

Miért érdemes a Copernicus Climate Change Service (C3S) adatait használni?



Climate Change

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... és még sokan mások a C3S-ből

Európai Középtávú Előrejelző Központ (ECMWF)





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Overview

- **Copernicus and Copernicus Climate Change Service (C3S): short overview**
- **Climate Data Store (CDS): data access, applications, toolbox**
- **CORDEX (CMIP5) datasets published in the CDS**
- **Sectoral Information System (SIS): brief overview**
- **Summary, conclusions**



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COPERNICUS AND COPERNICUS CLIMATE CHANGE SERVICE (C3S): SHORT OVERVIEW



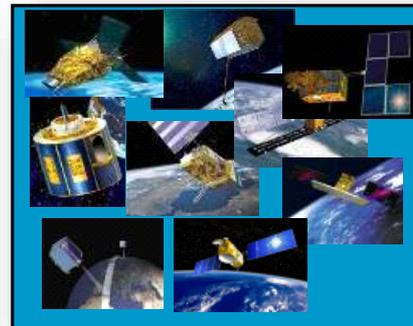
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Copernicus architecture

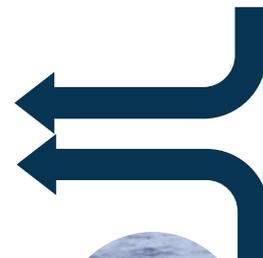


Sentinels

6 services use Earth Observation data to deliver ...



Contributing missions



in-situ



...added-value products

Copernicus: 6 operational services

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Monitoring the State of the Earth System Environment



... cross-cutting
Thematic Services



Aim: to be an authoritative source of climate information for Europe
(building on national investments and complement national climate service providers)

Financed by the European Union

Past: how the climate is changing?

Observations & Reanalysis

What are the societal impacts?

Climate indicators & Sectoral information

Future: How the climate change will evolve in the future?

Forecasts & Projections

Free and open access to climate data and tools based on the best available science

<http://climate.copernicus.eu/>

C3S COMPONENTS

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Climate Data Store (CDS)

- ECVs past, present and future
- Observed, reanalysed and simulated
- Derived climate indicators
- Tools to support adaptation and mitigation at global and European level

Sectoral Information System (SIS)



Evaluation and Quality Control (EQC)

- Monitors quality of C3S products and services
- Ensures C3S delivers state-of-the-art climate information to end-users
- Identifies gaps in service provision
- Bridges Copernicus with the research agenda in Europe (e.g. H2020, national research projects)

Outreach and Dissemination

- Web content
- Public outreach
- Coordination with national outreach
- Liaison with public authorities
- Conferences, seminars
- Training and education



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COPERNICUS CLIMATE DATA STORE (CDS): DATA ACCESS, APPLICATIONS, TOOLBOX



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What the Climate Change Service 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

Implemented by ECMWF as part of The Copernicus Programme

Climate Change Service

News Events Press Tenders Help & Support

ABOUT US WHAT WE DO DATA QSEARCH

European Commission | Copernicus | ECMWF | close

What we do

Our core objective is to provide reliable access to high-quality climate data. We do this through our Climate Data Store (CDS). We also offer tools and expert guidance that make it possible to transform the data into more visual products, such as maps and charts.

Climate datasets

The CDS provides a single point of access to a variety of climate datasets, including observations, reanalyses of past observations, seasonal forecasts and climate model projections.

[Read more](#)

[Browse the CDS data catalogue](#)

Tools for using climate data

The CDS features a powerful toolbox for processing and visualising data in the cloud, so that users can develop climate information suited to their needs.

[Read more](#)

[Browse the CDS toolbox](#)

Sectoral impacts

We provide real applications of CDS data and tools that demonstrate how businesses, governments and citizens can make informed decisions on how to mitigate the effects of climate change.

[Read more](#)

Quality assurance

We provide quality assurance for all CDS data, tools and applications. We continuously engage with users and independent experts to evaluate our services and ensure that they are fit for purpose.

[Read more](#)

ECMWF Copernicus Europe's eyes on Earth European Commission



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Climate Data Store (CDS) – free data access

cds.climate.copernicus.eu

The CDS contains **observations**, global and regional **climate reanalyses**, global and regional **climate projections** and **seasonal forecasts**. It also contains generic and **sectoral climate indicators**.

