C3S data: Observations and Essential Climate Variables (ECVs)

Climate Change

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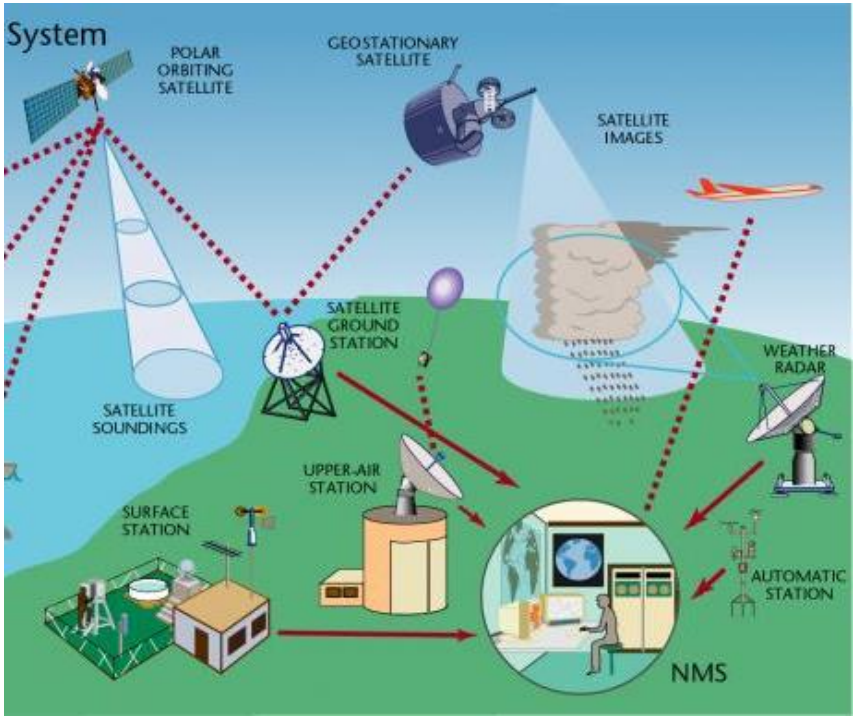
Why observations?



- Source WMO -

<u>Observations are key to understand the climate system</u> (historical & present)

Uses:

- Reanalysis (see next presentation by H. Hersbach),
- Essential Climate Variables

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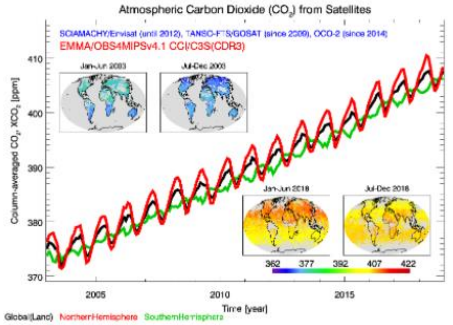
E C V s

We use historical observations from in-situ and satellite sensors to build <u>Climate Data Records of Essential Climate Variables (ECVs)</u>

Climate Data Record: A (Thematic) Climate Data Record is a time series of measurements of sufficient length, consistency, and continuity to determine climate variability and change.

Essential Climate Variables: An Essential Climate Variable is a geophysical variable (or a group of linked variables) that critically contributes to the characterization of Earth' s climate.

→ Relevant, Feasible, Cost-effective



Required to support the work of the UNFCCC and the IPCC

- Provide empirical evidence to understand the evolution of climate (climate indicators)
- Guide mitigation and adaptation measures (decision making)
- Assess risks and enable attribution of climate events to underlying causes
- Underpin climate services.

