

Copernicus Climate Change Service



Climate Change

C3S

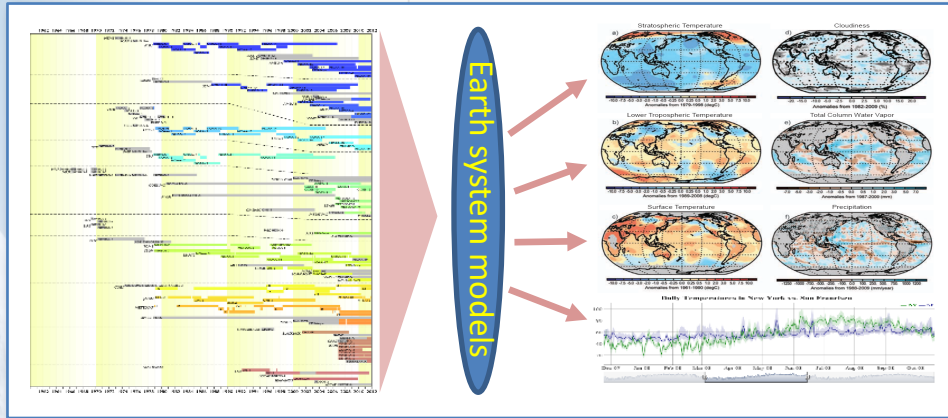
Anca Brookshaw,
Jean-Noël Thépaut





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C3S portfolio: Access to past, present and future climate information

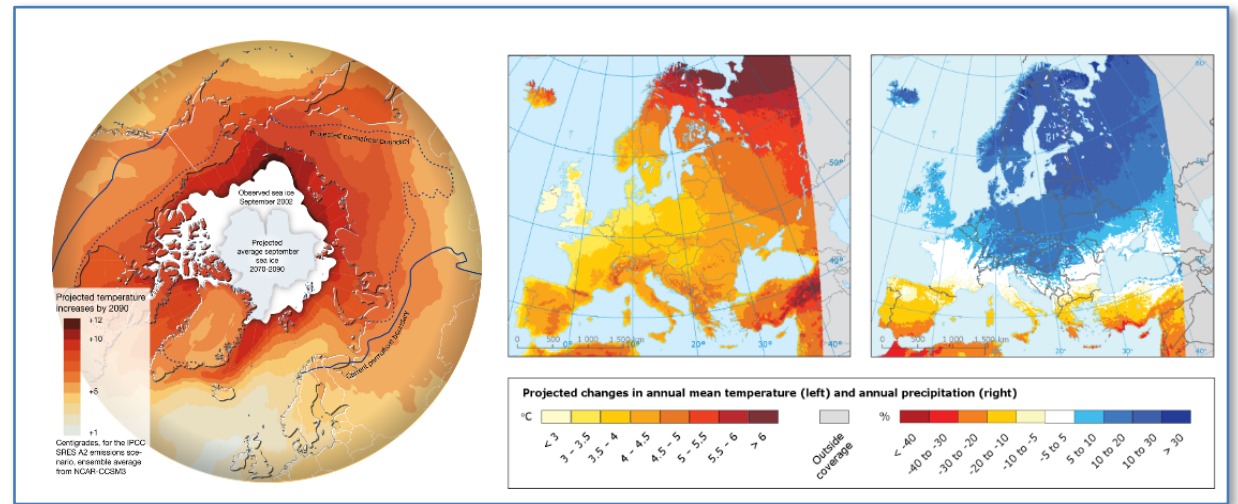
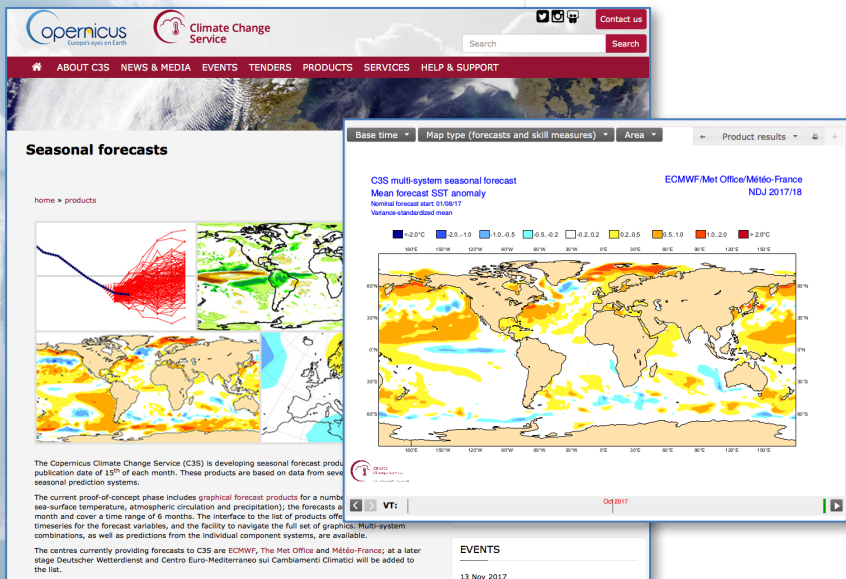


