholar)


Quarterly Journal of the Royal Meteorological Society
RMetS

RESEARCH ARTICLE Open Access

The ERA5 global reanalysis

Hans Hersbach, Bill Bell, Paul Berrisford, Shoji Hirahara, András Horányi, Joaquín Muñoz-Sabater, Julien Nicolas, Carole Peubey, Raluca Radu, Dinand Schepers, Adrian Simmons ... See all authors

First published: 17 May 2020 | https://doi.org/10.1002/qj.3803 | Citations: 2,445

Funding information: European Union through the Copernicus Climate Change Service

Broadcast in 9 languages, in year, C3S content - was seen 157 million times in Europe via the Euronews Climate Now show.

And C3S maps and data have been seen by 225m people around the world via CNN's climate updates.

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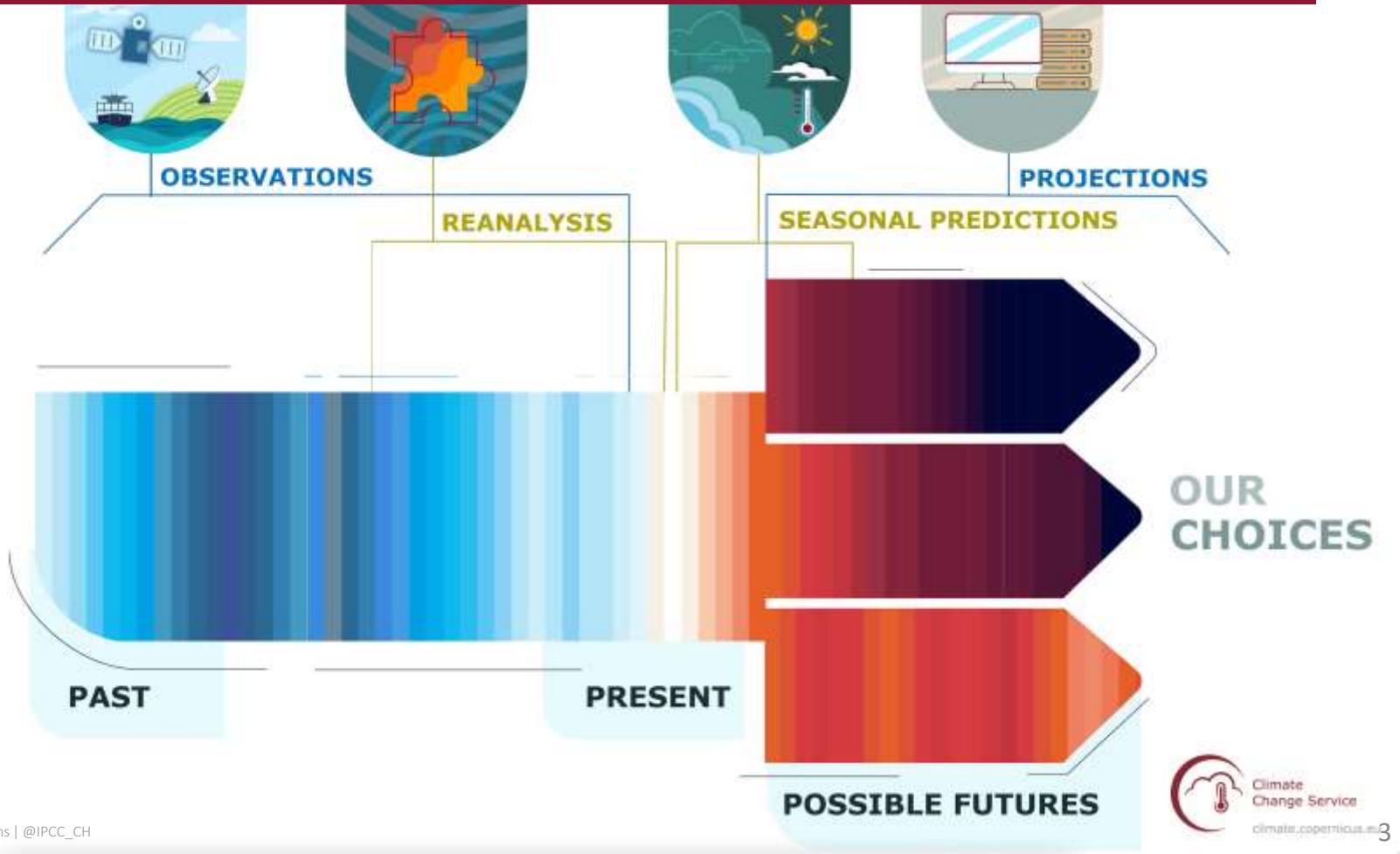
Smart data for smart decisions: past, present and future.



