

Climate4Impact v2

Enhance the use of climate research data and methods
climate4impact.eu

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Online platform that combines discovery of climate research data of the Earth System Grid Federation (ESGF), with experimentation workspaces, offering reproducible and sharable environments for climate-impact analysis.



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DAVID MCNEW/REUTERS/GETTY IMAGES

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Aimed at supporting research on predicting and mitigating climate change effects on the whole Earth ecosystem



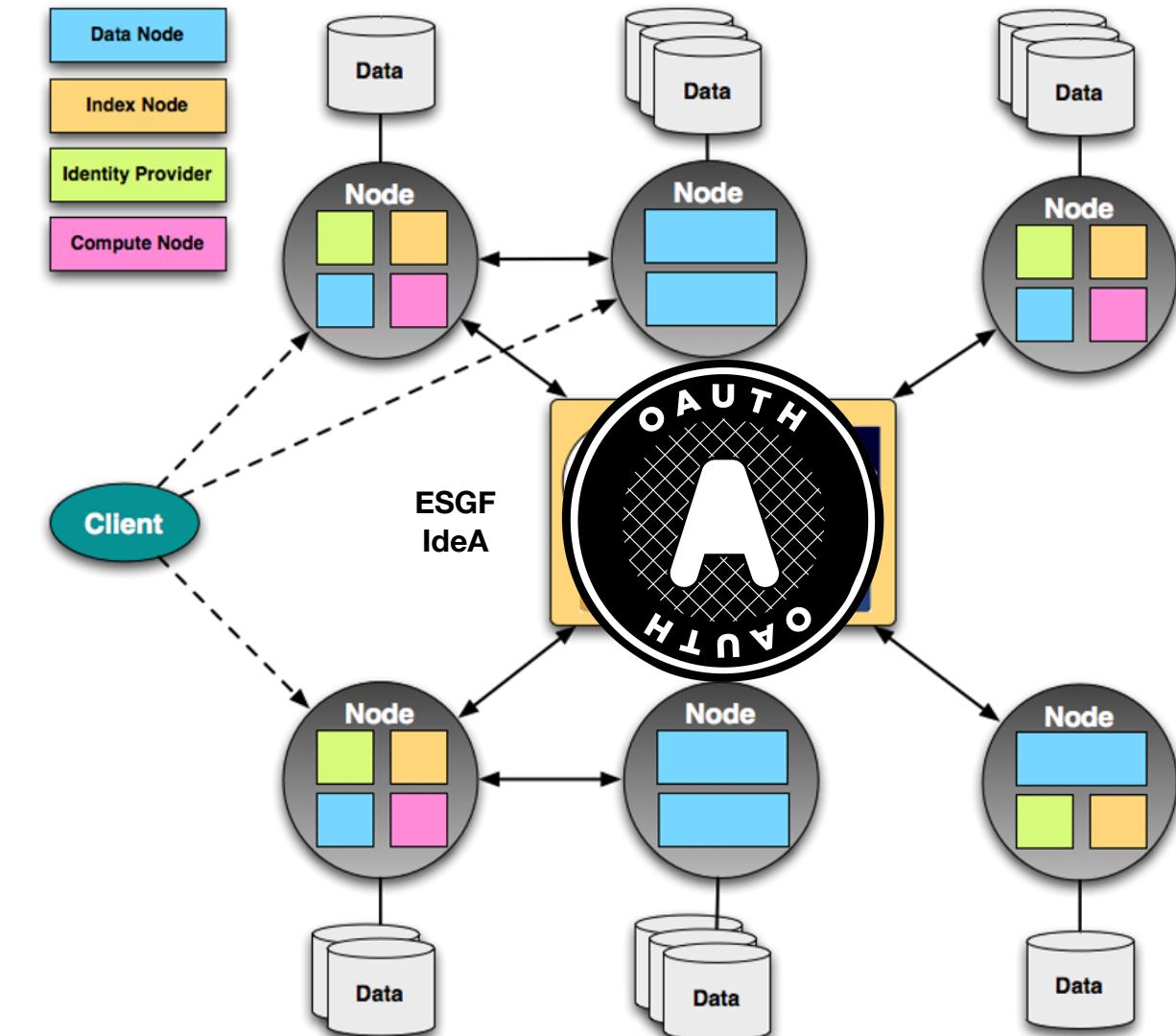


ESGF is a **multinational** effort that manages climate and environmental data.

A network of federated and **standardised data discovery, access and analysis services**.

Data Volume, in the order of tens of PB, is constantly increasing and distributed across different projects, e.g.

- CMIP5-6.. 7 coming up
- CORDEX
- Obs4MIPs

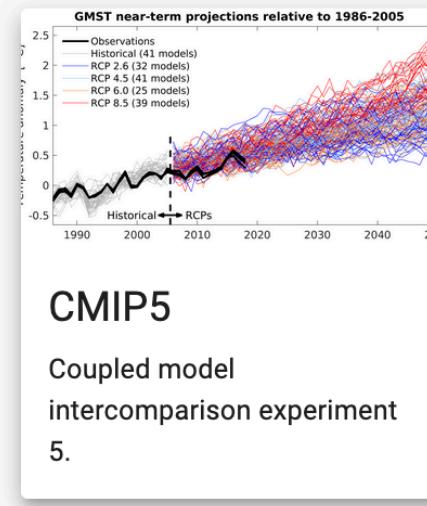
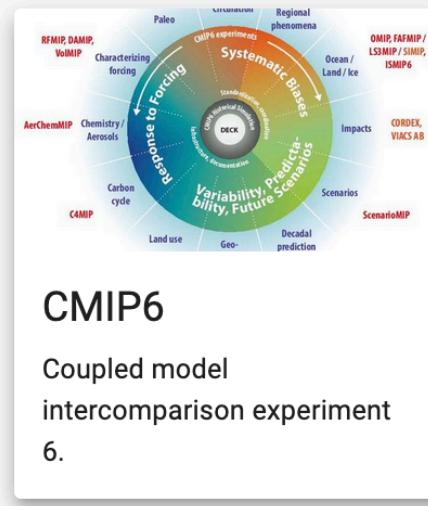


