

# CMIP6 Data Citation and IPCC Data Distribution Centre Services

- Two services for CMIP6 / AR6 provided by WDC Climate at DKRZ -

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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## Data Citation Service

### Concept/Workflow

The Data Citation Service is an integral part of the CMIP6 Infrastructure. Its concept is approved by the WGCM Infrastructure Panel.

### Implementation

The implementation of the CMIP6 Citation Service consists of an Oracle database schema with a GUI, a landing page and a Restful API.

[Data Citation](#)

### CMIP6 Integration

The Data Citation Service is integrated into the ESGF CoG portal and the furtherInfoURL page.

[IPCC DDC](#)

### Scholix Integration

Scholix develops services to improve the integration of data citations into the scholarly publication environment.

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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## Data Citation Service: Concept (1/5)

The Data Citation Service is an integral part of the CMIP6 Infrastructure approved by the WGCM Infrastructure Panel (WIP). An early data citation possibility was added for CMIP6.

### Early Data Citation and IPCC DDC Data Citation:

CMIP6 data should be cited in scholarly publications using DataCite DOIs. It is recommended to cite data long-term archived in the IPCC DDC when available. The evolving CMIP6 data published and disseminated by the ESGF will be assigned early citations.

- **Early Citation:** Data gets citable with its early citation reference as soon as the first datasets are published in the ESGF and the mandatory citation information is available, i.e. author list, title, and contact person. Citation references include the latest dataset version or download date:  
*creators (publication year): title. version: YYYYMMDD. ESGF. doi.*
- **DDC Citation:** Data will be long-term archived in the IPCC DDC at a snapshot date defined by the IPCC. This data subset of the CMIP6 data will be registered a DDC DOI. Citations of long-term archived data are static and thus do not include versions:  
*creators (publication year): title. WDCC at DKRZ. doi.*

### Terms of Use:

- CMIP6 Data: <https://pcmdi.llnl.gov/CMIP6/TermsOfUse>
- Data Citation Guidelines: <http://bit.ly/2gBCuqM>



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## Data Citation Service: Concept (2/5)

The Data Citation Service is an integral part of the CMIP6 Infrastructure approved by the WGCM Infrastructure Panel (WIP). An early data citation possibility was added for CMIP6.

### Citation Granularities:

Experiences from CMIP5 showed that the data citation of individual simulations contributed by an institute with a model is too fine-granular to be suitable for use in reference lists for some scholarly publications (i.e. number of data and article references are unbalanced). Therefore a second coarser data citation granularity was added for CMIP6 data citations.

The two provided data citation granularities for CMIP6 data are:

- **Coarse:** Data of a model contributed by an institution to a CMIP6 MIP
- **Fine:** Data of a model contributed by an institution to a CMIP6 experiment

The CMIP6 data citation service is also provided for the CMIP6 forcing data of the input4MIPs project.

### References:

- “CMIP6 Data Citation and Long-Term Archival” - WIP white paper, <http://bit.ly/23rsG8l> .
- CMIP6 Citation Service: <http://cmip6cite.wdc-climate.de>
- WIP: <https://www.earthsystemcog.org/projects/wip/>
- input4MIPs: <http://goo.gl/r8up31>

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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## Data Citation Service: Concept (3/5)

The Data Citation Service is an integral part of the CMIP6 Infrastructure approved by the WGCM Infrastructure Panel (WIP). An early data citation possibility was added for CMIP6.

### Data Citation Workflow (1) – CMIP6 Phase:

**Precondition:** CMIP6 CV: Registration of institution\_id and source\_id as CMIP6 Controlled Vocabulary (CV)

#### 1. Early Citation / CMIP6 Phase:

- a. **CMIP6 Citation GUI:** Provide mandatory citation information on authors, title and a contact person for the coarse model/MIP granularity via the CMIP6 Citation GUI.
- b. **ESGF:** Prepare and ESGF-publish the first datasets
  - Data Citation information is available in the ESGF CoG portal
  - A DataCite DOI on the early citation will be registered, which remains stable while the CMIP6 data evolves. The CMIP6 data is citable.
- c. **CMIP6 Citation GUI:** Maintain or add to the provided data citation information on coarse and fine citation granularities.

### References:

- CMIP6 CV: [https://github.com/WCRP-CMIP/CMIP6\\_CVs](https://github.com/WCRP-CMIP/CMIP6_CVs)
- CMIP6 Citation GUI: <http://cera-www.dkrz.de/citeXA>
- CMIP6 Citation: <http://cmip6cite.wdc-climate.de>

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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## Data Citation Service: Concept (4/5)

The Data Citation Service is an integral part of the CMIP6 Infrastructure approved by the WGCM Infrastructure Panel (WIP). An early data citation possibility was added for CMIP6.

