MISSION CE CLIMATE TRAINING V:

Copernicus platform workshop

April 22th, 2024

Zala Žnidaršič, Phd researcher (zala.znidarsic@bf.uni-lj.si) and

Rok Kuk, Msc Physics student

Interreg CENTRAL EUROPE

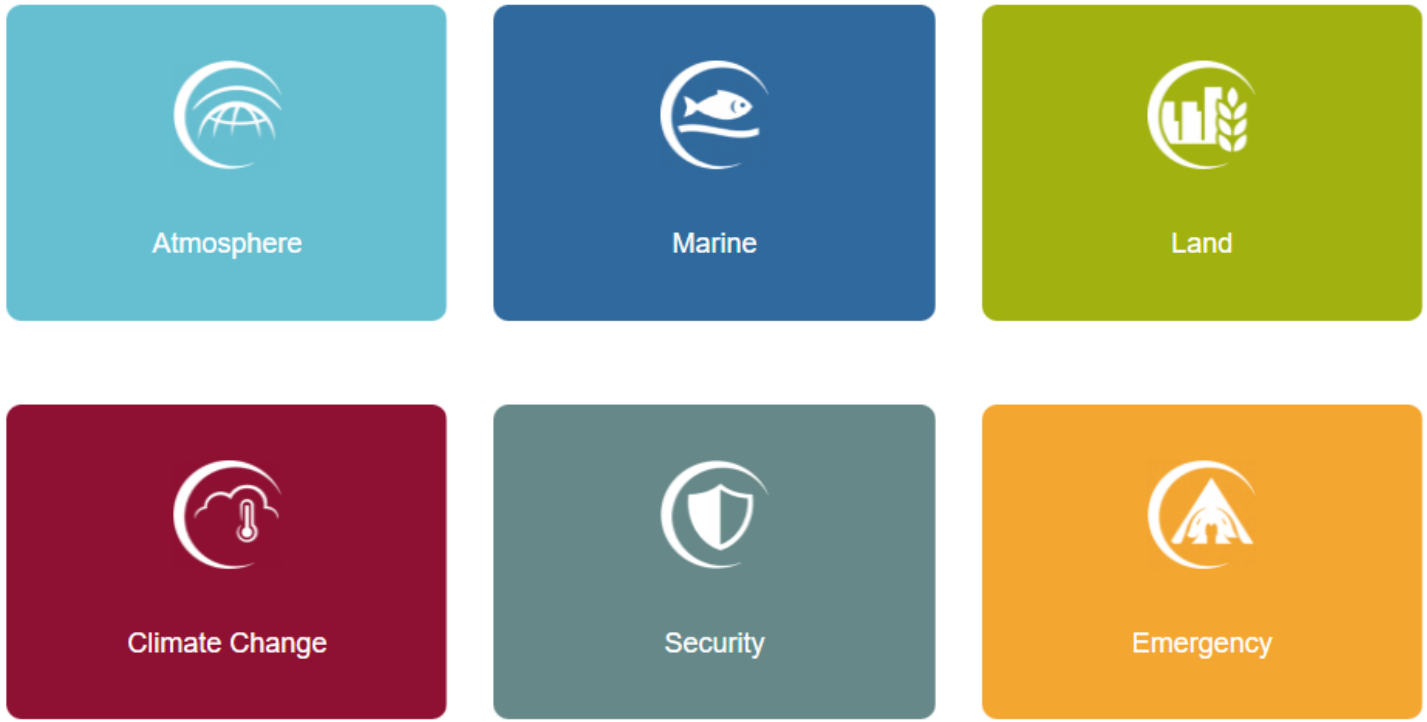
Co-funded by the European Union

MISSION CE CLIMATE

UNIVERSITY OF LJUBLJANA | BF Biotechnical Faculty

Copernicus

- **Copernicus** is the Earth observation component of the European Union's Space programme. It offers information services that draw from **satellite Earth Observation and in-situ (non-space) data.**



Copernicus Services

https://www.copernicus.eu/en/copernicus-services

Copernicus Climate Change Service (C3S)

- observations of the climate system with the latest science to develop authoritative, quality-assured information about the **past**, **current** and **future** states of the climate in Europe and worldwide.

informing

policy development to protect citizens from climate-related hazards such as high-impact weather events

improving

planning of mitigation and adaptation practices for key human and societal activities

promoting

the development of new services for the benefit of society

→ Climate Data Store: https://cds.climate.copernicus.eu/cdsapp#!/home

https://cds.climate.copernicus.eu/about-c3s

Which types of data are available in the CDS?