Climate4Impact v2 - Projects

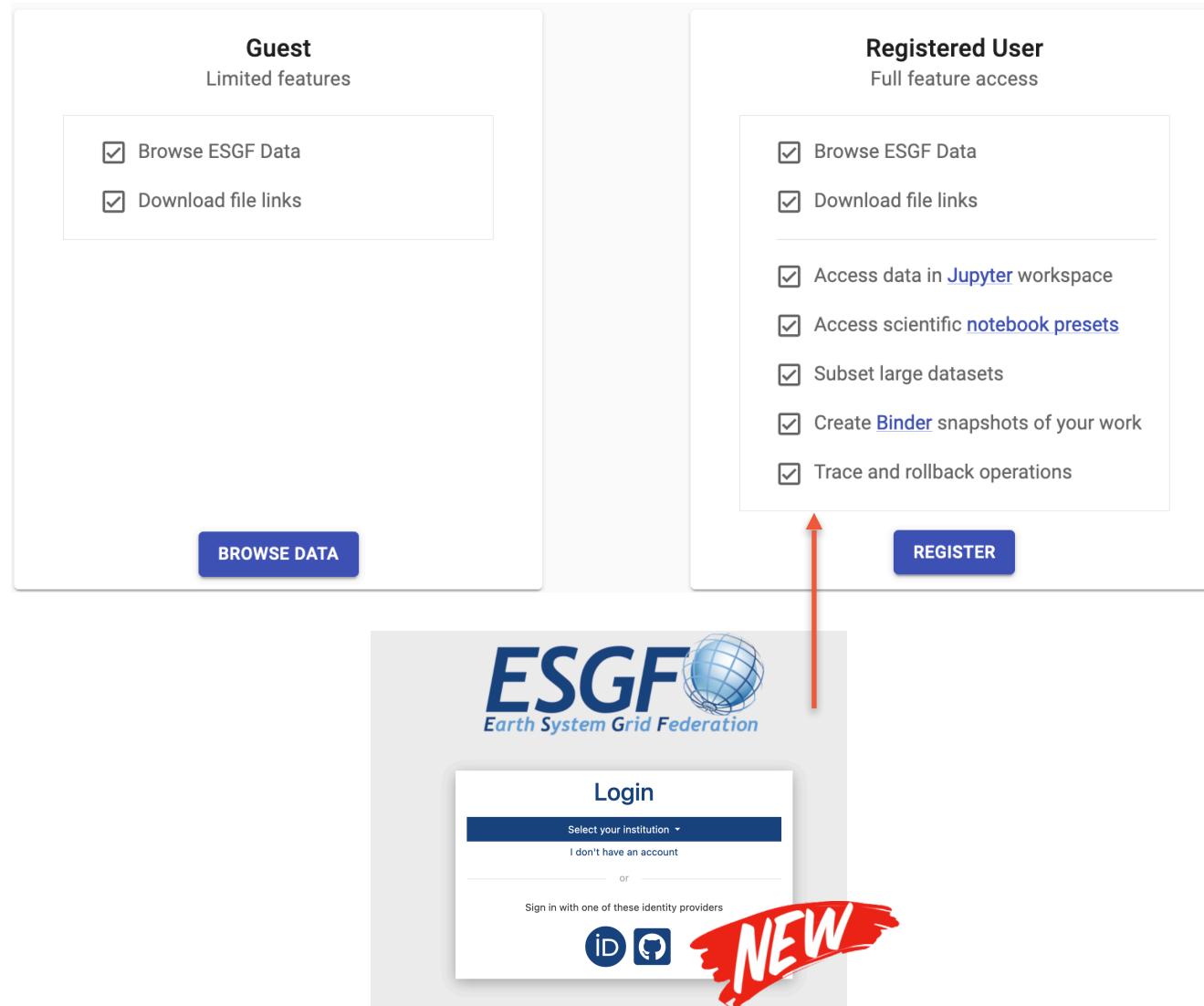


Select a project

You can search the Earth System Grid Federation for various kinds of climate data. Please select the project you are looking for.



Climate4Impact v2 - Profiles and SSO



The screenshot shows the Climate4Impact v2 user interface. It features two main sections: 'Guest' and 'Registered User'. The 'Guest' section is labeled 'Limited features' and includes options to 'Browse ESGF Data' and 'Download file links'. The 'Registered User' section is labeled 'Full feature access' and includes options to 'Browse ESGF Data', 'Download file links', 'Access data in Jupyter workspace', 'Access scientific notebook presets', 'Subset large datasets', 'Create Binder snapshots of your work', and 'Trace and rollback operations'. A red arrow points from the 'REGISTER' button in the Registered User section up towards the ESGF login screen. The ESGF login screen is visible at the bottom, showing fields for 'Select your institution', 'I don't have an account', and 'Sign in with one of these identity providers' (OpenID Connect and GitHub). A red 'NEW' banner is overlaid on the bottom right of the ESGF screen.

Two User Profiles

Guest: Basic Search & Local Download

Registered User: Data Analysis & Subsetting
(soon CORDEX support)

Registration procedure

1 - Send an email to c4i@knmi.nl specifying affiliation and motivation to become a Registered User

2 - Make sure the email is associated with at least one of your GitHub, ORCID, ESGF-CEDA accounts

3 - Once approved, login to C4I via the ESGF SSO

C4I v2 - Search and Nodes



Search Parametrisation made easier

is-enes Exploring climate model data

Home Data Discovery Help Feedback Sign Up

PROJECT: CMIP 6 NODES: ALL SCOPED VIEW

variable:tasmax frequency:day experiment_id:ssp585 source_id:EC-Earth3 member_id:r1i1p1f1 member_id:r2i1p1f1

VARIABLE

FREQUENCY

EXPERIMENT

MODEL

MEMBER

Temperature Precipitation Humidity Wind

- ta - Air temperature (9)
- tas - Temperature (6)
- tasmin - Min. Temperature (6)
- tasmax - Max. Temperature (6)**

- pr - Precipitation (6)
- prsn - Snow (4)
- prc - Convective precipitation (1)

- hurs - Rel. Humidity (6)
- huss - Specific humidity (5)
- rhsmin - Min. Rel. Humidity (-)
- rhs - Rel. Humidity (-)
- hus - Spec. Humidity (7)
- hur - Rel. Humidity (4)

- uas - Eastward wind (6)
- vas - Northward wind (6)
- sfcWind - Wind (5)
- sfcWindmax - Max Wind (4)

Radiation Pressure Evaporation

- rsds - SW Radiation Dn (5)
- rlus - LW Radiation Up (4)
- rsus - SW Radiation Up (2)
- rlds - LW Radiation Dn (2)
- rsdssdiff - Diff. Radiation (-)
- clt - Cloud (2)

- ps - Pressure (-)
- psl - Sea level pressure (6)
- pfull - Pressure (-)

- evpsbl - Act. Evap. (-)
- evpsblpot - Pot. Evap. (-)
- evpsblsoi - Sol Evap. (-)
- evpsbiveg - Canopy Evap. (-)

C4I v2 - Search and Nodes

Search Parametrisation made easier



Data Nodes Selection by Service

Exploring climate model data

Home Data Discovery Help Feedback Sign Up

PROJECT: CMIP 6 NODES: ALL

VARIABLE FREQUENCY EXPERIMENT MODEL MEMBER

variable:tasmax frequency:day experiment_id:ssp585 source_id:EC-Earth3 member_id:r1i1p1f1

Temperature

- ta - Air temperature (9)
- tas - Temperature (6)
- tasmin - Min. Temperature (6)
- tasmax - Max. Temperature (6)

Precipitation

- pr - Precipitation
- prsn - Snow
- prc - Convective precipitation

Radiation

- rsds - SW Radiation Dn (5)
- rlus - LW Radiation Up (4)
- rsus - SW Radiation Up (2)
- rlds - LW Radiation Dn (2)
- rsdssdiff - Diff. Radiation (-)
- clt - Cloud (2)