### Data Citation Workflow (2) – IPCC DDC Phase:

#### 2. IPCC DDC Phase:

- a. **CMIP6 Citation GUI:** The snapshot date for closing the IPCC DDC Reference Data long-term Archive will be announced. Afterwards the data citation information can be finalized in the Citation GUI.  
→ Data Citation Information is no longer changeable.
- b. **Long-Term Archival in the DDC:** Data is moved from the CMIP6 data node repositories into the IPCC DDC long-term archive hosted at DKRZ. Available documenting ancillary metadata, e.g. ES-DOC metadata, is added to the data and quality assurance is applied.  
→ The DDC mints DataCite DOIs on this snapshot and subset of CMIP6 data with references to the CMIP6 early citation DOI.  
→ The displayed data citation recommendation for users will be changed to using and citing the stable long-term archived IPCC DDC data.

### References:

- CMIP6 Citation GUI: <http://cera-www.dkrz.de/citeXA>
- Data Citation Guidelines: <http://bit.ly/2gBCuqM>

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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## Data Citation Service: Concept (5/5)

The Data Citation Service is an integral part of the CMIP6 Infrastructure approved by the WGCM Infrastructure Panel (WIP). An early data citation possibility was added for CMIP6.

### Future Plans:

#### 1. User-defined citable data collections:

The current concept focusses on the credit idea. Thus for an identification of the exact datasets underlying a scholarly publication, the article has to be read. An extension of the data citation concept by a user-defined data collection citation is planned for CMIP7. The user then should cite the source CMIP6 data and the used data collection in a scholarly publication. CMIP policies are required for

- Authorship of data collections over several data citation entities
- Long-term availability of the data – Integration in CMIP replication strategy

#### 2. Federated data citation:

Different data nodes within the ESGF plan to or already register DataCite DOIs. For CMIP7 it is likely that the central data citation approach from CMIP5/AR5 and CMIP6/AR6 will be changed into a federated approach. One possibility is an ESGF membership of DataCite. An integration of the citation information gathering into the data preparation process would be required.

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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## Data Citation Service: Implementation (1/3)

The implementation of the CMIP6 Citation Service consists of an Oracle database schema with a Graphical User Interface, a landing page for displaying and a Restful API for machine-access of data citation information.

### Graphical User Interface (Oracle APEX):

Every citation manager of the contributing modeling centers is provided with an account to maintain the data citation information. Author lists, titles and a contact person are mandatory. Information on contributors like funders or research groups or references to articles are optional.

Precondition to use the data citation service is the registration of institution\_id and source\_id (model acronym) for CMIP6.

**GUI:** <http://cera-www.dkrz.de/citeXA>

**Tutorial:** [http://cera-www.dkrz.de/docs/pdf/CMIP6\\_Citation\\_Userguide.pdf](http://cera-www.dkrz.de/docs/pdf/CMIP6_Citation_Userguide.pdf)

The screenshot displays the 'Create Citation for CMIP6 Data' form. It includes fields for Title, Date/Version, List Name, Modification Date, and List Description. Below the form, there is a table of existing citations with columns for DRS Name, URL of Citation Landing Page, and Citation Landing Page. The table lists several citations, including 'cmip5.output1.MPI-M.MPI-ESM-P' and 'CMIP6.CMIP.MOHC.HadGEM3.1pctCO2'. A red arrow points to the 'next' button at the bottom right of the table.