The CDS is designed as a **distributed system**, providing improved access to **existing datasets** through a **unified web interface**.

The screenshot shows the Climate Data Store website. At the top, there are logos for the European Commission, Copernicus, ECMWF, and the Climate Change Service. A 'Login/register' button is in the top right. Below the logos, a navigation bar contains 'Home', 'Search', 'Datasets', 'Toolbox', and 'Help & support'. The main content area has a heading 'Welcome to the Climate Data Store' and a sub-heading 'Dive into this wealth of information about the Earth's past, present and future climate.' Below this, there is a paragraph explaining that the service is free and provides a one-stop shop for climate data, with a 'Register for free' link. A search bar with the placeholder 'Enter search term(s)' and a dropdown menu set to 'All' is present. At the bottom, there are three featured sections: 'Climate Data Store Toolbox' with a line graph, 'Climate Data Store API' with a code snippet, and 'Access climate reanalysis (ERA5)' with a map of Europe.



We support scientists, policy makers and businesses by providing authoritative, quality-assured information about the past, present and future climate.

Key products and services





Edit Export ...

1a - CDS Users - Geographical distribution

Registered users

33,591

Represented countries (>=2 users)

181

New users in the last 24h

129

Daily registration (avg)

69

Geographical distribution



Country ranking by registered users (Top 10)

Country ↕	Users ↕	Last registration ↕
China	5351	2020-02-12 07:49:01
United States	3259	2020-02-11 20:32:07
United Kingdom	2235	2020-02-11 20:18:00
Germany	1939	2020-02-11 15:21:10
India	1632	2020-02-12 07:34:03
France	1607	2020-02-11 17:08:54
Italy	1505	2020-02-12 08:09:59
Spain	1115	2020-02-12 07:32:11
Brazil	932	2020-02-11 22:28:48
Netherlands	818	2020-02-11 14:11:46

🔍 ⬇️ ⓘ ↻ a minute ago

Distribution by sector

🔍 ⬇️ ⓘ ↻ a minute ago

Registered users



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CDS: data access statistics



Data access by product type (User Interface)

product_type	last_access	users	requests	retrieved_gbs
efas	Aug 8, 2019, 9:54:29 AM	48	195	214.15
insitu	Aug 8, 2019, 2:37:23 AM	167	313	40.76
monthly stats	Aug 7, 2019, 10:40:26 PM	558	1,070	151.83
projections	Aug 8, 2019, 10:15:23 AM	586	3,476	1,691.67
reanalysis	Aug 8, 2019, 10:28:34 AM	8,628	194,888	1,927,210.86
satellite	Aug 8, 2019, 9:11:57 AM	1,044	4,991	8,965.91
seasonal	Aug 8, 2019, 9:35:48 AM	434	10,332	20,602.06
sis	Aug 8, 2019, 7:16:02 AM	502	1,141	3,188.68



Data access by product type (API)

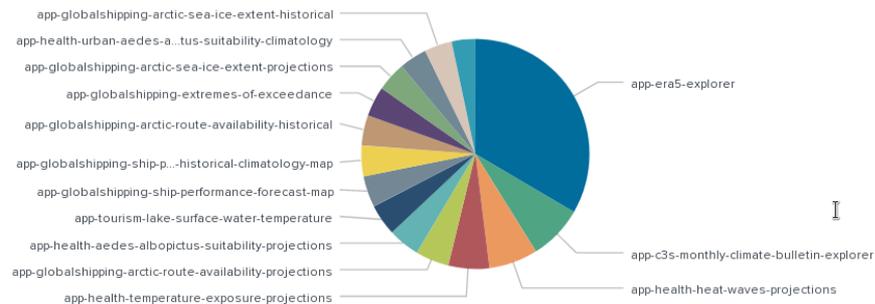
product_type	last_access	users	requests	retrieved_gbs
efas	Aug 8, 2019, 8:18:24 AM	10	611	159.76
insitu	Aug 8, 2019, 8:18:24 AM	62	898	159.42
monthly stats	Aug 8, 2019, 8:18:25 AM	46	917	40.61
projections	Aug 8, 2019, 8:18:24 AM	74	6,309	2,437.96
reanalysis	Aug 8, 2019, 10:32:55 AM	4,873	16,729,973	8,062,381.91
satellite	Aug 8, 2019, 8:18:24 AM	129	25,221	4,436.4
seasonal	Aug 8, 2019, 10:24:01 AM	227	138,151	42,723.61
sis	Aug 8, 2019, 9:57:09 AM	62	5,005	6,491.37



