



# Historical Weather API

60 years global archive with hourly values at 0.25° resolution

[URL Builder](#)
[Parameter documentation](#)

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The free Open-Meteo Historical Weather API has just been released! Read the [blog article](#).

## Select Coordinates or City

Latitude  
-35.28

Longitude  
149.13

Select city

[Detect GPS Position](#)

## Specify Time Interval

Start date  
2002-12-02

End date  
2022-12-02

## Hourly Weather Variables

- Temperature (2 m)
- Relative Humidity (2 m)
- Dewpoint (2 m)
- Apparent Temperature
- Sealevel Pressure
- Surface Pressure
- Precipitation (rain + showers + snow)
- Rain (rain + showers)
- Snowfall

- Cloudcover Total
- Cloudcover Low
- Cloudcover Mid
- Cloudcover High
- Shortwave Solar Radiation
- Direct Solar Radiation
- Diffuse Solar Radiation
- Direct Normal Irradiance (DNI)

- Wind Speed (10 m)
- Wind Speed (100 m)
- Wind Direction (10 m)
- Wind Direction (100 m)
- Wind Gusts (10 m)
- Reference Evapotranspiration (ET<sub>0</sub>)
- Vapor Pressure Deficit

- Soil Temperature (0-7 cm)
- Soil Temperature (7-28 cm)
- Soil Temperature (28-100 cm)
- Soil Temperature (100-255 cm)
- Soil Moisture (0-7 cm)
- Soil Moisture (7-28 cm)
- Soil Moisture (28-100 cm)
- Soil Moisture (100-255 cm)

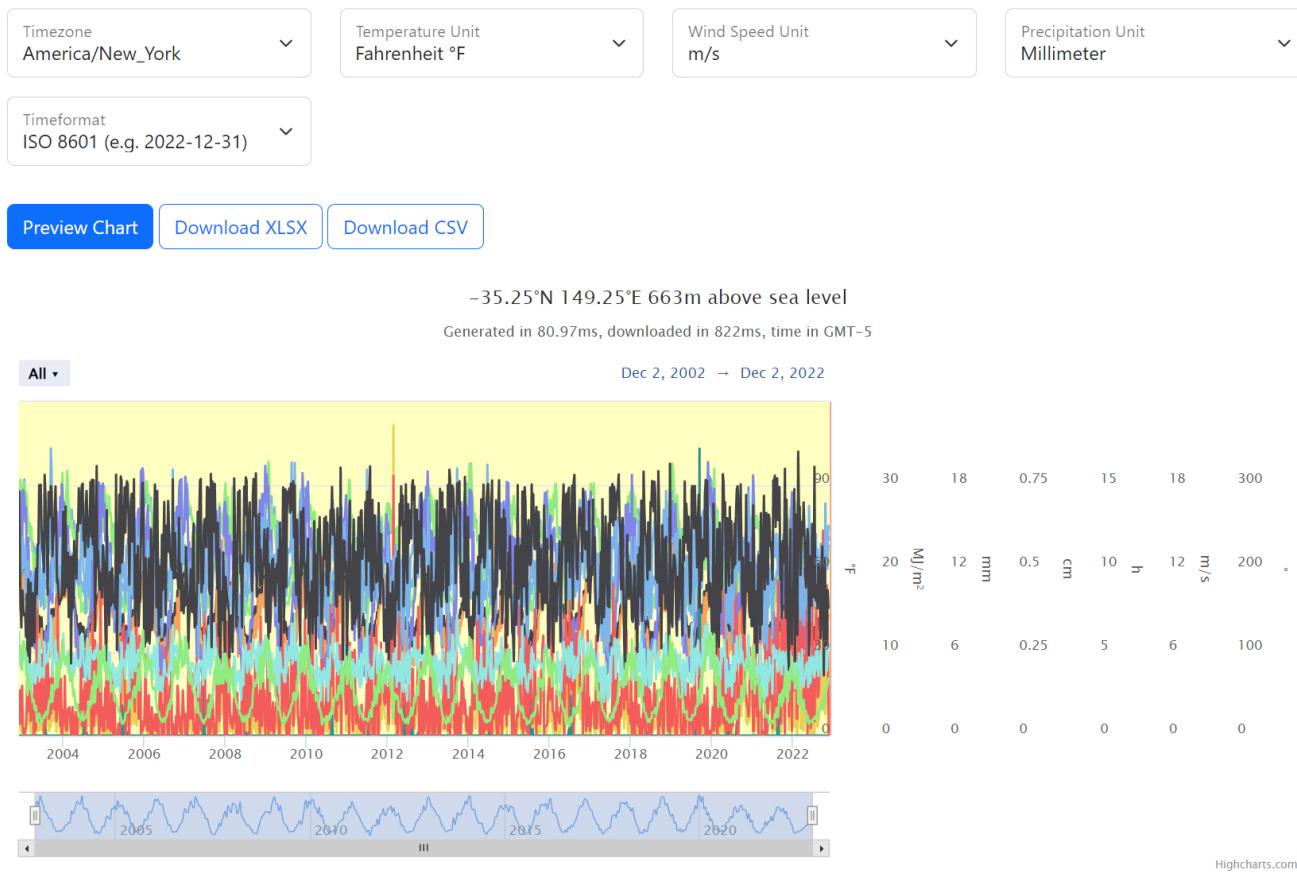
## Daily Weather Variables (\*)