DRS Name	URL of Citation Landing Page	Citation Landing Page
cmip5.output1.MPI-M.MPI-ESM-P	<a href="http://cera-www.dkrz.de/WDCC/meta/CMIP6/cmip5.output1.MPI-M.MPI-ESM-P">http://cera-www.dkrz.de/WDCC/meta/CMIP6/cmip5.output1.MPI-M.MPI-ESM-P</a>	<a href="#">View</a>
CMIP6.CMIP.MOHC.HadGEM3.1pctCO2	<a href="http://cera-www.dkrz.de/WDCC/meta/CMIP6/CMIP6.CMIP.MOHC.HadGEM3.1pctCO2">http://cera-www.dkrz.de/WDCC/meta/CMIP6/CMIP6.CMIP.MOHC.HadGEM3.1pctCO2</a>	<a href="#">View</a>
CMIP6.ScenarioMIP.Institute.model	<a href="http://cera-www.dkrz.de/WDCC/meta/CMIP6/CMIP6.ScenarioMIP.Institute.model">http://cera-www.dkrz.de/WDCC/meta/CMIP6/CMIP6.ScenarioMIP.Institute.model</a>	<a href="#">View</a>
CMIP6.ScenarioMIP.MPI-M.MPI-ESM2	<a href="http://cera-www.dkrz.de/WDCC/meta/CMIP6/CMIP6.ScenarioMIP.MPI-M.MPI-ESM2">http://cera-www.dkrz.de/WDCC/meta/CMIP6/CMIP6.ScenarioMIP.MPI-M.MPI-ESM2</a>	<a href="#">View</a>
CMIP6.ScenarioMIP.MPI-M.MPI-ESM2.ssp126	<a href="http://cera-www.dkrz.de/WDCC/meta/CMIP6/CMIP6.ScenarioMIP.MPI-M.MPI-ESM2.ssp126">http://cera-www.dkrz.de/WDCC/meta/CMIP6/CMIP6.ScenarioMIP.MPI-M.MPI-ESM2.ssp126</a>	<a href="#">View</a>
CMIP6.ScenarioMIP.MPI-M.MPI-ESM2.ssp245	<a href="http://cera-www.dkrz.de/WDCC/meta/CMIP6/CMIP6.ScenarioMIP.MPI-M.MPI-ESM2.ssp245">http://cera-www.dkrz.de/WDCC/meta/CMIP6/CMIP6.ScenarioMIP.MPI-M.MPI-ESM2.ssp245</a>	<a href="#">View</a>
cmip5.output1.MPI-M.MPI-ESM-P.1pctCO2	<a href="http://cera-www.dkrz.de/WDCC/meta/CMIP6/cmip5.output1.MPI-M.MPI-ESM-P.1pctCO2">http://cera-www.dkrz.de/WDCC/meta/CMIP6/cmip5.output1.MPI-M.MPI-ESM-P.1pctCO2</a>	<a href="#">View</a>

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## Data Citation Service: Implementation (2/3)

The implementation of the CMIP6 Citation Service consists of an Oracle database schema with a Graphical User Interface, a landing page for displaying and a Restful API for machine-access of data citation information.

### Landing Page

The landing page displays the available data citation information ordered under different tabs.

The URL of this page gets registered as target page for the DataCite DOI, after the first data is ESGF-published and the mandatory data citation information is provided by the citation manager.



The screenshot shows the WCRP PCMDI metadata page for CMIP6.ScenarioMIP.PCMDI-test-1-0. The page includes a navigation bar with tabs: Citation, Abstract, Creators, Researchers, Funders, and Relations. The main content area displays citation elements for the dataset, including the creator (Taylor, Karl E.; Lautenschlager, Michael; Lawrence, Bryan), publication year (2017), title (PCMDI PCMDI-test1.0 model output prepared for CMIP6 ScenarioMIP), publication agency (Earth System Grid Federation), identifier (10.22033/ESGF/CMIP6.858), contact (Lautenschlager, Michael), funder(s) (Federal Ministry of Education and Research (BMBF), Program for Climate Model Diagnosis and Intercomparison (PCMDI), Met Office (HC) (MCHG)), research group(s) (Institut Pierre Simon Laplace (IPSL), LASG, Institute of Atmospheric Physics, Chinese Academy of Sciences (IAP-LASG), Norwegian Meteorological Institute (met.no), University of Melbourne (UMelb), Japan Meteorological Agency (JMA)), rights (Creative Commons Attribution 4.0 International License (CC BY-SA 4.0)), license (CMIP6 model data is evolving in the sense that datasets are changed and added as new versions. The author list and the title are not final, either. Cite this data collection including the latest dataset version or if not available the download date as creators (publication year), title, version: YYYYMMDD, publisher, doi according to the Data Citation Guidelines (http://bit.ly/2gBCuqM). Individuals using the data must abide to the terms of use for CMIP6 data (https://pcmdi.llnl.gov/home/CMIP6/CitationRequirements0-0.html). Details on any license restrictions is recorded as a global attribute in the files.), data access (http://esgf-testtest.dkzr.de/search/testproject/?project=CMIP6&activity=ScenarioMIP&institute=PCMDI&model=PCMDI-test-1-0), and metadata export options (XML, JSON). Navigation arrows for 'back' and 'next' are visible at the bottom right of the content area.

