

Online portals and tools for obtaining, visualizing and processing climate data

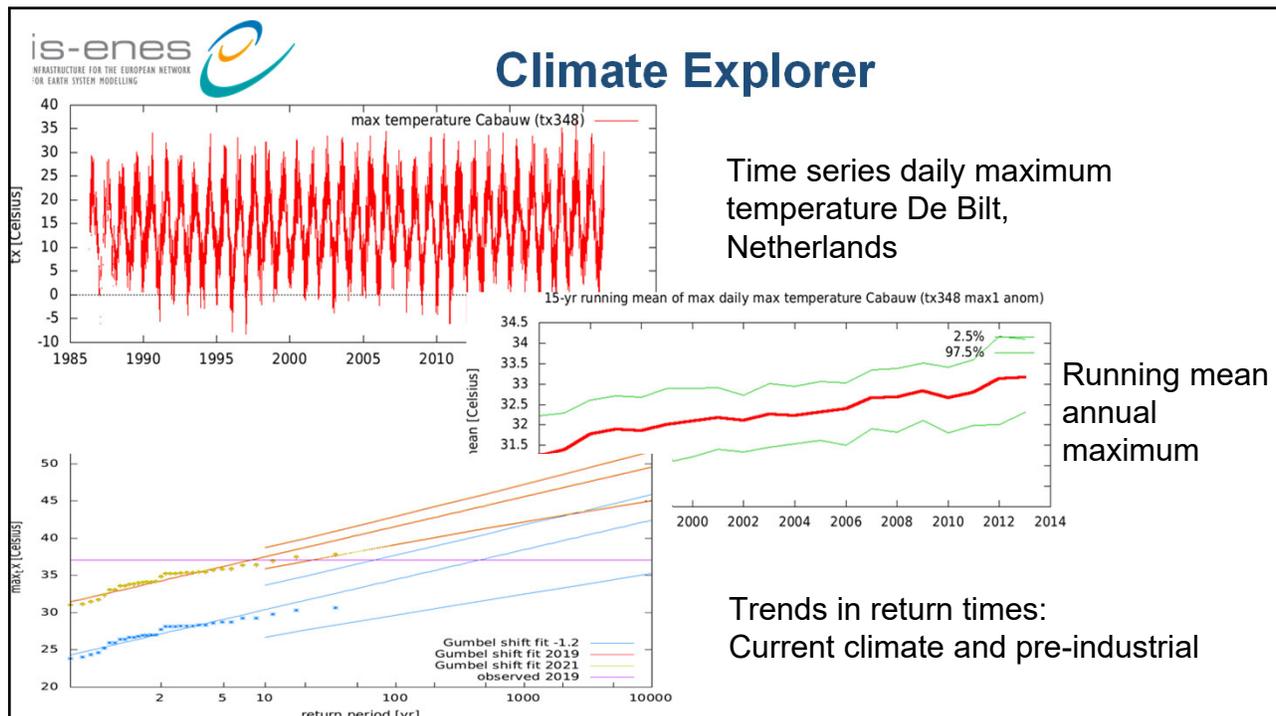
P. Siegmund/ R. Dankers/ C. Page/
J. Bessembinder

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FOR EARTH SYSTEM MODELLING

Climate Explorer

- Developed for climate researchers especially
- Access to observations, re-analysis, climate model data
- Option to upload own datasets
- Many processing options
- Climate change atlas

<https://climexp.knmi.nl/>

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Climate4impact

- Platform for researchers to explore climate data and perform analysis
- Connects to ESGF web services
 - CMIP6, CMIP5, CORDEX, other MIPS
- Web Map Services for visualization
- ICCLIM climate indices calculation, data reduction
- Personal store for processing outcomes
- Upload and store your own data
 - Visualize your own data online
 - Process your own data online

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Climate4impact

Home Data discovery Downscaling Documentation Help About us Account

Search Catalogs Explore your own catalogs or files Map & Plot Processing

Filters ? Help

Project (23) Parameter (1721) Frequency (16) Experiment (177) Domain (30) Model (142) Date Geobox Free text

> show all filters clear all filters

Quick select Parameter All Parameter properties (1721)

