



# Bulk data download using APIs

Proyectos en ingeniería de datos e inteligencia artificial



**ecmwf/cdsapi**

Python API to access the Copernicus Climate Data Store (CDS)



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# What is an API

Application Programming Interface

# **What is an API**

## **API Functionality**

APIs enable communication and data exchange between different software systems seamlessly and efficiently.

# What is an API

## **Automation and Scalability**

APIs automate data retrieval processes and support scalable data processing essential for modern data science tasks.



# Registration



PROGRAMME OF  
THE EUROPEAN UNION



Copernicus  
Europe's eyes on Earth

Climate

Change Service

climate.copernicus.eu



IMPLEMENTED BY

CECMWF

Andres Navarro

Climate Data Store

Datasets

Applications

User guide

Live

Your requests

3 Sep 2025 To improve our C3S service, we need to hear from you! Please complete this very short [survey](#). Thank you.

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Dive into this wealth of information about the Earth's past, present and future climate

The Climate Data Store homepage features a large, scenic photograph of a snow-covered Antarctic landscape with icebergs and mountains under a blue sky. A white search bar is centered over the image, containing the word "Search" and a magnifying glass icon. Above the search bar, a dark banner displays a message from September 3, 2025, encouraging users to complete a survey to improve the service. The banner also includes navigation arrows and page numbers. The top navigation bar includes links for Climate Data Store, Datasets, Applications, User guide, Live (with a green dot), and Your requests. Logos for the European Union, Copernicus, and ECMWF are visible at the top left, and a user profile for "Andres Navarro" is at the top right.

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

# The .cdsapirc file

## 1. Setup the CDS API personal access token

Here is how to setup the CDS API personal access token:

1. If you do not have an account yet, please [register](#)
2. If you are not logged in, please [login](#)
3. Once logged in, copy the code displayed below to the file **\$HOME/.cdsapirc**  
(in your Unix/Linux environment)

```
url: https://cds.climate.copernicus.eu/api  
key: 1d70d144-5623-4d9c-8ab9-b517c2b2f316
```



```
andres — python - conda install conda-forge::cdsapi — 126x29
~ — python - conda install conda-forge::cdsapi +
```

```
environment location: /usr/local/Caskroom/miniconda/base/envs/xarray

added / updated specs:
- conda-forge::cdsapi

The following packages will be downloaded:

  package          |      build
-----|-----
attrs-24.3.0      | py313hecd8cb5_0    174 KB
brotlicffi-1.0.9.2 | py313h6d0c2b6_1    393 KB
cdsapi-0.7.6       | pyhd8ed1ab_0        17 KB  conda-forge
certifi-2025.8.3   | py313hecd8cb5_0    161 KB
cffi-1.17.1        | py313h9205ec4_1    294 KB
ecmwf-datastores-client-0.4.0| pyhd8ed1ab_0        25 KB  conda-forge
idna-3.7           | py313hecd8cb5_0    110 KB
multiurl-0.3.7     | pyhd8ed1ab_0        22 KB  conda-forge
pysocks-1.7.1      | py313hecd8cb5_0    35 KB
requests-2.32.4    | py313hecd8cb5_0    178 KB
tqdm-4.67.1         | py313h653c010_0    161 KB
typing_extensions-4.12.2 | py313hecd8cb5_0    83 KB
urllib3-2.5.0       | py313hecd8cb5_0    360 KB
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```

|  |        |        |
|--|--------|--------|
|  | Total: | 2.0 MB |
|--|--------|--------|

```
The following NEW packages will be INSTALLED:
```

conda install conda-forge::cdsapi

# Example.py

```
import cdsapi

client = cdsapi.Client()

dataset = 'reanalysis-era5-pressure-levels'
request = {
    'product_type': ['reanalysis'],
    'variable': ['geopotential'],
    'year': ['2024'],
    'month': ['03'],
    'day': ['01'],
    'time': ['13:00'],
    'pressure_level': ['1000'],
    'data_format': 'grib',
}
target = 'download.grib'

client.retrieve(dataset, request, target)
```

# Product codes

| Código del producto               | Descripción                                  |
|-----------------------------------|--|
| reanalysis-era5-pressure-levels   | Datos de ERA5 en niveles de presión          |
| reanalysis-era5-single-levels     | Datos de ERA5 en niveles únicos (superficie) |
| seasonal-original-single-levels   | Predicciones estacionales en niveles únicos  |
| sis-agriculture-indicators        | Indicadores agroclimáticos                   |
| satellite-sea-surface-temperature | Temperatura superficial del mar por satélite |

# Var names

- Temperatura y viento:
  - 2m\_temperature
  - 10m\_u\_component\_of\_wind
  - 10m\_v\_component\_of\_wind
  - surface\_pressure
- Precipitación y humedad:
  - total\_precipitation
  - 2m\_dewpoint\_temperature
- Radiación y energía:
  - surface\_solar\_radiation\_downwards
  - net\_surface\_solar\_radiation
- Océano y olas:
  - sea\_surface\_temperature
  - significant\_height\_of\_combined\_wind\_waves\_and\_swell
- Nieve y suelo:
  - snow\_depth
  - volumetric\_soil\_water\_layer\_1

# Assignment

## **Download data from Copernicus Climate Data Store**

- ERA5\_T2M\_SINGLE-LEVEL\_DAILY-2024
  - Compute Monthly mean with cdo