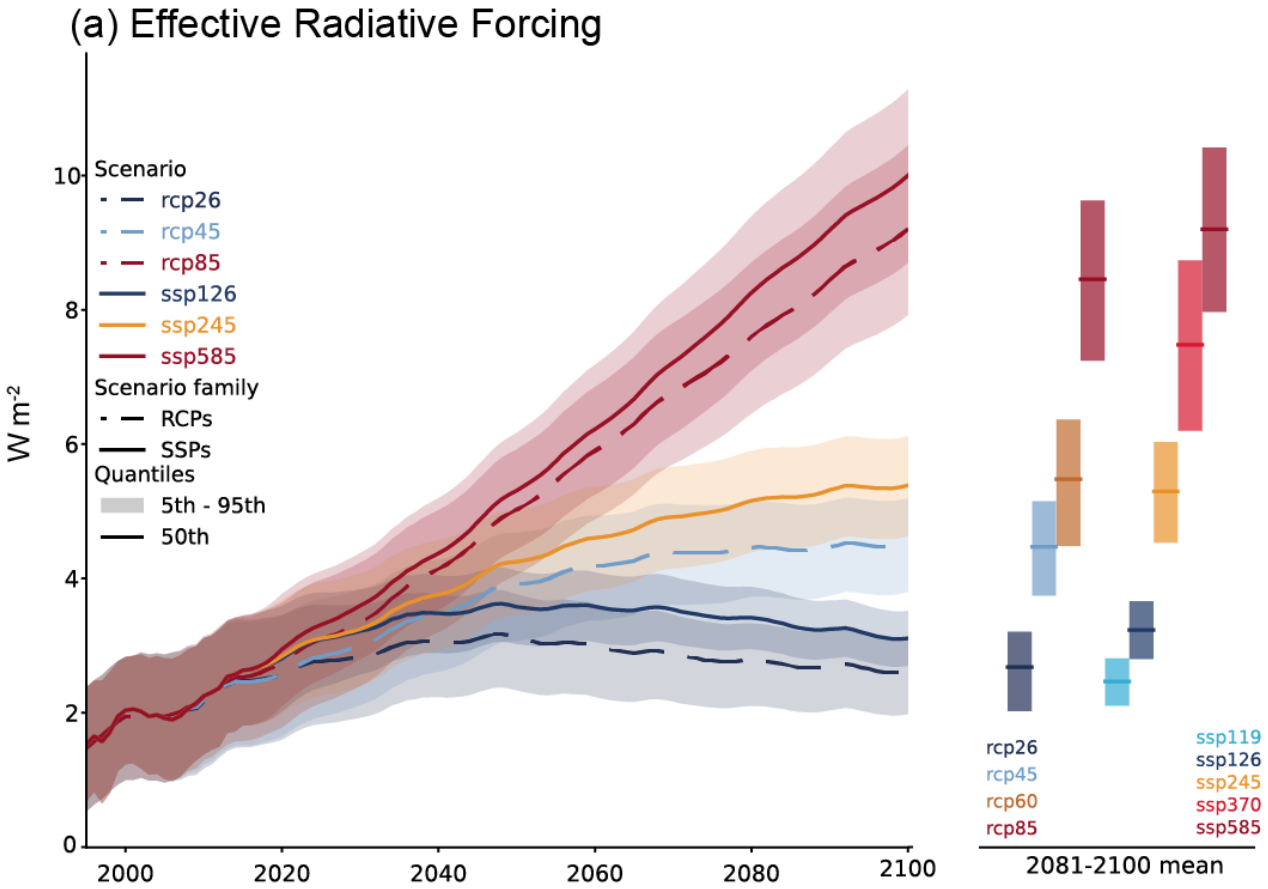
- **In-situ observations**
- **Satellite observations**
- **Reanalysis**: describes the global history of the atmosphere for the periods up to the present day, using a combination of forecast models and data assimilation systems to 'reanalyse' past observations.
- **Climate projections**: simulations of Earth's climate for future decades (typically until 2100) based on assumed 'scenarios' for the concentrations of greenhouse gases, aerosols, and other atmospheric constituents that affect the planet's radiative balance.