Inspired by @Ed_Hawkins | @IPCC_CH

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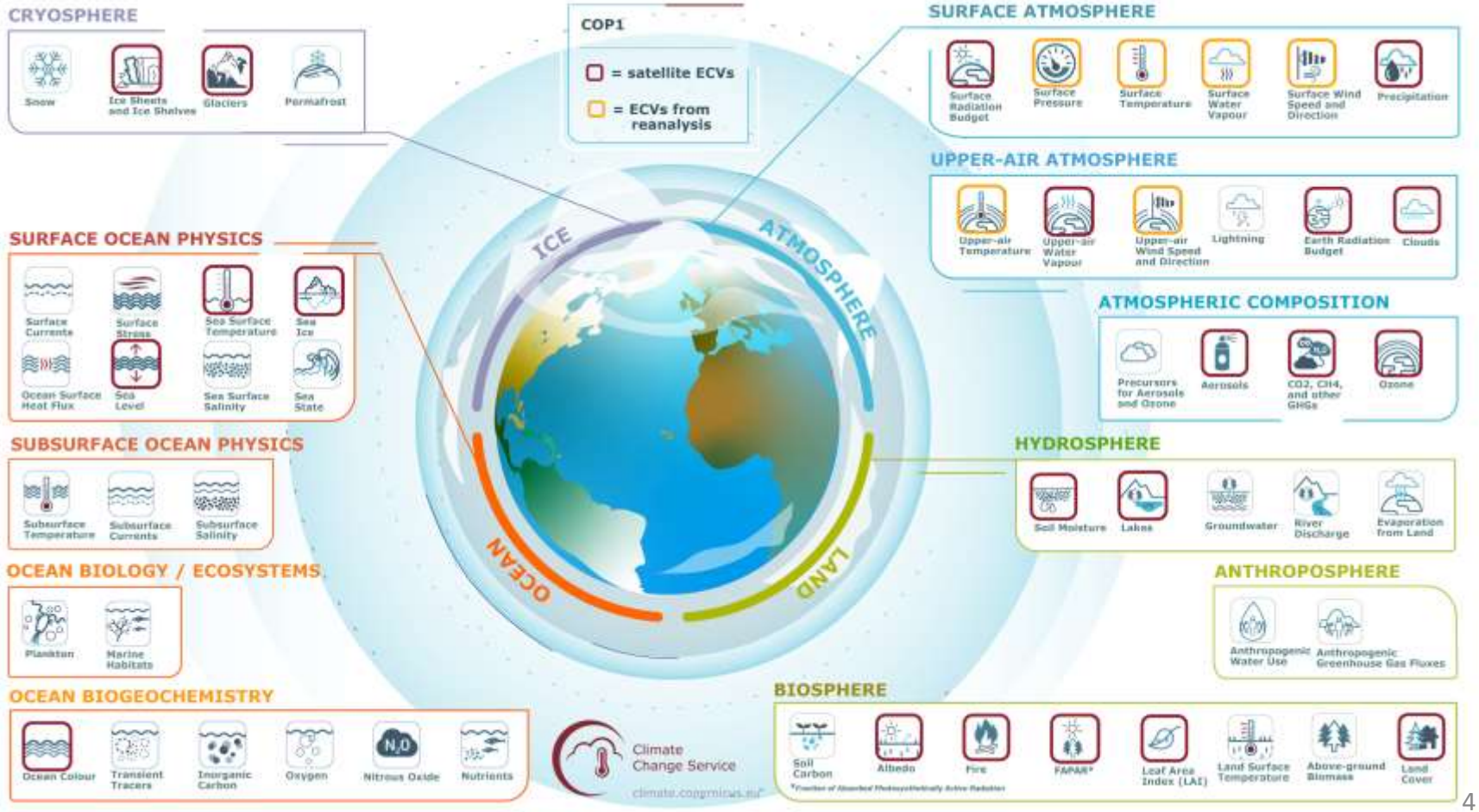
Essential Climate Variables



Applications

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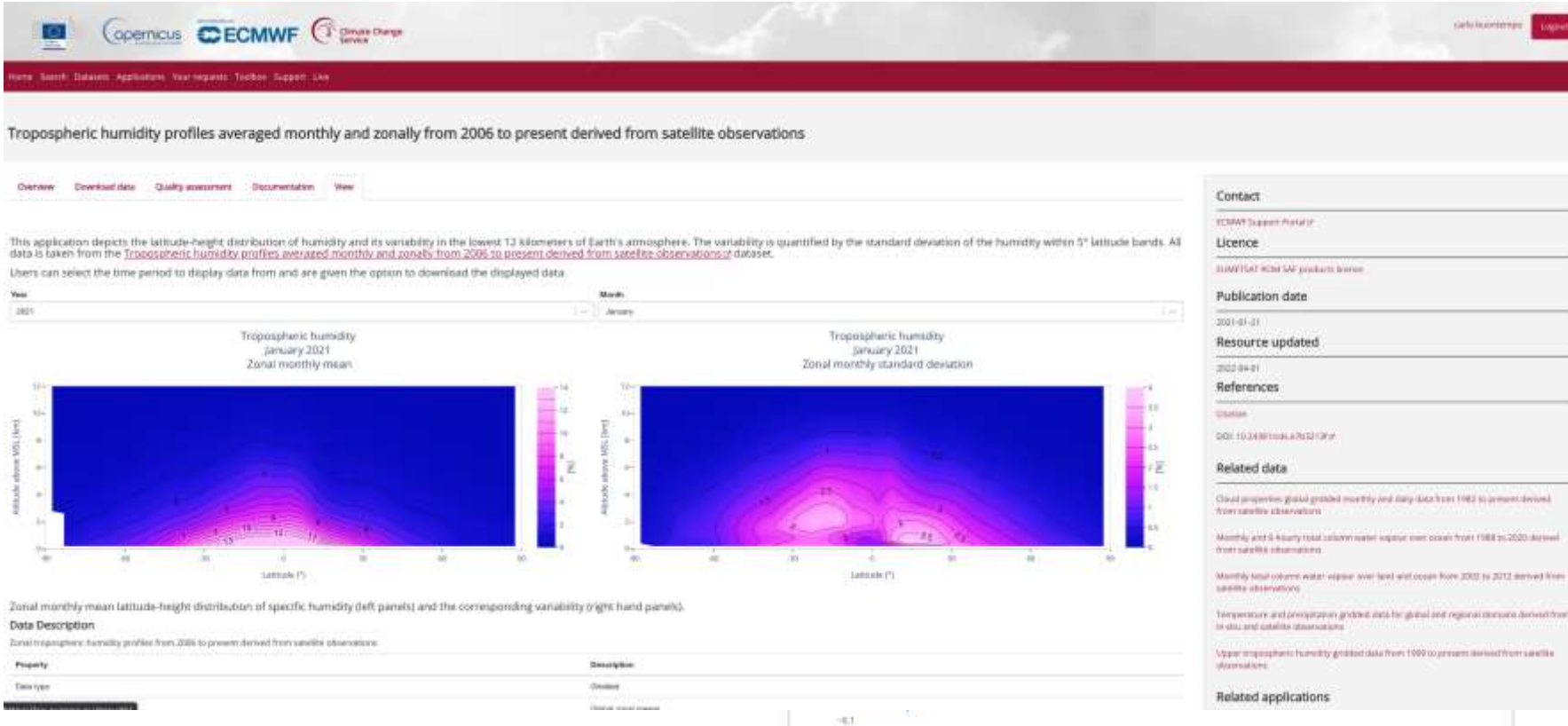