Observations and climate reanalyses

Seasonal forecast data and products

Climate model simulations

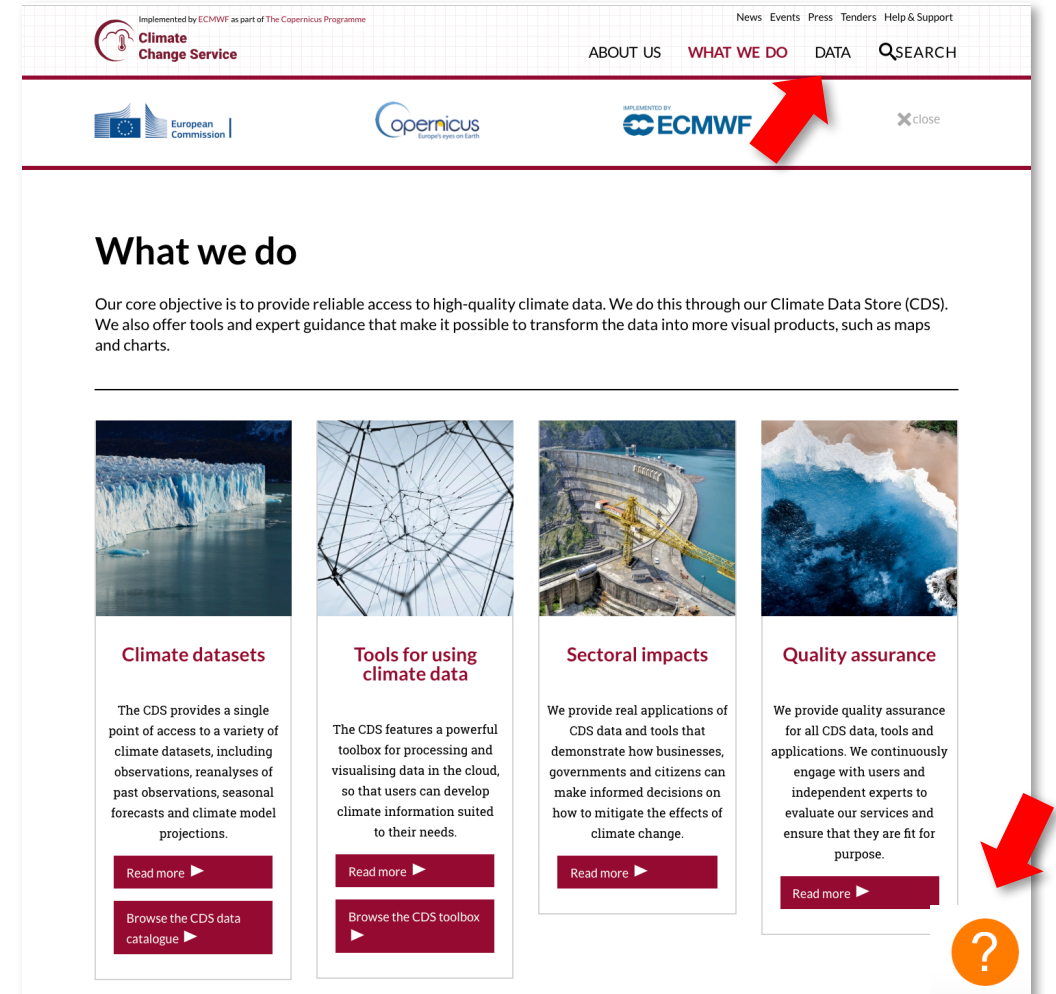
Sectoral climate impact indicators



What C3S has to offer

- Open and free access to climate data
- Tools needed to use the data
- Information on sectoral impacts
