

Web-supported adaption to CMIP6 project standards

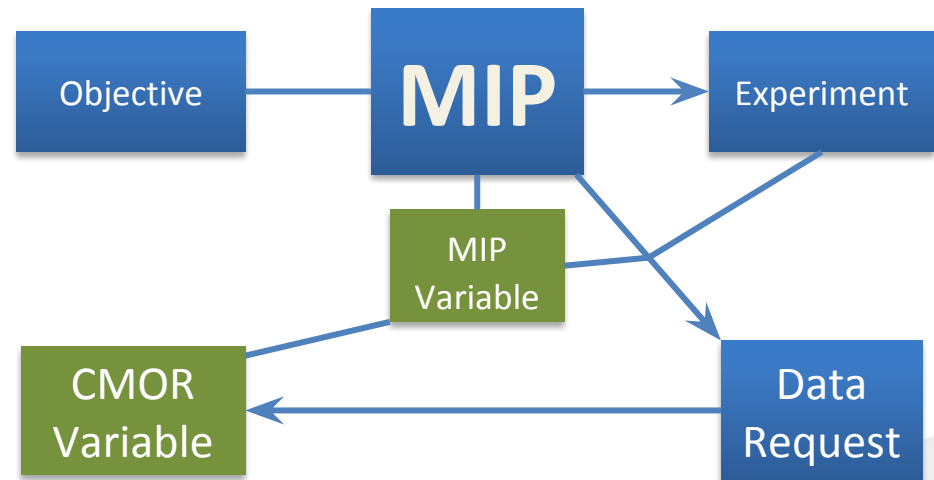
Martin Schupfner
Deutsches Klimarechenzentrum (DKRZ)

Outline

- **CMIP6 Data Request**
- **Variable Mapping**
- **Post-Processing: Creation of script fragments for diagnostic and CMIP standard compliant rewrite**
- **Controlling the Post-Processing of variables individually or in groups**

Data Request Python API (DreqPy) & CMIP6 Data Request Structure

- MIPs founded to achieve WCRP defined scientific objectives
- MIPs define Experiments, Variables and set up a data request
- CMOR-Variables are the different realisations (frequency, shape, ...) of a MIP-Variable



Example:

MIP-Variable: Ozone volume mixing ratio

CMOR Variables:

- (1) Ozone vmr (zonal mean on 39 pressure levels, monthly mean)
- (2) Ozone vmr (global field on model levels, monthly mean)
- (3) Ozone vmr (global field on 23 pressure levels, monthly mean)



DKRZ

CMIP6 Data Request WebGUI

- Requested Variables
- Volume Estimate
- Variable Mapping
- Infotables
- Documentation & Links
- Feedback
- Admin Panel

Create Custom CMIP6 Data Request

This WebGUI facilitates the use of Martin Juckes' [Data Request Python \(DreqPy\) API](#) to generate a customized requested variable list for [CMIP6](#).

A Data Request depends on the **MIPs** to be supported, the **Experiments** to be conducted as well as the **Experiment Tier** and the **Priority** of the requested variables.

In the following a customized data request can be generated either in .csv or .xlsx format. Alternatively an Excel sheet containing the data request for all MIPs and Experiments can be downloaded:

[Download official CMIP6 Excel Sheet](#)

Select MIP(s) 

- All BUT selection
- AerChemMIP
- C4MIP
- CFMIP
- CMIP
- CORDEX
- DAMIP
- ESM

Select Experiment(s) 