Temperature	Precipitation	Humidity	Wind
<input type="checkbox"/> Temperature (tas)	<input type="checkbox"/> Precip. (pr)	<input type="checkbox"/> Specific Humidity (huss)	<input type="checkbox"/> Wind (sfcWind)
<input type="checkbox"/> Min. Temperature (tasmin)	<input type="checkbox"/> Conv. Precip. (prc)	<input type="checkbox"/> Rel. Humidity (hurs)	<input type="checkbox"/> Max. Wind (sfcWindmax)
<input type="checkbox"/> Max. Temperature (tasmax)	<input type="checkbox"/> Snow (prsn)	<input type="checkbox"/> Max. Rel. Humidity	<input type="checkbox"/> E. Wind (uas)
<input type="checkbox"/> Air Temperature (ta)		<input type="checkbox"/> Min. Rel. Humidity (rhsmn)	<input type="checkbox"/> N. Wind (vas)
		<input type="checkbox"/> Rel. Humidity (rhs)	
		<input type="checkbox"/> Spec. Humidity (hus)	
		<input type="checkbox"/> Rel. Humidity (hur)	

Radiation	Pressure	Evaporation
<input type="checkbox"/> SW Radiation Dn (rsds)	<input type="checkbox"/> Pressure (ps)	<input type="checkbox"/> Act. Evap. (evspsbl)
<input type="checkbox"/> SW Radiation Up (rsus)	<input type="checkbox"/> SL Pressure (psl)	<input type="checkbox"/> Pot. Evap. (evspsblpot)
<input type="checkbox"/> LW Radiation Dn (rlds)	<input type="checkbox"/> Pressure (pfull)	<input type="checkbox"/> Soil Evap. (evspsblsoi)
<input type="checkbox"/> LW Radiation Up (rlus)		<input type="checkbox"/> Canopy Evap. (evspsblveg)
<input type="checkbox"/> Diff. Radiation Dn (rdsdscdiff)		
<input type="checkbox"/> Clouds (clt)		

- Filters to select data
- Documentation/ background information
- Processing options

<https://climate4impact.eu/>

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C3S Climate Data Store

Copernicus Climate Change Service (<https://climate.copernicus.eu/>)

- Part of the EU's Copernicus programme
- Aim is to open up data for the benefit of multiple end users
- Key part is the climate data store
- Sectoral information se

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C3S climate Data Store

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

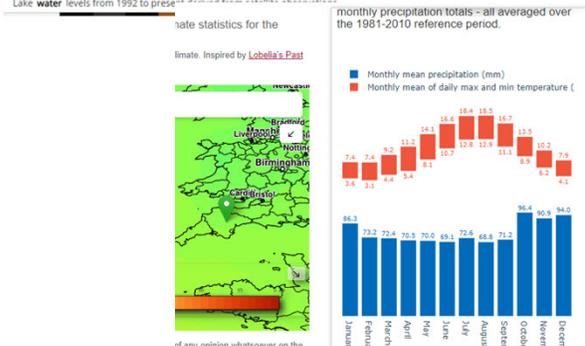
- Access to climate data
- Pre-processed data and indicators
- Toolbox for processing data
- Applications allowing users to explore data in a user-friendly way
- Applications providing sector-specific information

Water quantity indicators for Europe
Water quantity indicators for Europe

Water quality indicators for European rivers
Water quality indicators for European rivers

Water level change indicators for the European coast from 1977 to 2100 derive from climate projections
Water level change indicators for the European coast from 1977 to 2100 derived from climate

Lake water levels from 1992 to present derived from satellite observations
Lake water levels from 1992 to present



Monthly mean precipitation (mm) and Monthly mean of daily max and min temperature (C) for the 1981-2010 reference period.

Month	Monthly mean precipitation (mm)	Monthly mean of daily max and min temperature (C)
January	84.3	7.4
February	73.2	7.4
March	72.4	4.4
April	70.5	4.4
May	70.0	5.4
June	69.1	8.1
July	72.6	11.2
August	68.8	12.8
September	71.1	15.6
October	75.4	15.5
November	70.9	13.7
December	74.0	11.7

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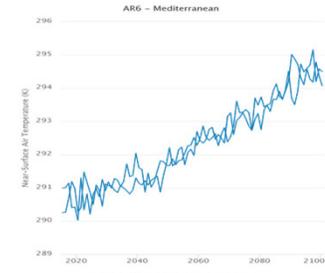


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Other examples

CMIP6 Visualisation Tool
<https://cmip6.science.unimelb.edu.au/>

- “Easy” visualisation of new CMIP6 scenarios
- Download regional averages in text format
- Open source python library

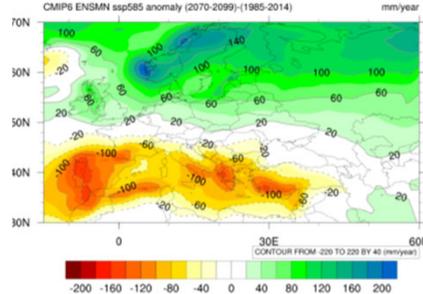


AR6 - Mediterranean

— MPI-ESM1-2-HR ssp585 r311p1f1 gn
— MRI-CGCM3-HR ssp585 r311p1f1 gn

NOAA CMIP6 portal
<https://psl.noaa.gov/ipcc/cmip6/>

- Easy visualization of new CMIP6 model runs
- Precipitation and temperature, annual and per season
- Different time period



