

Climate data rescue, management and mining

1. Observed data

1.1. Global observed data

Air Temperature

[ASOS Data](#)

[NCEI Past Weather Data](#)

[KNMI Climate Explorer](#)

[ClimatView](#)

[Global Marine Data](#)

[EUMETSAT](#)

[IRI Climate and Society Map Room](#)

Sea Surface Temperature

[Global Marine Data](#)

[EUMETSAT](#)

[IRI Climate and Society Map Room](#)

Precipitation

[ASOS Data](#)

[NCEI Data Past Weather](#)

[KNMI Climate Explorer](#)

[ClimatView](#)

[Global Marine Data](#)

[IRI Climate and Society Map Room](#)

Wind

[ASOS Data](#)

[KNMI Climate Explorer](#)

[Global Marine Data](#)

[EUMETSAT](#)

[IRI Climate and Society Map Room](#)

Climate Indices

[KNMI Climate Explorer](#)

[IRI Climate and Society Map Room](#)

1.2.Regional observed data

1.2.1. North America

Air Temperature

[RAWS USA Climate Archive](#)

[CAROGEN](#)

[IRI Climate and Society Map Room](#)

Precipitation

[RAWS USA Climate Archive](#)

[CAROGEN](#)

[IRI Climate and Society Map Room](#)

Wind

[RAWS USA Climate Archive](#)

1.2.2. Europe / Middle East / Africa

Air Temperature

[ECA&D](#)

[IRI Climate and Society Map Room](#)

Precipitation

[ECA&D](#)

[IRI Climate and Society Map Room](#)

Wind

[ECA&D](#)

1.2.3. Asia

Air Temperature

[SACS&D](#)

[IRI Climate and Society Map Room](#)

Precipitation

[SACS&D](#)

[IRI Climate and Society Map Room](#)

Wind

[SACS&D](#)

1.2.4. South America

Air Temperature

[IRI Climate and Society Map Room](#)

Precipitation

[IRI Climate and Society Map Room](#)

1.2.5. Australia

Air Temperature

[IRI Climate and Society Map Room](#)

Precipitation

[IRI Climate and Society Map Room](#)

2. Reanalysis

2.1. Global reanalysis

Air Temperature

[CFS](#)

[Reanalysis-1/ Reanalysis-2](#)

[ECMWF](#)

[IRI Climate and Society Map Room](#)

Sea Surface Temperature

[CFS](#)

[ECMWF](#)

Precipitation

[CFS](#)

[ECMWF](#)

[IRI Climate and Society Map Room](#)

Wind

[CFS](#)

[Reanalysis-1/ Reanalysis-2](#)

[ECMWF](#)

2.2. Regional reanalysis

Air Temperature

[NARR](#)

[IRI Climate and Society Map Room](#)

Precipitation

[NARR](#)

[IRI Climate and Society Map Room](#)

Wind

[NARR](#)

[IRI Climate and Society Map Room](#)

3. Predictions and Projections

Air Temperature

[ECMWF](#)

[IRI Climate and Society Map Room](#)

Sea Surface Temperature

[ECMWF](#)

[IRI Climate and Society Map Room](#)

Precipitation

[ECMWF](#)

[IRI Climate and Society Map Room](#)

Wind

[ECMWF](#)

Data

Name and organization	Description of source	Instructions	Time and data provided
<p>ASOS Data</p> <p>Iowa State University</p>	<p>This archive simply provides the as-is collection of historical observations from all over the world, very little quality control is done.</p> <p>Note: <i>Not a government website.</i></p> <p>Note: <i>Precipitation data is not available outside of the United States.</i></p>	<p>Click on any of the links to the right. First, select which country or state in the drop down menu "Select Network" and click "Switch to Network".</p> <p>Then, select any of the following stations and click "Add Selected".</p> <p>Next, choose data from the drop down menu "Select From Available Data" If more than one data set is needed. Hold the control key and click on additional sets of data. After the following steps, select "Finally, get Data:".</p>	<p>Air Temperature: Hourly</p> <p>Precipitation: Hourly</p> <p>Wind: Hourly</p>
<p>NCEI Past Weather Data</p> <p>NCEI (National Centers for Environmental Information).</p>	<p>Past daily weather observations from land station from NCEI (National Centers for Environmental Information).</p>	<p>Click on any of the links to the right. First, enter the desired location.</p> <p>Then, choose a specific station on the map and select "Access Data". Finally, click on "Download Station Data" Depending on</p>	<p>Air Temperature: Daily</p> <p>Precipitation: Daily</p>

