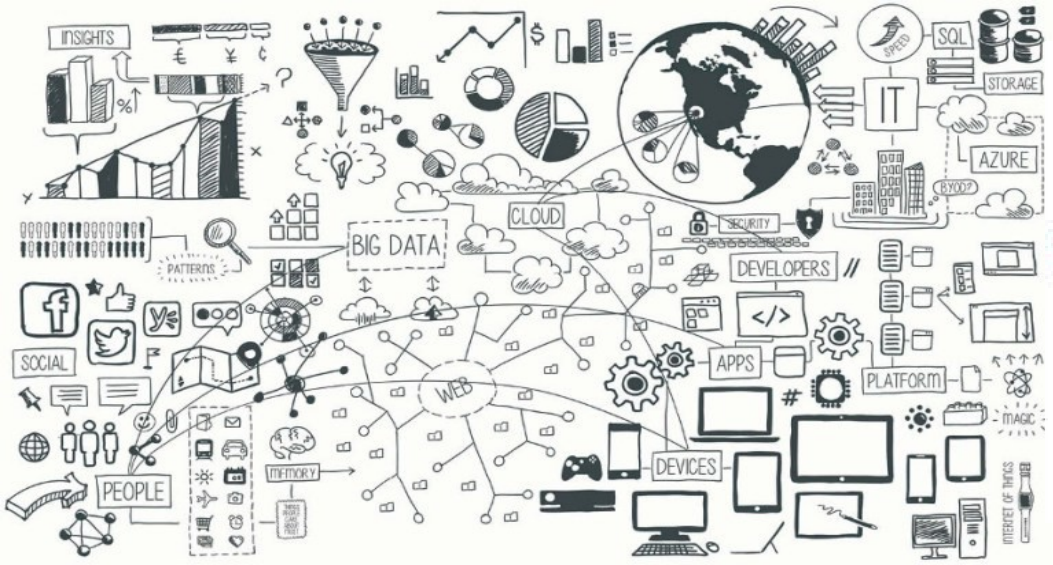
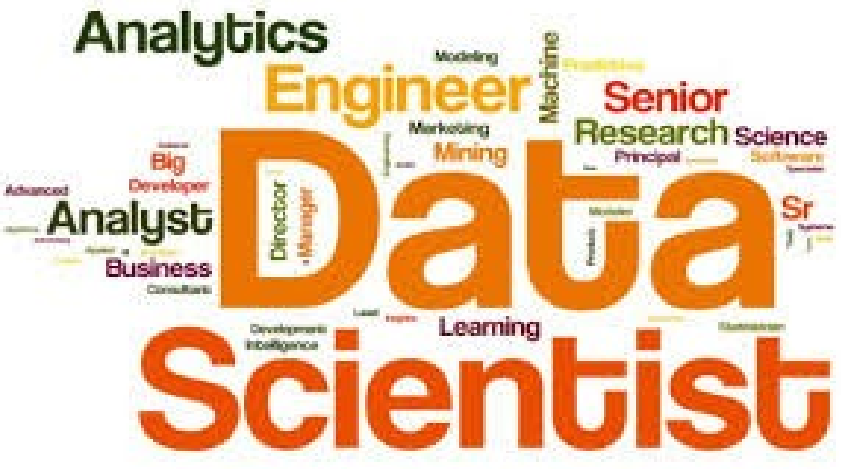
DataLab: Environment and Meteorology

Downloading Climate Data – ESGF & MARS





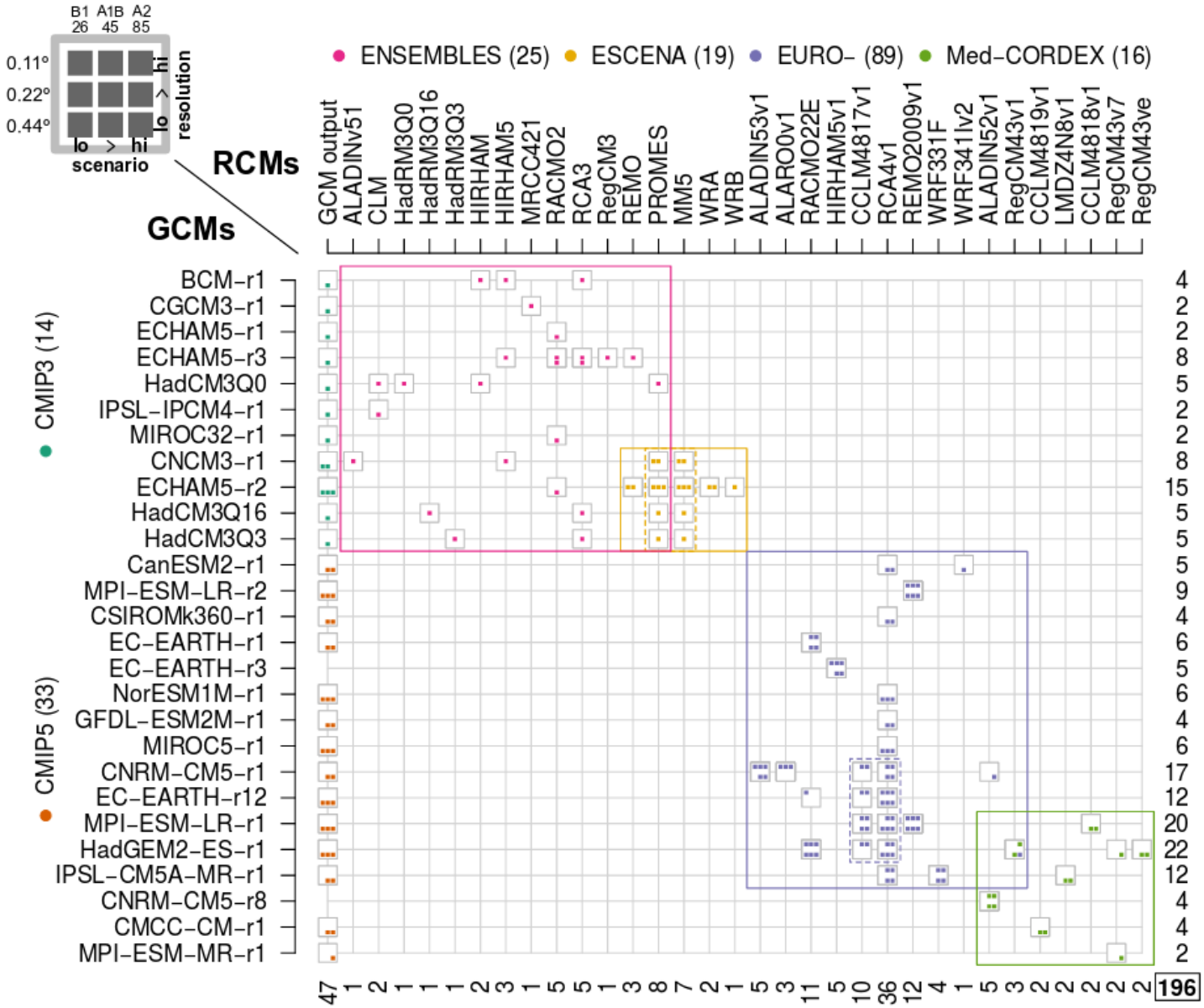
Sixto Herrera García

Grupo de Meteorología

Univ. de Cantabria – CSIC
MACC / IFCA

M1980 – Data Laboratory: Environment & Meteorology (18:00-20:00)				
04/01	L	Introduction: Clime and Models	T	SH
04/02	**M**	**Data Repositories: ESGF & MARS**	**TL**	**SH**
04/03	**X**	**Data Repositories: ESGF & MARS**	**TL**	**SH**
04/04	J	Lab: Climate4R – Example 1	L	JB
04/05	V	Lab: Climate4R – Example 2	L	JB
04/08	L	Downscaling: Data Mining in Clime	T	SH
04/09	M	Lab: downscaleR	L	JB
04/10	X	Evaluation and Validation	T	SH
04/11	J	Lab: Evaluation and Validation	L	JB
04/15	L	Impacts	L	JB & SH
04/16	M	Impacts	L	JB & SH
04/17	X	Impacts	L	JB & SH

SH - Sixto Herrera | **JB** – Joaquín Bedia



Observations
Reanalysis
Climate Change:
- Global Models (**GCM**)
- Regional Models (**RCM**)
- Scenarios/Experiments
- Runs
- Parameterizations
- ...

