Information for the CDS

Temporary dataset title:

**CMIP5 monthly data on single levels**

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Official reference number service contract: C3S\_34a\_Lot1/SC3

( Please note that Abstract, Additional variables, Picture, Licence and Documentation can be filled later on, as well the explanation of the variables. Mandatory from the start are: Manifests, conventions and names and units for the variables.

Please see <https://confluence.ecmwf.int/display/COPSRV/How+to+integrate+data+in+the+CDS+Catalogue> to have more specific information on how to provide the required information)

This is important since there are always some small changes in the way the information should be provided due to lessons learned with the provider.

## ACCESSING DATA:

## File name and path convention used to create the addresses to access the files with data

## **Very Important: This should describe the whole dataset to be delivered and not just a part. Not just what already exists, but also what is expected to exist.**

The dataset is made accessible to the CDS via HTTP and OpenDAP protocols.

The URL addresses for the data records are structured as follows:

%(root)s

/%(product)s

/%(institute)s

/%(model)s

/%(experiment)s

/%(time\_frequency)s

/%(realm)s

/%( table)s

/%(ensemble)s

/%(variable)s

/%(version)s

/%(variable)s\_%(table)s\_%(model)s\_%(experiment)s\_%(ensemble)s\_%(timeperiod)s.nc

|  |  |  |
| --- | --- | --- |
| **Identifier** | **All possible values** | **Explanation** |
| root | <http://data.mips.copernicus-climate.eu/thredds/fileServer/esg_c3s-cmip5>  http://data.mips.copernicus-climate.eu/thredds/dodsC/esg\_c3s-cmip5 | Download method, HTTP or OpenDAP |
| product | output1 | CMIP5 product |
| institute | BCC  BNU  CCCma  CMCC  CNRM-CERFACS  CSIRO-BOM  CSIRO-QCCCE  FIO  ICHEC  INM  IPSL  LASG-CESS  LASG-IAP  MOHC  MPI-M  NASA-GISS  NCAR  NCC  NOAA-GFDL  NSF-DOE-NCAR | CMIP5 institution id |
| model | ACCESS1-0  ACCESS1-3  bcc-csm1-1  bcc-csm1-1-m  BNU-ESM  CanAM4  CanCM4  CanESM2  CCSM4  CESM1-BGC  CESM1-CAM5  CESM1-FASTCHEM  CESM1-WACCM  CMCC-CESM  CMCC-CM  CMCC-CMS  CNRM-CM5  CNRM-CM5-2  CSIRO-Mk3-6-0  EC-EARTH  FGOALS-g2  FGOALS-s2  FIO-ESM  GFDL-CM2p1  GFDL-CM3  GFDL-ESM2G  GFDL-ESM2M  GFDL-HIRAM-C180  GFDL-HIRAM-C360  GISS-E2-H  GISS-E2-H-CC  GISS-E2-R  GISS-E2-R-CC  HadCM3  HadGEM2-A  HadGEM2-CC  HadGEM2-ES  inmcm4  IPSL-CM5A-LR  IPSL-CM5A-MR  IPSL-CM5B-LR  MPI-ESM-LR  MPI-ESM-MR  MPI-ESM-P  NorESM1-M  NorESM1-ME | CMIP5 model name |
| experiment | amip  historical  piControl  rcp26  rcp45  rcp60  rcp85 | CMIP5 experiment name |
| time\_frequency | mon | CMIP5 time frequency |
| realm | atmos  land  landIce  ocean  seaIce | CMIP5 modelling realm |
| table | Amon  LImon  Lmon  OImon  Omon | CMIP5 MIP (CMOR) table id |
| ensemble | r10i1p1  r11i1p1  r12i1p1  r13i1p1  r14i1p1  r1i1p1  r1i1p121  r1i1p124  r1i1p125  r1i1p126  r1i1p127  r1i1p128  r1i1p142  r1i1p2  r1i1p3  r1i1p4  r1i2p1  r1i2p2  r2i1p1  r2i1p2  r2i1p3  r2i3p1  r3i1p1  r3i1p2  r3i1p3  r3i2p1  r4i1p1  r4i1p2  r4i1p3  r4i3p1  r5i1p1  r5i1p2  r5i1p3  r5i3p1  r6i1p1  r6i1p2  r6i1p3  r7i1p1  r8i1p1  r9i1p1 | CMIP5 ensemble identifier |
| variable | clt  evspsbl  hfls  hfss  hurs  huss  mrro  mrsos  pr  prsn  ps  psl  rlds  rlus  rlut  rlutcs  rsds  rsdt  rsus  rsut  rsutcs  sfcWind  sic  sim  sit  snd  snw  sos  tas  tasmax  tasmin  tauu  tauv  tos  ts  tsice  uas  vas  zos | CMIP5 variable id |