- Maximum Temperature (2 m)
- Minimum Temperature (2 m)
- Maximum Apparent Temperature (2 m)
- Minimum Apparent Temperature (2 m)
- Sunrise
- Sunset
- Shortwave Radiation Sum
- Precipitation Sum
- Rain Sum
- Snowfall Sum
- Precipitation Hours
- Maximum Wind Speed (10 m)
- Maximum Wind Gusts (10 m)
- Dominant Wind Direction (10 m)
- Reference Evapotranspiration (ET<sub>0</sub>)

\* Parameter `timezone` is mandatory

[Settings](#)

## Settings



**Tip:** You can click and drag to zoom in. Click All on the top, to reset zoom.

API URL ([Open in new tab](#))

[https://archive-api.open-meteo.com/v1/era5?latitude=-35.28&longitude=149.13&start\\_date=2002-12-02&end\\_date=2022-12-02&daily=temperature\\_&hourly=windspeed&precipitation](https://archive-api.open-meteo.com/v1/era5?latitude=-35.28&longitude=149.13&start_date=2002-12-02&end_date=2022-12-02&daily=temperature_&hourly=windspeed&precipitation)

You can copy this API URL into your application

## API Documentation

The API endpoint `/v1/era5` accepts a geographical coordinate, a time interval, a list of weather variables and returns historical weather data. Data is based on [ECMWF ERA5](#) with hourly values and 0.25° global resolution. Data is updated daily with a delay of 5-7 days.

To keep data storage low, data for sea, far north areas and the poles are unavailable in the public API.

All URL parameters are listed below:

Parameter	Format	Required	Default	Description
<b>latitude</b> <b>longitude</b>	Floating point	Yes		Geographical WGS84 coordinate of the location
<b>start_date</b> <b>end_date</b>	String (yyyy-mm-dd)	Yes		The time interval to get weather data. A day must be specified as an ISO8601 date (e.g. 2022-12-31).
<b>hourly</b>	String array	No		A list of weather variables which should be returned. Values can be comma separated, or multiple <code>&amp;hourly=</code> parameter in the URL can be used.
<b>daily</b>	String array	No		A list of daily weather variable aggregations which should be returned. Values can be comma separated, or multiple <code>&amp;daily=</code> parameter in the URL can be used. If daily weather variables are specified, parameter <code>timezone</code> is required.
<b>temperature_unit</b>	String	No	celsius	If <code>fahrenheit</code> is set, all temperature values are converted to Fahrenheit.
<b>windspeed_unit</b>	String	No	kmh	Other wind speed speed units: <code>ms</code> , <code>mph</code> and <code>kn</code>
<b>precipitation_unit</b>	String	No	mm	Other precipitation amount units: <code>inch</code>
<b>timeformat</b>	String	No	iso8601	If format <code>unixtime</code> is selected, all time values are returned in UNIX epoch time in seconds. Please note that all time is then in GMT+0! For daily values with unix timestamp, please apply

`utc_offset_seconds` again to get the correct date.

<b>timezone</b>	String	No	GMT	If <code>timezone</code> is set, all timestamps are returned as local-time and data is returned starting at 00:00 local-time. Any time zone name from the <a href="#">time zone database</a> is supported. If <code>auto</code> is set as a time zone, the coordinates will be automatically resolved to the local time zone..
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Additional optional URL parameters will be added. For API stability, no required parameters will be added in the future!

## Hourly Parameter Definition

The parameter `&hourly=` accepts the following values. Most weather variables are given as an instantaneous value for the indicated hour. Some variables like precipitation are calculated from the preceding hour as and average or sum.