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CDS: applications

Application Views



Application ↕	Users ▼	Countries ↕	Views ↕
app-era5-explorer	519	68	1037
app-c3s-monthly-climate-bulletin-explorer	108	38	238
app-health-heat-waves-projections	81	23	215
app-health-temperature-exposure-projections	60	17	180
app-globalshipping-extremes-of-exceedance	45	20	131
app-globalshipping-arctic-route-availability-projections	35	16	147
app-globalshipping-ship-performance-forecast-map	35	15	136
app-health-aedes-albopictus-suitability-projections	34	17	139
app-tourism-lake-surface-water-temperature	28	12	137
app-globalshipping-arctic-route-availability-historical	25	11	133
app-health-urban-aedes-albopictus-suitability-climatology	25	13	122
app-globalshipping-ship-performance-historical-climatology-map	24	16	134
app-globalshipping-arctic-sea-ice-extent-historical	22	14	121
app-globalshipping-arctic-sea-ice-extent-projections	22	12	128
app-globalshipping-ice-class-limits	12	8	104



Toolbox Editor



02 Plot map

Console

Your queue

Layout

Copy



Run

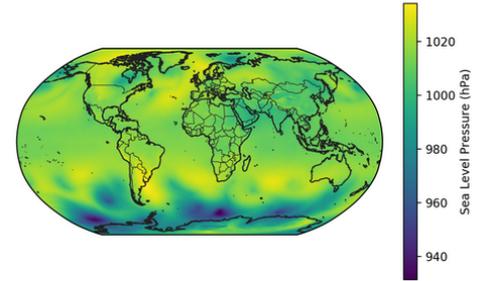
```

1  import cdstoolbox as ct
2
3
4  variables = {
5      'Near-Surface Air Temperature': '2m_temperature',
6      'Eastward Near-Surface Wind': '10m_u_component_of_wind',
7      'Northward Near-Surface Wind': '10m_v_component_of_wind',
8      'Sea Level Pressure': 'mean_sea_level_pressure',
9      'Sea Surface Temperature': 'sea_surface_temperature',
10 }
11
12
13 @ct.application(title='Plot Map')
14 @ct.input.dropdown('variable', label='Variable',
15                   values=variables.keys())
16 @ct.output.figure()
17 def plot_map(variable):
18     """
19     Application main steps:
20
21     - set the application layout with output at the bottom
22     - select a variable name from a list in the dropdown menu
23     - retrieve the selected variable
24     - compose a title

```

Plot Map

Sea level pressure



Variable

Sea Level Pressure

- Applications Data Documentation
- Search for app or example
- your workspace
 - 00 Hello World-1
 - 00 Hello World
 - examples
 - 00 Hello World
 - 01 Retrieve data
 - 02 Plot map**
 - 03 Extract time series and plot graph
 - 11 Calculate time mean and standard deviation
 - 12 Calculate climatologies
 - 21 Calculate regional mean and anomalies
 - 31 Calculate trends
 - 41 Calculate GDD
 - 42 Use cdo functions
 - 51 Calculate zonal means



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CORDEX DATASETS PUBLISHED IN THE CDS (ALSO SOME APPLICATIONS BASED ON CORDEX DATA)



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Search results



All

Datasets

Sort by

Relevancy

Title

Type

Product type

Showing 1-1 of 1 results for **CORDEX** x

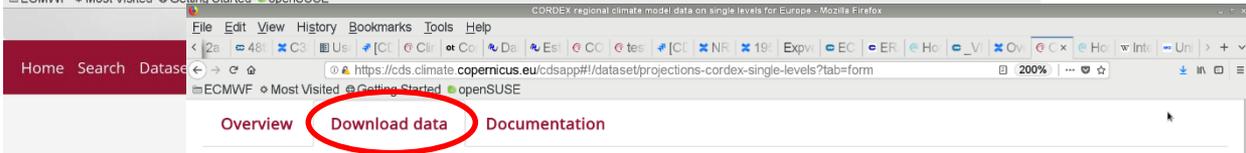


CORDEX regional climate model data on single levels for Europe

CORDEX regional climate model data on single levels for Europe



CORDEX DATA IN THE CDS (ONLY FOR EUROPE FOR THE TIME BEING)



CORDEX regi

Overview Down

This dataset provides single levels from a number of the framework of the term computed at one level or a dedicated process excluded from this category.

