

FAIR data within the large international research project CMIP6 and the IPCC AR6

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1. Motivation – IPCC



1. IPCC's Governing Principles

IPCC (Intergovernmental Panel on Climate Change) is a UN body.

It regularly publishes assessment reports (AR) of the current state of knowledge of the science related to climate change, currently the AR6 is being prepared.

IPCC does not conduct original research.

IPCC's reports are policy-relevant but not policy-prescriptive.

- Principles governing IPCC work are:
comprehensiveness, objectivity, openness and transparency
- Idea of FAIRness is part of IPCC's governing principles,
- Development of guidance for digital Data FAIRness is a task for
TG-Data (Task Group on Data Support for Climate Change Assessments)

1. Motivation – DDC

1. DDC's Principles



IPCC DDC (Data Distribution Centre)

is jointly managed by three data centers:

- Centre for Environmental Data Analysis (CEDA) in the UK,
- World Data Center for Climate (WDCC) at DKRZ in Germany, and
- Center for International Earth Science Information Network (CIESIN) in the US.

As **WDS (World Data System) Members** the DDC provides trusted quality-assured scientific data and data services, products, and information for IPCC with a long-term commitment and a commitment to support developing countries.



1. Motivation – IPCC AR6 WGs

1. Motivation of the IPCC AR6 WGs

IPCC Working Groups (WGs) aim to improve:

- the end-to-end provenance and traceability of IPCC results and
- the long-term curation of digital data underpinning the reports, like key figures, tables, headline statements.

AR6 depends on the latest climate research results provided within coordinated modeling initiatives - the WCRP **CMIP6** (Coupled Model Intercomparison Project Phase 6) and **CORDEX** (Coordinated Regional Climate Downscaling Experiment).

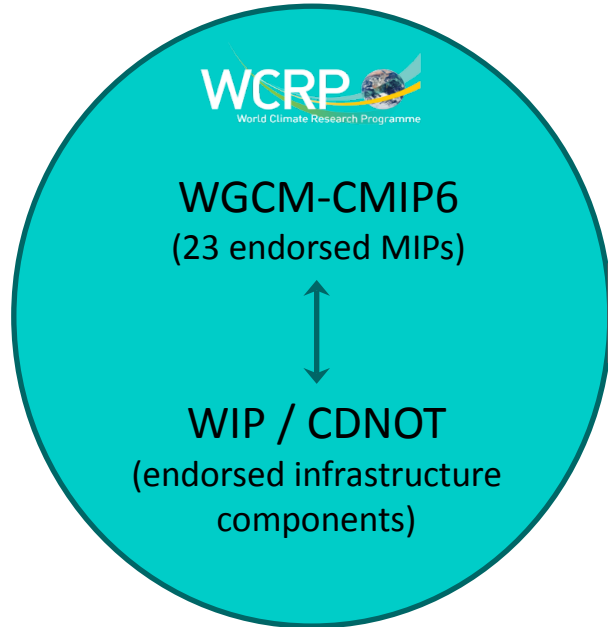


Working Group I is producing a web-based digital **Atlas** as part of its assessment.



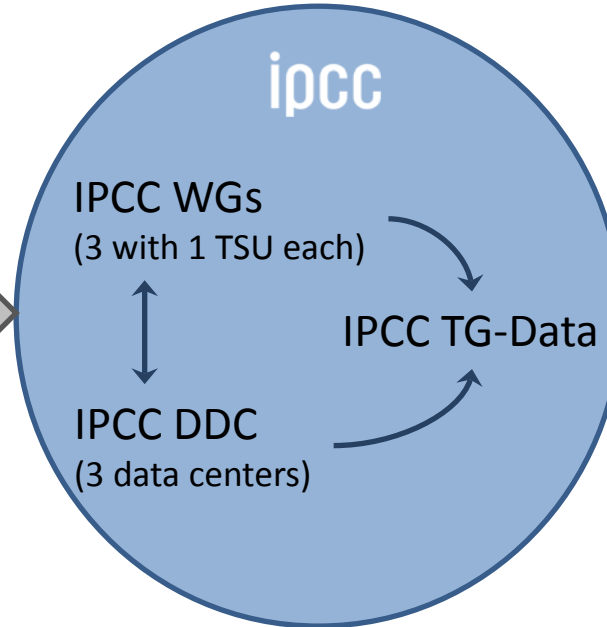
2. Climate research and assessment spheres