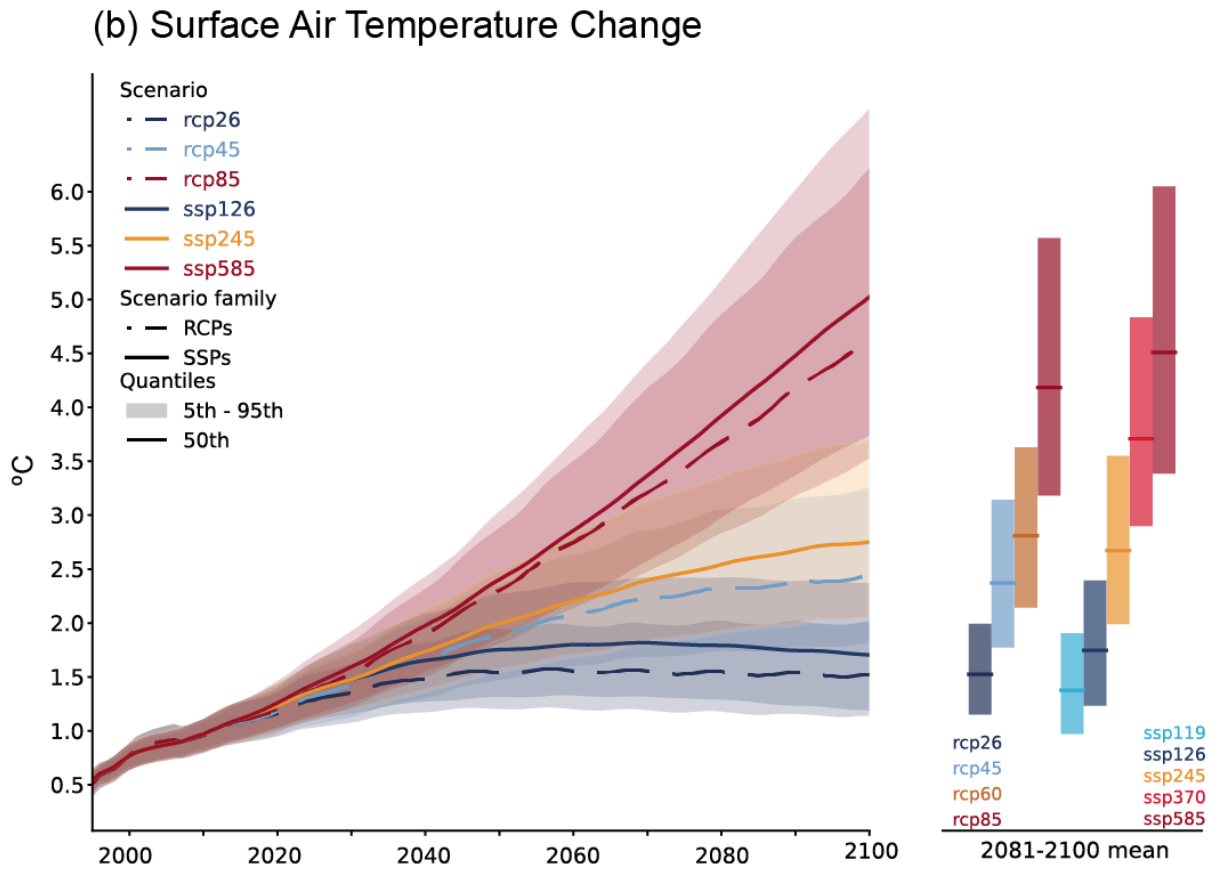
  → Global Climate Models (GCMs) – also known as General Circulation Models