High-resolution RCMs local scales in relative Global Climate Mode



Overview **Download data** Documentation

Experiment

At least one selection must be made

- Evaluation
- RCP 2.6
- RCP 8.5

Time aggregation

At least one selection must be made

- Daily mean

Variable

At least one selection must be made

- Near surface relative humidity
- Surface solar radiation downwards

Regional Climate Model

At least one selection must be made

- CCLM4-8-17 (CLM-Community, EU)
- RACMO22E (KNMI, Netherlands)

Global Climate Model

At least one selection must be made

- CNRM-CM5 (CNRM-CERFACS, France)
- IPSL-CM5A-MR (IPSL, France)
- NorESM1-M (NCC, Norway)

Ensemble member

At least one selection must be made

- r12i1p1
- r11i1p1



Overview **Download data** Documentation

• EURO-CORDEX essential information (.net)

The link above provides simple and direct information on EURO-CORDEX. It also works as an entry point for more in-depth documentation on EURO-CORDEX data and experiments.

Contact

copernicus-support@ecmwf.int

License

[CORDEX licence](#)

Publication Date



CORDEX DOWNLOAD STATISTICS

Active users

226

Number of completed requests

6,710

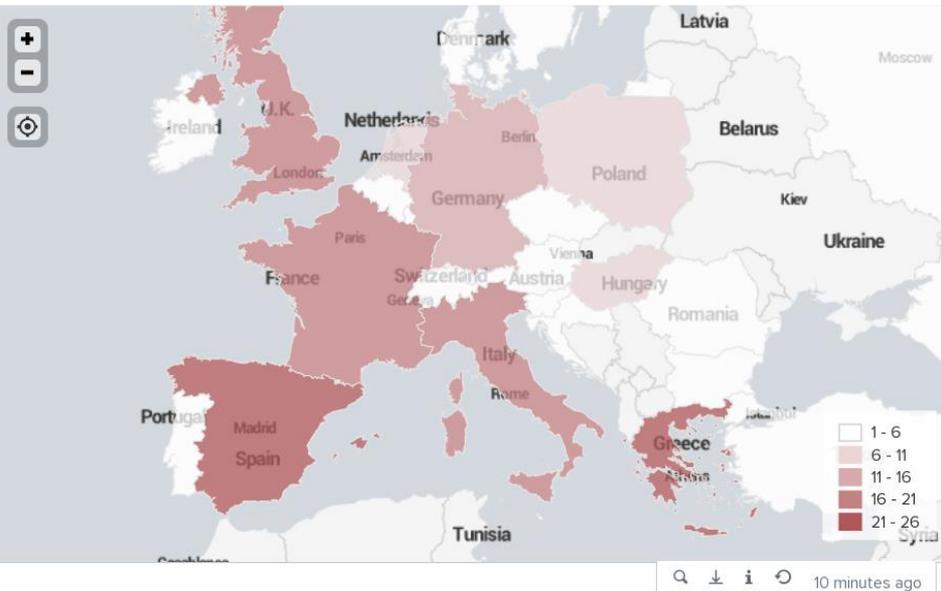
Number of failed requests

875

Retrieved volume in GB

2,846.66 GB

Geographical distribution of Active users



Top users (Volume in GB)

User ↕	Requests ↕	Volume ↕
18309 - Unknown - Spain - private	4813	1035.25
196 - Predictia Intelligent Data Solutions - Spain - private	898	269.78
4901 - Unknown - Italy - academic	389	250.14
4958 - Aistech Space SL - Spain - private	77	179.67
35998 - Unknown - Poland - private	120	165.88
21655 - IEA - United Kingdom - private	48	137.94
11372 - University of Minho - Portugal - academic	32	83.80
27254 - University of Gdańsk - Poland - academic	42	47.96
7618 - Unknown - Italy - academic	17	41.90
24317 - Unknown - Greece - academic	67	41.14
1003 - Hungarian Meteorological Service - Hungary - public	47	40.03
12331 - Aon Central and Eastern Europe; a.s. - Czech Republic - private	55	36.36