Seasonal Forecast:
- Member
- Initialization
- ...

Petabytes → Exabytes!!!

Source: Fernández, J. et al. 2018, Consistency of climate change projections from multiple global and regional model intercomparison projects. Climate Dynamics. Doi:10.1007/s00382-018-4181-8

Observations

- **ECA&D:** https://www.ecad.eu//dailydata/index.php
- **WATCH Datasets:** http://www.eu-watch.org/data_availability
- **EWEMBI:** http://dataservices.gfz-potsdam.de/pik/showshort.php?id=escidoc:1809891
- **Spain02:** http://meteo.unican.es/en/datasets/spain02
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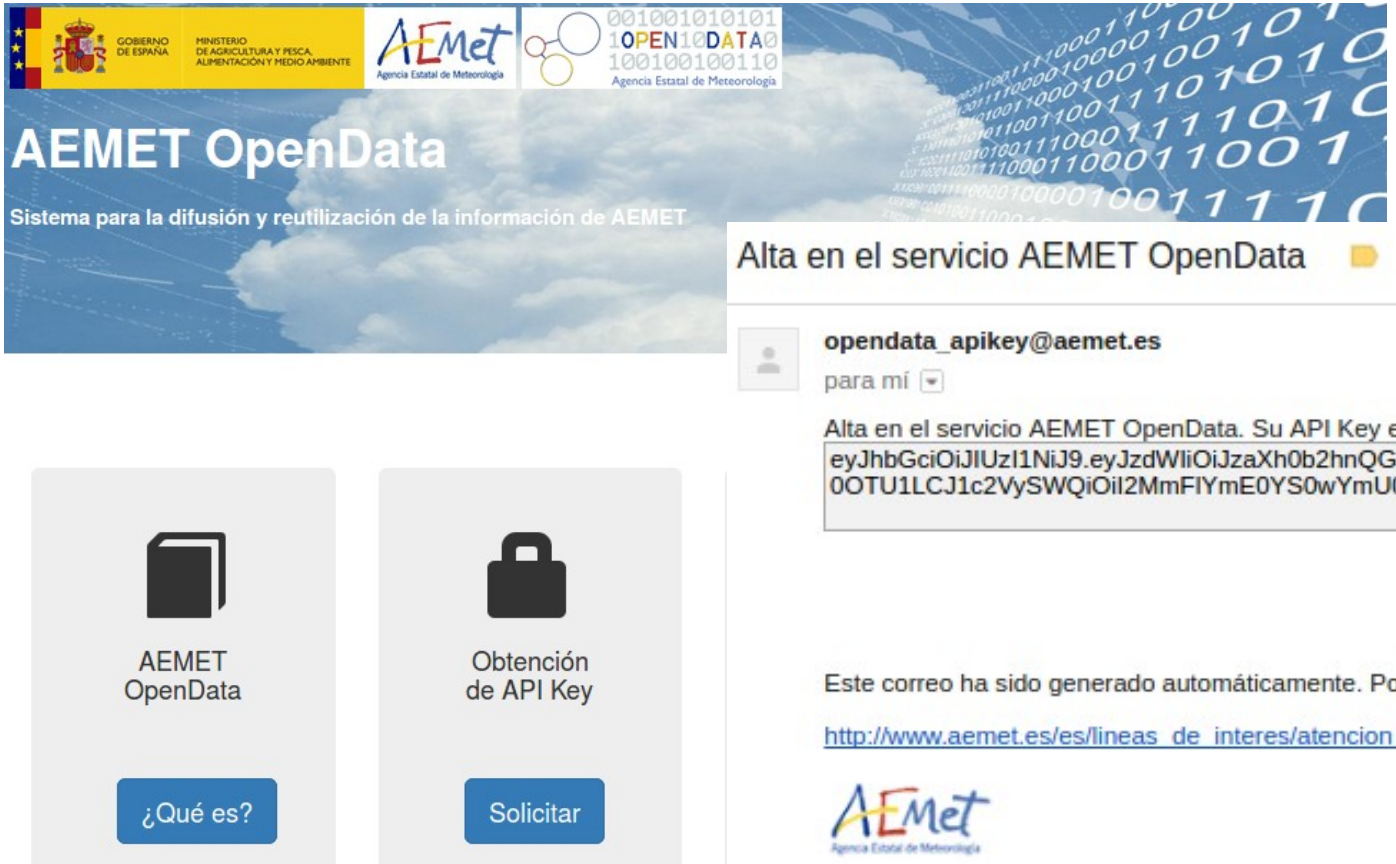

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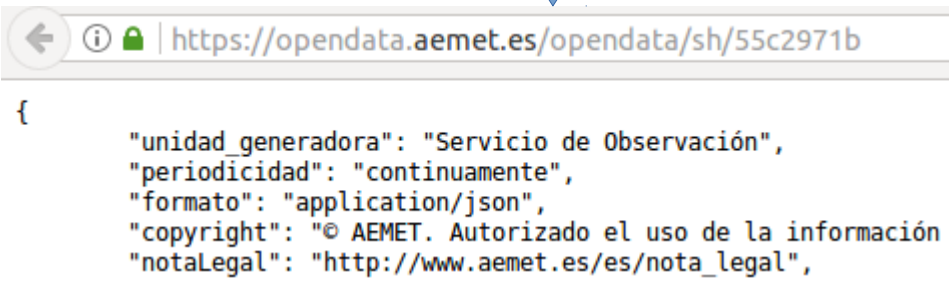

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Reanalysis

- **NCEP/NCAR:** https://www.ncdc.noaa.gov/data-access https://www.esrl.noaa.gov/psd/thredds/catalog.html
- **ECMWF:** https://www.ecmwf.int/, http://apps.ecmwf.int/datasets/
  - **API:** https://software.ecmwf.int/wiki/display/WEBAPI/

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- AEMET-OpenData:

Reanalysis

- NCEP/NCAR:
https://www.ncdc.n
https://www.esrl.no

- ECMWF:
https://www.ecmwf.
- API: https://so

```
#!/usr/bin/env python
from ecmwfapi import ECMWFDataServer
server = ECMWFDataServer()
server.retrieve({
    'stream'   : "oper",
    'levtype'  : "sfc",
    'param'    : "228.128",
    'dataset'  : "interim",
    'step'     : "0",
    'grid'     : "0.75/0.75",
    'time'     : "00/06/12/18",
    'date'     : "2004-01-01/to/2017-07-31",
    'type'     : "an",
    'class'    : "ei",
    'format'   : "netcdf",
    'target'   : "interim_2004-01-01to2017-07-31_00061218_166.128.nc"
})
```