  → Regional Climate Models (RCMs)

https://cds.climate.copernicus.eu/about-c3s

Climate scenarios



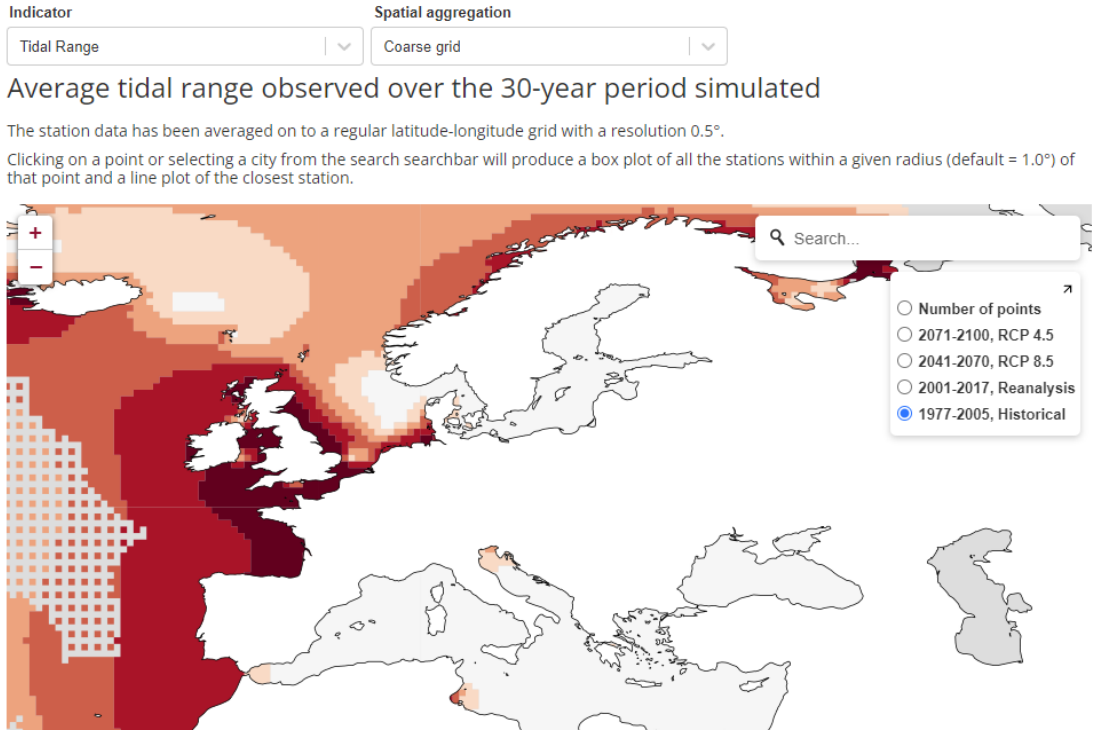


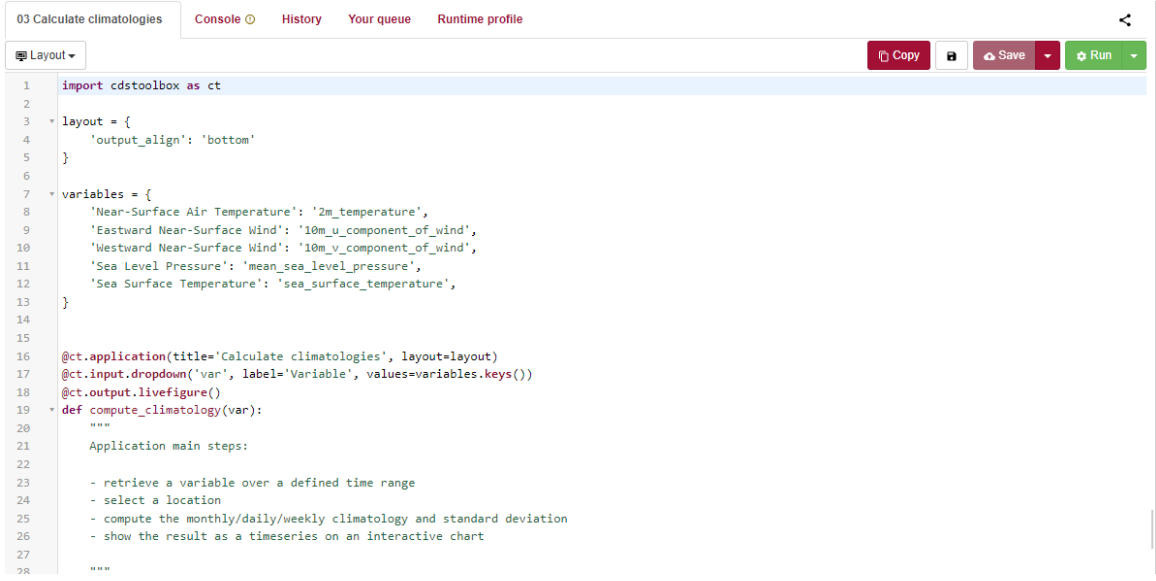
SSP	RCP(s) associated with SSP	End of century CO2 ppm	Description
SSP1	RCP 1.9 RCP 2.6	~390 ---	Sustainability: The world shifts gradually, but pervasively, toward a more sustainable path, emphasizing more inclusive development that respects perceived environmental boundaries.
SSP2	RCP 4.5	---	Middle of the road: The world follows a path in which social, economic, and technological trends do not shift markedly from historical patterns.
SSP3	RCP 7.0	---	Regional rivalry: A resurgent nationalism, concerns about competitiveness and security, and regional conflicts push countries to increasingly focus on domestic or, at most, regional issues.
SSP4	RCP 3.4	---	Inequality: Highly unequal investments in human capital, combined with increasing disparities in economic opportunity and political power, lead to increasing inequalities and stratification both across and within countries.
SSP5	RCP 8.5	~1130	Fossil-fueled development: This world places increasing faith in competitive markets, innovation and participatory societies to produce rapid technological progress and development of human capital as the path to sustainable development. Global markets are increasingly integrated.