<p>KNMI Climate Explorer</p> <p>KNMI (Royal Netherlands Meteorological Institute)</p>	<p>The KNMI Climate Explorer is a web application to analyze climate data statistically. It contains more than 10 TB of climate data and dozens of analysis tools. It is part of the WMO Regional Climate Centre at KNMI.</p>	<p>For air temperature, precipitation, or wind, Select stations in the "Select Stations" box and bound distance between stations and time frame in the "time, distance" box. Finally, select "get stations" and then "get data".</p> <p>For Climate Indices, select the desired data set. After selection, there are options to manipulate the series below the charts provided.</p>	<p>Air Temperature: Daily or Monthly</p> <p>Precipitation: Daily or Monthly</p> <p>Wind: Daily</p> <p>Climate Indices: Daily, Monthly, or Annually</p>
<p>ClimatView</p> <p>Japan Meteorological Agency</p>	<p>The ClimatView tool allows for access to weather and climate data from stations all around the world. The data is from the Japan Meteorological agency.</p>	<p>Click on any of the links to the right and use the drop down menus to select desired data.</p> <p>Then, select a point on the map if interested in observed weather for that station.</p>	<p>Air Temperature: Monthly</p> <p>Precipitation: Monthly</p>
<p>Global Marine Data</p> <p>NCEI (National Centers for Environmental Information)</p>	<p>Past global marine data in 10-degree bins derived from the International Comprehensive Ocean-Atmosphere Data Set.</p>	<p>Click on any of the links to the right. Use the search boxes to get the desired data set.</p> <p>Then, click download on any of the CSV files that are provided below.</p>	<p>Air Temperature: Hourly</p> <p>Sea Surface Temperature: Hourly</p> <p>Precipitation: Hourly</p> <p>Wind: Hourly</p>

<p>EUMETSAT (European Organization for the Exploitation of Meteorological Satellites)</p> <p>EUMETSAT</p>	<p>EUMETSAT is the European operational satellite agency for monitoring weather, climate and the environment from space.</p>	<p>For Air Temperature or Sea Surface Temperature, click on any of the links to the right to access data.</p> <p>For wind, the link will lead to another document with the many wind products that EUMETSAT has to offer.</p>	<p>Air Temperature: AVHRR Level 1B, IASI Combined Sounding Products, or AMSU-A Level 1B,</p> <p>Sea Surface Temperature: GHRSSST, IASI Combined Sounding Products</p> <p>Wind: EUMETSAT Wind Data Source</p>
<p>IRI (International Research Institute) Climate and Society Map Room</p> <p>Columbia Climate School International Research Institute for Climate and Society</p>	<p>The mission of the IRI is to enhance society's capability to understand, anticipate and manage the impacts of climate in order to improve human welfare and the environment, especially in developing countries. The IRI conducts this mission through strategic and applied research, education, capacity building, and by providing forecasts and information products with an emphasis on practical and verifiable utility and partnership.</p>		<p>Air Temperature: IRI Air Temperature .pdf</p> <p>Sea Surface Temperature: NMME Hindcast Monthly Climatology or Seasonal, SST, Vector wind, and Wind Speed, Monthly Climatological SST, and SST Monthly or Weekly.</p> <p>Precipitation: IRI Precipitation.pdf</p> <p>Wind: SST, Vector wind, and Wind Speed, Monthly Wind Climatology, and Reanalysis: Specific Humidity, Temperature, and Wind</p> <p>Climate Indices: El Niño, La Niña and the Southern Oscillation, Quasi-Biennial Oscillation, and Madden Julian Oscillation</p>