| version | v1  v2  v20110323  v20110324  v20110406  v20110418  v20110427  v20110513  v20110601  v20110629  v20110630  v20110701  v20110726  v20110728  v20110803  v20110822  v20110823  v20110901  v20110905  v20110913  v20110914  v20110915  v20110916  v20110920  v20110923  v20110927  v20110928  v20110930  v20111005  v20111006  v20111007  v20111010  v20111014  v20111017  v20111018  v20111025  v20111028  v20111103  v20111109  v20111119  v20111128  v20111129  v20111205  v20111206  v20111207  v20111208  v20111209  v20111215  v20111217  v20111218  v20111220  v20111222  v20111228  v20120105  v20120106  v20120110  v20120113  v20120114  v20120120  v20120202  v20120225  v20120227  v20120229  v20120315  v20120316  v20120330  v20120407  v20120410  v20120412  v20120417  v20120425  v20120430  v20120501  v20120502  v20120503  v20120504  v20120508  v20120510  v20120511  v20120514  v20120515  v20120516  v20120517  v20120518  v20120522  v20120523  v20120524  v20120526  v20120528  v20120530  v20120531  v20120602  v20120604  v20120611  v20120612  v20120613  v20120614  v20120615  v20120616  v20120620  v20120621  v20120623  v20120624  v20120625  v20120626  v20120628  v20120705  v20120708  v20120709  v20120711  v20120714  v20120716  v20120717  v20120718  v20120720  v20120723  v20120724  v20120731  v20120804  v20120807  v20120808  v20120809  v20120810  v20120813  v20120814  v20120815  v20120817  v20120820  v20120822  v20120827  v20120828  v20120830  v20120904  v20120905  v20120906  v20120910  v20120914  v20120920  v20120921  v20120925  v20120928  v20121001  v20121002  v20121010  v20121015  v20121016  v20121029  v20121031  v20121107  v20121113  v20121128  v20121129  v20121211  v20121213  v20121214  v20130101  v20130104  v20130207  v20130212  v20130213  v20130214  v20130216  v20130226  v20130302  v20130304  v20130305  v20130312  v20130313  v20130314  v20130315  v20130325  v20130329  v20130401  v20130402  v20130404  v20130411  v20130416  v20130417  v20130425  v20130426  v20130510  v20130513  v20130715  v20130731  v20130808  v20130820  v20130821  v20130822  v20130826  v20130827  v20130828  v20130830  v20130903  v20130904  v20130905  v20130906  v20130909  v20130910  v20130911  v20130912  v20130916  v20130918  v20130926  v20131031  v20131108  v20131119  v20131120  v20131126  v20131127  v20131217  v20131218  v20131219  v20131220  v20131227  v20131231  v20140114  v20140129  v20140219  v20140221  v20140225  v20140304  v20140305  v20140327  v20140402  v20140403  v20140404  v20140417  v20140520  v20140522  v20140826  v20181201  v4 | ESGF version number |
| timeperiod | 000101 - […]  […] - 301101 | Temporal period of data in file |

**Examples:**

<http://data.mips.copernicus-climate.eu/thredds/fileServer/esg_c3s-cmip5/output1/NCAR/CCSM4/historical/mon/atmos/Amon/r1i1p1/rlds/v20130425/rlds_Amon_CCSM4_historical_r1i1p1_185001-200512.nc>

This URL provides an HTTP download link to CMIP5 monthly geopotential height on pressure levels data computed by the CCSM4 model from NCAR for the historical experiment by ensemble member r1i1p1 over the time period 1850-01 – 2005-12.

## Address for Manifest File for data

HTTP URLs:

<https://drive.google.com/file/d/1Zghw0bQIjlWW7EhOTrjrxAvBJxh6YCfh/view?usp=sharing>

OpenDAP URLs:

<https://drive.google.com/file/d/15vTnVolIO6ITXsFP0AtPRINdEPjrr6Bq/view?usp=sharing>

## Mapping between files and variables

The CMIP5 subset provided to the CDS follows the CF conventions where there is only variable per file. It is however possible to require multiple files to construct a timeseries of a given variable.