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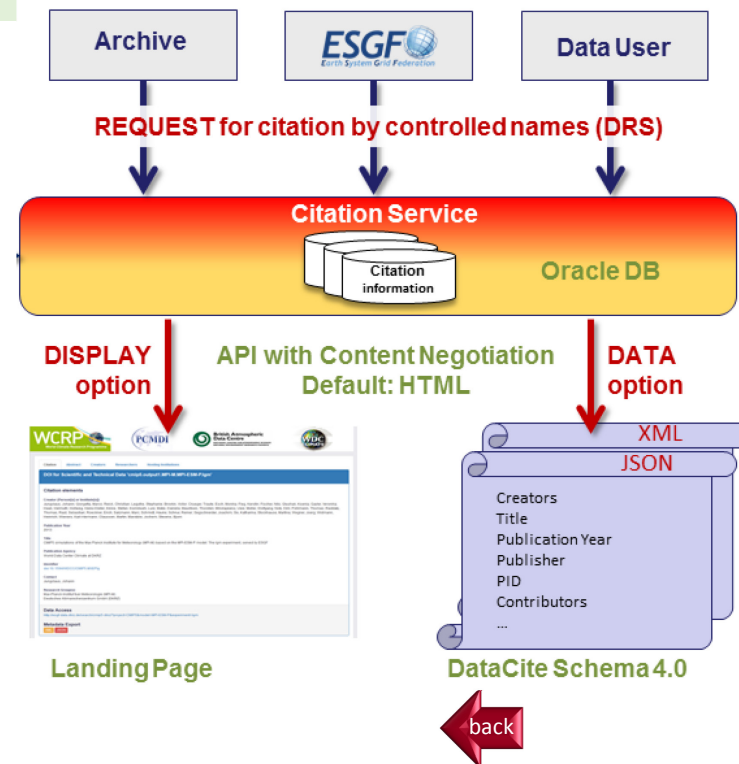
# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## Data Citation Service: Implementation (3/3)

The implementation of the CMIP6 Citation Service consists of an Oracle database schema with a Graphical User Interface, a landing page for displaying and a Restful API for machine-access of data citation information.

### Restful API

For machine-access of the CMIP6 data citation information a Restful API is available. It provides information in DataCite 4.0 XML and JSON formats using content negotiation. E.g. the ESGF CoG portal display option for citation information is based on the JSON format (see next section on “Citation: CMIP6 Integration”).



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DataCite 4.0 Schema: <http://doi.org/10.5438/0012>

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## Data Citation Service: CMIP6 Integration (1/2)

Data Citation information is displayed in the ESGF CoG portal and integrated into the furtherInfoURL information page.

### ESGF CoG Portal

Data users searching for and downloading CMIP6 data can access the connected data citation information via the 'Show Citation' link. Core citation information is displayed using the JSON format of the Restful API (see last section on "Citation: Implementation"). The provided URL gives access to the landing page displaying the complete data citation information.

The screenshot shows the ESGF CoG Portal search interface. On the left is a sidebar with filters for Project (CMIP6), Product (PCMDI), Institute (PCMDI), Model (PCMDI-test-1-0), Experiment, Experiment Family, Time Frequency, Realm, CMIP Table, Ensemble, Variable, and Variable Long Name. The main area contains a search bar with 'Enter Text:' and buttons for Search, Reset, and Display (set to 10 results per page). Below the search bar are checkboxes for 'Show All Replicas', 'Show All Versions', and 'Search Local Node Only (Including All Replicas)'. The search constraints are listed as 'CMIP6 | PCMDI | PCMDI-test-1-0 | ScenarioMIP'. The total number of results is 1. A message prompts users to login to add search results to their Data Cart. Expert users are informed that they can display the search URL and return results as XML or JSON. The first result is 'cmip6.ScenarioMIP.PCMDI.PCMDI-test-1-0.ssp126.r1i1p1f1.6hrLev.ua.gn' with a Data Node of 'esgf-dev.dkrz.de' and Version '20170303'. It includes links for 'Show Metadata', 'Show Files', 'THREDDS Catalog', 'WGET Script', 'Hide Citation', and 'PID'. The 'Data Citation (Landing Page)' section provides the Identifier URL '10.22033/ESGF/CMIP6.858', Creators 'Taylor, Karl E.; Lautenschlager, Michael; Lawrence, Bryan', Title 'PCMDI PCMDI-test1.0 model output prepared for CMIP6 ScenarioMIP', Publisher 'Earth System Grid Federation', and Publication Year '2017'.

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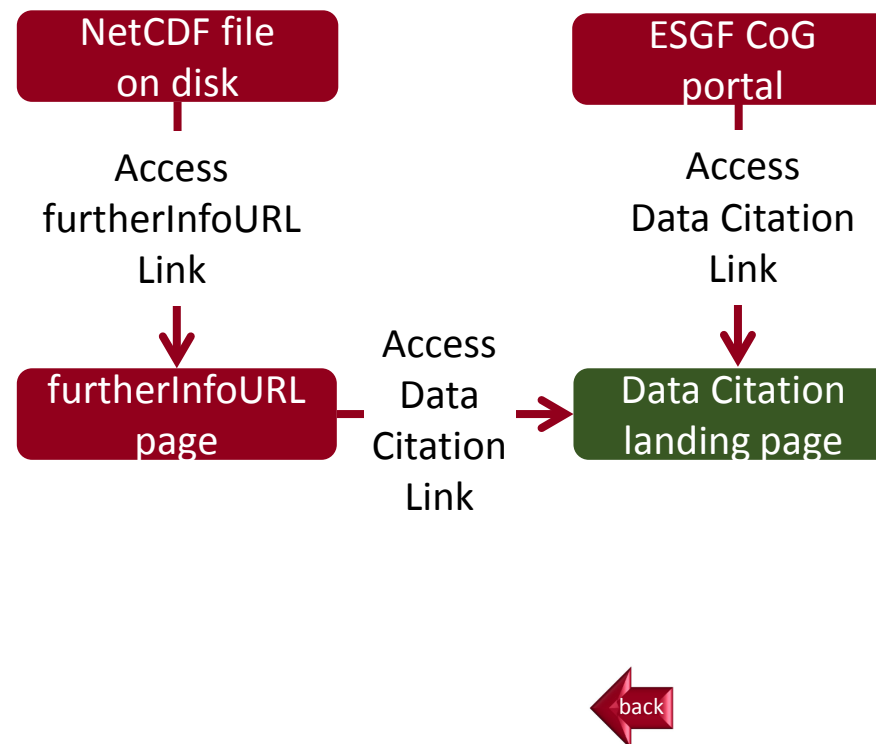
## Data Citation Service: CMIP6 Integration (2/2)