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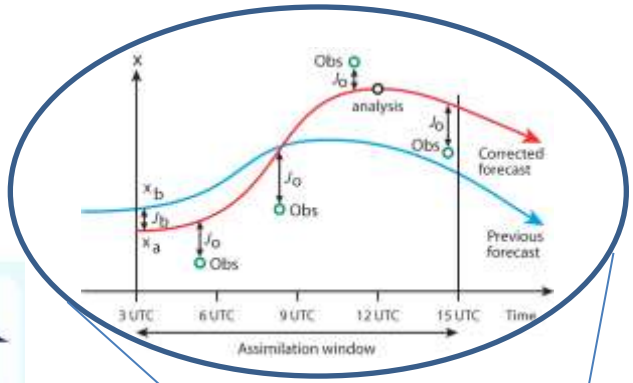
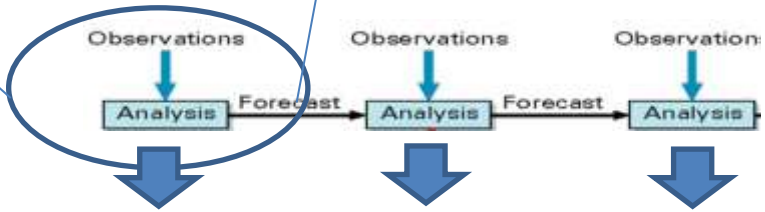
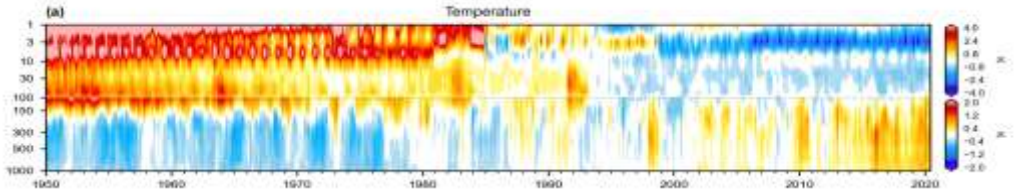
Reanalysis: a key tool and a popular product



Data assimilation & reanalysis
Combining information from observations and models to provide an estimate of weather and climate over multi-decadal timescales





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Reconstructing the weather of the past

https://www.ecmwf.int/en/about/media-centre/science-blog/2019/ecmwf-over-moon

NASA Apollo 17 image of the Earth taken on 7 December 1972 at 10h39 UTC (left) and the corresponding pseudo-image generated from an 11-hour 9-km resolution ECMWF forecast initialised from ERA5 reanalysis (right).

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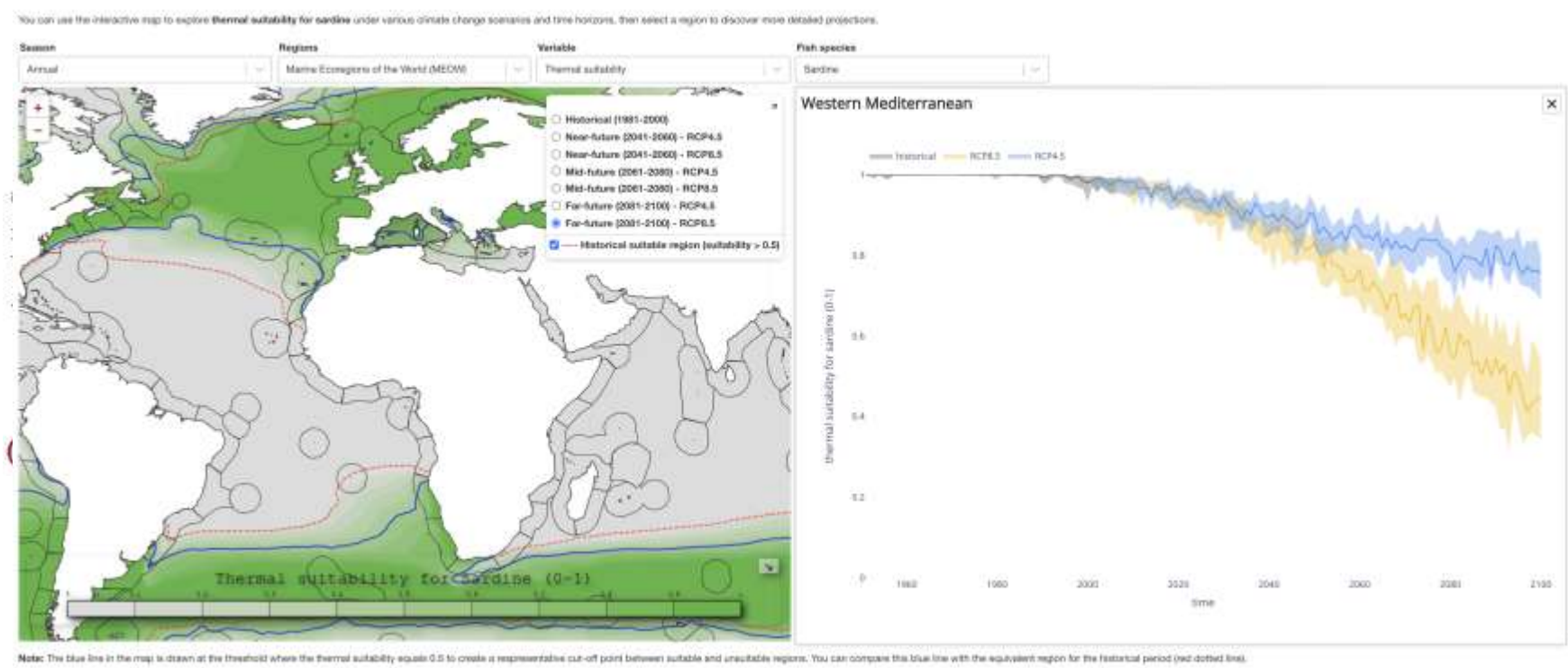
What lies ahead



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European State of the Climate 2021 – 5th edition of annual report