Climate Research CMIP6, CORDEX



analyze

Climate Assessment IPCC-AR6



COPDESS



Project Data Dissemination

Long-Term Curated Data Dissemination

3. Improvements for AR6 – DDC Support

3. DDC Support

Virtual Workspaces for IPCC authors at CEDA and DKRZ



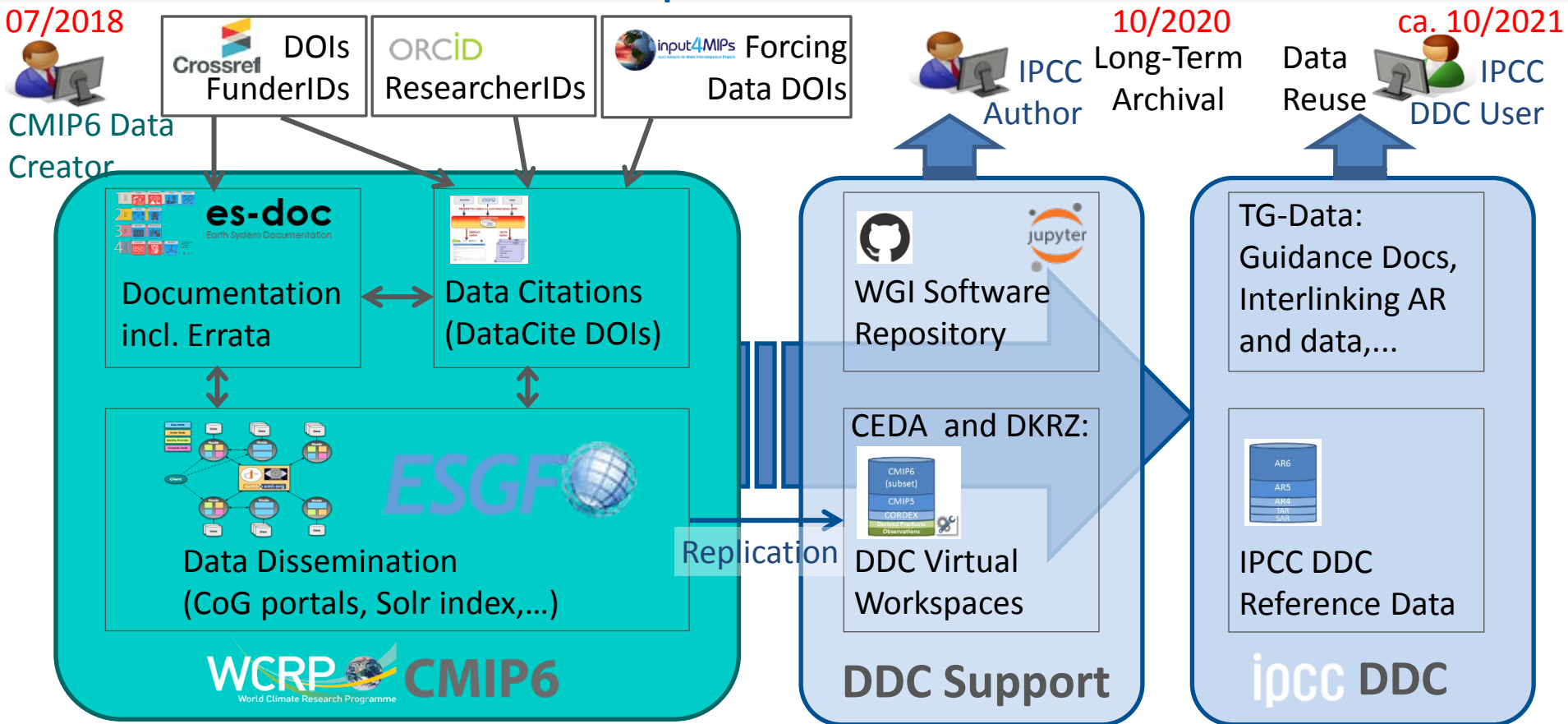
- Access to a requested CMIP6 data subset and further center-specific climate-relevant data on local disk storage provided
 - Community climate software packages and development, incl. ESMVal tool at DKRZ
- Closer connection of CMIP6 data used in AR6 to the IPCC DDC Data Archive

WGI TSU




- Community analysis scripts and data used to create key products, including digital Atlas curated for provenance.
- Scripts and data made available for Expert and Government Review



3. Improvements for AR6 - Infrastructure



4. Summary for Data FAIRness - F

- DDC partners comply with high WDS and IPCC standards
- Challenges in multi-component and multi-organizational environment
- Several improvements for AR6 under way, esp. provenance
- Incremental steps towards improved traceability and transparency


Findable 



- 
 - Information on DDC web page
 - Information and data access at data center
 - Metadata is machine-readable
 - Usage of DOIs on data collections
 - Continuity across IPCC assessments
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 - Common DDC Data Index
 - Better interlinking of IPCC data and report
 - Use of Persistent Identifiers (PIDs) on documents

(Sources used for comparison: GO-FAIR - <https://www.go-fair.org/fair-principles/>; Enabling FAIR Data - <http://www.copdess.org/enabling-fair-data-project>)

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Accessible 

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 - Access to quality-assured data and data services
 - Long-term data storage, curation, access
 - Barrier of high-volume data access lowered for developing countries by mailing data subsets on USB devices
 - User support / assistance
- 
 - Server-side processing as flexible possibility to reduce data transfer volume

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Interoperable 



- DOI landing pages are human- and machine-accessible (JSON-LD)
- Metadata complies to common standards, e.g. NetCDF/CF, DRS (controlled vocabulary),...
- Recommendation to provide references to papers, data, ORCIDs etc.

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4. Summary for Data FAIRness - R

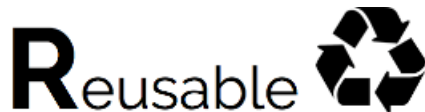
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- Metadata enrichment using common standards
- Comprehensive guidance documents
- Information on data analysis, e.g. software packages
- License statement of CMIP6 project added for AR6
- Data citation information on landing page
- Basic provenance with software preservation added for AR6



- Many provenance and documentation improvements



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IPCC DDC: <http://ipcc-data.org>
DDC Support: https://cedadev.github.io/ipcc_ddc/

IPCC Author Training: 06/2019

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