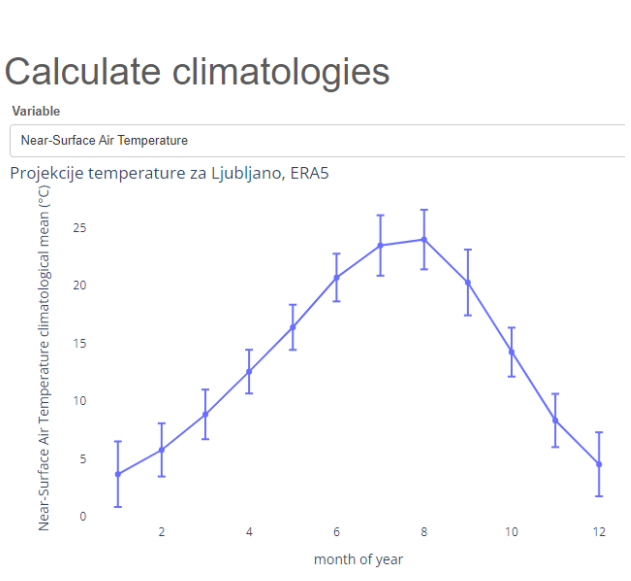
How is data accessible?

1. **Datasets**
2. **Applications –** online visualization of data
3. **Toolbox and Application Program Interface**