Pressure

- ps - Pressure
- psl - Surface Pressure
- pfull - Full Pressure

Available ESGF Nodes

Select & enable Rook WPS subsetting

Node	Subsetting Mode
esgf1.dkrz.de	Rook WPS
esgf3.dkrz.de	Rook WPS
aims3.llnl.gov	Not Available
cmip.dess.tsinghua.edu.cn	Not Available
cmip.fio.org.cn	Not Available
cordexesg.dmi.dk	Not Available
crd-esgf-drc.ec.gc.ca	Not Available
data.meteo.unican.es	Not Available
dataserver.nccs.nasa.gov	Not Available
dpesgf03.nccs.nasa.gov	Not Available

OK

ESMValTool in C4I Models' Performance Comparison



is-enes
INFRASTRUCTURE FOR THE EUROPEAN NETWORK
FOR EARTH SYSTEM MODELLING

Exploring climate model data

Home Data Discovery Help Feedback Sign Up

▼ PROJECT: CMIP 6 ▼ NODES: CUSTOM (2)

variable:ta variable:prsn variable:huss frequency:day experiment_id:ssp585 source_id:CanESM5

VARIABLE

FREQUENCY

EXPERIMENT

MODEL

MEMBER

Model

CanESM5 - CanESM5
 MPI-ESM1-2-LR - MPI-ESM1.2-LR
 UKESM1-0-LL - UKESM1.0-N96ORCA1
 CNRM-CM6-1 - CNRM-CM6-1
 MIROC6 - MIROC6
 CNRM-ESM2-1 - CNRM-ESM2-1
 MRI-ESM2-0 - MRI-ESM2.0
 GFDL-CM4 - GFDL-CM4
 HadGEM3-GC31-LL - HadGEM3-GC3.1-N96ORCA1
 MPI-ESM1-2-HR - MPI-ESM1.2-HR
 INM-CM4-8 - INM-CM4-8
 INM-CM5-0 - INM-CM5-0
 ACCESS-CM2 - Australian Community Climate and Earth System Simulator Climate Model
 AWI-CM-1-1-MR - AWI-CM 1.1 MR
 NorESM2-LM - NorESM2-LM (low atmosphere-medium ocean resolution, GHG concentration
 BCC-CSM2-MR - BCC-CSM 2 MR
 CMCC-CM2-SR5 - CMCC-CM2-SR5
 FGOALS-g3 - FGOALS-g3

COMPARE MODEL PERFORMANCE

Climate impact result viewer

This application shows results from CMIP5 and CMIP6 models, calculated with ESMValTool. It is intended to provide some guidance for climate impact researchers, to select one or more datasets that adequately sample the spread of the CMIP ensemble.

- Bias is calculated with respect to the ERA5 reanalysis dataset over the period 1981–2015.
- Future change is calculated for 2036–2065 as compared to 1986–2015.
- Area is set to Europe (lon 0–39°; lat 30–76.25°).
- All data are taken from the RCP/SSP 8.5 scenario

Hold ctrl to pan and zoom, hold alt to select a range (points will be highlighted in both graphs), then hold shift to select multiple points.

Temperature (K)

Projected change (2050 versus 2000)

Bias with respect to ERA5 (1981-2010)

Precipitation (mm/day)

Projected change (2050 versus 2000)

Bias with respect to ERA5 (1981-2010)

Project_project CMIP6 ▾
Selected datasets:
• CNRM-CM6-1
• MIROC6
• CanESM5

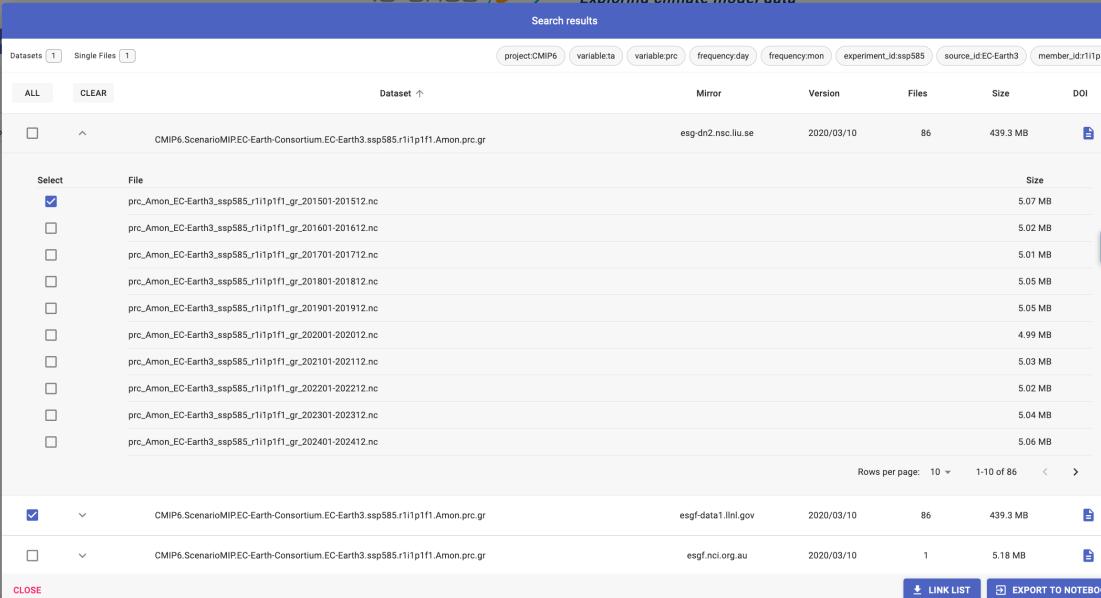
Netherlands eScience Center

[View static recipe output](#)

C4I v2 Local Download



Climate4Impact Search for CMIP5/6
(soon CORDEX) Data
<https://climate4impact.eu>



The screenshot shows a search results page for CMIP6 datasets. The search bar at the top contains the query "project:CMIP6". Below the search bar, there are several filter buttons: variable:ta, variable:prc, frequency:day, frequency:mon, experiment_id:ssp585, source_id:EC-Earth3, and member_id:r1i1p1f1. The main table lists datasets from two mirrors: esgf-dn2.nsc.liu.se and esgf-data1.llnl.gov. The columns in the table are: Dataset, Mirror, Version, Files, Size, and DOI. A blue arrow points from the search results table towards the XML code on the right.

Dataset	Mirror	Version	Files	Size	DOI
CMIP6.ScenarioMIP:EC-Earth-Consortium:EC-Earth3.ssp585.r1i1p1f1.Amon.prc.gr	esgf-dn2.nsc.liu.se	2020/03/10	86	439.3 MB	DOI
prc_Amon_EC-Earth3_ssp585_r1i1p1f1_gr_201501-201512.nc				5.07 MB	
prc_Amon_EC-Earth3_ssp585_r1i1p1f1_gr_201601-201612.nc				5.02 MB	
prc_Amon_EC-Earth3_ssp585_r1i1p1f1_gr_201701-201712.nc				5.01 MB	
prc_Amon_EC-Earth3_ssp585_r1i1p1f1_gr_201801-201812.nc				5.05 MB	
prc_Amon_EC-Earth3_ssp585_r1i1p1f1_gr_201901-201912.nc				5.05 MB	
prc_Amon_EC-Earth3_ssp585_r1i1p1f1_gr_202001-202012.nc				4.99 MB	
prc_Amon_EC-Earth3_ssp585_r1i1p1f1_gr_202101-202112.nc				5.03 MB	
prc_Amon_EC-Earth3_ssp585_r1i1p1f1_gr_202201-202212.nc				5.02 MB	
prc_Amon_EC-Earth3_ssp585_r1i1p1f1_gr_202301-202312.nc				5.04 MB	
prc_Amon_EC-Earth3_ssp585_r1i1p1f1_gr_202401-202412.nc				5.06 MB	
CMIP6.ScenarioMIP:EC-Earth-Consortium:EC-Earth3.ssp585.r1i1p1f1.Amon.prc.gr	esgf-data1.llnl.gov	2020/03/10	86	439.3 MB	DOI
CMIP6.ScenarioMIP:EC-Earth-Consortium:EC-Earth3.ssp585.r1i1p1f1.Amon.prc.gr	esgf-nic.org.au	2020/03/10	1	5.18 MB	DOI