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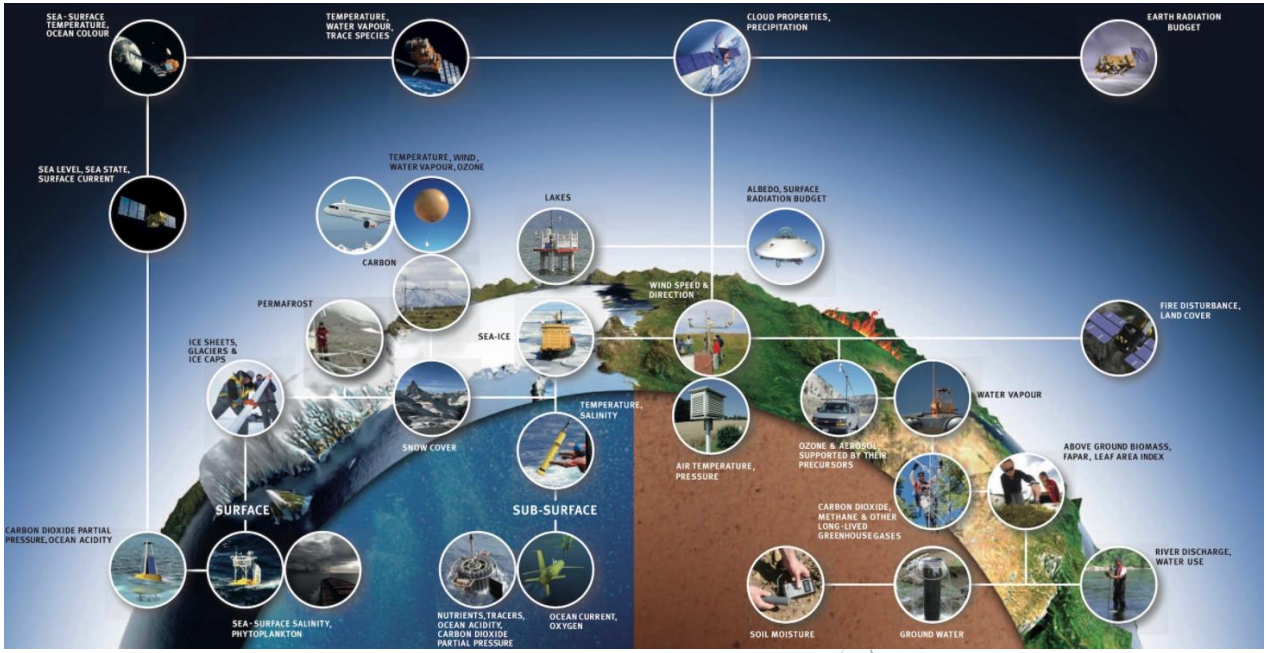
GCOS and ECVs

Scientific requirements for observations are based on the framework provided by the Global Climate Observing System (GCOS).



→ 54 Essential Climate Variables

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ECV services in C3S (satellite data)

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			C3S_312a							
				C3S_312b						
								C3S2_312		
		GCOS	2017	2018	2019	2020	2021	2022	2023	2024
Atmospheric physics										
	Precipitation	4.3.5								
	Surface Radiation Budget	4.3.6								
	Water Vapour	4.5.3			Lot 1			Atmospheric Physics		
	Cloud Properties	4.5.4								
	Earth Radiation Budget	4.5.5								
Atmospheric composition										
	Carbon Dioxide	4.7.1	Lot 6							
	Methane	4.7.2	Lot 6		Lot 2			Atmospheric Composition		
	Ozone	4.7.4	Lot 4							
	Aerosol	4.7.5	Lot 5							
Ocean										
	Sea Surface Temperature	5.3.1	Lot 3							
	Sea Level	5.3.3	Lot 2		Lot 3			Ocean		
	Sea ice	5.3.5	Lot 1							
	Ocean Colour	5.3.7								
Land hydrology & cryosphere										
	Lakes	6.3.4								
	Glaciers	6.3.6	Lot 8		Lot 4			Land Hydrology & Cryosphere		
	Ice sheets and ice shelves	6.3.7								
	Soil moisture	6.3.16	Lot 7							
Land biosphere										
	Albedo	6.3.9	Lot 9							
	Land Cover	6.3.10			Lot 5			Land Biosphere		
	Fraction of Absorbed Photosynthet	6.3.11	Lot 9							
	Leaf Area Index	6.3.12	Lot 9							
	Fire	6.3.15								
			2019	2018	2019	2020	2021	2022	2023	2024

Table 1: From proof-of-concept phase (9 Lots) to operations (5 Lots) of C3S ECV services. The column labelled GCOS shows the relevant section in the GCOS Status Report (GCOS-SR 2015).