Editorial Team
Francesca Guglielmo, David Lavers, Julien Nicolas, Freja Vamborg (ECMWF)

Contributing authors across C3S and beyond

Science writers

Communications team + agencies

- https://climate.copernicus.eu/esotc/2021
- https://climate.copernicus.eu/climate-indicators

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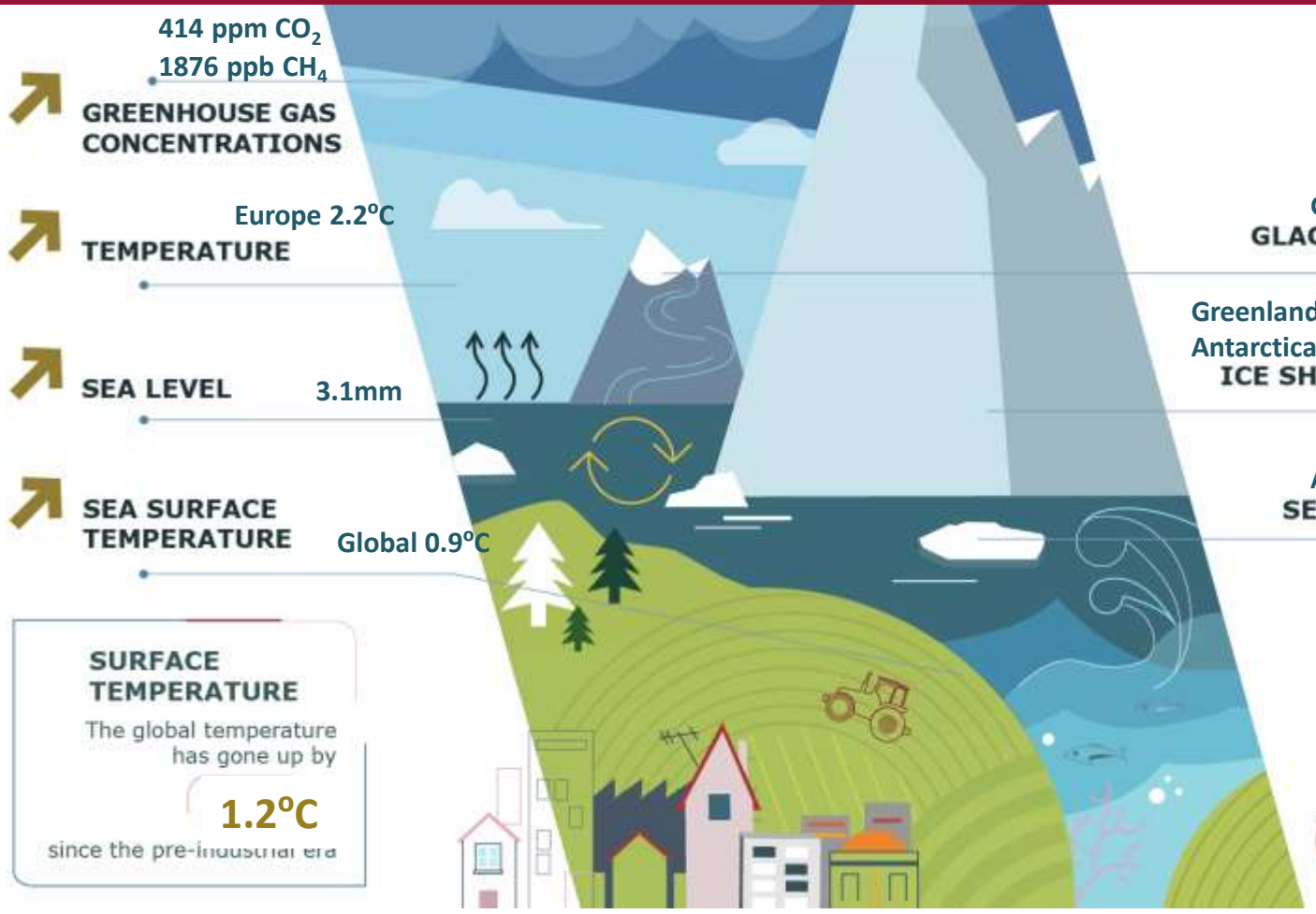
Climate monitoring