Local Download via Metalink
<https://en.wikipedia.org/wiki/Metalink>

```

1 <metalink xmlns="urn:ietf:params:xml:ns:metalink">
2   <file name="tasmin_day_EC-Earth3_ssp585_r1i1p1f1_gr_20150101-20151231.nc">
3     <size>140066295</size>
4     <hash type="SHA256">6c54d27ecc06771fd0f593bba68df5cde31e1440581499142952088ae126213e</hash>
5     <url priority="1">http://esgf3.dkrz.de/thredds/fileServer/cmip6/ScenarioMIP/EC-Earth-Consortium/EC-Earth3\_ssp585\_r1i1p1f1\_gr\_201501-201512/tasmin/day/tasmin\_day\_EC-Earth3\_ssp585\_r1i1p1f1\_gr\_20150101-20151231.nc</url>
6   </file>
7
8   <file name="tasmin_day_EC-Earth3_ssp585_r1i1p1f1_gr_20160101-20161231.nc">
9     <size>140536230</size>
10    <hash type="SHA256">eb19230d74844f4b122ef144a51b8805c569f1f66e934824c8659bdb09c0a2d</hash>
11    <url priority="1">http://esgf3.dkrz.de/thredds/fileServer/cmip6/ScenarioMIP/EC-Earth-Consortium/EC-Earth3\_ssp585\_r1i1p1f1\_gr\_201601-201612/tasmin/day/tasmin\_day\_EC-Earth3\_ssp585\_r1i1p1f1\_gr\_20160101-20161231.nc</url>
12   </file>
13
14   <file name="tasmin_day_EC-Earth3_ssp585_r1i1p1f1_gr_20170101-20171231.nc">
15     <size>140142064</size>
16     <hash type="SHA256">46420a196bd05aea989966bb49137ad0be93c784fef9aa3f64b815eb31984ed9</hash>
17     <url priority="1">http://esgf3.dkrz.de/thredds/fileServer/cmip6/ScenarioMIP/EC-Earth-Consortium/EC-Earth3\_ssp585\_r1i1p1f1\_gr\_201701-201712/tasmin/day/tasmin\_day\_EC-Earth3\_ssp585\_r1i1p1f1\_gr\_20170101-20171231.nc</url>
18   </file>
19
20 </metalink>
```

- Scriptable (WGET/cURL)

C4I v2 Workflows and Workspaces



*Only for registered and validated accounts!
Cost-effective and secure*

Full Data Staging...

8

...Subsetting onto personal workspaces

Workspaces offer very large storage

Full Data staging allows 3GB per request
(prevents timeout, given the occasional high load on the nodes)

The remote subsetting option, where available, helps reducing the requested data based on user's needs

C4I v2 Workflows and Workspaces



*Only for registered and validated accounts!
Cost-effective and secure*

Full Data Staging...

The screenshot shows a search results page with two entries. The first entry is 'CMIP6.ScenarioMPIDKRZ.MPI-ESM1-2-HR.ssp585.r1i1p1f1.day.tasmax.gn' from 'esgf3.dkrz.de' on 2019/07/10, containing 18 files (3.77 GB total). The second entry is 'CMIP6.ScenarioMPIDKRZ.MPI-ESM1-2-HR.ssp585.r1i1p1f1.Amon.tasmax.gn' from 'esgf3.dkrz.de' on 2019/07/10, containing 18 files (121.94 MB total). A modal dialog titled 'Resume Notebook' is open, stating 'Link collection ready (limited to 500 datasets). Found 0 datasets containing 0 file links and 6 single file(s.)'. It also contains a note about data usage and performance, and buttons for 'NEW NOTEBOOK' and 'RESUME NOTEBOOK'.

...Subsetting onto personal workspaces

The screenshot shows a map of Europe and North Africa with a red rectangular subset box. The box covers parts of France, Spain, Portugal, Italy, and Morocco. A sidebar on the left lists various locations. At the bottom, there are coordinate inputs and buttons for 'CLOSE', 'Hide Coordinates', 'Box', 'Map', 'Center', 'Zoom', and 'Coordinate Format'.

&

Workspaces offer very large storage

Full Data staging allows 3GB per request
(prevents timeout, given the occasional high load on the nodes)

The remote subsetting option, where available, helps reducing the requested data based on user's needs

C4I v2 Workflows and Workspaces



*Only for registered and validated accounts!
Cost-effective and secure*

Full Data Staging...

Search results

Dataset	Mirror (Node)	Version	Files	Size	Doc
CMIP6.ScenarioMPIDKRZ.MPI-ESM1-2-HR.ssp585.r1i1p1f1.day.tasmax.gn	esgf3.dkrz.de	2019/07/10	18	3.77 GB	

Resume Notebook

Link collection ready (limited to 500 datasets). Found 0 datasets containing 0 file links and 6 single file(s).

- Existing notebook found (<https://swirrl.climate4impact.eu/swirrl/jupyter/38a6f3fc-b689-4e5a-9fee-ce47e0576307token:4a4efb9798d8c50512bb2da7ea5a7ad6f5f57c58168d66>) current data usage: 6.42 GB.
- You have selected 1.32 GB of data. Some ESGF nodes perform worse than others and even the more performant ones can experience downtime occasionally. This means that your workflow can time out. If this occurs, we advise you to split your workflow up into smaller parts or to try a different node.

RESUME NOTEBOOK

...Subsetting onto personal workspaces

&

C4I_Summer_days_Calculate X

```
plt.suptitle("Two Time Steps of Summer Days", y=1.03)
plt.show()
```

Two Time Steps of Summer Days

time = 2018-07-16

time = 2019-07-16

Latitude (degrees,north)

Longitude (degrees,east)

Summer days (number of days with minimum temperature > 20 degrees Celsius)

13: # Set spatial extent and centre
central_lat = 47.0
central_lon = 1.0
extent = [-30, 30, 30, 56] # Western Europe

Calculate time average
su_avg = su.mean(dim='time', keep_attrs=True)