Coordination with CM-SAF / ROM SAF / ESA CCI / Uni. Maryland / NASA / NOAA

Coordination with ESA-CCI and other national projects

Coordination with ESA-CCI

Coordination with ESA-CCI, GloboLakes, Arc-Lake, HydroWeb

Coordination with ESA-CCI, CGL, QA4ECV, LSA-SAF

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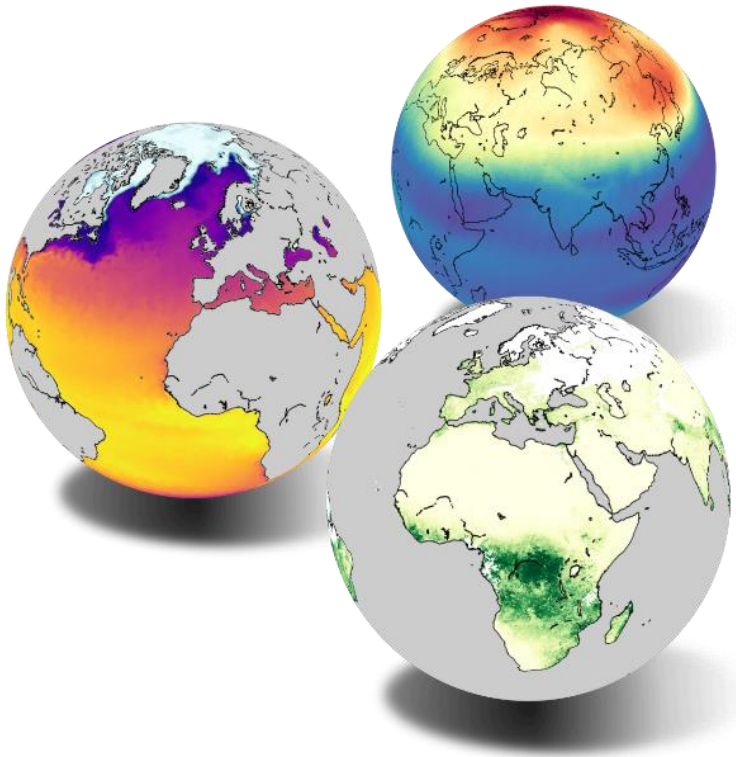
ECVs operational services



ECV products that are

- State-of-the-art
  - ***Coordination with ESA CCI, EUMETSAT/SAFs & other Copernicus services***
- Long-term, consistent , complete (CDR)
  - **Single/Multi sensor approach**
- Regularly extended in time (ICDR)
  - **Frequent updates of data records**
- Gridded, aggregated
  - **Meeting user requirements**
- *Accessible & Tracible*
  - ❑ *Access through the Climate Data Store*
    - ❑ ***Creation of adaptors, integration in CDS Toolbox***
  - ❑ *Documentation*

    Supporting documentation (ATBD, PQAD,PUGS, …)
  - ❑ *Evaluation and Assessment*
    - ❑ ***EQC, own QC procedures, benchmarking, cross-ECV consistency***
  - ❑ *User support*
    - ❑ ***Service desks opened for all services***

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Example of Dataset access in the CDS