<p>RAWS (Remote Automatic Weather Stations) USA Climate Archive</p> <p>National Interagency Fire Center</p>	<p>Past weather data from RAWS (Remote Automatic Weather Stations) which include air temperature, dew point, pressure, wind direction, wind speed, humidity, and other data hourly. Climatology data such as wind rose for each month is also included.</p>	<p>Click on any of the links to the right. Hover cursor over "Station Maps and Data" and then hover over each region to get the desired state.</p> <p>Then, select a point on the map to get data from a specific station.</p> <p>Finally, use the menu on the left to get necessary data.</p>	<p>Air Temperature: Hourly, Daily, or Monthly</p> <p>Precipitation: Hourly, Daily, or Monthly</p> <p>Wind: Hourly, Daily, or Monthly</p>
<p>CAROGEN (Caribbean Regional Climate Outlook Forum Climate Generator)</p> <p>PBRCCC (Programming for Building Regional Climate Capacity in the Caribbean)</p>	<p>Provides temperature and precipitation for the Caribbean region.</p>	<p>Click on any of the links to the right and follow the different menus on the website.</p>	<p>Air Temperature: Daily or Monthly</p> <p>Precipitation: Daily or Monthly</p>

<p>ECA&D (European Climate Assessment & Data)</p> <p>KNMI (Royal Netherlands Meteorological Institute)</p>	<p>ECA&D offers science-based operational services for assessing observed changes in climate extremes in Europe. These services rely on high-quality observational datasets provided by the participants; 66 National Meteorological and Hydrological Services, observatories and universities from Europe and the Mediterranean.</p> <p>This is all coordinated by the Royal Netherlands Meteorological Institute (KNMI).</p>	<p>For Daily data, click on "Custom query". Then use the drop down menus to obtain desired data. Select "next" and click "Download".</p> <p>For Annual data, select "Time series plots". Then, use the drop down menu to get desired data. Finally, select "next" and can download the data by selecting "Download data".</p>	<p>Air Temperature: Daily or Annually</p> <p>Precipitation: Daily or Annually</p> <p>Wind: Daily or Annually</p>
--	--	---	--

<p>SACS&D (Southeast Asia Climate Assessment & Data)</p> <p>KNMI (Royal Netherlands Meteorological Institute)</p>	<p>SACA&D offers science-based climate services for assessing observed changes in climate extremes in the Southeast Asian region and aims to serve stakeholders from e.g. the food-security sector. These services rely on high-quality observational data sets provided by the participants; 23 National Meteorological and Hydrological Services, observatories and universities mainly from Southeast Asia.</p> <p>This project is Jointly coordinated by the Badan Meteorologi, Klimatologi, dan Geofisika (BMKG, Indonesia) and the Royal Netherlands Meteorological Institute (KNMI, The Netherlands).</p> <p><i>Note: May get a Privacy Error when attempting to access any of the links.</i></p>	<p>For daily data, click on "Custom query". Then use the drop down menus to obtain desired data. Select "next" and click "Download".</p> <p>For annual data, select "Time series plots". Then, use the drop down menu to get desired data. Finally, select "next" and can download the data by selecting "Download data".</p>	<p>Air Temperature: Daily or Annually</p> <p>Precipitation: Daily or Annually</p> <p>Wind: Daily or Annually</p>
---	--	---	--