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```
chmod +x script.py  # Execute permission for the user
python script.py  # Execute the script
```

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  - **API:** https://software.ecmwf.int/wiki/display/WEBAPI/
- **JRA-55:** http://jra.kishou.go.jp/JRA-55/index_en.html
  - **API:** http://jra.kishou.go.jp/comm/application_en.html

Observations

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  - **API:** http://jra.kishou.go.jp/comm/application_en.html

Climatic Change:

- **ESGF:** https://esgf.llnl.gov/index.html

User Information	
User Name	M1980 *[5 to 30 characters, letters, digits and @/./-/_ only. Please note that the username is used to build a unique OpenID that you will use to login. If your chosen username is not available, you will be automatically assigned a similar one.]*
First Name	Meteo
Last Name	DataLab
Email	sixtohg@gmail.com
Password	•••••••••• *[At least 8 characters, including one lower case letter, one upper case letter, one number, and one special symbol. All characters are allowed EXCEPT for ( ) " .]* Password score: strong. Estimated time to crack password: 4 years
Confirm Password	•••••••••• *[Must match the password above.]*
Institution	University of Cantabria
Department	Applied Mathematics and Computer Science
City	Santander
State	
Country	SPAIN
Interest Keywords	downscaling, climate change [A short list of science fields you are involved with (60 characters maximum). Example: Software Engineering, Grid Computing, Climate Change.]