CMIP5 DOWNLOAD STATISTICS

Active users

1,307

Number of completed requests

73,672

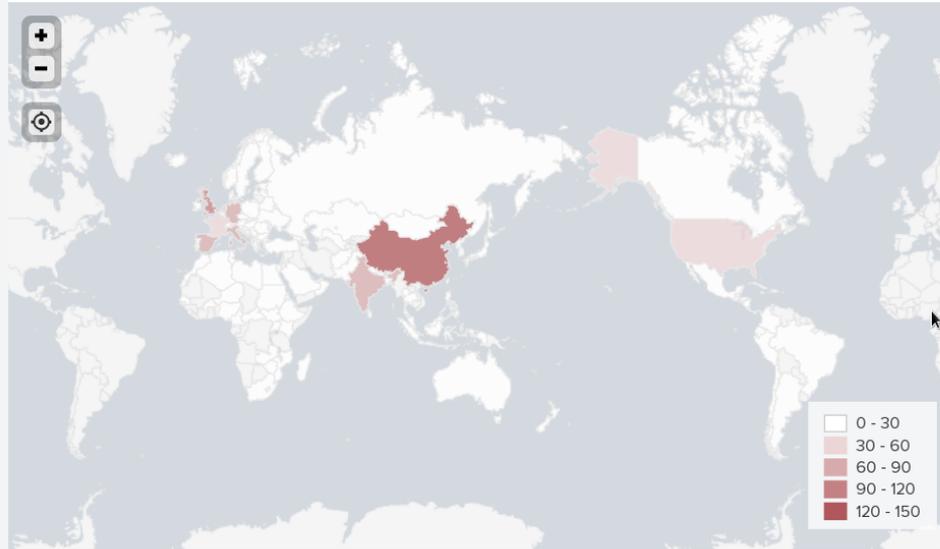
Number of failed requests

263,306

Retrieved volume in GB

29,205.05 GB

Geographical distribution of Active users



6 minutes ago

Top users (Volume in GB)

User ↕	Requests ↕	Volume ↕
7277 - Deutscher Wetterdienst - Germany - public	23875	4551.49
10412 - Unknown - Kazakhstan - academic	3341	4544.48
9429 - Unknown - Belgium - academic	270645	3120.82
196 - Predictia Intelligent Data Solutions - Spain - private	7314	2732.74
23966 - USP - Brazil - academic	615	1886.01
18309 - Unknown - Spain - private	8977	1658.07
7173 - bsc - Spain - academic	6622	1310.46
17741 - Unknown - Switzerland - private	61	891.83
2879 - Unknown - Netherlands - ngo	105	454.17
14154 - UCAS - China - academic	78	358.15
21655 - IEA - United Kingdom - private	313	306.21
10166 - Unknown - Italy - private	376	287.82
25562 - Hebrew University - Israel - academic	187	284.15



CORDEX IN THE CDS: ADDITIONAL EXPERIMENTS

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Additional experiments are being funded by C3S to extend the CORDEX information in terms of addressing uncertainties (RCP/GCM/RCM matrix)