Data Citation information is displayed in the ESGF CoG portal and integrated into the furtherInfoURL information page.

### FurtherInfoURL Page

The furtherInfoURL is part of the global attributes of every NetCDF file. It points to a page summarizing information on ancillary metadata, such as ES-DOC, Errata, and Data Citation.

Thus users having already downloaded a file, can access the connected data citation information via the furtherInfoURL.



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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## Data Citation Service: Scholix Integration

Scholix (Scholarly Link eXchange) develops services to improve the integration of data citations in the scholarly publication environment.

### Scholix

The Scholix initiative is a high level interoperability framework for exchanging information about the links between scholarly literature and data. It aims to build an open information ecosystem to understand systematically what data underpins literature and what literature references data. Within the RDA/WDS Scholarly Link Exchange (Scholix) WG the services are currently developed. The IPCC DDC at DKRZ supports Scholix. The CMIP6 Citation Service plans to be an early adopter of the Scholix services to provide statistics on CMIP6 data usage in literature for the CMIP6 project and the contributing modeling centers.

**Scholix:** <http://www.scholix.org>

**RDA/WDS WG:** <https://www.rd-alliance.org/groups/rdawds-scholarly-link-exchange-scholix-wg>

### Four Key Use Cases



This is **Natalie**. She works for a publisher, managing their online platform. She wants to present links to relevant data to her users that are reading an article online.

Live linking



This is **Paula**. She's a researcher interested in scholarly publication and wants to be able to crawl the web of article/data links to find out if data citation is effective.

Exploration



This is **Mike**. He works for a data center, and he wants to be able to get an overview of all articles and data sets referencing/citing data sets managed by his data center.

Overview



This is **Jeff**. He works for a data center, and he wants to be notified as soon as one of the data sets managed by his data center is referenced or cited in the literature.

Notification

(source: [WDS, 2016](#))

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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## IPCC Data Distribution Centre (IPCC DDC)

### Role

The IPCC DDC facilitates wide availability of climate data and scenarios to enable research and sharing of information across the three IPCC working groups.

### Reference Archive

The IPCC DDC at DKRZ hosts the Reference Data Archive for the climate model output since the Second Assessment Report (1995) in support of IPCC's integrity.

### CMIP6 Data Pool

In support of and in collaboration with the IPCC Working Groups a CMIP6 Data Pool is set up at the IPCC DDC at DKRZ facilitating script-based data analyses.

### IPCC Integration

The IPCC DDC is overseen by the Task Group on Scenarios for Climate and Impact Assessment (TGCIA). Its mandate is currently under review of an IPCC Adhoc Task Force.

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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## IPCC DDC: Role and Mandate

The IPCC DDC facilitates wide availability of climate data and scenarios to enable research and sharing of information across the three IPCC working groups.

### IPCC Data Distribution Centre (IPCC DDC):

The IPCC DDC is jointly managed by the British Atmospheric Data Centre (BADC) in the UK, the Center for International Earth Science Information Network (CIESIN) in the USA, and the World Data Center Climate (WDCC) at DKRZ in Germany. All three data centers are WDS (World Data System) members.

### IPCC DDC hosted by WDCC/DKRZ:

The IPCC DDC hosted by WDCC at DKRZ is maintaining

- the **Reference Data Archive for the climate model output** since the Second Assessment Report (SAR). This is the data underlying the first parts of each AR. The long-term availability of the IPCC data contributes to IPCC's integrity.
- The **CMIP6 Data Pool** is set up as new DDC service for AR6 in cooperation with the three Technical Support Units (TSUs) of the Working Groups (WG) in order to improve the support for the IPCC WGs.