Interest Statement	Regional climate change scenarios. [A short paragraph describing your professional interests (1000 characters maximum).]
Subscribe to COG Email List?	☐ *['cog_info', low traffic list]*

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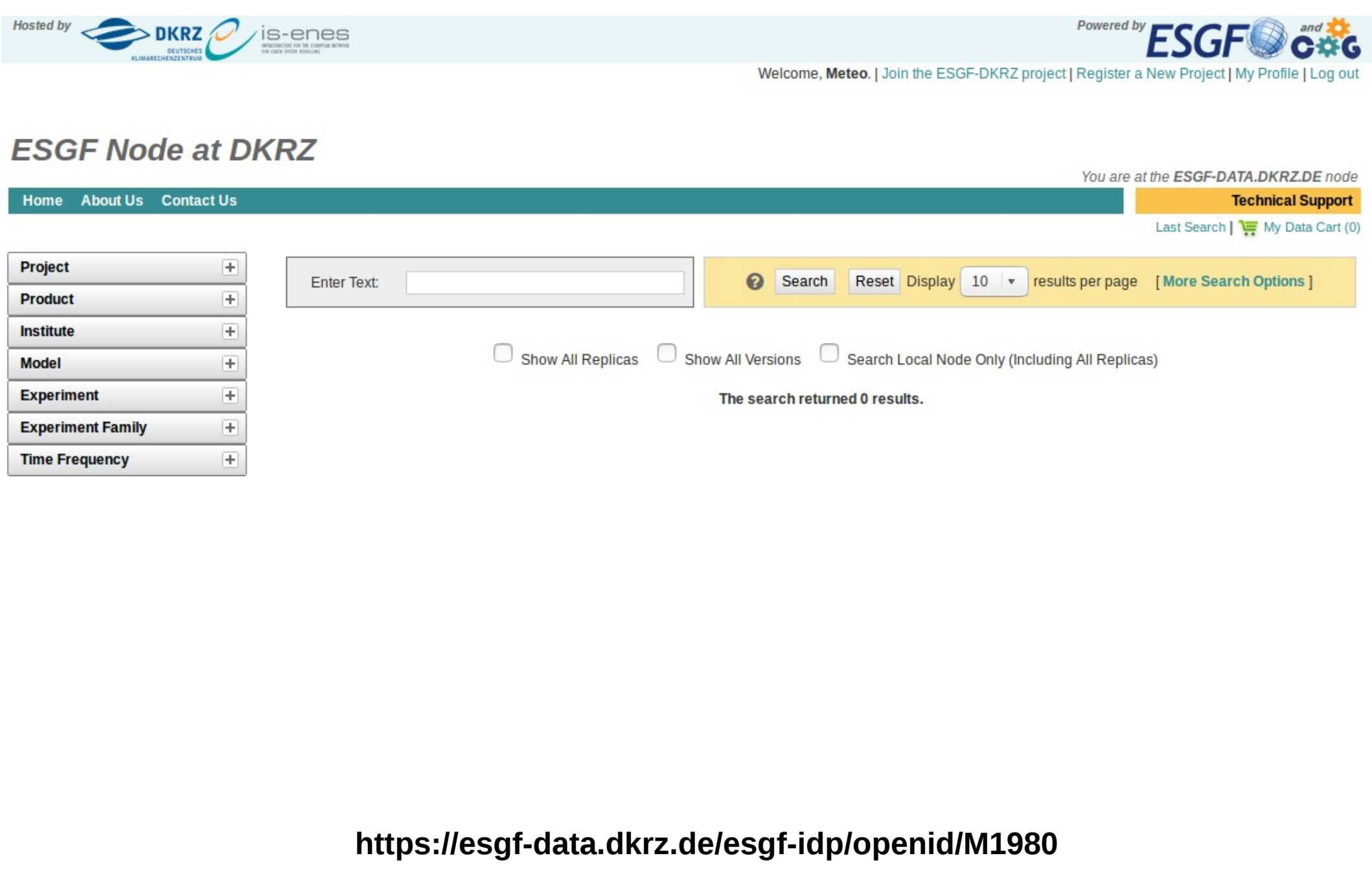
https://esgf-data.dkrz.de/esgf-idp/openid/M1980



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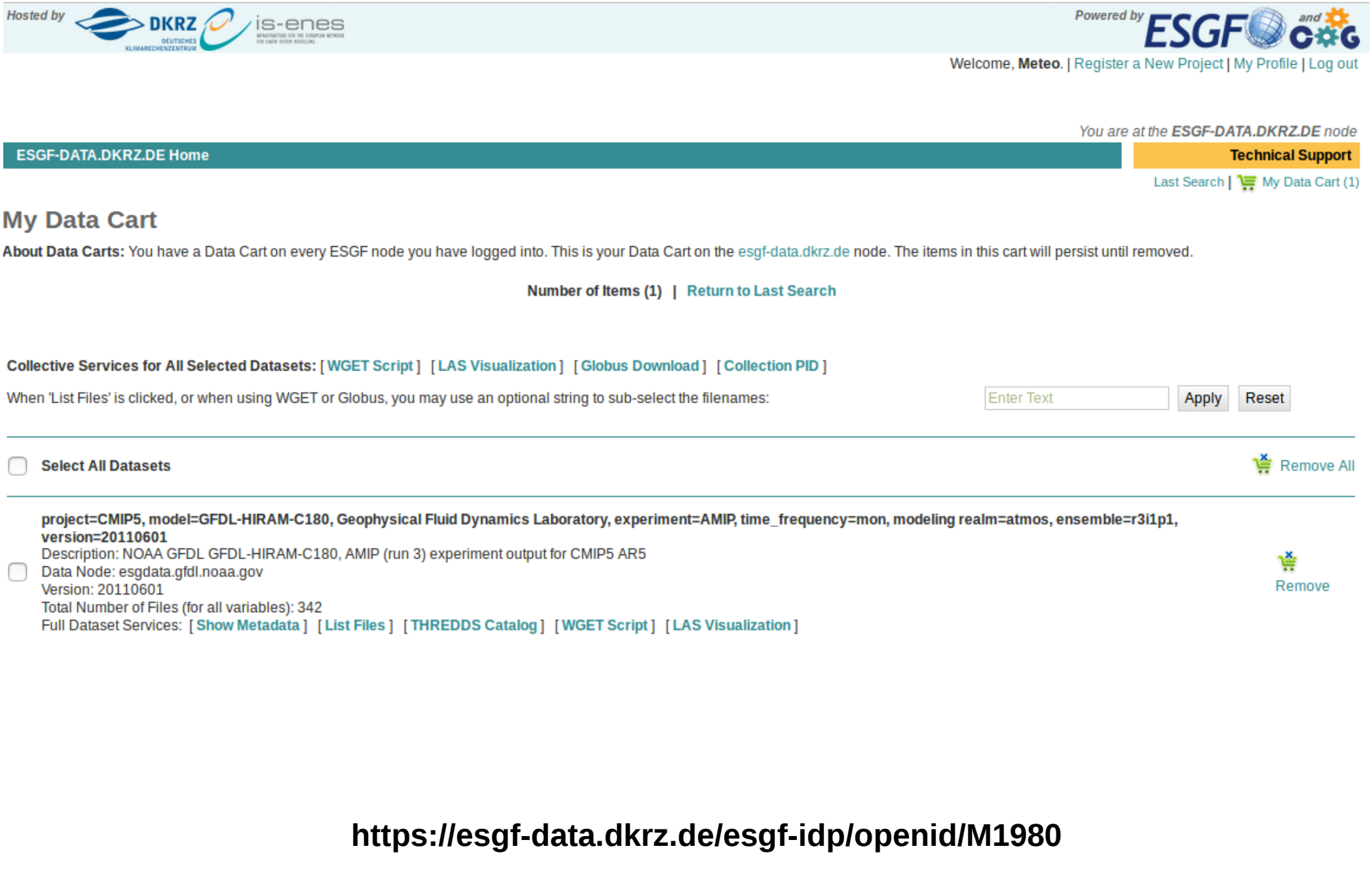

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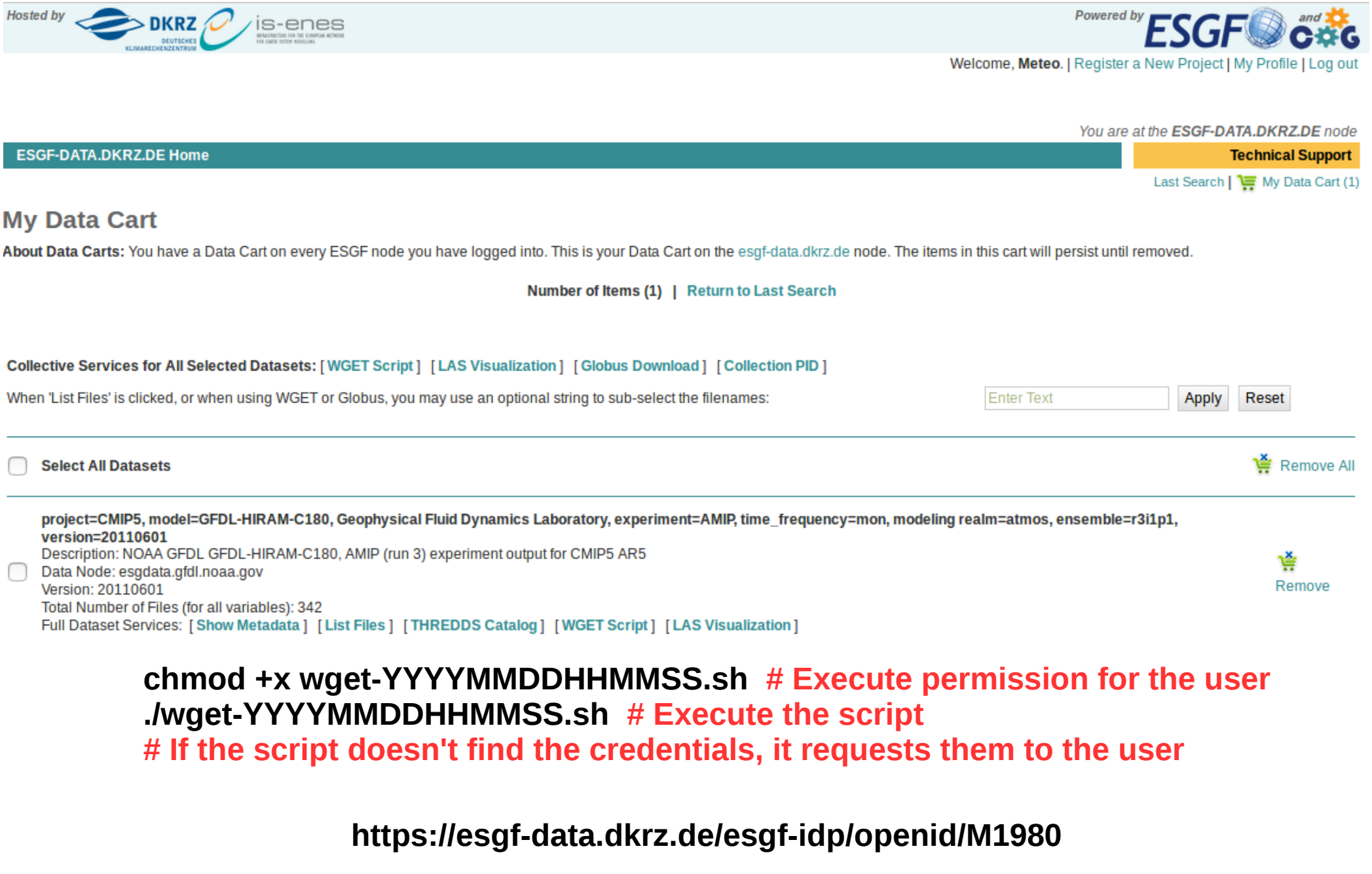
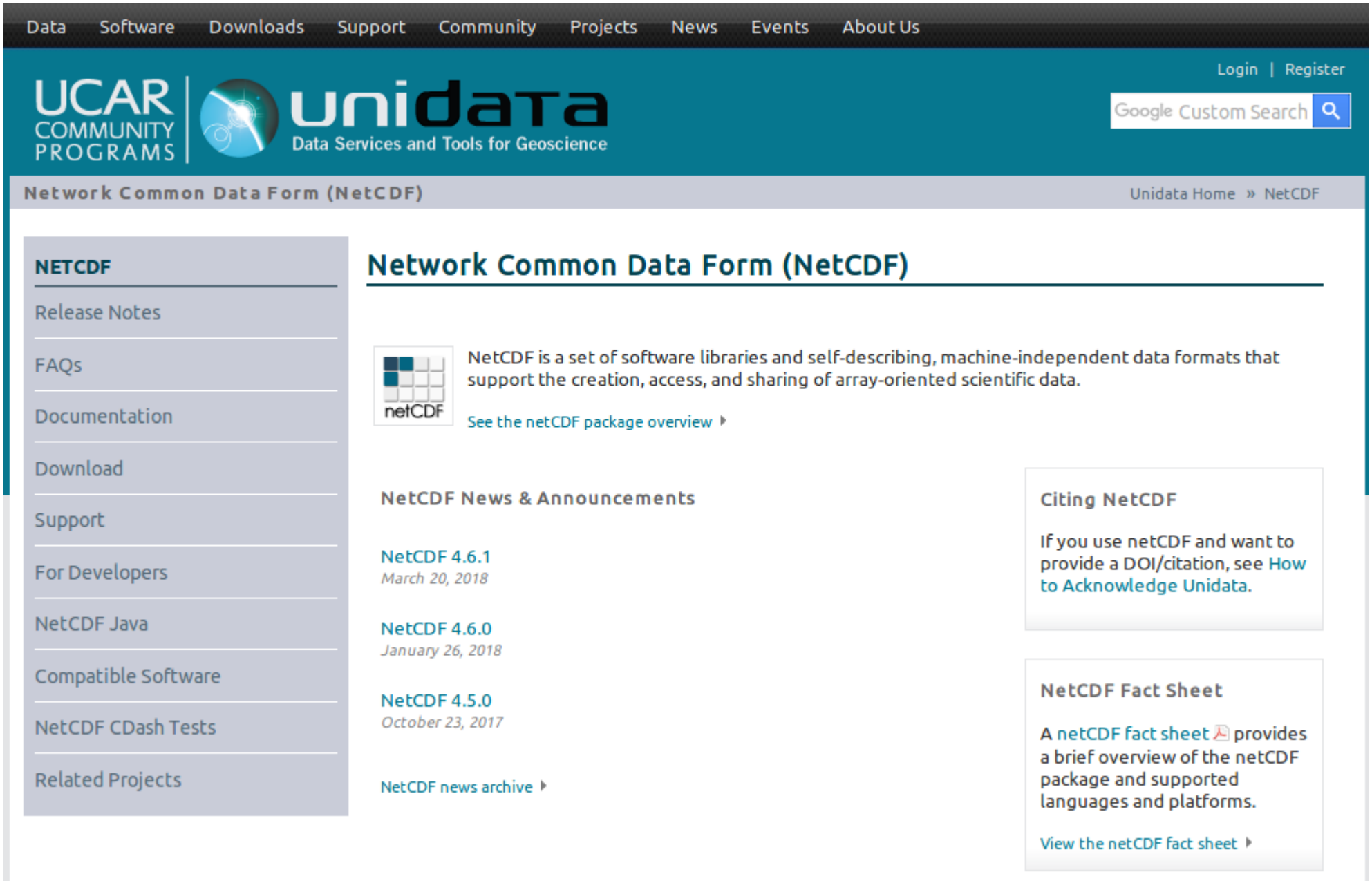


chmod +x wget-YYYYMMDDHHMMSS.sh # Execute permission for the user

./wget-YYYYMMDDHHMMSS.sh # Execute the script

If the script doesn't find the credentials, it requests them to the user

https://esgf-data.dkrz.de/esgf-idp/openid/M1980



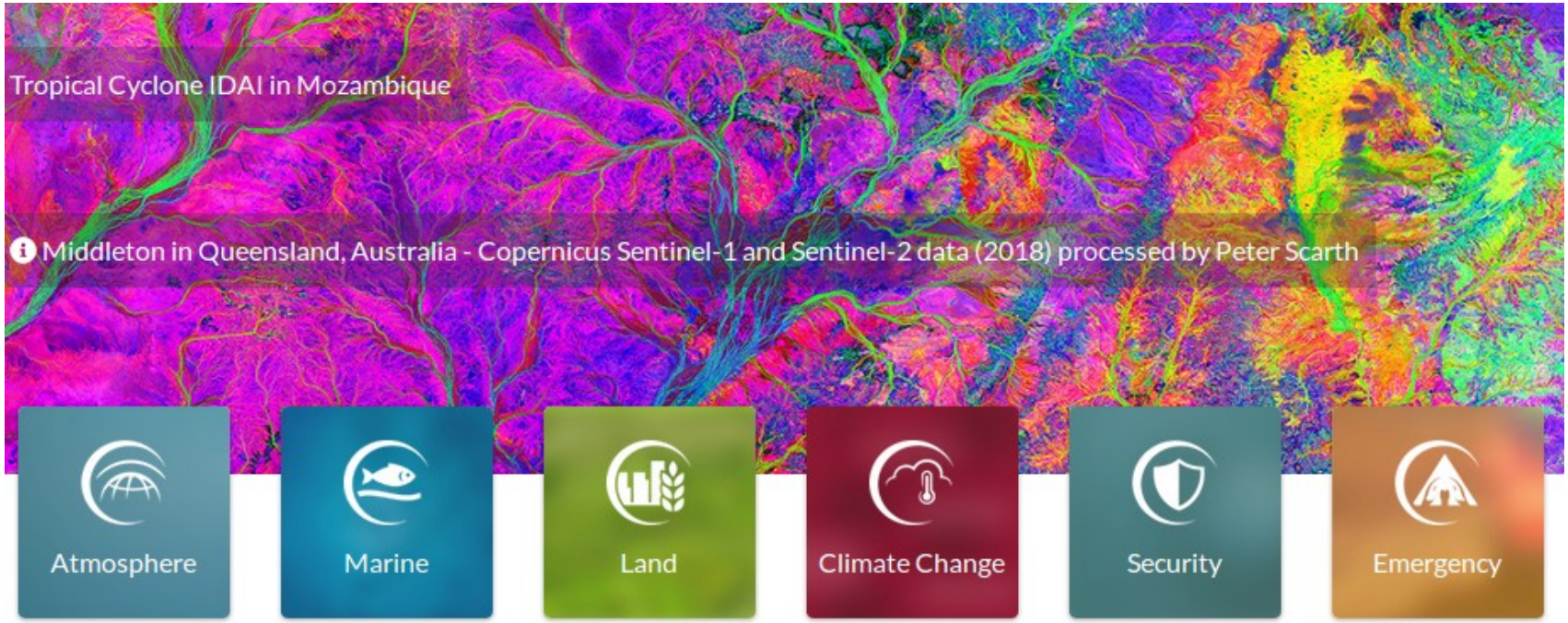
https://www.unidata.ucar.edu/software/netcdf/

Satellite: ~12 Sentinels in the following 10 years (**ESA**, **EUMETSAT 6**)

Local observations (In situ):

- Sensors in the shore of the rivers
- Ocean buoys
- Meteorological globes
- Non-static radars (ships, airplane, etc.)
- ….

Local observations are needed to calibrate the data provided by the satellite.



https://www.copernicus.eu/en

https://cds.climate.copernicus.eu/

Home Search Datasets Applications Your requests Toolbox Help & support

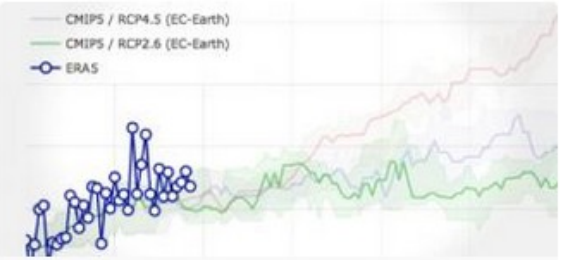
Welcome to the Climate Data Store

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.

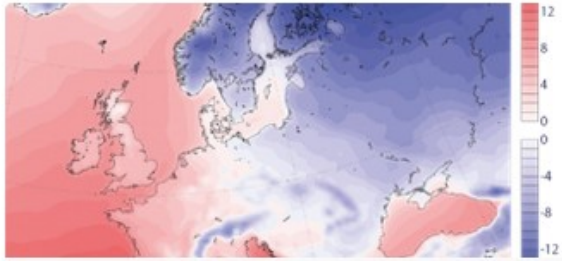
We are constantly improving the services and adding new datasets. For more information, please consult the catalogue and our FAQ.