CMIP6 ENSMN ssp585 anomaly (2070-2099)-(1985-2014) mm/year

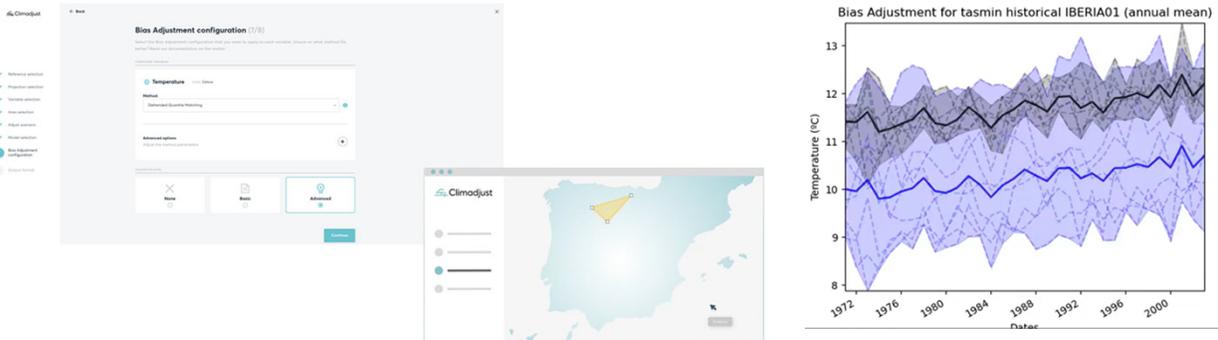
CONTOUR FROM -200 TO 200 BY 40 (mm/year)

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Example bias adjustment

ClimAdjust (<https://climadjust.com>)

- Access to bias-corrected data from trusted sources
- Apply bias correction techniques to your own data
- Paid-for service (limited free data available)



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Some other portals

Portals with Data and Tools

- ECA&D and ICA&D (European/international Climate Assessment Database): <https://www.ecad.eu/>, <https://www.ecad.eu/icad.php> (E-OBS through C3S CDS)
- Climate Data Guide: <https://climatedataguide.ucar.edu/>

Portal with Tools

- Climate Data Tool: <https://iri.columbia.edu/our-expertise/climate/tools/cdt/>

Impact Data

- Impact2C: <https://www.atlas.impact2c.eu/en/>
- ISIMIP project: <https://www.isimip.org/>

National portals

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Climate indices: where to find?

Europe (Observations)

- www.ecad.eu/download/millennium/millennium.php (**ECA&D** - station data)
- surfobs.climate.copernicus.eu/dataaccess/access_eobs.php (**E-OBS** - gridded data)
- www.indecis.eu/data.php (**Indecis**: 125 sector-oriented indices, both data and visuals)

Global (Observations)

- www.climdex.org/ (**Climdex** (HadEX2/3, GHCNDEX))

Teleconnection

- climexp.knmi.nl/selectdailyindex.cgi?id=someone@somewhere (**Climate explorer**)

Projections (model)

- climate4impact.eu/impactportal/general/index.jsp (IS-ENES **Climate4Impact**)

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Climate indices: how to calculate?

Available software (both online and offline):

- IS-ENES **Climate4Impact** climate4impact.eu/impactportal/general/index.jsp
- **CDO** (Climate Data Operators) code.mpimet.mpg.de/projects/cdo/embedded/cdo_eca.pdf
- R-Packages
 - **ClimPact**: climpact-sci.org/
 - **ClimInd**: cran.r-project.org/web/packages/ClimInd/index.html
- Python
 - **icclim** – Index Calculation **CLIM**ate: icclim.readthedocs.io/en/latest/
 - **Drought indices**: pypi.org/project/climate-indices/
- Additional info provided by **Indecis** project: www.indecis.eu/software.php

Parallel course works with CDO and ICCLIM!

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Some thoughts about portals

- A large variety of portals is available
 - Non-homogeneity in available datasets
 - Very different capabilities and interfaces
- May be difficult to know which one is suitable for specific needs and knowledge
 - **Recommendation:** Discussions with experts about which datasets to use for a particular impact study is particularly encouraged and useful
- Guidance/Support may not be available
- Applicability and cautions about datasets and their possible use may not always be obvious
- On-demand remote calculations and subsetting, downloading results is not always possible
- For national, regional and local studies, always seek first for National portals