Set plot projection

Workspaces offer very large storage

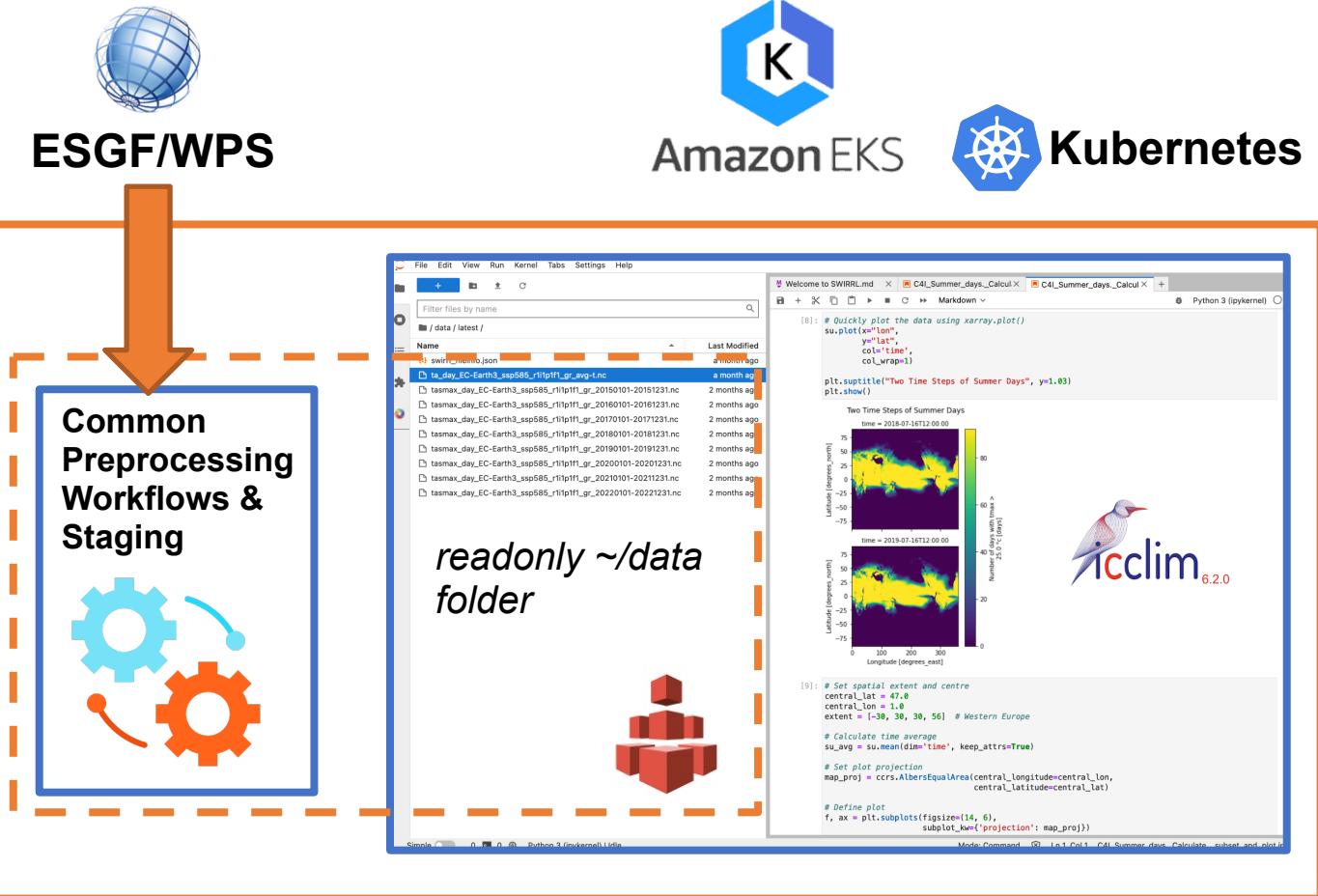
Full Data staging allows 3GB per request
(prevents timeout, given the occasional high load on the nodes)

The remote subsetting option, where available, helps reducing the requested data based on user's needs

SWIRRL - VRE API



Manage **data-driven collaborative workspaces**, combining reproducible **Notebooks, Workflows and Visualisation tools** on the Cloud



SWIRRL

https://doi.org/10.1162/dint_a_00129
<https://gitlab.com/KNMI-OSS/swirrl>

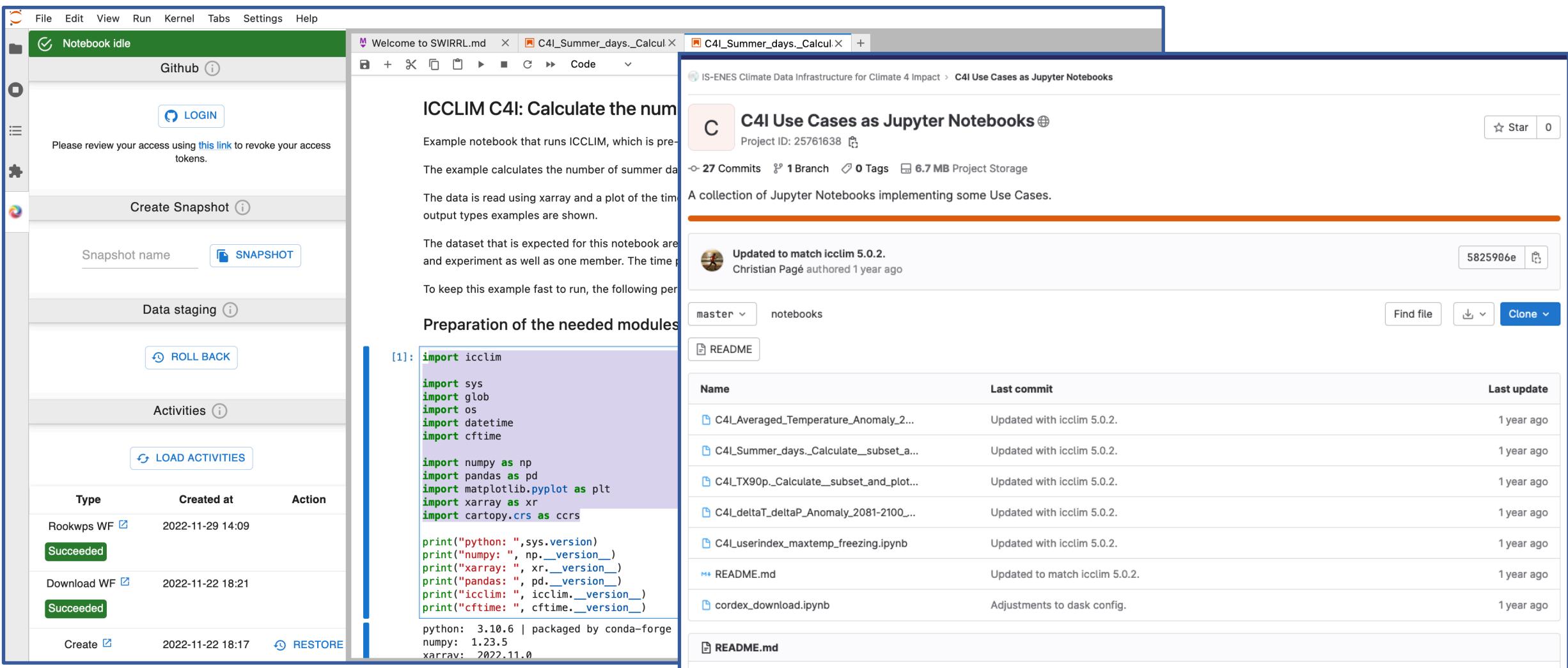


AWS Fargate

icclim sample notebooks



<https://gitlab.com/is-enes-cdi-c4i/notebooks>



The screenshot shows a Jupyter Notebook interface with two tabs open: "Welcome to SWIRRL.md" and "C4I_Summer_days_Calcul...". The "C4I_Summer_days_Calcul..." tab contains a Jupyter Notebook titled "ICCLIM C4I: Calculate the number of summer days". The notebook includes a description of the task, code for importing modules like icclim, numpy, pandas, matplotlib, xarray, and cartopy, and a print statement showing the Python and package versions. The output cell shows the results: python: 3.10.6 | packaged by conda-forge, numpy: 1.23.5, and xarray: 2022.11.0.