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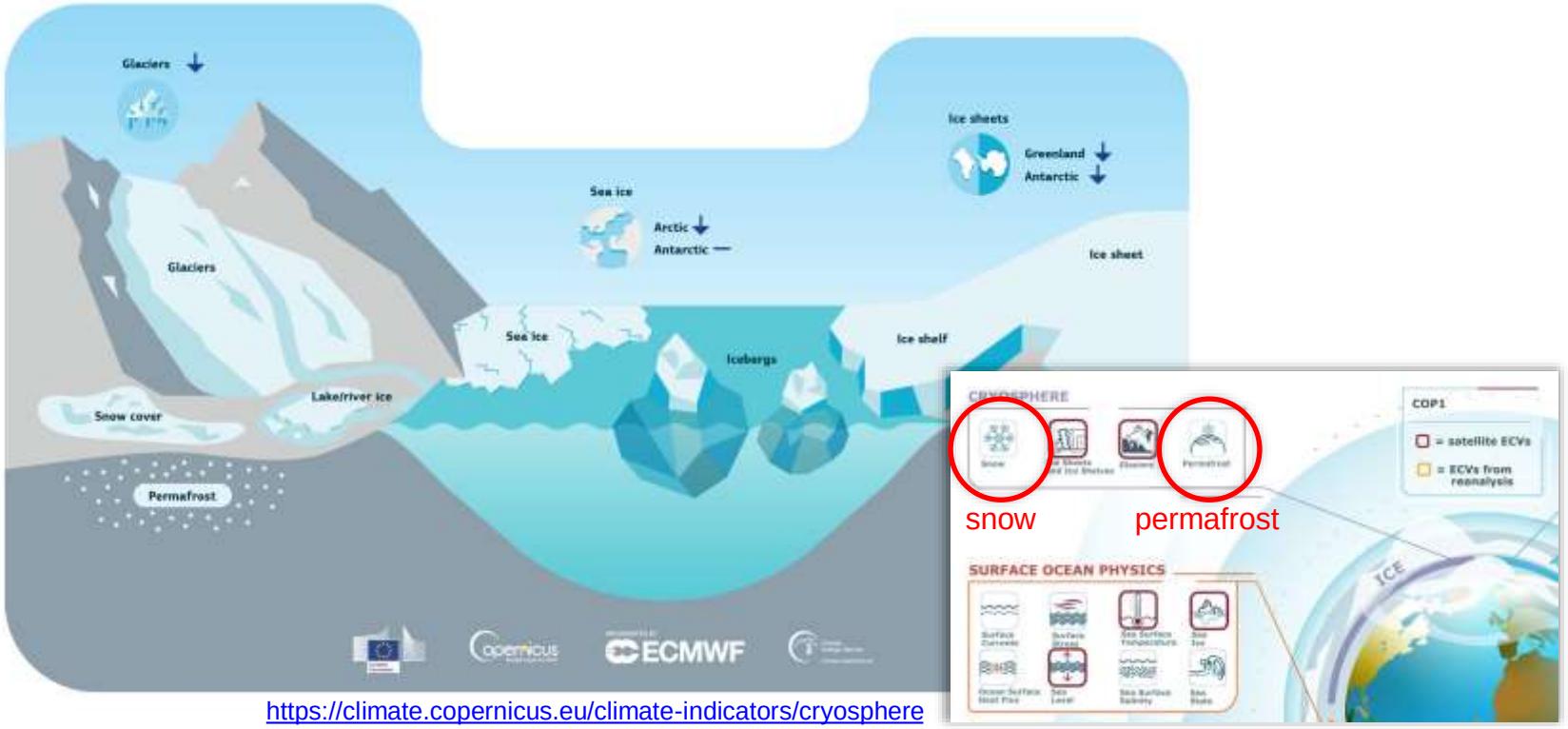
Climate stories: Example of the Cryosphere



https://climate.copernicus.eu/climate-indicators/cryosphere

C3S monitoring of the Cryosphere

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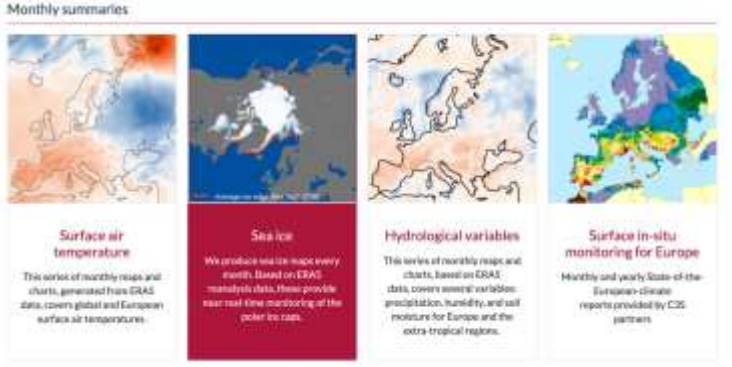

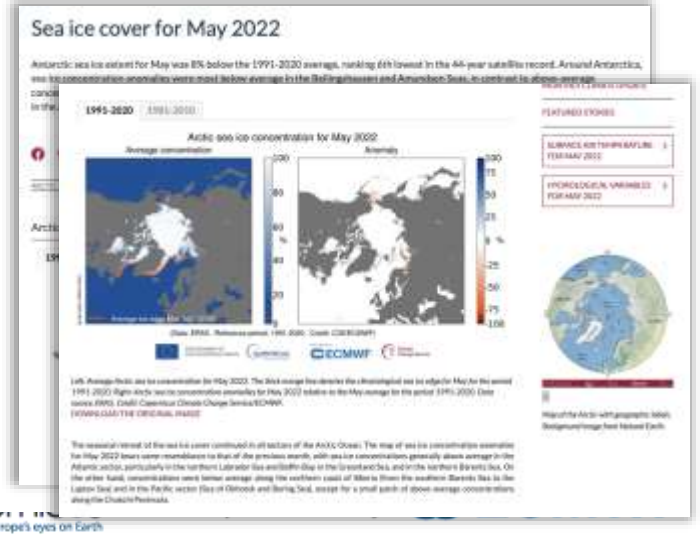

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Europe's eyes on Earth

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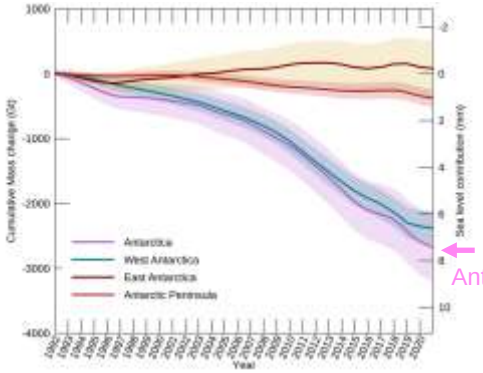
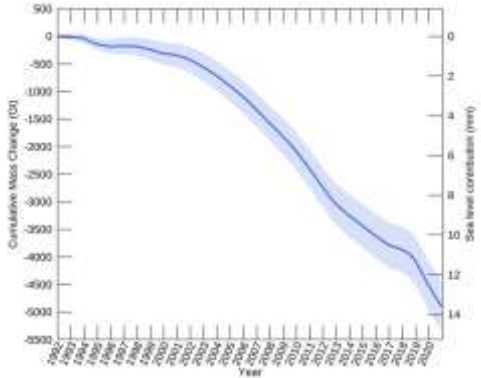
Land ice changes and their contribution to sea level rise