- Quality assurance
- User support and training
- Climate change assessments
- Outreach and communication

A one-stop Climate Data Store





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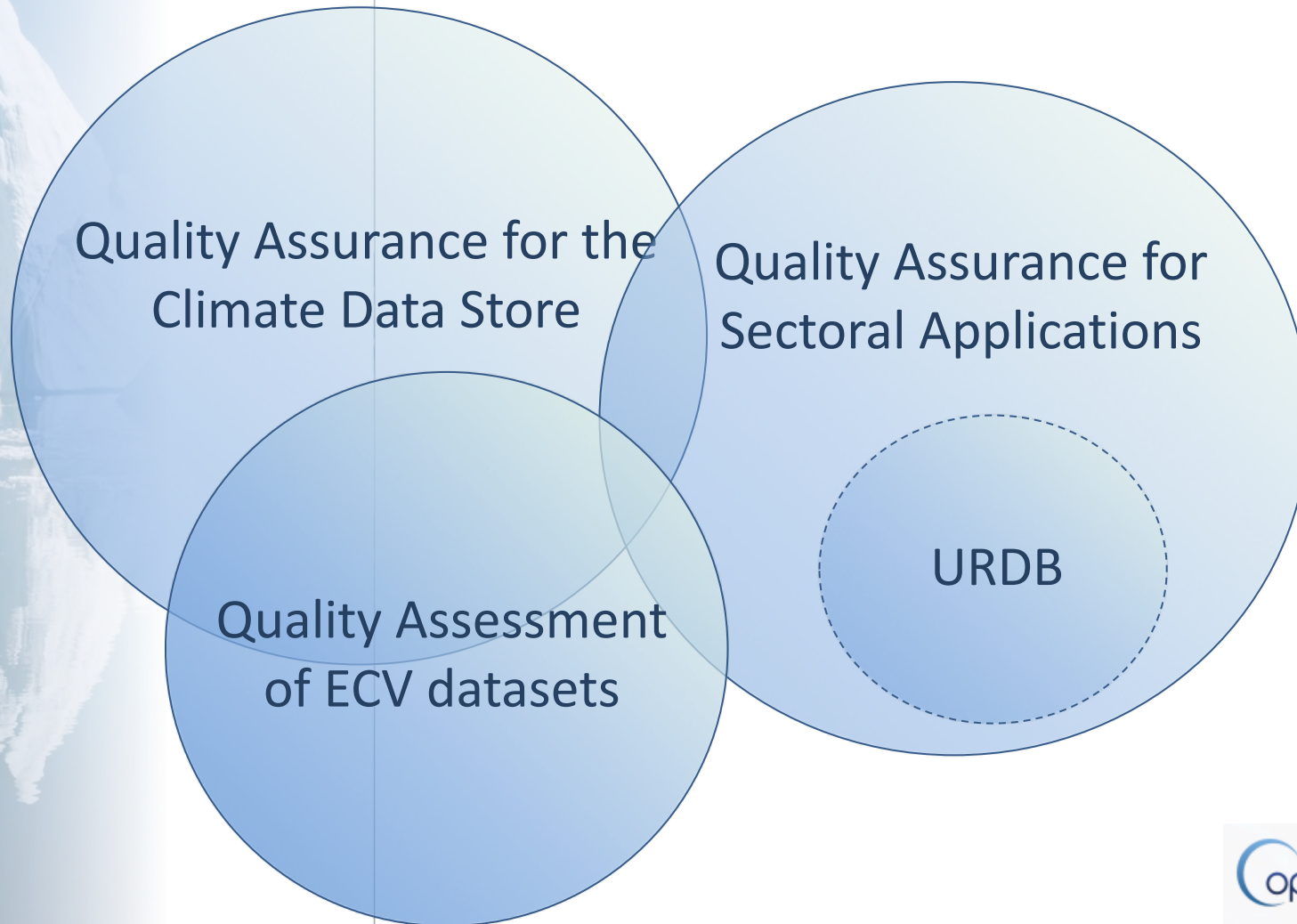
Service evolution: consolidation + enhancement