On the right, there is a GitLab project page for "C4I Use Cases as Jupyter Notebooks" (Project ID: 25761638). The page shows 27 commits, 1 branch, 0 tags, and 6.7 MB of project storage. It describes a collection of Jupyter Notebooks implementing some Use Cases. A recent commit by Christian Page is highlighted, noting it was updated to match icclim 5.0.2. The page also lists other notebooks such as C4I_Averaged_Temperature_Anomaly.ipynb, C4I_Summer_days_Calculate_subset_and_plot.ipynb, and C4I_TX90p_Calculate_subset_and_plot.ipynb, all last updated a year ago.

Reproducibility Controls



Workflow Monitoring



GitHub Authentication



Snapshot Controls

Data Staging Rollback



Activities History
and Provenance

The screenshot illustrates the Jupyter Notebook interface with various tools for reproducibility:

- GitHub Authentication:** Shows a GitHub session with a user profile picture and a "SWITCH USER" button.
- Snapshot Controls:** Allows creating a snapshot with a "SNAPSHOT" button.
- Data Staging Rollback:** Features a "ROLL BACK" button highlighted by a red circle.
- Activities History and Provenance:** Shows a history of library updates, workflow runs, and file operations, each with a "RESTORE" button highlighted by a red circle.
- Notebook Content:** Displays Python code for time subsetting and plotting, resulting in two heatmaps showing the number of days with tmax > 25.0 °C over a geographic area from -75 to 75 degrees north and 0 to 300 degrees east.

Users create intermediate and shareable snapshots on GitHub, Binders, compatible with <https://mybinder.org/>

Rollback workflows and Restore environments to a previous state

Reproducibility Controls



File Edit View Run Kernel Tabs Settings Help

SWIRRL

Notebook idle

Github [\(i\)](#)

[LOGIN](#)

Please review your access using [this link](#) to revoke your access tokens.

Create Snapshot [\(i\)](#)

Snapshot name [SNAPSHOT](#)

Data staging [\(i\)](#)

[ROLL BACK](#)

Activities [\(i\)](#)

[LOAD ACTIVITIES](#)

Type	Created at	Action
Rookwps WF	2022-11-29 14:09	Succeeded
Download WF	2022-11-22 18:21	Succeeded
Create	2022-11-22 18:17	RESTORE

M Welcome to SWIRRL.md x C4I_Summer_days_Calcul x C4I_Summer_days_Calcul x + Python 3 (ipykernel) |

```
[8]: # Quickly plot the data using xarray.plot()
su.plot(x="lon",
         y="lat",
         col="time",
         col_wrap=1)

plt.suptitle("Two Time Steps of Summer Days", y=1.03)
plt.show()
```

Two Time Steps of Summer Days

[9]: # Set spatial extent and centre
central_lat = 47.0
central_lon = 1.0
extent = [-30, 30, 30, 56] # Western Europe

Calculate time average
su_avg = su.mean(dim='time', keep_attrs=True)

Set plot projection
map_proj = ccrs.AlbersEqualArea(central_longitude=central_lon,
 central_latitude=central_lat)

Define plot
f, ax = plt.subplots(figsize=(14, 6),
 subplot_kw={'projection': map_proj})

W3C PROV

```

  "prov:used": [...],
  "provone:hadPart": [
    {
      "prov:wasAssociatedWith": [...],
      "@type": [
        "Resource",
        "prov:Activity",
        "provone:Execution"
      ],
      "rdfs:label": "orchestrate",
      "prov:startedAtTime": "2022-11-29T14:13:02Z",
      "@id": "urn:roocs:orchestrate_16ca3e1f-fee6-4419-a264-65d273a801bf",
      "prov:endedAtTime": "2022-11-29T14:13:45Z"
    },
    {
      "prov:wasAssociatedWith": [
        ...
      ],
      "prov:wasActivityOfInfluence": [...],
      "@type": [
        "Resource",
        "prov:Activity",
        "provone:Execution"
      ],
      "rdfs:label": "average_ta_1",
      "roocs:apply_fixes": false,
      "@id": "urn:roocs:average_ta_1_6eabac6b-444e-4e9a-a71b-bcc1b16b9fb1",
      "roocs:dims": "time"
    },
    ...
  ],
  "@type": [...],
  "@context": {...},
  "prov:generated": [...],
  "swirrl:sessionId": "13abfb95-fd4a-463f-ba61-fc96d40a9b6c",
  "swirrl:message": "Succeeded",
  "prov:wasAssociatedWith": [...],
  "@id": "urn:uuid:49f0d7f5-5cc8-4893-8e17-2a18ed870540",
  "swirrl:jobId": "49f0d7f5-5cc8-4893-8e17-2a18ed870540",
  "prov:endedAtTime": "2022-11-29T13:13:54.220Z",
  "prov:atLocation": "POST /workflow/rookwps/run/",
  "prov:startedAtTime": "2022-11-29T13:09:03.676Z"
]
  
```

automated provenance management and data-versioning, fostering traceability and reproducibility.

Help Material and Feedback Form





Exploring climate model data

[Home](#) [Data Discovery](#) [Help](#) [Feedback](#) [Register](#)

 0000-0002-0077-8491

How do I search for data?

In the **Data Discovery Page** you select the project you want to access the data from (CMIP6 - CMIP5 - CORDEX).

Once you have selected the project, the portal will display a page where you can compose queries interactively by combining different properties. These are shown in separated tabs on the top of the page (*variable, frequency, experiment, model, member*) and can be configured in any order.

When configuring a specific property, to facilitate identifying the most relevant options, a subset of the possible values is presented, grouped by different topics. This is the *Scoped* view. This presentation mode can be changed by switching the knob at the top left of the screen, from *Scoped* to *Extended*. The *Extended* presentation mode will display, for each property, all the possible values available for the current query configuration.

In the image above we show that the summary of the current query is always displayed on the top of the screen. Each value can be interactively removed. Adding or removing a property value will always result in the live update of the available choices for each property.

When selecting the Model, by clicking on **Compare Model Performance** at the bottom of the Model panel, users will be prompted with a page showing how the selected models (and the others available) foresee a change on a variable (Temperature/Precipitation) compared to the past. The page is generated by using the [ESMValTool](#) and, in combination with the bias, gives some confidence on the performance.


Exploring climate model data

Climate impact result viewer

This application shows a results from CMIP5 and CMIP6 models, calculated with ESMValTool. It is intended to provide some guidance for climate impact researchers, to select one or more datasets that adequately sample the spread of the CMIP ensembles.

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0000-0002-0077-8491

How do I search for data?