<p>Climate Forecast System</p> <p>NCEI (National Centers for Environmental Information)</p>	<p>CFS uses the latest scientific approaches to incorporate observations from a variety of data sources, including surface observations, upper air balloon observations, aircraft observations, and satellite observations. NCEI provides access to near real-time historical model data</p>	<p>Click on any of the links to the right and select "Operational".</p> <p>Choose any of the products and Data Access Links.</p>	<p>Air Temperature: 6-Hourly or Monthly</p> <p>Sea Surface Temperature: 6-Hourly</p> <p>Precipitation: 6-Hourly</p> <p>Wind: 6-Hourly or Monthly</p>
<p>Reanalysis 1/ Reanalysis 2</p> <p>NCEI (National Centers for Environmental Information)</p>	<p>NCEI provides access to gridded data from Reanalysis-2 as both a 6-hourly reanalysis, and monthly means.</p> <p><i>Note: Reanalysis-2 ingest data at NCEI stopped with a complete, fixed period of record of 01 Jan 1979 through 30 Sep 2005.</i></p>	<p>Click on any of the links to the right.</p> <p>Choose any of the models and select Data Access Link.</p>	<p>Air Temperature: 6-Hourly or Monthly</p> <p>Precipitation: 6-Hourly or Monthly</p> <p>Wind: 6-Hourly or Monthly</p>
<p>ECMWF Reanalysis Models</p> <p>ECMWF (ECMWF is the European Centre for Medium-Range Weather Forecasts)</p>	<p>Selection of reanalysis datasets from the ECMWF model.</p>	<p>Click on any of the links on the right. Choose any of the following datasets.</p>	<p>Air Temperature: Hourly, 6-Hourly, or Monthly</p> <p>Sea Surface Temperature: 6-Hourly or Monthly</p> <p>Precipitation: Hourly, 3-Hourly, 6-Hourly, or Monthly</p> <p>Wind: Hourly, 3-Hourly, 6-Hourly, or Monthly</p>

<p>NARR (North American Regional Reanalysis)</p> <p>NCEI (National Centers for Environmental Information)</p>	<p>NCEI provides NARR models A and B. The page also provides NARR monthly mean models.</p>	<p>Click on any of the links on the right. Then, select any model and Data Access Links.</p>	<p>Temperature: 3-Hourly or Monthly</p> <p>Precipitation: 3-Hourly or Monthly</p> <p>Wind: 3-Hourly or Monthly</p>
<p>ECMWF Real-time</p> <p>ECMWF (ECMWF is the European Centre for Medium-Range Weather Forecasts)</p>	<p>Provides ECMWF model datasets.</p> <p>Note: <i>Due to the move of the Meteorological Archival and Retrieval System (MARS) to the new Data Centre in Bologna, there will be no or degraded access to this dataset at times between June and October 2022.</i></p>	<p>Click on any of the links to the right.</p>	<p>Air Temperature: 3-Hourly</p> <p>Sea Surface Temperature: 3-Hourly</p> <p>Precipitation: 3-Hourly</p> <p>Wind: 3-Hourly</p>

WMO guidance

Climate Data Observations

[Climate Data Management System Specifications \(WMO-No. 1131\)](#)

This publication establishes a framework defining the functionality required within a Climate Data Management System (CDMS). It defines a set of policies and governance processes that are necessary to effectively manage climate data. These policies should be implemented as a global framework to facilitate better integration of climate data between the National Meteorological and Hydrological Services (NMHSs) and ease the workload required for regional and global analysis of climate data.

[Guide to Meteorological Instruments and Methods of Observation \(WMO-No. 8\)](#)

This Guide revised Seventh Edition includes new topics and chapters, reflecting recent technological developments. Its purpose, as with the previous editions, is to give comprehensive and up-to-date guidance on the most effective practices for carrying out meteorological observations and measurements.

[Guidelines on Climate Data Management \(WMO/TD No. 1376\)](#)

These Guidelines are intended to provide National Meteorological and Hydrological Services (NMHSs) with information on best practice climate data management. This information is timely given the need for many countries to make the transition from older databases to the kind of systems that are providing much greater utility, security and robustness.