Enter search term(s) | All | Search



Climate Data Store **Toolbox**

Climate Data Store **API**



Access **climate reanalysis (ERA5)**

Copernicus Europe's eyes on Earth — IMPLEMENTED BY ECMWF — Climate Change Service

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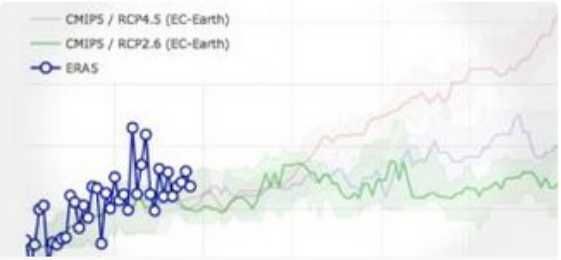

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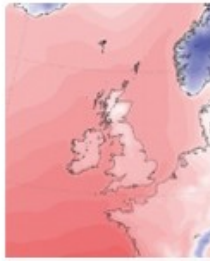
Climate Data Store **API**



Access c

Product type

- [ ] Climate projections (5)
- [ ] Reanalysis (8)
- [ ] Satellite observations (12)
- [ ] Seasonal forecasts (6)
- [ ] Sectoral climate indices (2)

Variable domain

- [ ] Atmosphere (composition) (3)
- [ ] Atmosphere (surface) (5)
- [ ] Atmosphere (upper air) (7)
- [ ] Land (biosphere) (1)
- [ ] Land (cryosphere) (2)
- [ ] Land (hydrology) (4)
- [ ] Ocean (physics) (5)

Spatial coverage

- [ ] Europe (6)
- [ ] Global (23)

Temporal coverage

- [ ] Future (13)
- [ ] Past (31)
- [ ] Present (4)

Master Universitario Oficial **Data Science**
con el apoyo del
UC Universidad de Cantabria — UIMP Universidad Internacional Menéndez Pelayo — CSIC

ESGF & MARS

CDS Copernicus

Originating centre

- [ ] ECMWF
- [x] DWD
- [ ] UK Met Office
- [ ] CMCC
- [ ] Météo France

Select all Clear all

System

- [x] 2
- [ ] 3
- [ ] 4
- [ ] 5
- [ ] 6
- [ ] 12
- [ ] 13

Select all Clear all

Variable

- [ ] 10m u-component of wind
- [ ] 10m v-component of wind
- [ ] 10m wind gust since previous post-processing
- [ ] 2m dewpoint temperature
- [x] 2m temperature
- [ ] Eastward turbulent surface stress
- [ ] Evaporation
- [ ] Land-sea mask