Mass balance of the Antarctic Ice Sheet



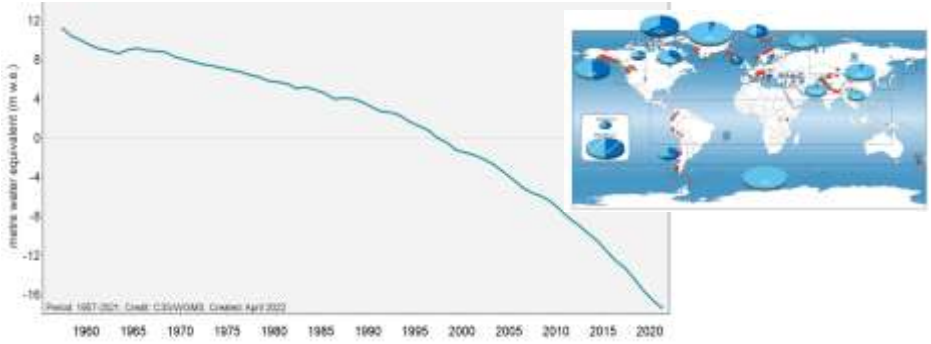
All Antarctica

Mass balance of the Greenland Ice Sheet



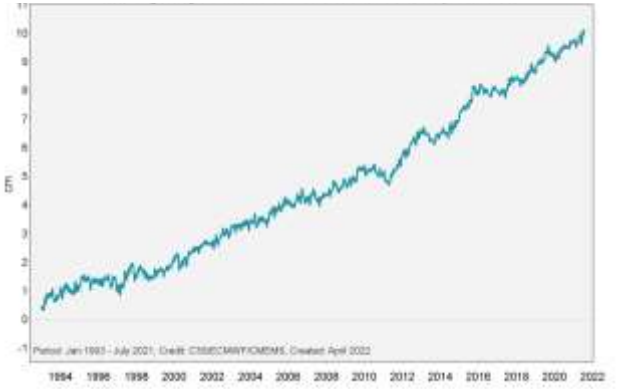
Data: IMBIE. Credit: IMBIE/ESA/NASA
https://climate.copernicus.eu/climate-indicators/ice-sheets

Cumulative glacier mass balance relative to 1957



https://climate.copernicus.eu/climate-indicators/glaciers

Change in global mean sea level relative to the year 1993



https://climate.copernicus.eu/climate-indicators/sea-level

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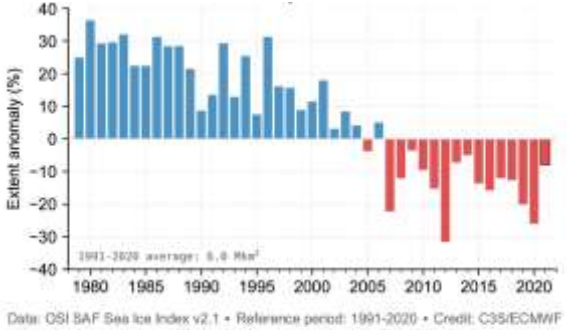
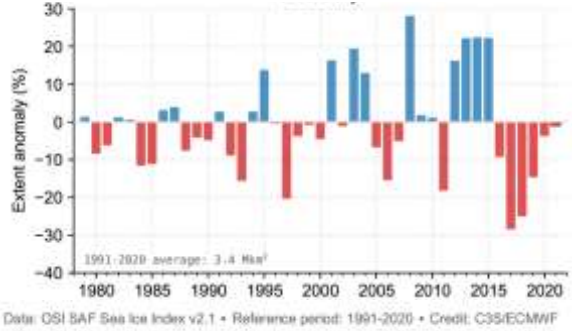
Sea ice changes: Arctic vs Antarctic

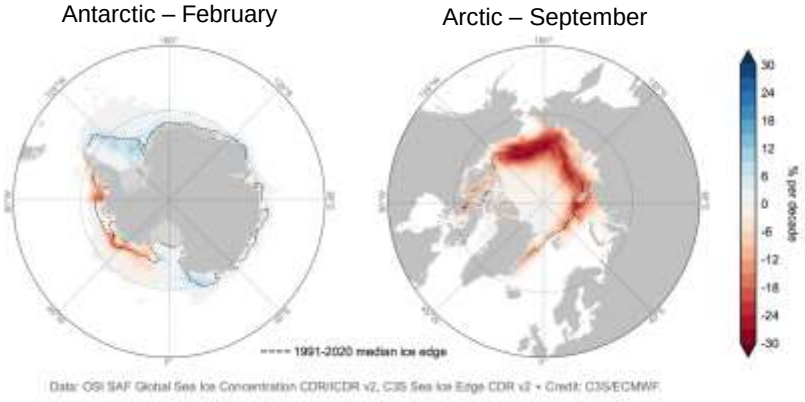
Arctic sea ice extent anomalies in September



Antarctic sea ice extent anomalies in February



Sea ice concentration trends 1979-2021



Covered both in our monthly sea ice summaries and our Sea Ice Climate Indicator

https://climate.copernicus.eu/climate-indicators/sea-ice
https://climate.copernicus.eu/sea-ice

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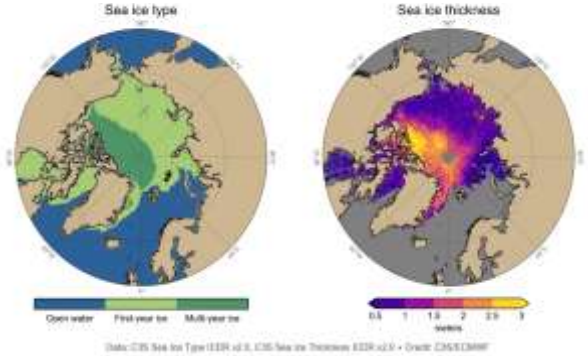
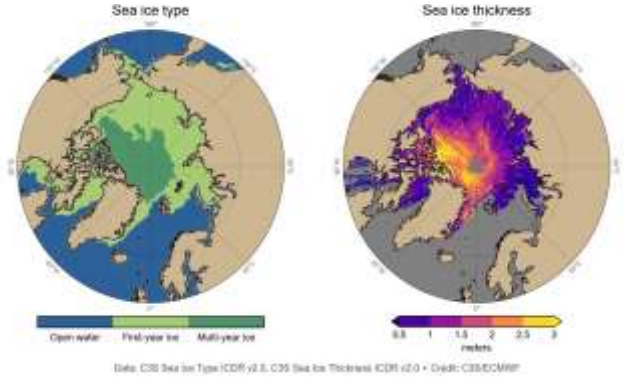
Sea ice: Beyond sea ice extent and concentration