Joaquin Munoz Sabater Logout

This is a new service -- your feedback will help us to improve it BETA

Home Search Datasets Applications Your requests Toolbox Help & support

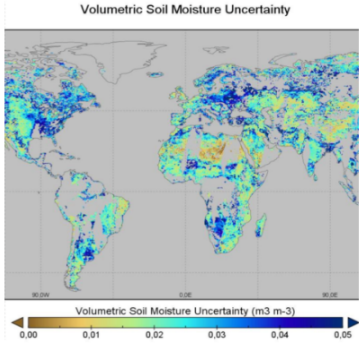
Soil moisture gridded data from 1978 to present

Overview | Download data | Quality assessment | Documentation

This dataset provides estimates of **soil moisture** over the globe from a large set of satellite sensors. It is based on the ESA Climate Change Initiative soil moisture version 03.3 and represents the current state-of-the-art for satellite-based soil moisture climate data record production, in line with the "Systematic observation requirements for satellite-based products for climate" as defined by GCOS (Global Climate Observing System). Data are on a regular latitude/longitude grid expectedly with gaps in space and time.

When dealing with satellite data it is common to encounter references to Climate Data Records (CDR) and interim-CDR (ICDR). For this dataset, both the ICDR and CDR parts of each product were generated using the same software and algorithms. The CDR is intended to have sufficient length, consistency, and continuity to detect climate variability and change. The ICDR provides a short-delay access to current data where consistency with the CDR baseline is expected but was not extensively checked. The dataset contains the following products: "active", "passive" and "combined". The "active" and "passive" products were created by using scatterometer and radiometer soil moisture products, respectively. The "combined" product results from a blend based on the two previous products.

This dataset is produced on behalf of the Copernicus Climate Change Service (C3S).



Contact

ECMWF Support Portal

Licence

Licence to use Copernicus Products

Publication date

2018-10-25

DATA DESCRIPTION	
Data type	Gridded
Projection	Regular latitude-longitude grid
Horizontal coverage	Global
Horizontal resolution	0.25° x 0.25°
Temporal coverage	1978 to present
Temporal resolution	Daily, 10-day, Monthy
File format	NetCDF
Conventions	Climate and Forecast (CF) Metadata Convention v1.8
Versions	v201706, v201812, v201912, v202012
Update frequency	ICDR: 10-day with a 10-day latency. CDR: annual.

MAIN VARIABLES		
Name	Units	Description
Surface soil moisture	%	Content of liquid water in a surface soil layer of 2 to 5 cm depth expressed as the percentage of total saturation