In the **Data Discovery Page** you select the project you want to access the data from.

Once you have selected the project, the portal will display a page where you can search for variables (*variable, frequency, experiment, model, member*) and can be configured in a number of ways:

The screenshot shows the Data Discovery interface for the CMIP-6 project. On the left, there's a sidebar with filters for VARIABLE, FREQUENCY, EXPERIMENT, MODEL, and MEMBER. The main area displays four categories: Temperature, Precipitation, Humidity, and Radiation. Each category has a list of variables with their respective IDs in parentheses. For example, under Temperature, there are entries like 'ta - Air temperature' (166026), 'tsmax - Max. Temperature' (166024), and 'tsmin - Min. Temperature' (166025). Under Radiation, there are entries like 'rads - SW Radiation Dn' (122087) and 'rads - LW Radiation Up' (276812).

When configuring a specific property, to facilitate identifying the most relevant choice, the order of the available choices can be changed by switching the knob at the top left of the screen, from *Scientific Presets* to *Configurable*.

In the image above we show that the summary of the current query is always updated, providing a live update of the available choices for each property.

When selecting the Model, by clicking on **Compare Model Performance** at the bottom of the interface, it is possible to foresee a change on a variable (Temperature/Precipitation) compared to the historical values.

Climate impact result viewer

This application shows a results from CMIP5 and CMIP6 models. It allows researchers, to select one or more datasets that adequately cover the climate impact research needs.

Exploring climate model data

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Data Management: the **/data** folder

Thanks to the support for workflows that perform data-staging operations from remote providers, workspace are populated with the data you are interested in.

SWIRRL manages the data in the **/data** folder, which is accessible from your ***JupyterLab** instance. To make sure that this folder is always consistent and your analysis reproducible, this is set as *'read only'*. However, you can always request to add more data.

/data/latest

Is the data that you have requested already available?

Check your **/data/latest** folder! Here you will find the most updated version the data available for you to use.

Not there yet? Click on the SWIRRL Explorer

In this handy control panel you can check whether there are workflows running in the background. For instance, one might be copying data to your workspace just now.

The screenshot shows the SWIRRL Explorer interface. At the top, there's a header with the SWIRRL logo and a GitHub link. Below it, a message says 'Workflow job running'. A 'LOGIN' button is present. At the bottom, there's a note: 'Please review your access using this link to revoke your access tokens.' There's also a small circular icon with a colorful pattern.

You will read more about the functionalities of SWIRRL Explorer in this short guide!

/data/staginghistory

Each time data is staged to your workspace, SWIRRL keeps track of the changes by maintaining a staging history. You will find this in the **/data/staginghistory** folder.

The screenshot shows a file explorer interface for the /data/staginghistory folder. It lists several files with their names and sizes. A search bar at the bottom is labeled 'Filter files by name' with a magnifying glass icon. The path '/data/staginghistory/' is shown in the address bar.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824084

Help Material and Feedback Form



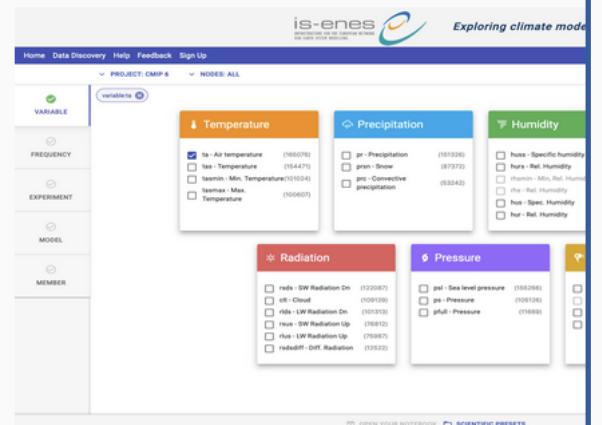
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How do I search for data?

In the **Data Discovery Page** you select the project you want to access the data from.

Once you have selected the project, the portal will display a page where you can search for variables (variable, frequency, experiment, model, member) and can be configured in a number of ways.



When configuring a specific property, to facilitate identifying the most relevant datasets, the search results can be changed by switching the knob at the top left of the screen, from **Scientific Presets** to **Configurable**.

In the image above we show that the summary of the current query is always available, providing a live update of the available choices for each property.

When selecting the Model, by clicking on **Compare Model Performance** at the bottom of the interface, you will foresee a change on a variable (Temperature/Precipitation) compared to the one currently selected.



This application shows a results from CMIP5 and CMIP6 models. It allows researchers, to select one or more datasets that adequately cover the required time period.

Data Management: the /data folder

Thanks to the support for workflows that perform data-staging operations from remote providers, workspace are populated with the data. SWIRRL manages the data in the **/data** folder, which is accessible from your ***JupyterLab** instance. To make sure that this folder is a *'read only'*. However, you can always request to add more data.

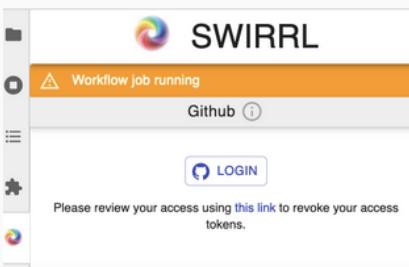
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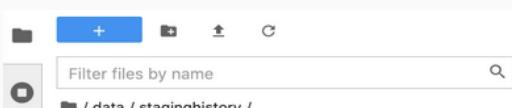


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Filter files by name

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Email *

What is your function? *

This helps us get a better understanding of whom our end users are.

- Climatologist
- Impact Researcher
- Hydrologist
- Geologist
- Altro:

What kind of feedback to you have? *

This helps us organize the feedback we receive.

- Feature Request
- Bug Report

Web Analytics and Computational KPIs



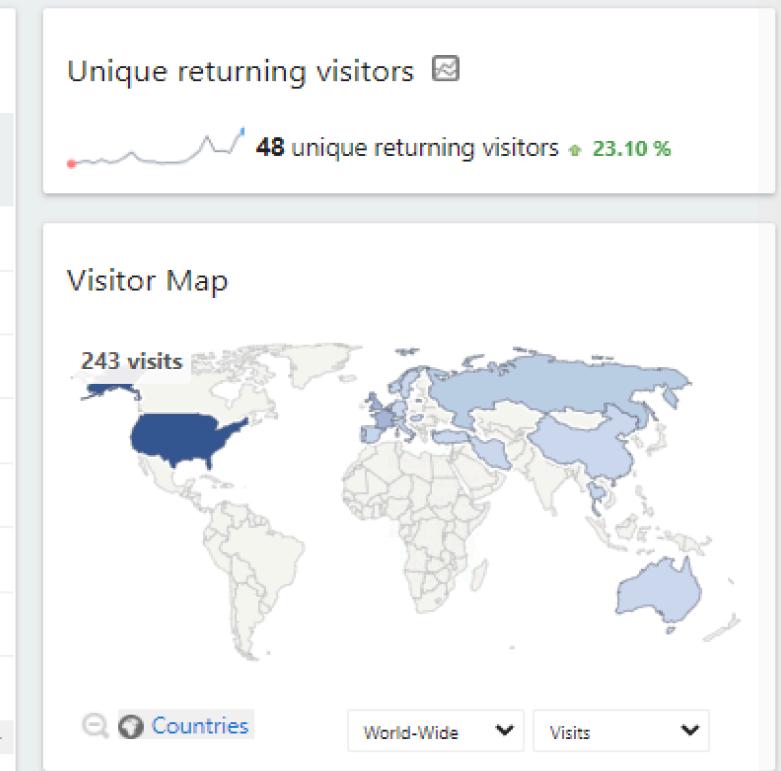
GDPR Compliant Web analytics service (Matomo)