### References:

- IPCC DDC: <http://ipcc-data.org>
- IPCC DDC at DKRZ: <http://ipcc.wdc-climate.de>
- Mandate: <http://ipcc.ch/pdf/activity/tgca-mandate.pdf>
- WDS: <http://icsu-wds.org/>

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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## IPCC DDC: Reference Data Archive (1/3)

The IPCC DDC at DKRZ hosts the Reference Data Archive for the climate model output since the Second Assessment Report (1995) in support of IPCC's integrity.

### IPCC DDC Reference Data Archive:

After the end of each CMIP phase, a subset of the data is transferred into the long-term archive of the IPCC DDC at DKRZ and data-related information is added.

The DDC data is quality assured prior to long-term archival and a DataCite DOI citation reference is registered for the data. Data is stored with a second copy and curated on the long-term to ensure long-term availability and usability.

For **IPCC AR5** two data collections were archived with the snapshot date 15.03.2013:

- **IPCC Working Group I snapshot** (collected by the WG I)
- **DDC Reference snapshot** (disseminated by ESGF)

### References:

- Reference Data Archive: [http://ipcc-data.org/sim/gcm\\_monthly/](http://ipcc-data.org/sim/gcm_monthly/)
- IPCC DDC at DKRZ: <http://ipcc.wdc-climate.de>

**Data Distribution Centre**

**ipcc**

**DDC AR5 Reference snapshot**

The DDC AR5 Reference snapshot was collected by the World Data Center Climate (WDCC) at the DKRZ in Germany, the British Atmospheric Data Centre (BADC) in the UK and the Program for Climate Model Diagnosis and Intercomparison (PCMDI) University of California in the US. The DDC AR5 Reference snapshot is based on the status of the CMIP5 data archive as of March 15, 2013. The corresponding IPCC WG-AR5 data snapshot can be found here.

CMIP5 data provided through the IPCC DDC has undergone a **quality control procedure**. To find individual information on data, data creation and data quality for an experiment, please follow the links in the below tables.

The CMIP5 archive is evolving and in some cases the data used in the IPCC 5th Assessment Report may have been superseded. Latest versions for all experiments are available in the Earth System Grid Federation (ESGF) at <http://esgf.cgd.ucsf.edu>. For corrections of data sets published under later versions please look at the [update page](#) hosted by PCMDI. Further information on CMIP5 can be found on [this page](#). The data is provided in [NetCDF/CF](#) format.

<sup>1</sup> Please note that the full CMIP5 data archive continues to be updated with new results, corrections etc. in contrast to the two archives available from the DDC.

**CMIP5 License Statement**

These data were first published under the license of CMIP5. Terms of use for CMIP5 are applied for DDC-AR5 data. They are provided at <http://esgf.cgd.ucsf.edu>. Data from some modelling centres are licensed for use in non-commercial research and for educational purposes, other for unrestricted use. Please refer to the [terms of use for the CMIP5 modelling groups](#) for details. DDC-AR5 data should be cited by its DataCite DOI and according to the [citation recommendation of CMIP5](#).

Please note:

A table entry represents a CMIP5 experiment as general citation unit in the literature. Green experiments have completed the quality control process and are assigned DataCite DOIs (Digital Object Identifiers). The underlying links resolve to the DOI landing pages, which provide basic information related to the data including access. For grey experiments the data is securely archived in the IDCC and the quality control process is ongoing. The underlying links resolve to web pages displaying basic information related to the data including access.

**Long-term Predictions: Central and longer scenarios**

**Choose an experiment**

Centre(s)	Centre Acronym(s)	Model	gControl	amip	historical	trp	other	scen	sat	paleo	aqua	add. data
Beijing Climate Center China	BCC	BCC-CSM1.1	pControl	amip	historical	rcp26	rcp45	rcp60	abrgdaCO2	rcp26	rcp45	rcp60
		BCC-CSM1.1(m)	pControl	amip	historical	rcp26	rcp45	rcp60	abrgdaCO2	rcp26	rcp45	rcp60