[Guidelines on Climate Data Rescue \(WMO/TD No. 1210\)](#)

This publication develops the steps to take to make sure that the vast amount of climate data collected are properly preserved in an easily accessible useful form.

[Guidelines for Hydrological Data Rescue \(WMO-No. 1146\)](#)

These Guidelines review the rationale for hydrological data rescue, the benefits to be derived therefrom, appropriate rescue methods, sound data management practices as well as data management systems, procedures for securing rescued data far into the future and for safeguarding data through storage in an international database.

[Guidelines on Climate Observation Networks and Systems \(WMO/TD-No. 1185\)](#)

These Guidelines aim to provide climatologists with the essential information on observation networks and systems to help ensure that their outputs are adequate for the comprehensive needs of climate services, applications and research.

[IGOS Cryosphere Theme Report](#)

The Integrated Global Observing Strategy (IGOS) Cryosphere Theme Report is required to create a framework for, and facilitate improved coordination of, cryospheric observations, and to generate the data and information needed for both operational services and research. The report aims to initiate a process that will ultimately result in a more comprehensive, coordinated, and integrated cryospheric observing system.

[Observing Systems Capability Analysis and Review Tool \(OSCAR\)](#)

This database is the official repository of requirements for observation of physical variables in support of WMO Programmes and co-sponsored Programmes.

Training

The training modules below fall under the WMO-defined training competency on "Create and Manage Datasets." The first two modules allow the user to gain a brief background into what "climate" means from a meteorological standpoint. The following modules all teach the user how the different applications of various global satellites and how they are used to capture oceanic, atmospheric and ground based data that is applicable to climate datasets. All modules are currently available in English language.

Create and Manage Datasets

1. Climate Variability Lecture: Climate vs Weather/Climate Anomalies:
https://www.meted.ucar.edu/climate/cvc_lectures/media/flash/newman_climate_variability.mp4
2. Introduction to Climatology:
https://www.meted.ucar.edu/education_training/lesson/499
3. An Introduction to Satellite Based Climate Records:
https://www.meted.ucar.edu/education_training/lesson/10083
4. Satellite Monitoring of Atmospheric Composition:
https://www.meted.ucar.edu/education_training/lesson/985
5. Monitoring the Climate System with Satellites:
https://www.meted.ucar.edu/satmet/climate_monitoring/print.htm
6. Using Satellite Altimetry to Monitor the Ocean:
<https://www.meted.ucar.edu/EUMETSAT/jason/print.htm>

Tools

Data portal

[WMO Observing Systems Capability Analysis and Review Tool \(OSCAR\)](#)

This database is the official repository of requirements for observation of physical variables in support of WMO Programmes and co-sponsored Programmes.

[Climate Data Library:](#)

The IRI Data Library is a powerful and freely accessible online data repository and analysis tool that allows a user to view, analyze, and download hundreds of terabytes of climate-related data through a standard web browser.

[ClimatView:](#) The ClimatView tool enables viewing and downloading of monthly world climate data, including monthly temperature/precipitation statistics and 30-year climate normals. Data are available for the period since June 1982, when JMA started receiving CLIMAT messages. Click on a station to see the relevant monthly data chart.

[European Climate Assessment & Dataset:](#) Offers science-based operational services for assessing observed changes in climate extremes in Europe. These services rely on high-quality observational datasets provided by the participants; 66 National Meteorological and Hydrological Services, observatories and universities from Europe and the Mediterranean. This is all coordinated by the Royal Netherlands Meteorological Institute (KNMI).

[KNMI Climate Explorer:](#) The KNMI Climate Explorer is a web application to analyze climate data statistically. It contains more than 10 TB of climate data and dozens of analysis tools. It is part of the WMO Regional Climate Centre at KNMI.