(API) – online and offline programmatic access to CDS data

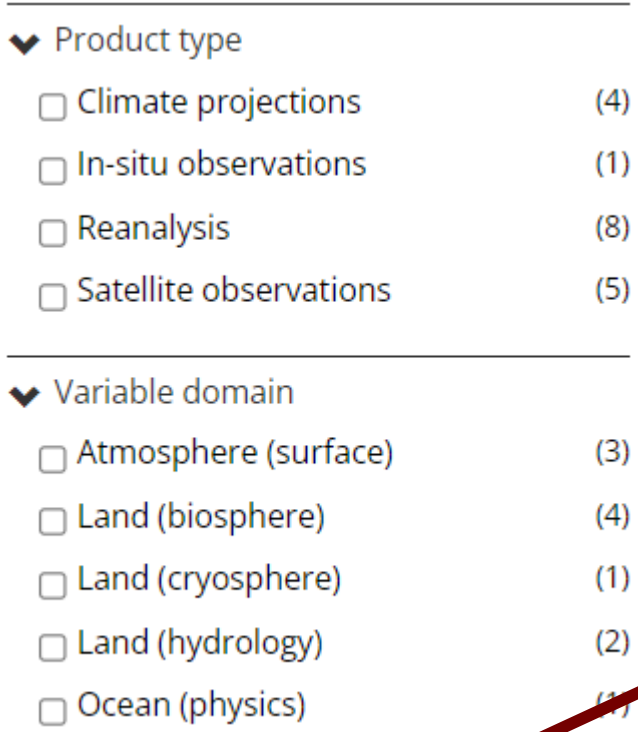


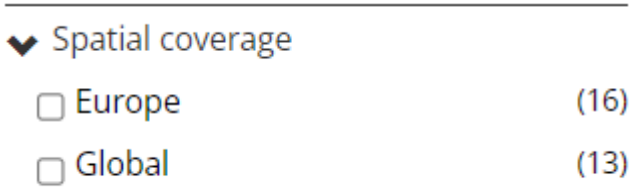


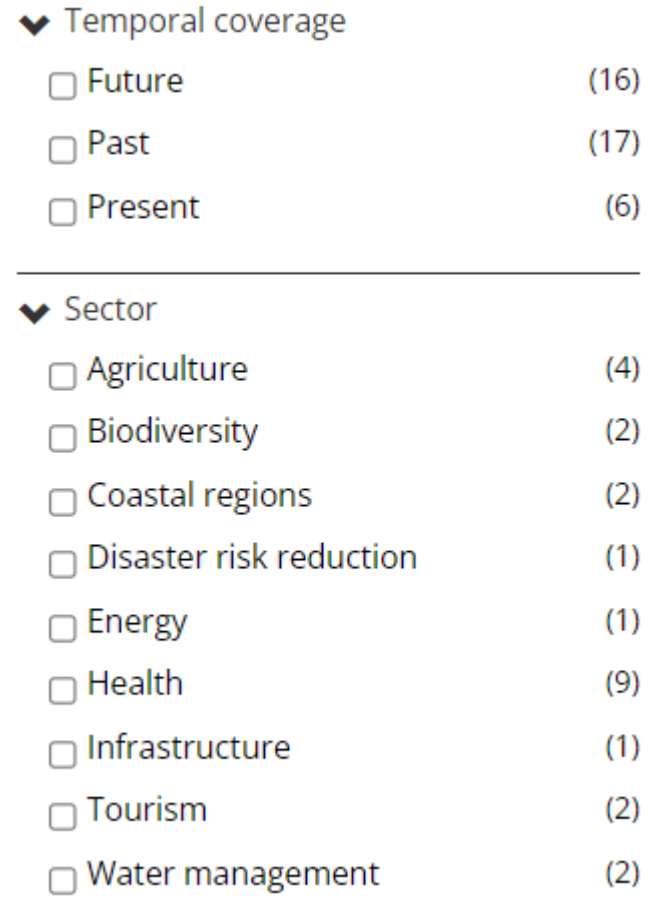


Browsing the CDS

- Product type
- Variable domain
- Spatial coverage
- Temporal coverage
- Sector







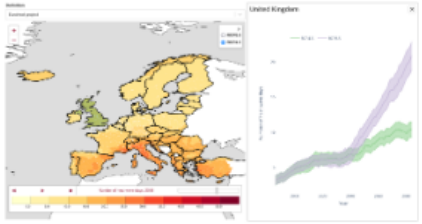
CDS Applications, relevant for **urban areas**:

Heat wave days for European countries derived from climate projections

Application | Health | Europe

This application is an exploratory tool for the Heat waves and cold spells in Europe derived from climate projections, which is based on bias adjusted output from the EURO-CORDEX ensemble of climate models. A heat wave is a prolonged period of high temperature, relative to the region. A number of qualifying definitions of heat waves are used in the climate and health communities. This application,...

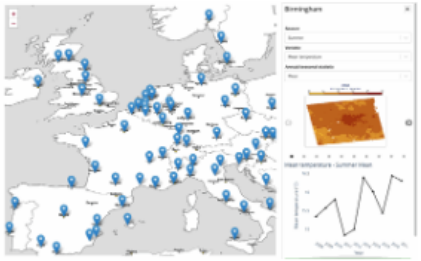
Updated 2022-08-31



Urban climate for cities in Europe from 2008 to 2017

Application | Health | Europe

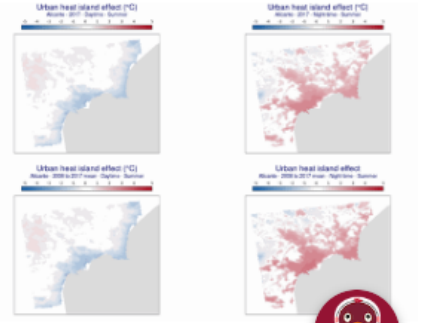
This application presents visualisations of urban temperature, humidity and wind speed statistics over the ten year period of 2008-2017; derived from the dataset: 'Climate variables for cities in Europe from 2008 to 2017', which is underpinned by the UrbClim model. Urban regions pose a challenge to our use of climate and meteorological data. These regions are where humans spend the majority of the...