Landing page

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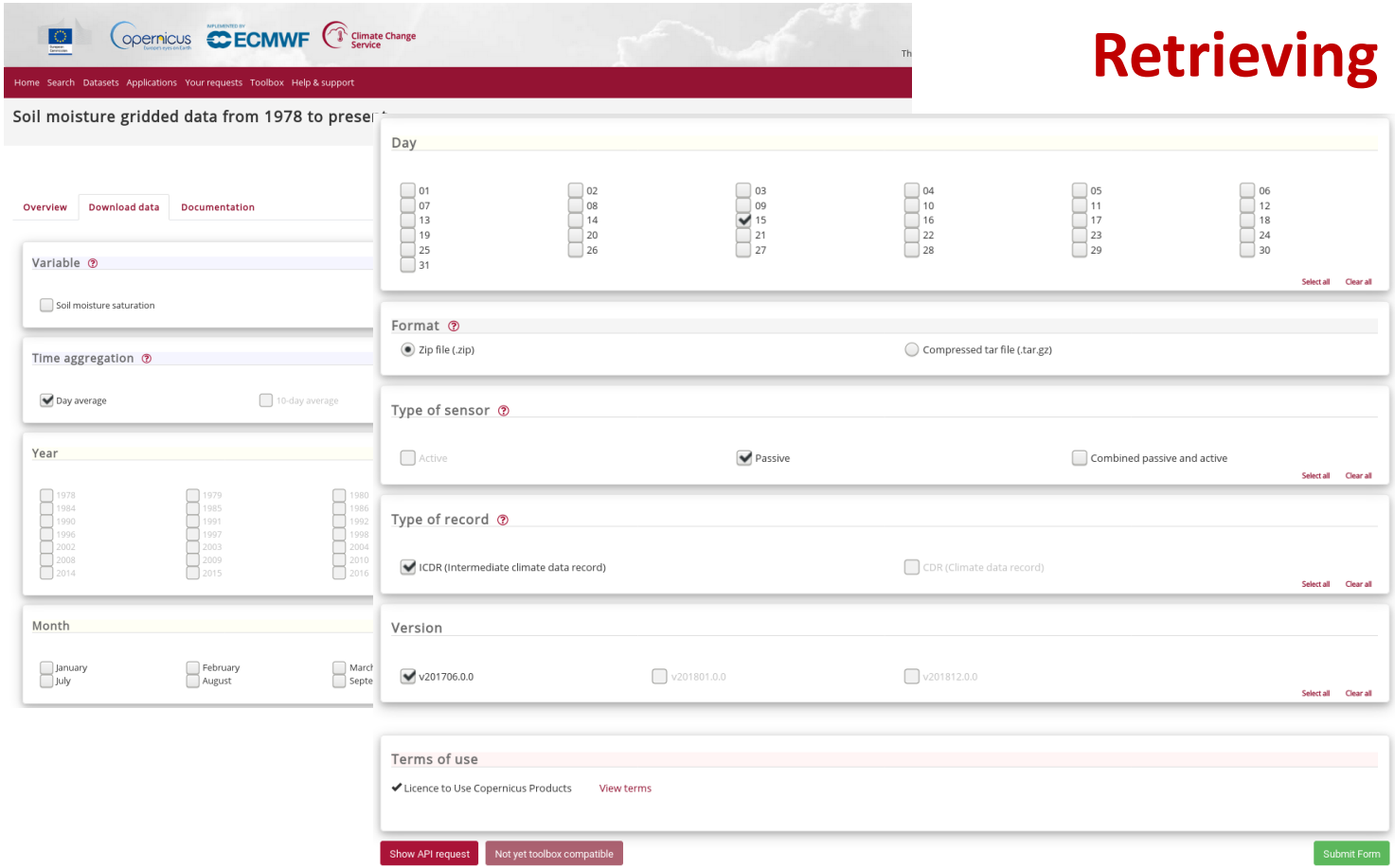
Example of Dataset access in the CDS

Retrieving data



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Example of Dataset access in the CDS

Documentation

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Example of Dataset access in the CDS

Overview | Download data | Quality assessment | Documentation

This is a new feature, work in progress. Should any inconsistency be found, please report to copernicus-support@ecmwf.int

The CDS datasets are assessed by the Evaluation and Quality Control (EQC) function of C3S independently of the data supplier. EQC encompasses a framework of processes aimed to assure technical and scientific quality harmonized across all dataset types available through the CDS. During the EQC process, the documentation provided with the dataset is scrutinized and data are checked for usability and reliability.

Variable:

Volumetric surface soil moisture ×

Type of sensor:

Combined passive and active ×

Time aggregation:

10-day average ×

Type of record:

CDR (Climate data record) ×

Version:

v201812.0.0 ×

Quality Assurance

▾ Variable: Volumetric surface soil moisture - Type of sensor: Combined passive and active - Time aggregation: 10-day average - Type of record: CDR (Climate data record) - Version: v201812.0.0

Last updated on 23/08/2021

INTRODUCTION	USER DOCUMENTATION	ACCESS	INDEPENDENT ASSESSMENT
Dataset overview	User guide	Toolbox compatibility	Data check
Temporal and spatial coverage and resolution	Scientific methodology	Archive	Expert evaluation
Providers	Uncertainty quantification		Dataset maturity
Dataset version	Validation		Key strengths and limitations
Data update	Inter-comparison		

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Thank you!

@copernicusEU
@copernicusECMWF
@j_munoz_sabater

C3S: https://climate.copernicus.eu/

Climate Data Store: https://cds.climate.copernicus.eu/

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