Portfolio	Product high level description
A: CDS core products	Climate observations
	Enhanced Observational gridded products (ECVs)
	Global and regional (Earth System) climate reanalyses
	Multi-model seasonal forecasts
	Initialised climate predictions (decadal) Service Component
	Global and regional climate scenarios (→ CMIP6 - AR6)
B: SIS indicators	Climate Impact Indicators, either generic or sector-specific, covering a wide variety of economic sectors and policy DGs
	Use and demonstration cases for various sectors
	Sectoral workflows and applications
C: Evaluation and Quality Control	Quality Assurance for CDS: traceability, product quality, quality of service, verification service
	Quality Assurance for SIS: fitness for purpose, documentation, URDB, URAD
D: Outreach and Communication	Web content provision and management
	Monthly and Annual Statement of Climate
	Marketing, fact sheets, success stories, etc.
	Extreme events and Attribution Service Component
	Events: Workshops, Assemblies, conferences
	Training



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Service evolution: Growing focus on Quality Assurance



Quality of data:

- assessments
- user guidance
- gaps and limitations

Quality of tools:

- fitness for purpose
- best practices

Quality of service:

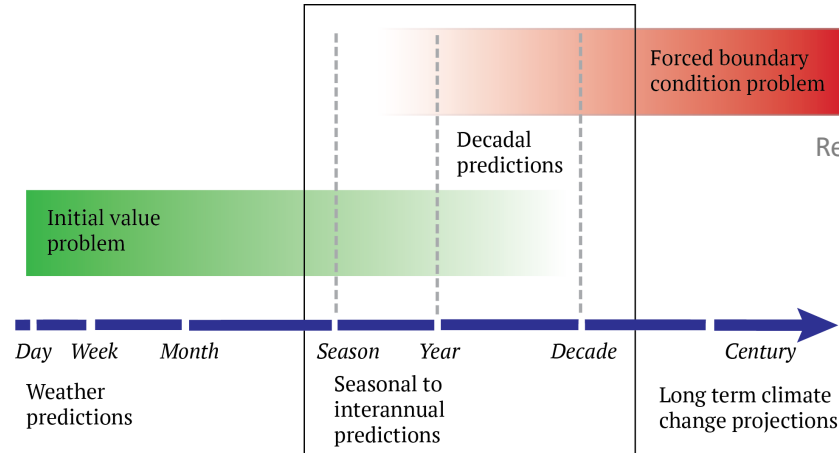
- speed, responsiveness
- system availability, ...



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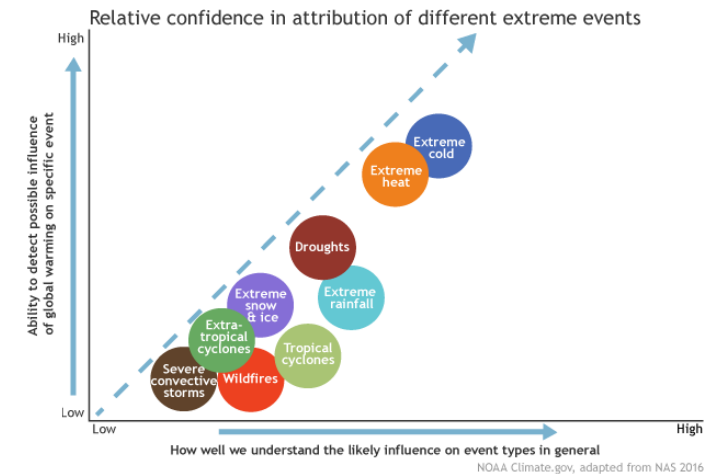
Service evolution: in a nutshell