The mapping is as follows:

* tas\_\*.nc files contain the variable: Near-surface (2m) air temperature
* ts\_\*.nc files contain the variable: Surface skin temperature
* tasmax\_\*.nc files contain the variable: Daily maximum near-surface air temperature
* tasmin\_\*.nc files contain the variable: Daily minimum near-surface air temperature
* psl\_\*.nc files contain the variable: Sea-level pressure
* ps\_\*.nc files contain the variable: Surface pressure
* uas\_\*.nc files contain the variable: Near-surface zonal component of wind
* vas\_\*.nc files contain the variable: Near-surface meridional component of wind
* sfcWind\_\*.nc files contain the variable: Near-surface wind speed
* hurs\_\*.nc files contain the variable: Near-surface relative humidity
* huss\_\*.nc files contain the variable: Near-surface specific humidity
* pr\_\*.nc files contain the variable: Precipitation
* prsn\_\*.nc files contain the variable: Snowfall flux
* evspsbl\_\*.nc files contain the variable: Evaporation
* tauu\_\*.nc files contain the variable: Surface eastward wind stress (downward)
* tauv\_\*.nc files contain the variable: Surface northward wind stress (downward)
* hfls\_\*.nc files contain the variable: Surface latent heat flux (upward)
* hfss\_\*.nc files contain the variable: Surface sensible heat flux (upward)
* rlds\_\*.nc files contain the variable: Surface downwelling longwave radiation
* rlus\_\*.nc files contain the variable: Surface upwelling longwave radiation
* rsds\_\*.nc files contain the variable: Surface downwelling shortwave radiation
* rsus\_\*.nc files contain the variable: Surface upwelling shortwave radiation
* rsdt\_\*.nc files contain the variable: Top of atmosphere incident shortwave radiation
* rsut\_\*.nc files contain the variable: Top of atmosphere outgoing shortwave radiation
* rsutcs\_\*.nc files contain the variable: Top of atmosphere outgoing clear-sky shortwave radiation
* rlut\_\*.nc files contain the variable: Top of atmosphere outgoing longwave radiation
* rlutcs\_\*.nc files contain the variable: Top of atmosphere outgoing clear-sky longwave radiation
* clt\_\*.nc files contain the variable: Total cloud fraction
* mrsos\_\*.nc files contain the variable: Total column soil moisture content
* mrro\_\*.nc files contain the variable: Total runoff
* snw\_\*.nc files contain the variable: Surface snow amount
* tos\_\*.nc files contain the variable: Sea surface temperature
* sos\_\*.nc files contain the variable: Sea surface salinity
* zos\_\*.nc files contain the variable: Sea surface height above geoid
* sic\_\*.nc files contain the variable: Sea ice fraction
* sit\_\*.nc files contain the variable: Sea ice thickness
* snd\_\*.nc files contain the variable: Snow depth over sea ice
* sim \_\*.nc files contain the variable: Sea ice and snow amount
* tsice\_\*.nc files contain the variable: Sea ice surface temperature
* od550aer\_\*.nc files contain the variable: Ambient Aerosol Optical Thickness at 550 nm

## Download options

* HTTP URLs:
  + https://data.mips.copernicus-climate.eu/thredds/fileServer/esg\_c3s-cmip5
* OpenDAP URLs:
  + https://data.mips.copernicus-climate.eu/thredds/dodsC/esg\_c3s-cmip5

## ACCESSING DOCUMENTATION:

## 

## Address for Manifest File for documents

None

**Documentation to be available in the CDS**

CMIP5 essential information: <https://pcmdi.llnl.gov/mips/cmip5/guide.html>

The link above provides simple and direct information on CMIP5. It also works as an entry point for more in-depth documentation on CMIP5 data and experiments.

## Information that can be provided after the manifest and conventions are accepted and tested:

## -----------------------------------------------------------------------------

# Abstract

This catalogue entry provides monthly climate projections on single levels from a large number of experiments, models, members and time periods computed in the framework of fifth phase of the Coupled Model Intercomparison Project (CMIP5). Information on how to access the complete CMIP5 dataset can be found in the Documentation section.

The term "single levels" is used to express that the variables computed at multiple vertical levels are excluded from this catalogue entry. The term "experiments" refers to the four main categories of CMIP5 simulations:

* Pre-industrial control experiments (Pi-control) with prescribed, non-evolving concentrations of atmospheric gases and aerosols as they are supposed to be before the industrial period;
* Historical experiments which cover the period where climate observations do exist;
* Ensemble of experiments from the Atmospheric Model Intercomparison Project (AMIP), which prescrives the oceanic variables for all models and during the all period of the experiment. This configuration removes the added complexity of ocean-atmosphere feedbacks in the climate system;
* Ensemble of climatic projection experiments following the Representative Concentration Pathways (RCP) 2.6, 4.5, 6.0 and 8.5.