- [ ] Maximum 2m temperature in the last 24 hours
- [ ] Mean sea level pressure
- [ ] Minimum 2m temperature in the last 24 hours
- [ ] Northward turbulent surface stress
- [ ] Orography
- [ ] Runoff
- [ ] Sea surface temperature
- [ ] Sea-ice cover
- [ ] Snow density
- [ ] Snow depth
- [ ] Snowfall
- [ ] Soil temperature level 1
- [ ] Surface latent heat flux
- [ ] Surface net solar radiation
- [ ] Surface net thermal radiation
- [ ] Surface sensible heat flux
- [ ] Surface solar radiation downwards
- [ ] Surface thermal radiation downwards
- [ ] TOA incident solar radiation
- [ ] Top net solar radiation
- [ ] Top net thermal radiation
- [ ] Total cloud cover
- [ ] Total precipitation

Product type

- [ ] Climate projections (5)
- [ ] Reanalysis (8)
- [ ] Satellite observations (12)
- [ ] Seasonal forecasts (6)
- [ ] Sectoral climate indices (2)

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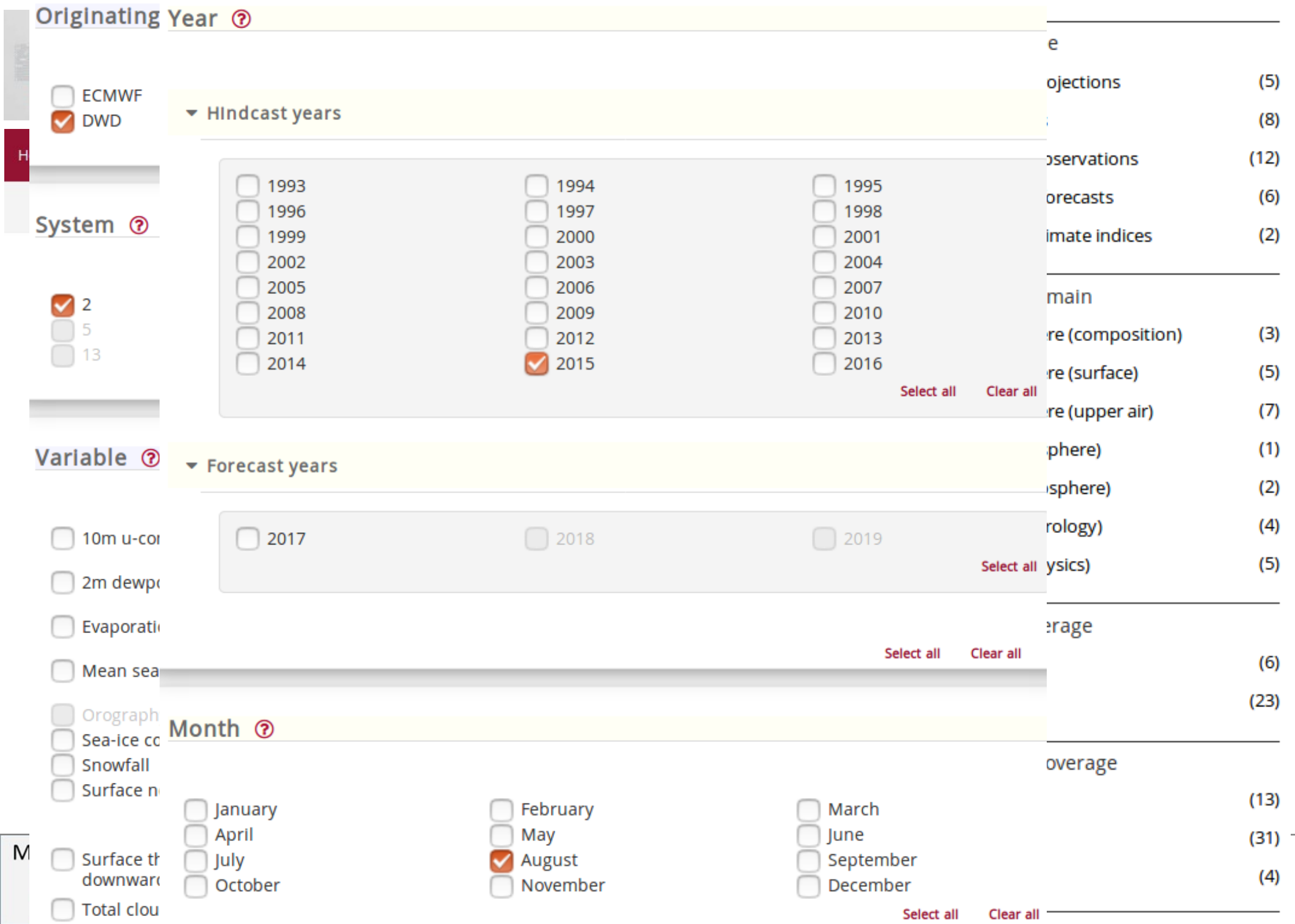
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2016
Select all
Clear all
Forecast years
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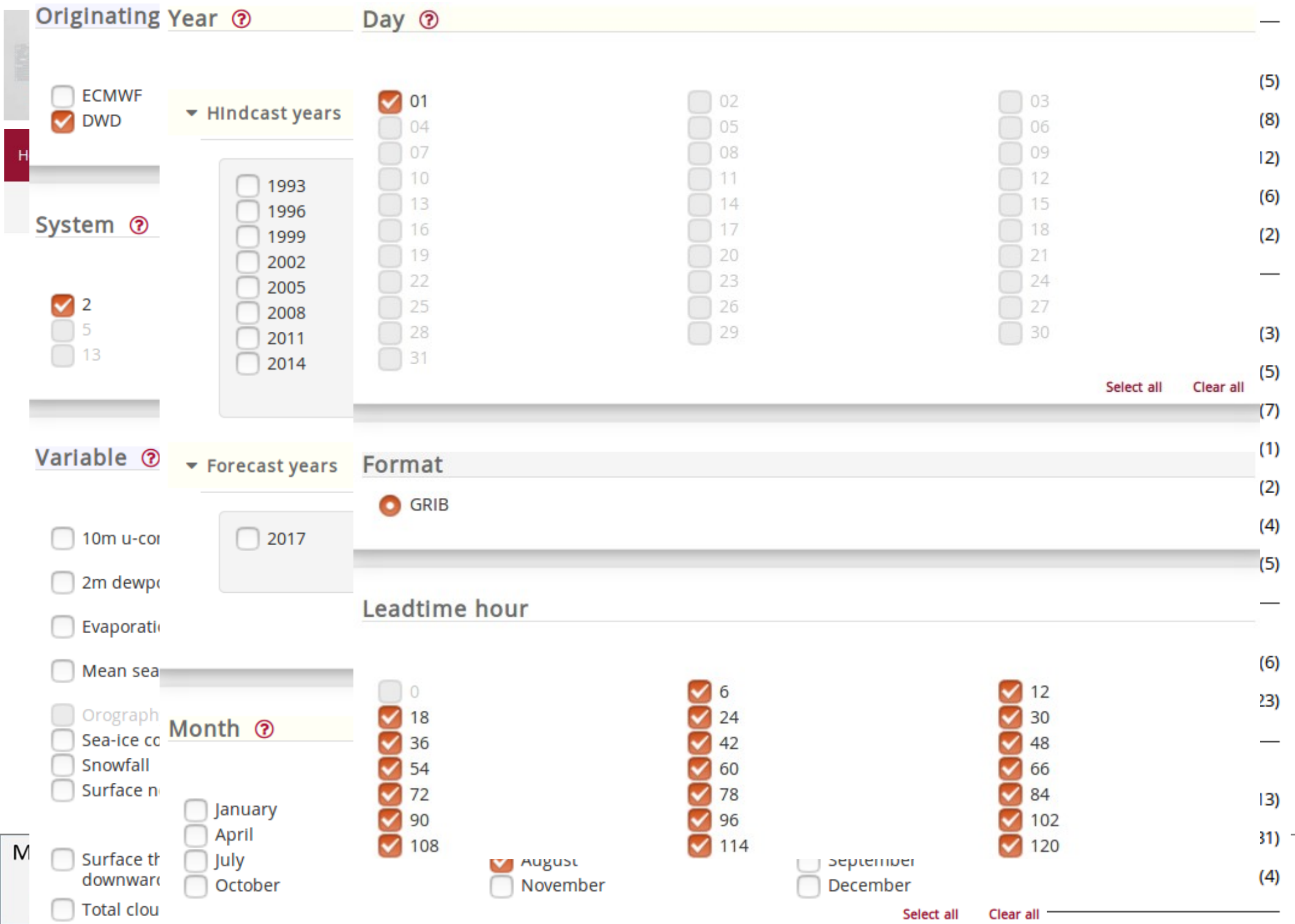
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2008
2011
2014
Forecast years
2017
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Select all
Clear all
Format
GRIB
Leadtime hour
0
18
36
54
72
90
108
6
24
42
60
78
96
114
12
30
48
66
84
102
120
September
December
Select all
Clear all

Originating Year Day

Hide API request | Not yet toolbox compatible | Submit Form

ECMWF
DWD

Please go to the documentation page for information as to how to use the CDS API.