Variable	Valid time	Unit	Description
<b>temperature_2m</b>	Instant	°C (°F)	Air temperature at 2 meters above ground
<b>relativehumidity_2m</b>	Instant	%	Relative humidity at 2 meters above ground
<b>dewpoint_2m</b>	Instant	°C (°F)	Dew point temperature at 2 meters above ground
<b>apparent_temperature</b>	Instant	°C (°F)	Apparent temperature is the perceived feels-like temperature combining wind chill factor, relative humidity and solar radiation
<b>pressure_msl</b> <b>surface_pressure</b>	Instant	hPa	Atmospheric air pressure reduced to mean sea level (msl) or pressure at surface. Typically pressure on mean sea level is used in meteorology. Surface pressure gets lower with increasing elevation.
<b>precipitation</b>	Preceding hour sum	mm (inch)	Total precipitation (rain, showers, snow) sum of the preceding hour. Data is stored with a 0.1 mm precision. If precipitation data is summed up to monthly sums, there might be small inconsistencies with the total precipitation amount.
<b>rain</b>	Preceding hour sum	mm (inch)	Only liquid precipitation of the preceding hour including local showers and rain from large scale systems.
<b>snowfall</b>	Preceding hour sum	cm (inch)	Snowfall amount of the preceding hour in centimeters. For the water equivalent in millimeter, divide by 7. E.g. 7 cm snow = 10 mm precipitation water equivalent
<b>cloudcover</b>	Instant	%	Total cloud cover as an area fraction
<b>cloudcover_low</b>	Instant	%	Low level clouds and fog up to 2 km altitude
<b>cloudcover_mid</b>	Instant	%	Mid level clouds from 2 to 6 km altitude
<b>cloudcover_high</b>	Instant	%	High level clouds from 6 km altitude
<b>shortwave_radiation</b>	Preceding hour mean	W/m <sup>2</sup>	Shortwave solar radiation as average of the preceding hour. This is equal to the total global horizontal irradiation
<b>direct_radiation</b> <b>direct_normal_irradiance</b>	Preceding hour mean	W/m <sup>2</sup>	Direct solar radiation as average of the preceding hour on the horizontal plane and the normal plane (perpendicular to the sun)
<b>diffuse_radiation</b>	Preceding hour mean	W/m <sup>2</sup>	Diffuse solar radiation as average of the preceding hour
<b>windspeed_10m</b> <b>windspeed_100m</b>	Instant	km/h (mph, m/s, knots)	Wind speed at 10 or 100 meters above ground. Wind speed on 10 meters is the standard level.
<b>winddirection_10m</b> <b>winddirection_100m</b>	Instant	°	Wind direction at 10 or 100 meters above ground
<b>windgusts_10m</b>	Preceding hour max	km/h (mph, m/s, knots)	Gusts at 10 meters above ground as a maximum of the preceding hour
<b>et0_fao_evapotranspiration</b>	Preceding hour sum	mm (inch)	ET <sub>0</sub> Reference Evapotranspiration of a well watered grass field. Based on <a href="#">FAO-56 Penman-Monteith equations</a> ET <sub>0</sub> is calculated from temperature, wind speed, humidity and solar radiation. Unlimited soil water is assumed. ET <sub>0</sub> is commonly used to estimate the required irrigation for plants.
<b>vapor_pressure_deficit</b>	Instant	kPa	Vapor Pressure Deficit (VPD) in kilopascal (kPa). For high VPD (>1.6), water transpiration of plants increases. For low VPD (<0.4), transpiration decreases
<b>soil_temperature_0_to_7cm</b> <b>soil_temperature_7_to_28cm</b>	Instant	°C (°F)	Average temperature of different soil levels below ground.

[soil\\_temperature\\_28\\_to\\_100cm](#)  
[soil\\_temperature\\_100\\_to\\_255cm](#)

<a href="#">soil_moisture_0_to_7cm</a>	Instant	m <sup>3</sup> /m <sup>3</sup>	Average soil water content as volumetric mixing ratio at 0-7, 7-28, 28-100 and 100-255 cm depths.
<a href="#">soil_moisture_7_to_28cm</a>			
<a href="#">soil_moisture_28_to_100cm</a>			
<a href="#">soil_moisture_100_to_255cm</a>			

## Daily Parameter Definition

Aggregations are a simple 24 hour aggregation from hourly values. The parameter `&daily=` accepts the following values:

Variable	Unit	Description
<a href="#">temperature_2m_max</a>	°C (°F)	Maximum and minimum daily air temperature at 2 meters above ground
<a href="#">temperature_2m_min</a>		
<a href="#">apparent_temperature_max</a>	°C (°F)	Maximum and minimum daily apparent temperature
<a href="#">apparent_temperature_min</a>		
<a href="#">precipitation_sum</a>	mm	Sum of daily precipitation (including rain, showers and snowfall)
<a href="#">rain_sum</a>	mm	Sum of daily rain
<a href="#">snowfall_sum</a>	cm	Sum of daily snowfall
<a href="#">precipitation_hours</a>	hours	The number of hours with rain
<a href="#">sunrise</a>	iso8601	Sun rise and set times
<a href="#">sunset</a>		
<a href="#">windspeed_10m_max</a>	km/h (mph, m/s, knots)	Maximum wind speed and gusts on a day
<a href="#">windgusts_10m_max</a>		
<a href="#">winddirection_10m_dominant</a>	°	Dominant wind direction
<a href="#">shortwave_radiation_sum</a>	MJ/m <sup>2</sup>	The sum of solar radiaion on a given day in Megajoules
<a href="#">et0_fao_evapotranspiration</a>	mm	Daily sum of ET <sub>0</sub> Reference Evapotranspiration of a well watered grass field

## JSON Return Object

On success a JSON object will be returned.



```
{  
    "latitude": 52.52,  
    "longitude": 13.419,  
    "generationtime_ms": 2.2119,  
    "timezone": "Europe/Berlin",  
    "timezone_abbreviation": "CEST",  
    "hourly": {  
        "time": ["2022-07-01T00:00", "2022-07-01T01:00", "2022-07-01T02:00", ...],  
        "temperature_2m": [13, 12.7, 12.7, 12.5, 12.5, 12.8, 13, 12.9, 13.3, ...]  
    },  
    "hourly_units": {  
        "temperature_2m": "°C"  
    },  
}
```

Parameter	Format	Description
<a href="#">latitude, longitude</a>	Floating point	WGS84 of the center of the weather grid-cell which was used to generate this forecast. This coordinate might be up to 5 km away.
<a href="#">generationtime_ms</a>	Floating point	Generation time of the weather forecast in milliseconds. This is mainly used for performance monitoring and improvements.
<a href="#">utc_offset_seconds</a>	Integer	Applied timezone offset from the <code>&amp;timezone=</code> parameter.
<a href="#">timezone</a>	String	Timezone identifier (e.g. <code>Europe/Berlin</code> ) and abbreviation (e.g. <code>CEST</code> )
<a href="#">timezone_abbreviation</a>		

## timezone\_abbreviation

<b>hourly</b>	Object	For each selected weather variable, data will be returned as a floating point array. Additionally a <code>time</code> array will be returned with ISO8601 timestamps.
<b>hourly_units</b>	Object	For each selected weather variable, the unit will be listed here.
<b>daily</b>	Object	For each selected daily weather variable, data will be returned as a floating point array. Additionally a <code>time</code> array will be returned with ISO8601 timestamps.
<b>daily_units</b>	Object	For each selected daily weather variable, the unit will be listed here.

## Errors

In case an error occurs, for example a URL parameter is not correctly specified, a JSON error object is returned with a HTTP 400 status code.



```
{
  "error": true,
  "reason": "Cannot initialize WeatherVariable from invalid String value temperture_2m for key hourly"
}
```

## Citation & Acknowledgement



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Hersbach, H., Bell, B., Berrisford, P., Biavati, G., Horányi, A., Muñoz Sabater, J., Nicolas, J., Peubey, C., Radu, R., Rozum, I., Schepers, D., Simmons, A., Soci, C., Dee, D., Thépaut, J-N. (2018): ERA5 hourly data on single levels from 1959 to present.  
Copernicus Climate Change Service (C3S) Climate Data Store (CDS). (Updated daily), 10.24381/cds.adbb2d47

All users of Open-Meteo data must provide a clear attribution to the Copernicus program as well as a reference to Open-Meteo.

### Features

Local models  
Weather variables  
Lightning fast APIs  
Service status and uptime

### Weather APIs

Weather Forecast API  
Historical Weather API  
ECMWF API  
GFS & HRRR Forecast API  
MeteoFrance API  
DWD ICON API  
GEM API

### Other APIs

Marine Weather API  
Air Quality API  
Geocoding API  
GFS & HRRR Forecast API  
Elevation API

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