Typically, the same experiment was done using different models. In addition, for each model, the same experiment was repeatedly done using slightly different conditions producing in that way an ensemble of experiments closely related. Each member of that ensemble is named after a triad of integers associated to the letters r, i and p. These three letter cover variations in initial conditions and dates as well as in the physical parameters of the models. The associated numbers are typically assigned sequentially. For instance, the member "r1i1p1" and the member "r1i2p2" for the same model and experiment indicate that the corresponding simulations differ since the initial conditions and the physical parameters of the model for the second member were changed relatively to the first member.

CMIP5 data were used extensively in the Intergovernmental Panel on Climate Change 5th Assessment Report (IPCC AR5) which was published in September 2009. The use of these data is often aimed at:

* addressing outstanding scientific questions that arose as part of the IPCC AR4 (the Intergovernmental Panel on Climate Change 4th Assessment Report) process;
* improving the understanding of climate;
* providing estimates of future climate change that will be useful to those considering its possible consequences;
* determining why similarly forced models produce a range of responses;
* assessing the mechanisms responsible for model differences in poorly understood feedbacks associated with the carbon cycle and with clouds;
* examining climate predictability and exploring the ability of models to predict climate on decadal time scales;
* evaluating how realistic the different models are in simulating the recent past.

# Data Description

|  |  |
| --- | --- |
| Horizontal coverage | Global |
| Horizontal resolution | From 0.125°x0.125° to 5°x5° depending on the model |
| Vertical resolution | Variables are provided in one single level (which may differ among variables). |
| Temporal coverage | Dependent on experiment. |
| Temporal resolution | Monthly |
| File format | NetCDF, Climate and Forecast (CF) Metadata Convention v1.4 |
| Data type | Grid |

# Main Variables

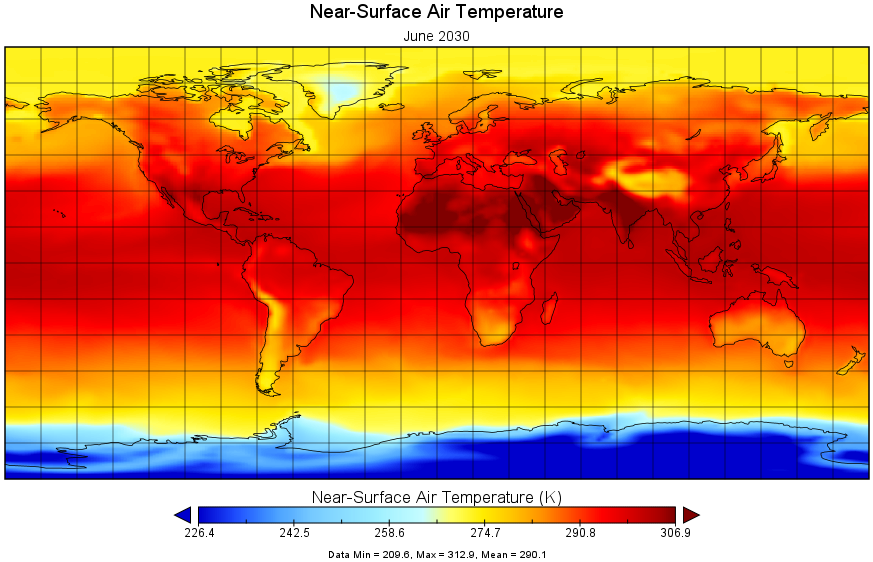
|  |  |  |
| --- | --- | --- |
| **Name** | **Units** | **Explanation** |
|  |  |  |
|  |  |  |
|  |  |  |

# This information is also available in monthly\_single-level\_variables.yml <https://drive.google.com/file/d/1Cqf0PLqKKd3HOs8X_uSy6uZtTzYXLhuM/view?usp=sharing>

# Additional Variables

None

# Overview Picture



# Licence

PDF Version: <http://licences.ceda.ac.uk/image/data_access_condition/cmip5_open.pdf>

**CMIP5 - Data Access - Terms of Use**

**Terms of use agreement for CMIP5 model output**

*All* model output in the CMIP5 archive is available for "non-commercial research and educational purposes." A *subset (about three-quarters of the models)* of the data has also been released for "unrestricted" use, see table in the document "[Modeling Groups and their Terms of Use](https://pcmdi.llnl.gov/mips/cmip5/docs/CMIP5_modeling_groups.pdf?id=95)". Users registering to access CMIP5 output will be granted access to some or all of the data, depending on which of the following terms of use are agreed to:

**Terms of use for unrestricted data:**

1. I understand that the subset of CMIP5 model output that will be made accessible to this group has been designated for "unrestricted" use.

