# Copernicus Climate Change Service (C3S) from raw data to users; making sense of the data

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Climate Change Service
climate.copernicus.eu

## Climate Data Records of Essential Climate Variables based on satellite observations

**R&D**: Research, development and production of Climate Data Records (CDRs) based on satellite sensors (radiometers, sounders, imagers, etc.)

**C3S:** operationalization of the production chains developed in R&D.
Provision of data and services through the Climate Data Store (cds.climate.copernicus.eu):

- Consistent spatial/temporal extension of CDRs
- Evaluation and Quality Control
  - Transparency / traceability
  - Uncertainty quantification
  - Fitness for purpose
- Full documentation
- User support

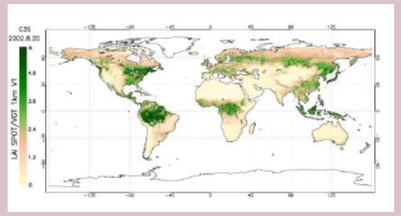
## Relevance for UNFCCC

### Essential Climate Variables (ECVs) and the Paris Agreement

- Support countries to determine their baseline climate-impact risk and to monitor national adaptation measures (Articles 7.10-14)
- Assist countries to provide accurate GHG inventories (Article 13.7)
- Help informing NDCs and planning of future term emission strategies (Article 4.19)
- Provide long-term, quality-assured, homogeneous and accessible climate data

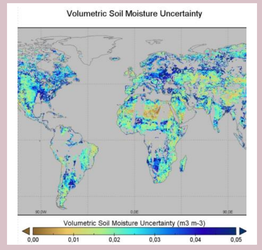
### Leaf area index and fraction absorbed of photosynthetically active radiation 10-daily gridded data from 1981 to present

cds.climate.copernicus.eu/cdsapp#!/dataset/satellite-lai-fapar



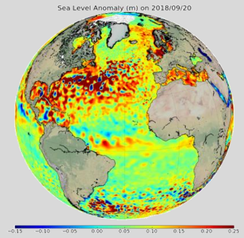

### Soil moisture gridded data from 1978 to present

cds.climate.copernicus.eu/cdsapp#!/dataset/satellite-soil-moisture

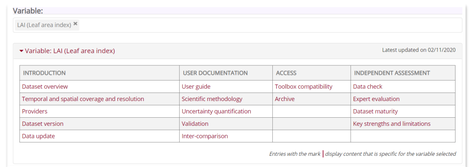



### Sea level daily gridded data from satellite altimetry for the global ocean from 1993 to present

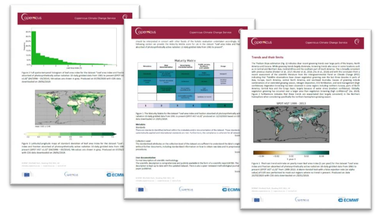
cds.climate.copernicus.eu/cdsapp#!/dataset/satellite-sea-level-global




### Quality assurance




### Independent assessment of ECVs

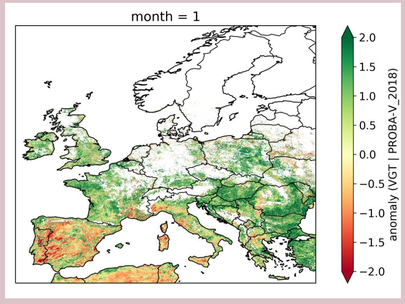


### User support journey

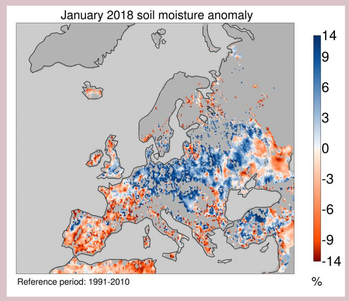

### European State of the Climate 2018

climate.copernicus.eu/vegetation-and-land-surface

Prolonged warm and dry conditions evident in anomalies of soil moisture and LAI for spring-summer 2018. *Increasing the relevance of monitoring products to specific sectors.*




*Monthly Leaf Area Index (LAI) anomalies for 2018 as estimated from satellites. Anomalies are given as a z-score comparing PROBA-V sensor data for 2018 to a climatology based on the SPOT-VGT sensor data for 1998-2014. Data source: SPOT-VGT/PROBA-V Credit: Copernicus Climate Change Service (C3S)/VITO.*

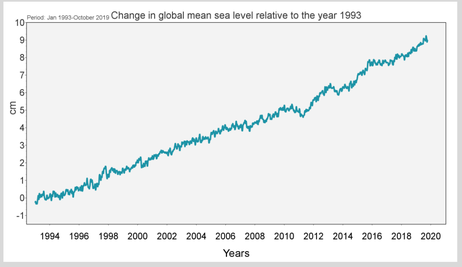



*Monthly soil moisture anomaly for each month of 2018 relative to the average for the same month for 1991-2010, as estimated from C3S satellite soil moisture. Data Source: C3S soil moisture v201812 PASSIVE. Credit: Copernicus Climate Change Service (C3S)/ECMWF/TUWIEN/EODC/VanderSat*

### Global sea level indicator

**climate.copernicus.eu/ESOTC/2019/sea-level**

Using C3S sea level CDR to derive the CMEMS global ocean monitoring indicator. *In support of WMO monitoring for UNFCCC.*




*Daily change in globally averaged mean sea level from January 1993 to October 2019. The data have been adjusted for glacial isostatic adjustment and are shown relative to the annual mean value for 1993. Data source: CMEMS Ocean Monitoring Indicator based on the C3S sea level product. Credit: Copernicus Climate Change Service (C3S)/Copernicus Marine Environment Monitoring Service (CMEMS).*

European Commission

IMPLEMENTED BY ECMWF