RCP8.5	RCA4	CcrCLM	REMO 09_15	RACMO22E	HIRHAM5	WRF381P	ALADIN63	RegCM4.6.1	HadGEM3-RA	Total now
MOHC-HadGEM2-ES	1		1	1	1*	#	#	*	*	6
ICHEC-EC-EARTH	1##		1	2#	1##				#	6
CNRM-CERFACS-CNRM-CMS	1		1	1*	#		*			4
NCC-NorESM1-M	1*	*	*	#	1	#				3
MPI-M-MPI-ESM-LR	1	1##	2#					#		3
IPSL-IPSL-CM5A-MR	1					1*				2
CCCma-CanESM2			1							1
MIROC-MIROC5			1							1
Current status	6	2	8	4	3	1	1	1	1	27
Remaining	4	7	2	4	5	5	3	4	4	37
RCP4.5	RCA4	CcrCLM	REMO 09_15	RACMO22E	HIRHAM5	WRF381P	ALADIN63	RegCM4.6.1	HadGEM3-RA	Total now
MOHC-HadGEM2-ES	1			1						2
ICHEC-EC-EARTH	1			2	1					4
CNRM-CERFACS-CNRM-CMS	1									1
NCC-NorESM1-M					1					1
MPI-M-MPI-ESM-LR	1		2							3
IPSL-IPSL-CM5A-MR	1									1
Current status	4	0	2	3	2	0	0	0	0	12
Remaining	0	0	3	0	1	0	1	0	0	5
RCP2.6	RCA4	CcrCLM	REMO 09_15	RACMO22E	HIRHAM5	WRF381P	ALADIN63	RegCM4.6.1	HadGEM3-RA	Total now
MOHC-HadGEM2-ES	1		1	1				#		3
ICHEC-EC-EARTH	1		1	1	1					4
CNRM-CERFACS-CNRM-CMS							#			0
NCC-NorESM1-M	#									0
MPI-M-MPI-ESM-LR	1		2							3
IPSL-IPSL-CM5A-MR										0
Current status	3	0	4	2	1	0	0	0	0	10
Remaining	2	0	2	2	2	0	1	2	2	15
Total outside PRINCIPLES	13	1	13	8	5	0	0	0	0	40
Remaining all RCPs	6	7	7	6	8	5	5	5	6	55
SC1 already counted	1	1	1	1	1	1	1	1	1	9
SC2 commitment	3	2	2	2	3	2	2	2	1	19
PRINCIPLES total	7	8	8	7	9	6	6	7	7	65
Maximum commitment	10	10	10	10	10	7	7	7	8	
Grand total	20	9	21	15	14	6	6	7	7	105



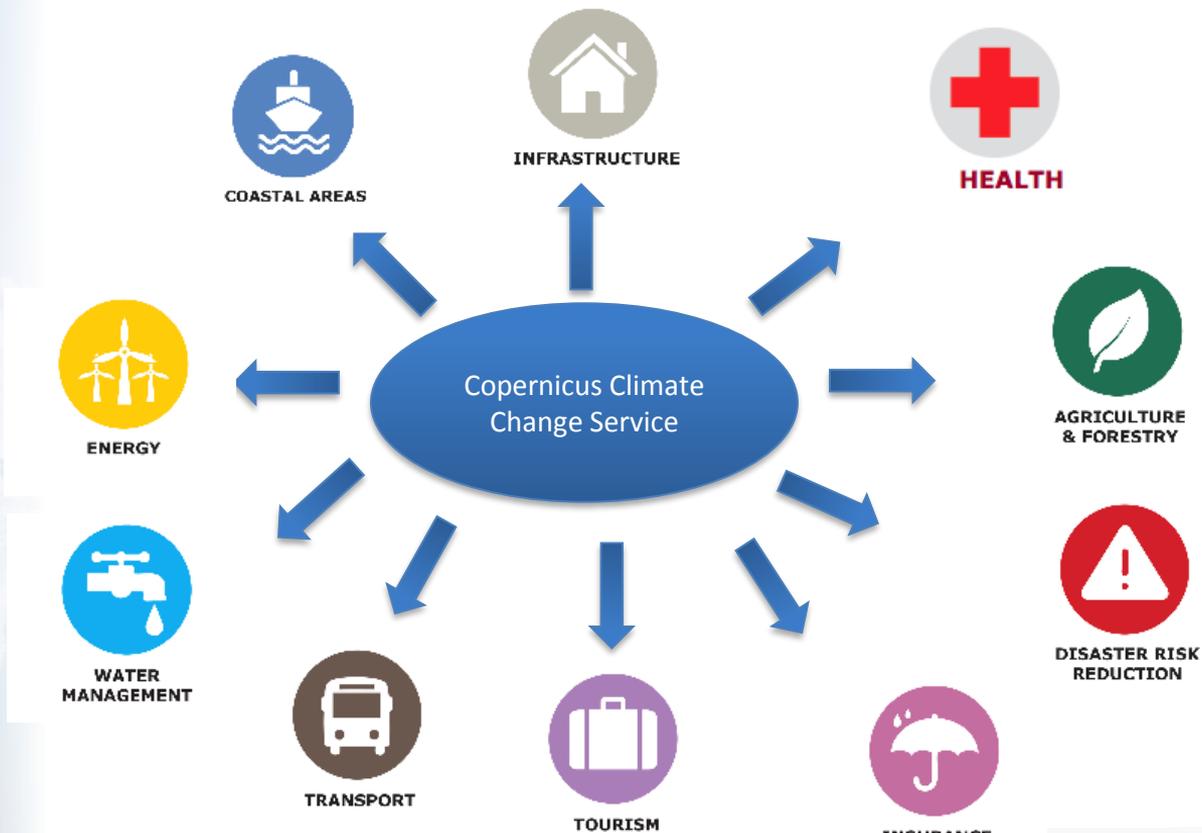
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SECTORAL INFORMATION SYSTEM (SIS)