Urban heat island intensity for European cities from 2008 to 2017 derived from reanalysis

Application | Health | Europe

This application presents visualisations of Urban Heat Island (UHI) effect over the ten year period of 2008-2017. Users can select from 100 European cities for each year from 2008-2017, for both Summer (June, July August) and Winter (December, January, February) seasons. UHI maps are provided for the annual mean daytime and night-time UHI for the selected year, and the mean daytime and night-time ...

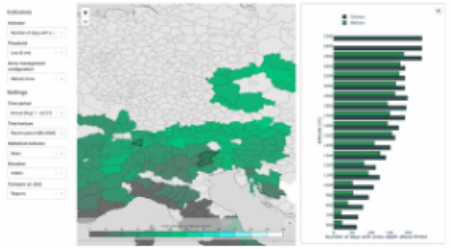


CDS Applications, relevant for **coastal regions** and the **tourism sector**:

Mountain tourism meteorological and snow indicators for Europe from 1986 to 2100 derived from reanalysis and climate projections

Application | Tourism | Europe

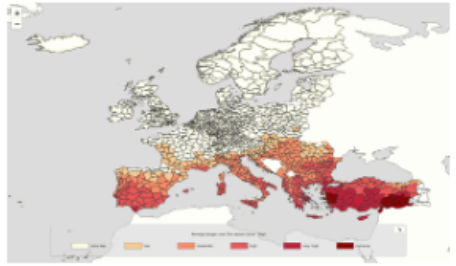
This application presents comparisons between past and future snow conditions relevant to the tourism industry. Based on the Mountain tourism meteorological and snow indicators (MTMSI) C3S dataset, the application enables the exploration of 39 indicators characterising meteorological conditions in the mountain regions of Europe by elevation, and on the scale of NUTS level 3 regions. The applicati...



Fire weather indicators for Europe from 1970 to 2098 derived from reanalysis and climate projections

Application | Tourism | Europe

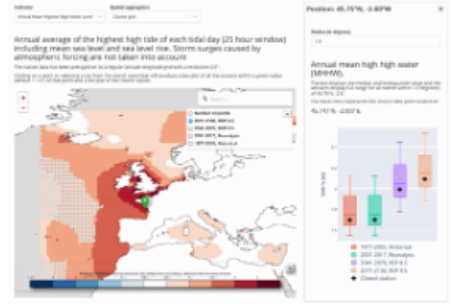
This application presents fire danger indicators for Europe, based on the Canadian Fire Weather Index System (FWI) fire danger model. This model is used by the European Forest Fire Information System (EFFIS) standard and provides a numerical, non-dimensional rating of fire potential based exclusively on meteorological conditions favourable to the start, spread and sustainability of fires. This app...



Indicators of water level change for European coasts in the 21st Century

Application | Coastal regions | Europe

The application presents a range of European coastal indicators, including water levels, tidal ranges and ocean surface wave parameters under the impacts associated with climate change up the 2100. The indicators are useful for various coastal sectors and studies, for example assessing coastal flooding, coastal erosion, infrastructure planning and adaption studies. This application is underpinned ...



https://cds.climate.copernicus.eu/cdsapp#!/search?type=application&keywords=((%20%22Sector:%20Tourism%22%20OR%20%22Sector:%20Coastal%20regions%22%20))

The Copernicus Interactive Climate Atlas (C3S Atlas) is a web application of the Copernicus Climate Change Service (C3S) allowing for flexible exploration and analysis of past and future climate monitoring and change information from multiple lines of evidence provided by the observational, reanalysis and climate change projection datasets available in the C3S Climate Data Store (CDS). The Atlas facilitates global and regional in-depth assessment of past trends and future changes in key variables and (extreme) indices for different periods across emission scenarios or for different policy-relevant global warming levels (e.g. 1.5°, 2°, 3° and 4°). Different graphical climate products such as maps and timeseries (or stripes) can be interactively customized to display temporally- or spatially-aggregated values (or changes relative to different baselines) over flexible seasons, periods and regions.