```
import cdsapi

c = cdsapi.Client()

c.retrieve(
    'seasonal-original-single-levels',
    {
        'originating_centre':'dwd',
        'system':'2',
        'variable':'2m_temperature',
        'year':'2015',
        'month':'08',
        'day':'01',
        'format':'grib',
        'leadtime_hour':[
            '6','12','18',
            '24','30','36',
            '42','48','54',
            '60','66','72',
            '78','84','90',
            '96','102','108',
            '114','120','126',
            '132','138','144',
            '150','156','162'
```

System

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Variable

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(5) (8) 12) (6) (2) (3) (5) (7) (1) (2) (4) (5) (6) 23) 13) 31) (4)

Originating Year Day

Hide API request | Not yet toolbox compatible | Submit Form

ECMWF
DWD

Please go to the documentation page for information as to how to use the CDS API.

```
import cdsapi

c = cdsapi.Client()

c.retrieve(
    'seasonal-original-single-levels',
    {
        'originating_centre':'dwd',
        'system':'2',
```

System

2
5

Seasonal forecast daily data on single levels from 2017 to present	2019-04-01 14:01:26	1:39:44	Queued	☐
Seasonal forecast daily data on single levels from 2017 to present	2019-04-01 14:01:09	1:40:01	Queued	☐
Seasonal forecast daily data on single levels from 2017 to present	2019-04-01 14:00:44	1:40:26	Queued	☐
Seasonal forecast daily data on single levels from 2017 to present	2019-04-01 14:00:25	1:40:46	Queued	☐
Seasonal forecast daily data on single levels from 2017 to present	2019-04-01 14:00:01	1:41:09	In progress	☐