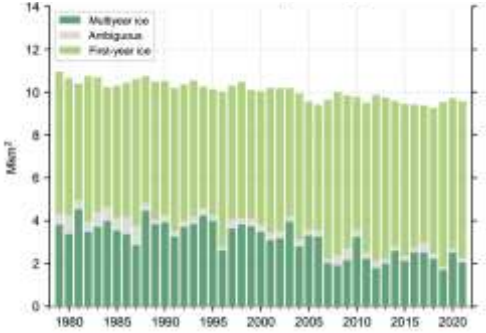
Arctic sea ice type and sea ice thickness in Dec 2020



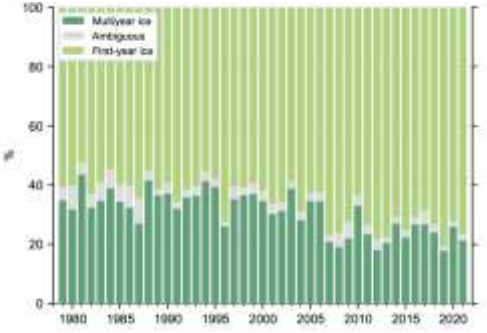
Arctic sea ice type and sea ice thickness in Dec 2021



Total sea ice area by sea ice type in Jan-March



Percentage of sea ice area by sea ice type in Jan-March



https://climate.copernicus.eu/climate-indicators/sea-ice

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Low sea ice in the Laptev Sea in 2020

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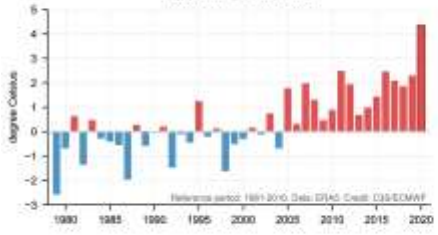
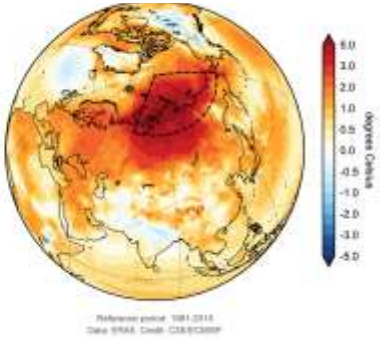
European State of the Climate in 2020 – Arctic section

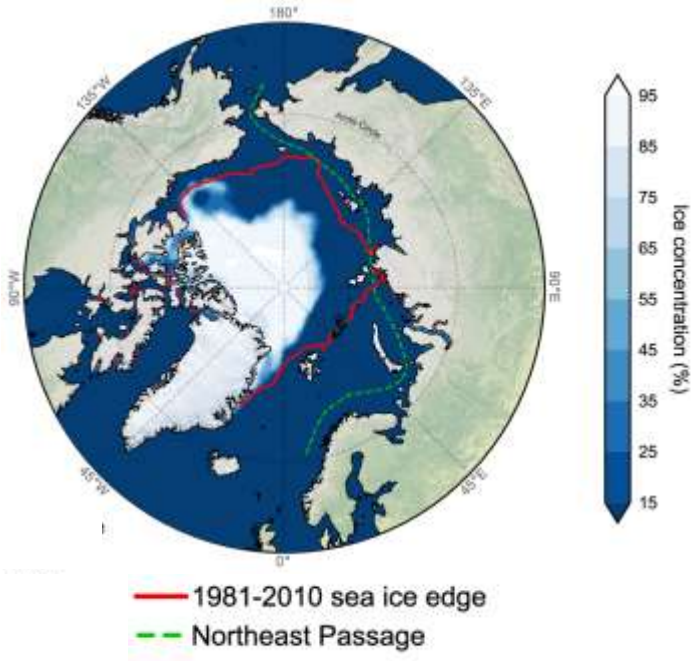
Annual surface temperature anomalies for Arctic Siberian land



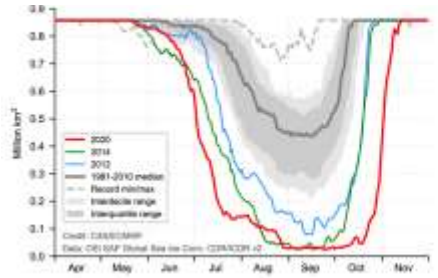
Surface temperature anomaly for 2020



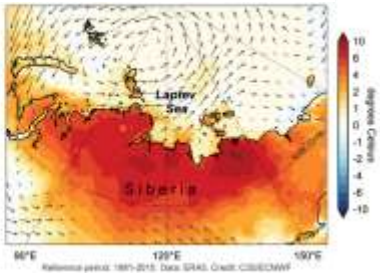
Sea ice concentration in Sept 2020



Daily sea ice extent in the Laptev Sea



Surface temperature anomaly and wind in June 2020



Data: OSI SAF Global Sea Ice Concentration CDR/ICDR v2, C3S Sea Ice Edge CDR/ICDR v1

https://climate.copernicus.eu/esotc/2020/arctic-sea-ice

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Low sea ice in the Greenland Sea in 2021

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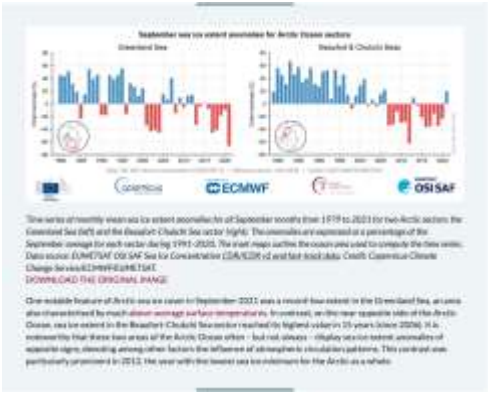
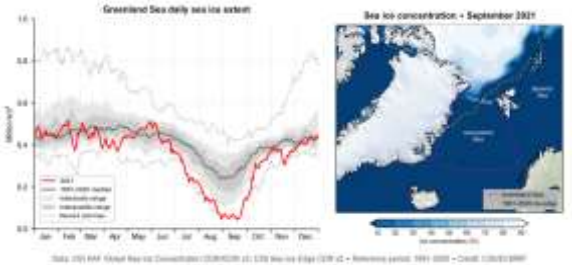
Month sea ice summary
Sept 2021