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SIS AT A GLANCE (PROOF-OF-CONCEPT)





Climate Change



POC to Operations

2016

2017

2018

2019

2020

2021

Proof of concept Operational Phase



AGRICULTURE & FORESTRY

Agriclass



WATER MANAGEMENT

SWICCA
EDGE



ENERGY

ECEM
Clim4Energy



INSURANCE

WISC



URBAN

UrbanSIS

POC migration (Predictia)

CDS / Toolbox launched

C3S Water (SMHI)

C3S Energy (WEMC)

C3S Wind Storms (KNMI)

Previous C3S GA March 2017

Present





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C3S European Health - 1

The screenshot shows the Safari browser window at the URL `https://cds.climate.copernicus.eu/cdsapp#/home`. The page header includes the logos for the European Union, Copernicus, ECMWF, and Climate Change Service, along with a "Login/register" button and the text "Your feedback helps us to improve the service". A navigation bar contains links for Home, Search, Datasets, Applications, Toolbox, FAQ, and Live. The main content area features a "Welcome to the Climate Data Store" heading, followed by a paragraph: "Dive into this wealth of information about the Earth's past, present and future climate. It is freely available and functions as a one-stop shop to explore climate data. Register for free to obtain access to the CDS and its Toolbox." Below this is another paragraph: "We are constantly improving the services and adding new datasets. For more information, please consult the catalogue, our FAQ or the C3S forum." A search bar with the placeholder "Enter search term(s)" and a search button is present. At the bottom, there are three featured sections: "Climate Data Store Toolbox" with a line graph, "Climate Data Store API" with a code snippet, and "Access the C3S Forum" with a blue abstract image.

Welcome to the Climate Data Store

Dive into this wealth of information about the Earth's past, present and future climate.

It is freely available and functions as a one-stop shop to explore climate data. Register for free to obtain access to the CDS and its Toolbox.

We are constantly improving the services and adding new datasets. For more information, please consult the [catalogue](#), our [FAQ](#) or the [C3S forum](#).

Enter search term(s) All Search

Climate Data Store Toolbox

Climate Data Store API

Access the C3S Forum



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C3S European Health - 2

The screenshot shows a web browser window displaying the CDS climate.copernicus.eu website. The browser title is "QuickTime Player" and the address bar shows "cds.climate.copernicus.eu". The website header includes logos for the European Commission, Copernicus, and ECMWF, along with a "Climate Change Service" logo. A search bar is visible, and the search results section displays three results for the query "mosquito".

Search results

mosquito

All Applications Datasets

Sort by Relevancy

Title Type

Product type

Variable domain

Spatial coverage

Temporal coverage

Sector

Showing 1-3 of 3 results for mosquito

- Climatic suitability of the Aedes albopictus mosquito in European cities from 2008 to 2017
Climatic suitability of the Aedes albopictus **mosquito** in European cities from 2008 to 2017
- Climatic suitability for the presence and seasonal activity of the Aedes albopictus mosquito for Europe derived from climate projections
Climatic suitability for the presence and seasonal activity of the Aedes albopictus **mosquito** for
- Climate projections of Asian tiger mosquito (Aedes albopictus) survival suitability for Europe
Climate projections of Asian tiger **mosquito** (Aedes albopictus) survival suitability for Europe

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Your feedback helps us to improve the service

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SUMMARY, CONCLUSIONS



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SUMMARY, CONCLUSIONS

- **CDS (including its Toolbox) is operational though it is still work in progress (especially the Toolbox)**
 - **Look for data, applications, toolbox tools**
- **The SIS applications are in a transition period: proof-of-concepts are not there any more and the CDS applications are not yet fully available**
- **It makes sense to look at updates in CDS and its Toolbox**
- **It is possible to give feedbacks, formalise user requirements**