```
            '150', '156', '162'
```

Mean sea

Orograph
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Select all Clear all

Research

UC MG UNIVERSIDAD DE CANTABRIA METEOROLOGY GROUP CSIC

Statistical Downscaling Portal

MOSAICC

http://www.fao.org/climatechange/mosaicc

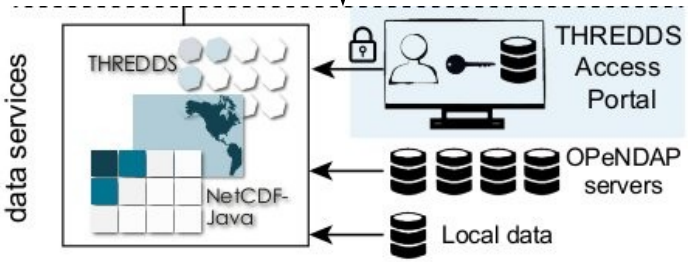
is-enes INFRASTRUCTURE FOR THE EUROPEAN NETWORK FOR EARTH SYSTEM MODELLING *Exploring climate model data*

Home | Data discovery | Downscaling | Documentation | Help | About us

Welcome to IS-ENES Climate4Impact

https://climate4impact.eu

User Data Gateway



ESGF Node

ESGF Earth System Grid Federation

ECLISEA

ERA4CS European Research Area for Climate Services

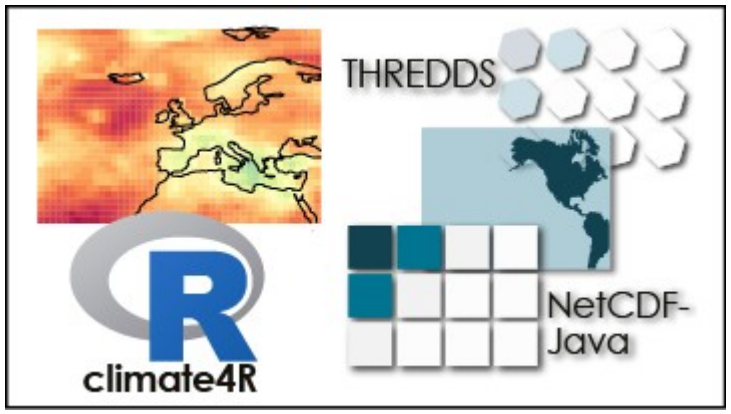
WATER

AfriCultuReS

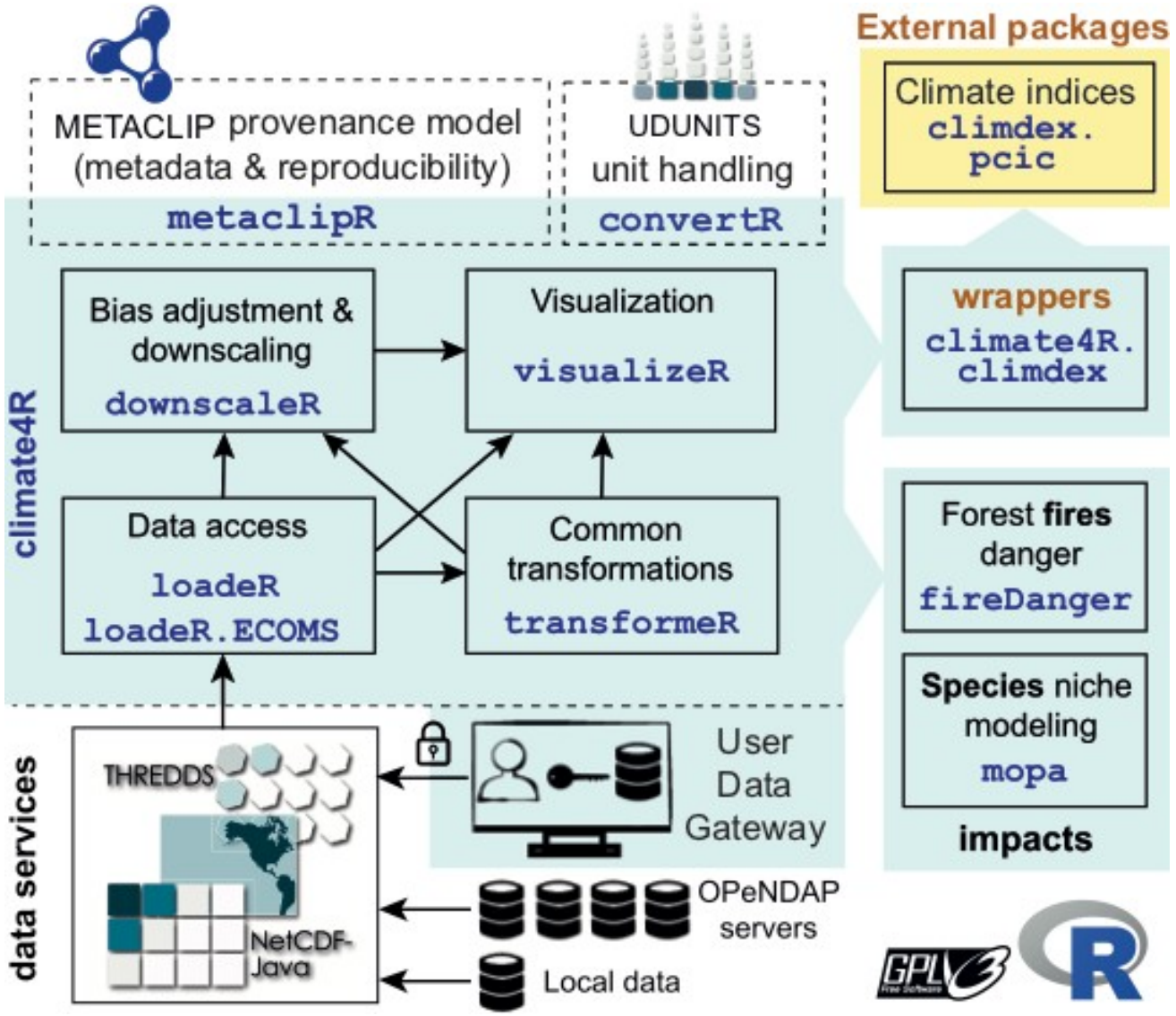
HORIZON 2020

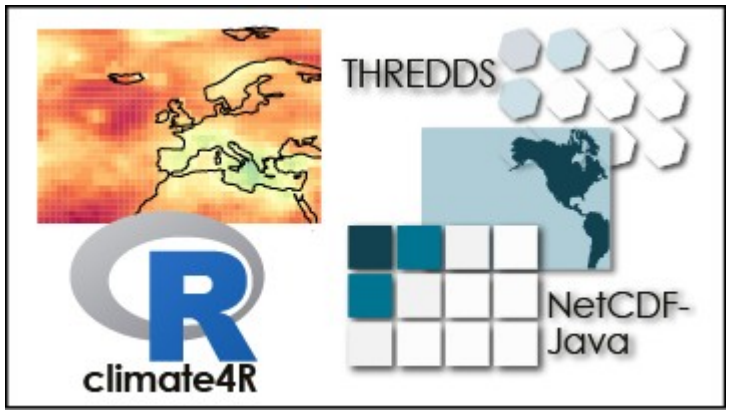
VALUE

cost



UDG: http://meteo.unican.es/udg-tap/home
UDG-Public Data:
http://www.meteo.unican.es/tds5/catalogs/public.html





UDG: http://meteo.unican.es/udg-tap/home
UDG-Public Data:
http://www.meteo.unican.es/tds5/catalogs/public.html

Task: Follow the instructions and complete the registration on the User Data Gateway. All the details are included in the Santander MetGroup Trac: https://meteo.unican.es/trac/wiki/udg