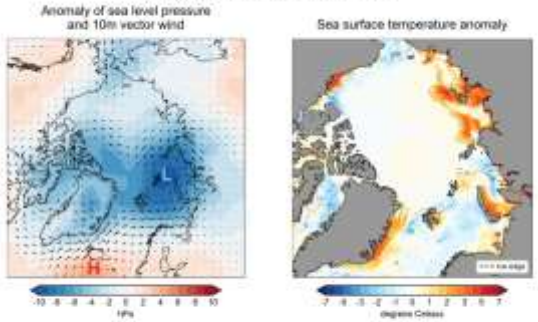


European State of the Climate in 2021 – Arctic section

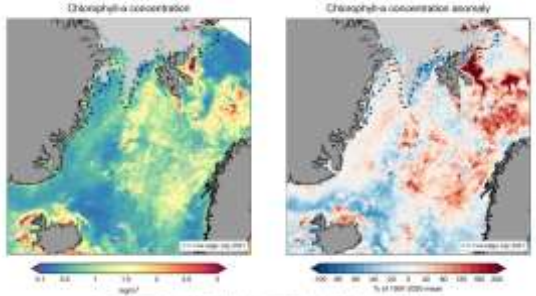
Sea ice extent in the Greenland Sea

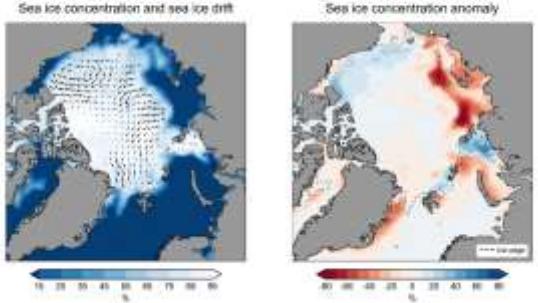


Monthly mean fields for July 2021



Chlorophyll-a in the Greenland Sea in July 2021





https://climate.copernicus.eu/sea-ice-cover-september-2021
https://climate.copernicus.eu/esotc/2021/low-sea-ice-greenland-sea

Communicating about changes in the Cryosphere

- **Opportunities**
  - Stunning landscapes
  - Can foster emotion and interest
  - Very visible changes (glaciers)
  - Connections to other components of the climate system
  - Climate change mechanisms (feedback loops)
- **Challenges**
  - Remoteness
  - Timescales of changes (short/long, seasonal/decadal)
  - Need to clarify key concepts (land/sea ice, melting)
  - Differences Arctic vs Antarctic
  - Data availability
  - Numbers hard to relate to

The Breiðamerkurjökull Glacier in Iceland. Credit: European Union, Sentinel-2 imagery

Turning climate data into meaningful numbers

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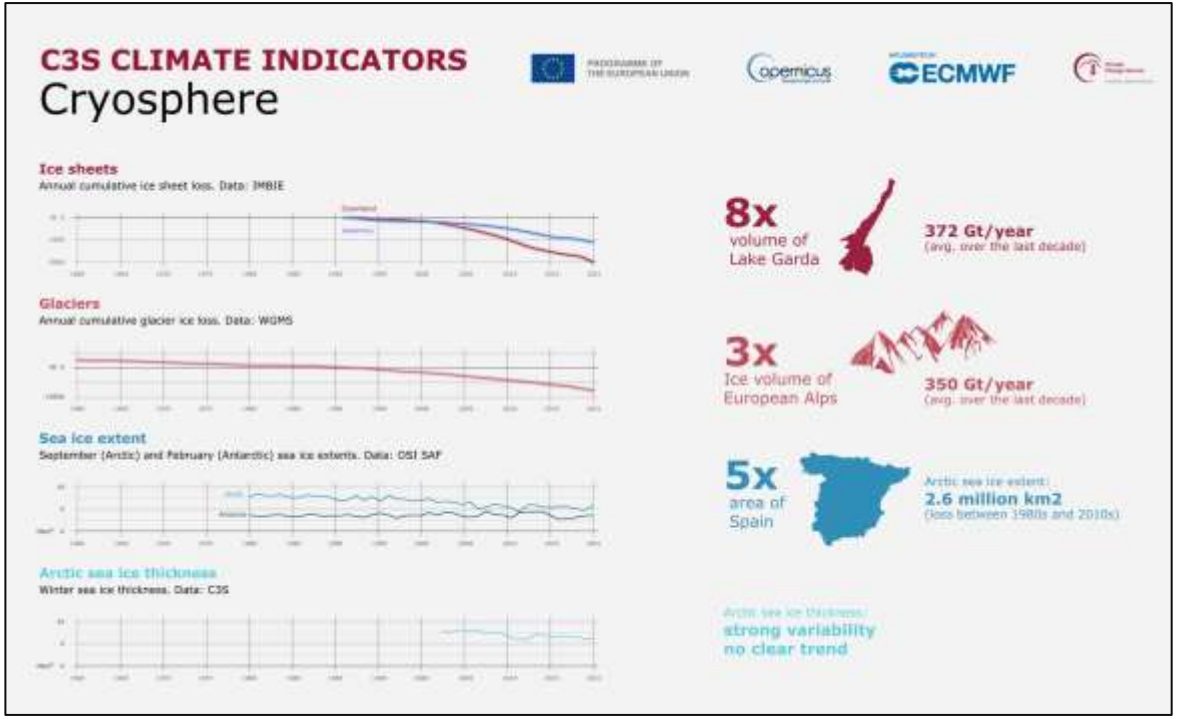

https://climate.copernicus.eu/climate-indicators/cryosphere

Screenshots from ESA video:
https://youtu.be/5GvMm4A7dFA

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Thank you for your attention

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