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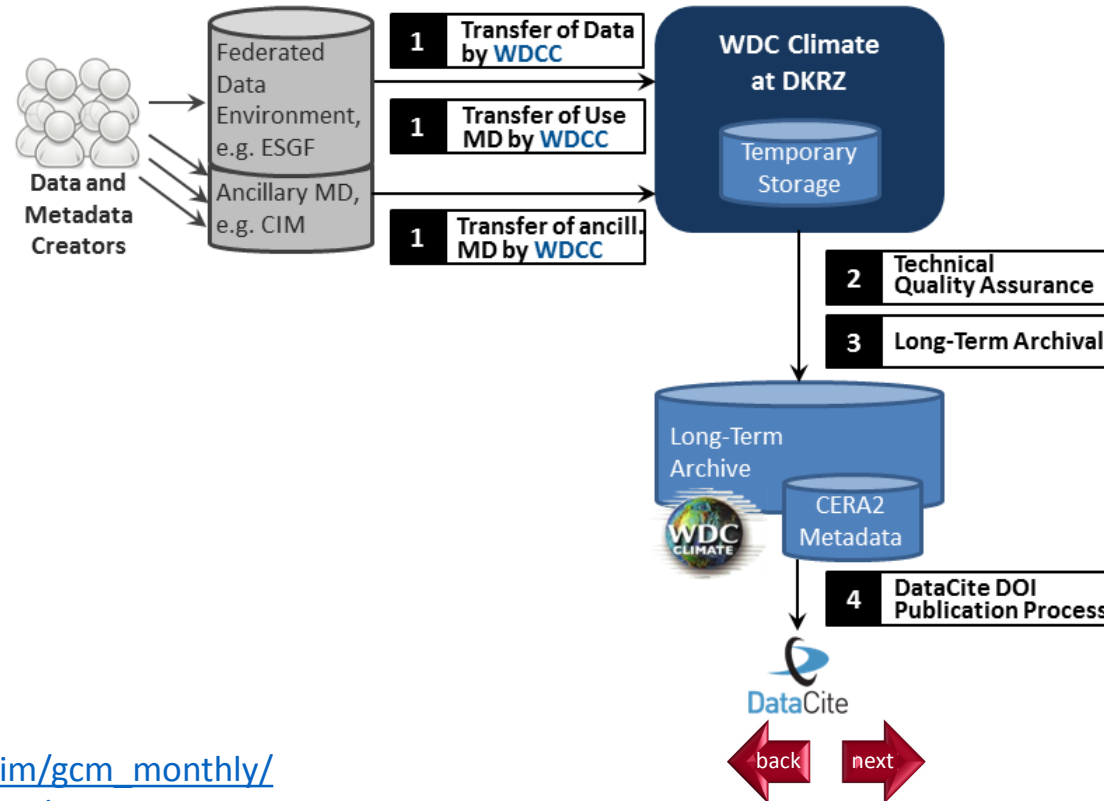
## IPCC DDC: Reference Data Archive (2/3)

The IPCC DDC at DKRZ hosts the Reference Data Archive for the climate model output since the Second Assessment Report (1995) in support of IPCC's integrity.

### Long-Term Archival Workflow:

On the IPCC DDC snapshot date the long-term archival workflow starts:

1. Transfer of data with synda tool and ancillary metadata, e.g. experiment description and data citation details
2. Quality Assurance of data and metadata
3. Long-Term data archival with storage of second data copy
4. DDC data citation established by DataCite DOI registration



### References:

- Reference Data Archive: [http://ipcc-data.org/sim/gcm\\_monthly/](http://ipcc-data.org/sim/gcm_monthly/)
- IPCC DDC at DKRZ: <http://ipcc.wdc-climate.de>

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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## IPCC DDC: Reference Data Archive (3/3)

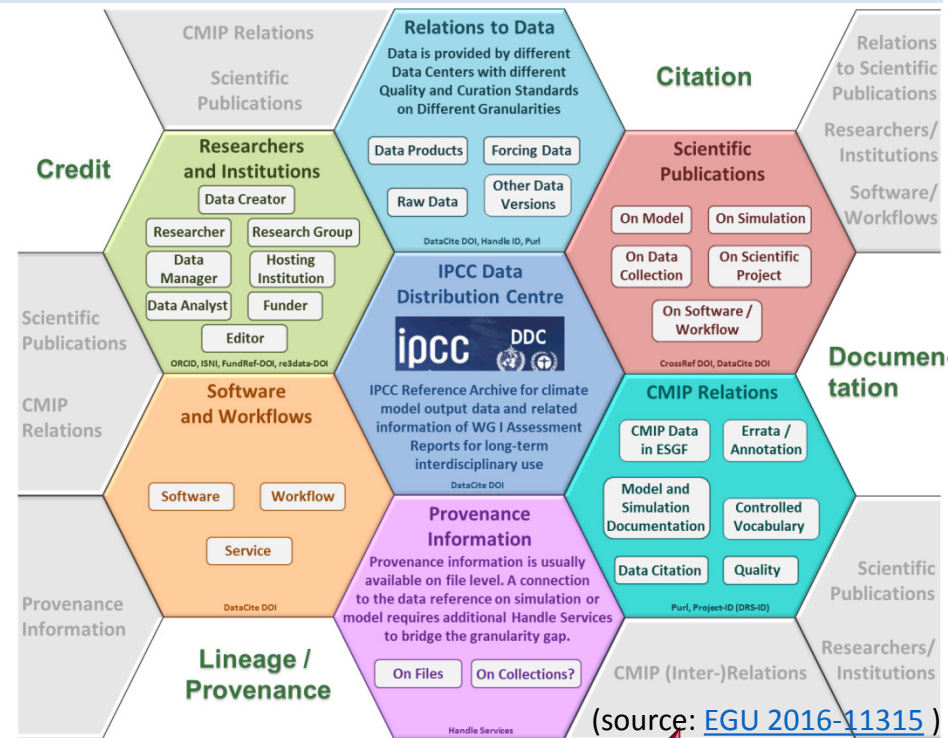
The IPCC DDC at DKRZ hosts the Reference Data Archive for the climate model output since the Second Assessment Report (1995) in support of IPCC's integrity.