2. I will hold no individual(s), organization(s), or group(s) responsible for any errors in the models or in their output data.

3. In publications that rely on the CMIP5 model output, I will appropriately credit the data providers by an acknowledgment similar to the following:

"We acknowledge the World Climate Research Programme's Working Group on Coupled Modelling, which is responsible for CMIP, and we thank the climate modeling groups (listed in Table XX of this paper) for producing and making available their model output. For CMIP the U.S. Department of Energy's Program for Climate Model Diagnosis and Intercomparison provides coordinating support and led development of software infrastructure in partnership with the Global Organization for Earth System Science Portals."

where *"Table XX"* in your paper should list the models and modeling groups that provided the data you used.

4. I understand that Digital Object Identifiers (DOI's used, for example, in journal citations) will be assigned to various subsets of the CMIP5 multi-model dataset, and when available and as appropriate, I will cite these references in my publications. I will consult the CMIP5 website (<https://pcmdi.llnl.gov/mips/cmip5/>) to learn how to do this.

5. I acknowledge the potential limitations of the data obtained from this archive. These may include (but are not necessarily limited to) errors in the models, shortcomings in the experiment designs, the conjectural quality of the forcing scenarios used to drive the models, and so on.

6. I understand that although the model output has been subjected to a quality control procedure, unrecognized errors almost certainly remain.

7. To aid participating groups in understanding and improving upon their models' behaviors, I will respond to reasonable requests from the WGCM for feedback about my CMIP5 research results (e.g., reporting model deficiencies, recording CMIP5 publications, etc.).

8. Although I may freely share downloaded CMIP5 data with close collaborators, I understand that I may not redistribute the data more widely without abiding by additional terms of use enumerated below.

Users may share data with close collaborators who have agreed to abide by the above terms of use. A research institution wishing to share CMIP5 data \*internally\* among its staff may seek permission to do so from PCMDI by submitting to PCMDI this form [permission\_to\_share\_form.docx](https://pcmdi.llnl.gov/mips/cmip5/docs/permission_to_share_form.docx). Others planning to redistribute CMIP5 model output must abide by additional "terms of use" enumerated below.

**\*Additional\* terms of use for redistribution of CMIP5 model output:**

For the following reasons, users are discouraged from downloading CMIP5 data for the purpose of redistributing it to others (beyond their close collaborators):

1. The CMIP5 data archive is a dynamic collection of files, and it will be difficult to keep a copy (of even a small subset of the archived data) up to date. (Even if an automated update procedure is implemented, the resources allocated to the official CMIP5 archive could be unduly affected.)

2. The modeling groups have requested that users downloading CMIP5 data be registered and agree to the terms of use, and PCMDI alone is responsible for this.

If despite the above arguments against it, you wish to redistribute CMIP5 data to others, there are specific conditions that must be met. In addition to abiding by the terms of use (see above), anyone redistributing CMIP5 output (beyond their close collaborators) is required to:

1. Seek permission to proceed by contacting PCMDI (taylor13@llnl.gov, williams13@llnl.gov).

2. Record contact information for all users downloading CMIP5 output. These records must be sent to PCMDI quarterly in a format acceptable to PCMDI. These records will be used 1) to inform users when flaws in model output are discovered, and 2) to gauge the impact of CMIP5 results through the collection of usage statistics, as requested by the modeling groups.

3. Continually update data holdings to accurately reflect the CMIP5 archive. This will prevent known flawed data from being distributed.

4. Require users to agree to the "terms of use" and "acknowledgement" statements found at: [http://cmip- pcmdi.llnl.gov/cmip5/terms.html](https://cmip.llnl.gov/cmip5/terms.html).

5. Display a prominent banner showing the source of the data (CMIP5) and indicating that the original CMIP5 data can be accessed through the ESGF data portals (see <https://pcmdi.llnl.gov/mips/cmip5/availability.html>).

6. Display a warning that the modeling groups have not checked or approved of the data being distributed.

In general, the operation of ESGF and its performance in serving other users must not be adversely affected.

Note that commercial use of all but "unrestricted" data is strictly forbidden. In particular, paid advertisements must not appear on websites providing access to data (or derived data products) from CMIP5 models that have been designated as being available only for "non-commercial research and educational purposes".

**Dataset citation**

**Literature citation**