[NOAA's Weather and Climate Toolkit:](#) The U.S. National Oceanic and Atmospheric Administration's (NOAA) Weather and Climate Toolkit (WCT) is free, platform independent software distributed from NOAA's National Centers for Environmental Information (NCEI). The WCT allows the visualization and data export of weather and climate data, including Radar, Satellite and Model data. The WCT also provides access to weather/climate web services provided from NOAA's National Center for Environmental Information (NCEI) and other organizations.

Data management

[CLIDATA](#)

The Clidata system is primarily intended for archiving climatology data, for data quality control and for administration of climatology stations and station observations. The System was designed to replace the old CLICOM system, which has been used in Czech Republic from 1993-2000. The system is designed for the Oracle database environment, which defines simple and secure access to stored data. The system has been operationally used in Czech Hydrometeorological Institute for 14 years and it is successfully installed in more than 30 other countries.

[CLiDE:](#) Climate Data for the Environment (CLiDE) is a Climate Data Management System (CDMS) developed as part of the Pacific Climate Change Science Program (PCCSP). CLiDE provides each country with a central database for climate records, with key entry forms, quality assurance tools, reports and data dumps. It is free and open-source software, using a web-based user interface and high reliability relational database system.

[Climatological and integrated Environmental Database \(IMS CLDB and EnviDB\):](#)

Climatological database (CLDB) is a MicroStep-MIS database system addressing the needs of the meteorological institutes to store the high-volume long-term meteorological, climatological and environmental data. The CLDB stores all collected data in one unified structure, thus avoiding data inconsistencies and discrepancies and enabling standard comfortable data access for all users and other software systems. No additional data storage and no different and confusing data formats are needed.

[ClimPACT:](#) The ClimPACT software is based on the RCLimDEX software developed by the WMO CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI). ClimPACT is the software for calculating indices of climate extremes including SPI and SPEI.

[CLIMSOFT:](#) CLIMSOFT is a software suite for storing climatic data in a secure and flexible manner and for extracting useful information from the data. The data can be used to produce summary reports, maps or diagrams; or subsets of the data can be extracted for further processing. Climsoft is developed according to the recommendations in the WMO Climate Data Management System Specifications.

[CLISYS - CDMS:](#) Clisys is a cutting-edge climate data management and production system that will allow us to secure climate heritage, carry out useful analysis and deliver personalized climate products. Clisys allow: - Collect and safely store all your climate data (historic as well as real time data). - Allow an extensive management of your metadata making your climate database richer and more accurate. - Ensure an efficient quality control of your data to make sure your data series are precise and relevant. - Provide a flexible and scalable production system in order to add value to your raw data and be able to deliver standard climatological reports and statistics, as well as customized products (graphs, charts, maps, etc.) especially elaborated to fulfill the needs of a specific end-user. - Enable easy access to your data and share your heritage worldwide according to your data policy and WIS recommendations.

[Hydrometeorological data service system CliWare:](#) CliWare is a technological system focused on solving problems with management of hydro-meteorological information at different levels of its collection and distribution. The system is a compute module that solves four major tasks: acquisition of hydro-meteorological data, ingestion of data and metadata into a data base, computation of summary statistics, and delivery information to the end-user.

[I-DARE Portal:](#) The International Data Rescue (I-DARE) Portal provides a single point of entry for information on the status of past and present worldwide data to be rescued. The Portal also includes data rescue projects, best methods and technologies involved in data rescue processes, as well as metadata needed for data to be successfully rescued.

[MCH:](#) The Meteorological, Climatological and Hydrological Database Management System (MCH) is a database management system (DBMS) based on open-source databases and software to digitize, store, and process large amounts of data. MCH is a simple, customizable and license-free solution to store, analyze data and generate reports on large amounts of meteorological, climatological and hydrological data.

[MESSIR-CLIM:](#) MESSIR-CLIM provides the following features: Acquisition and storage of national observations; Importation and digitalization of archived observations data using entry forms; Quality control of data according to WMO standards and rules; Rich GUI for

easy access to archived data; Web interface for remote users; Production of climate reports as graphics and text; Relational Database.