### Future Challenges for the Reference Data Archive:

1. Increasing data volume
2. Heterogeneity of data quality standards at the ESGF data nodes
3. Increasing number of repositories for ancillary metadata
4. Embedding DDC data in research environment, e.g. relations to data, researchers, scholarly publications etc.
5. Broadening data user community needing different services and levels of assistance

### References:

- Reference Data Archive: [http://ipcc-data.org/sim/gcm\\_monthly/](http://ipcc-data.org/sim/gcm_monthly/)
- IPCC DDC at DKRZ: <http://ipcc.wdc-climate.de>



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# CMIP6 Data Citation and IPCC Data Distribution Centre Services

## IPCC DDC: CMIP6 Data Pool

In support of and in collaboration with the IPCC Working Groups a CMIP6 Data Pool is set up at the IPCC DDC at DKRZ facilitating script-based data analyses.

### CMIP6 Data Pool – Motivation/Status:

For AR5 IPCC WG I set up a repository with a user-defined subset of the CMIP5 data. The main reasons were the complicated ESGF solutions for authentication/authorization and script-based data access and the non-transparent dataset versioning concept.

The IPCC DDC hosted at DKRZ will maintain a similar repository of CMIP6 data, the CMIP6 data pool, to support the IPCC AR6 WGs. This idea was first presented and discussed with the IPCC AR6 co-chairs at the IPCC Expert Meeting on the Future of TGICA in 01/2016 in Geneva and further developed at the Future Earth Workshop in 09/2016 in Stockholm.

For the CMIP6 Data Pool as DDC service a coordination on the technical level is currently established between the **IPCC DDC at DKRZ and the IPCC AR6 WG TSUs**. A coordination on the management level is about to be added involving the IPCC WG co-chairs.

### References:

- CMIP6 Data Pool: [https://redmine.dkrz.de/projects/dkrz\\_cdp/wiki](https://redmine.dkrz.de/projects/dkrz_cdp/wiki)
- IPCC EM 01/2016: [http://ipcc.ch/pdf/supporting-material/EMR\\_TGICA\\_Future.pdf](http://ipcc.ch/pdf/supporting-material/EMR_TGICA_Future.pdf)

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## IPCC DDC: IPCC Integration (1/2)

The IPCC DDC is overseen by the Task Group on Scenarios for Climate and Impact Assessment (TGICA). Its mandate is currently under review of an IPCC Adhoc Task Force.

### Task Group on Scenarios for Climate and Impact Assessment (TGICA):

TGICA was established in 1996. The IPCC Data Distribution Centre (IPCC DDC) is overseen by TGICA. TGICA comprises members with expertise and experience drawn from a cross section of research communities representing all three IPCC Working Groups. The DDC Managers are ex-officio members of TGICA.

### Adhoc Task Force on TGICA (ATF-TGICA):

An Adhoc Task Force on TGICA was established at the 44<sup>th</sup> Session of the IPCC in October 2016 to design a strategic plan and revised mandate and terms of reference for the transformation of TGICA functions to serve the needs of IPCC during and beyond the Sixth Assessment. The Task Force will conclude its work in time for its proposals to be considered at the 46<sup>th</sup> Session of the IPCC in September 2017.

### References:

IPCC TGICA: <http://ipcc.ch/activities/tgica.shtml>

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## IPCC DDC: IPCC Integration (2/2)

The technical coordination on processes and CMIP6 Data Pool content is directly performed by the IPCC DDC and the Technical Support Units (TSUs) of the three IPCC WGs .

### Technical Coordination between IPCC DDC and IPCC WG TSUs:

Practical and technical issues for the new DDC service of the CMIP6 Data Pool require a direct coordination between the DDC hosted at DKRZ and WG TSUs, e.g. on

- CMIP6 Data Pool content,
- CMIP6 Data Pool services and support, and
- Transfer of CMIP6 Data Pool content into the AR6 Reference Data Archive.

The CMIP6 Data Pool is part of the CMIP6 replication strategy, which is in discussion in the WIP. Apart from IPCC requirements the CMIP6 data pool has to meet both institutional (e.g. available resources) and national demands (support of the national climate scientists). The DDC at DKRZ relies on institutional resources and national funding from the Bundesministerium für Bildung und Forschung (BMBF). Long-term funding is currently not guaranteed.

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