Actions: Event Categories

EVENT CATEGORY	EVENTS	EVENT VALUE
FacetSidebar	710	-
TailoredSearch	171	-
DownloadResultsWindow	85	-
DownloadMetalinkDialog	57	-
SubsetResultsWindow	13	-
OpenNotebook	12	-
ResumeNotebookDownloadDialog	7	-
NewNotebookSubsettingDialog	7	-

Secondary dimension is Event Action.
Switch to Event Name



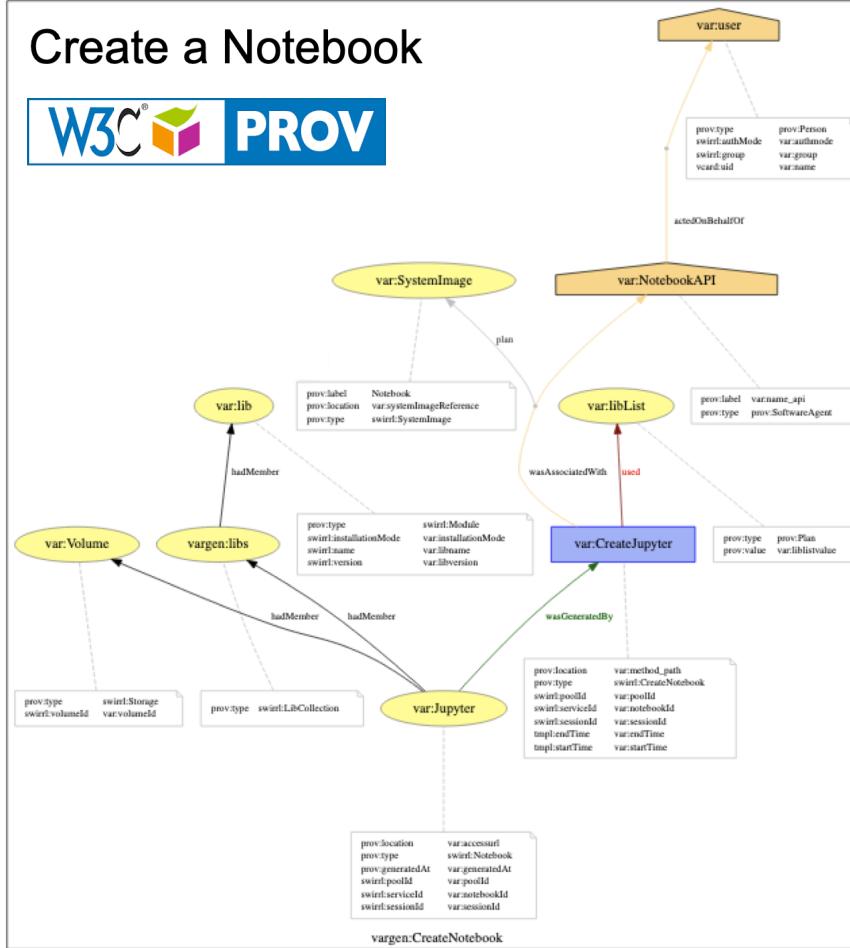
Tracking at Event Level
allows to get useful insights
at a very high granularity.

Web Analytics and Computational KPIs

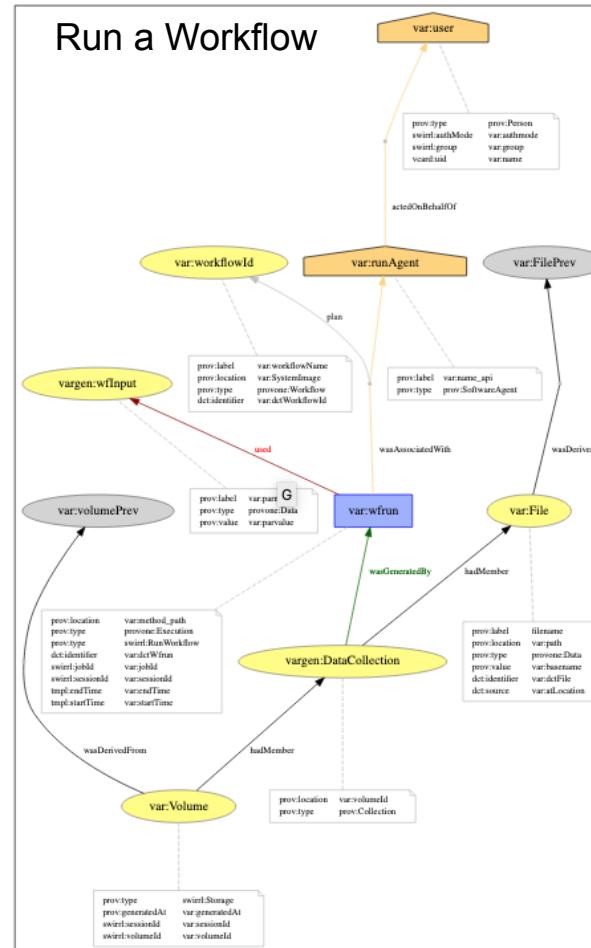


Provenance used to Collect Computational KPIs (examples)

Create a Notebook



Run a Workflow



Notebook stats:

session_count	notebook_count
34	34

Workflow stats:

wf_types	run_count	success %
download	98	82%
rookswps	18	72%

Staged-Data

Total Data Files	Unique Data Fies
1104	949

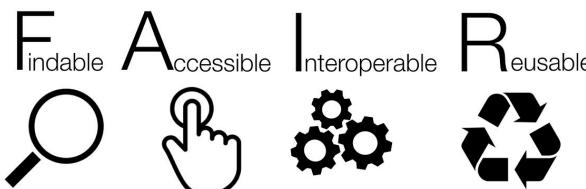
>90 Users Registered via the new ESGF SSO system at CEDA

Climate4Impact v2



Improvements from v1

- **Search Usability**
- **Models Performance Comparison (ESMValTool)**
- **Single Sign On with ESGF**
- **Flexible analysis features (Workspaces with ICCLIM Notebooks, Data Staging & Subsetting Workflows)**
- **Automated reproducibility mechanisms fostering FAIR research**



- **Decoupled Architecture (SWIRRL/SSO/WPS)**

Ongoing and Future work.....



- Access to CORDEX with ESGF SSO supported at more CORDEX nodes (ongoing)
- More ESGF nodes to implement Subsetting WPS (e.g. CMCC coming soon)
- More Notebooks Use Cases using *icclim*
<https://gitlab.com/is-enes-cdi-c4i/notebooks>
- Scientific Guidance produced by experts
- Use SWIRRL to create Collaborative Data Caches
(frequently requested by lecturers for educational purposes)