- Decadal predictions
 - Extreme events and attribution
 - Earth-system reanalyses (coupled)
- ... and ...
- Enhanced ECV products
(increasingly building upon Sentinel data)



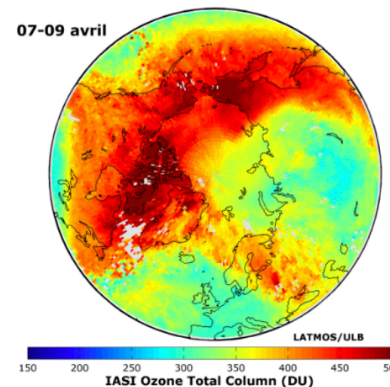
Reference:

- C3S User Requirement study (<https://climate.copernicus.eu/secteur>)
- <https://www.sciencedirect.com/science/article/pii/S2405880717300018>
- [European Roadmap for Climate Services](#)



Reference:

- C3S Technical Annex (page 34)
- C3S precursor project EUCLEIA <https://eucleia.eu>
- "EU court to hear citizens' climate case against EU" <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C:2018:285:FULL&from=EN>



copernicus
Europe's eyes on Earth



European
Commission

ECMWF

Activities to the end of current delegation agreement (mid-2021)

New invitations to tender, (almost) out now:

- Prototype of decadal prediction
- Proof of concept for an extreme events and attribution service
- Provision of additional world-wide CORDEX simulations for the C3S Climate Data Store

Also this year:

- Further work on integration between CDS and ESGF archiving and computing infrastructure
- New forecast systems in the seasonal forecast service (NCEP, JMA, ECCC; in 2020 also BoM)



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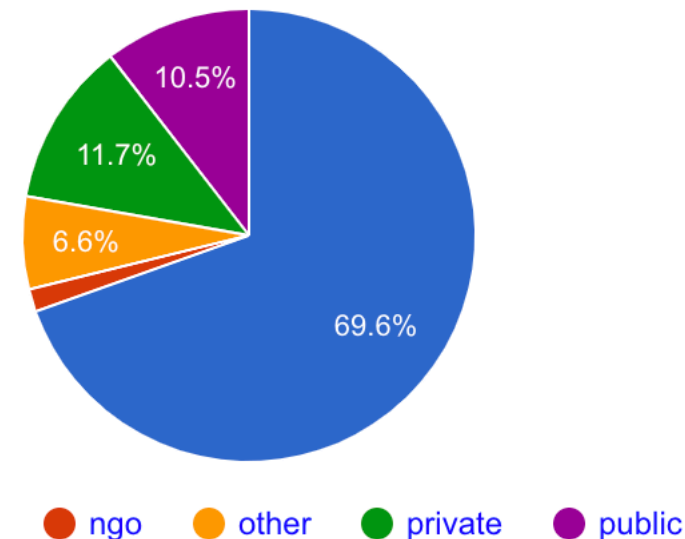
User requirements and research needs

The CDS delivers ~ 40 TBytes a day to 13 000 users

Datasets Top 8 (Running or queued)

1. ERA5 complete
2. ERA5 hourly data on single levels from 1979 ...
3. ERA5 hourly data on pressure levels from 19...
4. Seasonal forecast daily data on single levels f...
5. UERRA regional reanalysis for Europe on sin...
6. UERRA regional reanalysis for Europe on hei...
7. Seasonal forecast monthly statistics on singl...
8. Seasonal forecast monthly statistics on press...

Distribution by sector



Snapshot of CDS products popularity: May 2019

Reanalysis is by far the most popular dataset for scientists



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Research topics (not in priority order)

Topics (not in priority order):

1. Coupled data assimilation (atmosphere/ocean/land/carbon/AQ)
Preparing for future Earth System climate reanalyses
2. Processing/reprocessing of future sentinels and other satellites
Building and enhancing Climate Data records
3. Advancing observational products and error characteristics
Ensuring C3S to fully benefit from state-of-the-art ECV science
4. Underpinning science in modelling and multi-model product generation
To feed into seasonal , decadal and centennial climate information
5. Extreme events and Attribution science (relies on 4. too)
Ensuring credibility of an Attribution Service
6. And more...



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