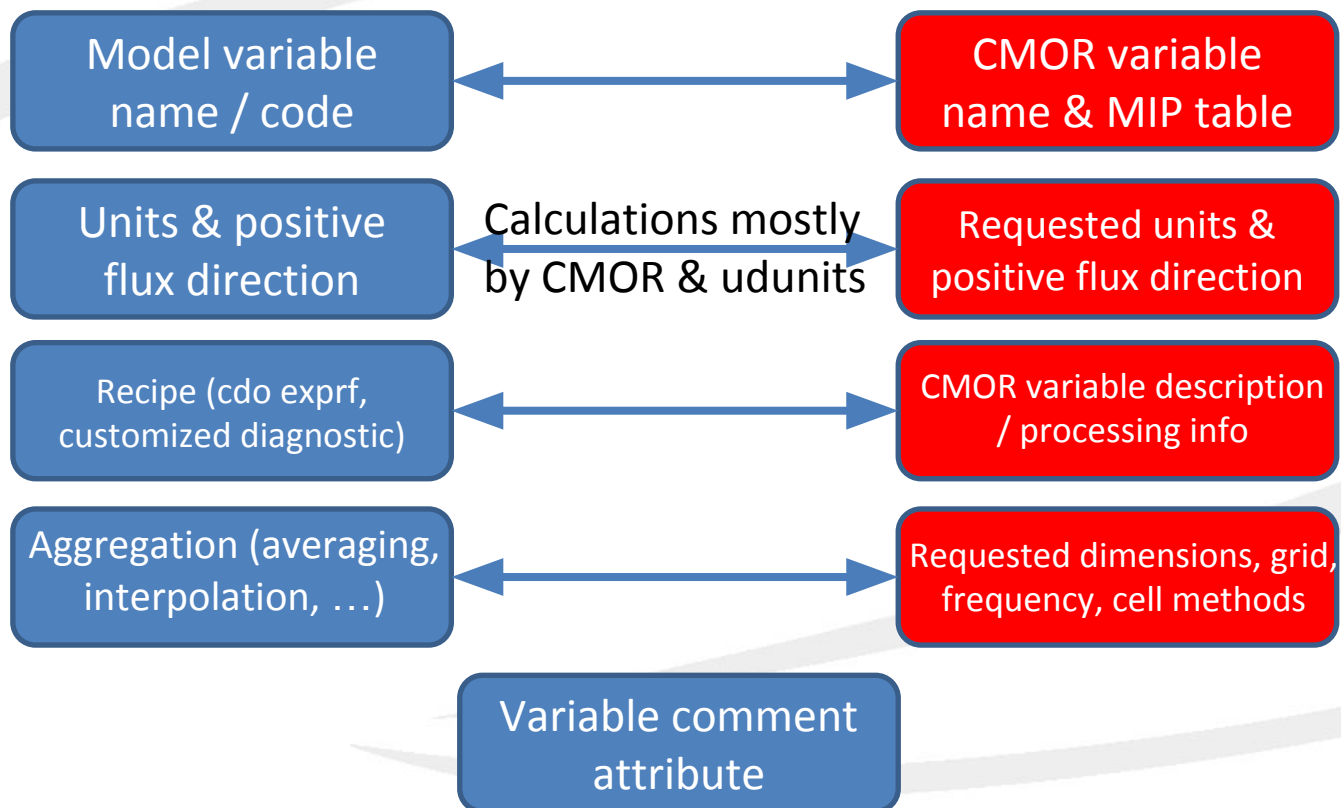
- All BUT selection
- All defined by selected MIPs
- All defined by selected MIPs above AND selection
- All defined by selected MIPs above BUT selection
- 1pctCO2
- abrupt-4xCO2
- amp
- historical
- piControl
- 1pctCO2-4xext

Select maximum priority and tier 

All Variable Priority (max)

Variable Mapping

Map Model Variable to CMOR Variable





DKRZ

CMIP6 Data Request WebGUI

Requested Variables Volume Estimate Variable Mapping Infotables Documentation & Links Feedback Admin Panel

CMIP6 Variable Mapping

Web Application to map CMOR variables to their climate model counterparts.








In order to edit a model's mapping table, select a **Submodel** and click on the **Model Icon** or the corresponding button labeled **Edit**.

The **Mapping Table Files** can be generated by clicking on the button labeled **Generate**.

Mapping Table Files will be generated for each submodel individually.

The Submodels' Mapping Tables can only be edited one at a time!

In order to request the addition of another model or submodel, use the [Feedback](#) form.

Model	Sub-Model	Edit or Generate Mapping-Table Files
 EMAC ECHAM/MESSy Atmospheric Chemistry	Select Sub-Model	Edit Generate
 AWI-CM AWI Climate Model	Select Sub-Model	Edit Generate
 Max-Planck-Institut für Meteorologie MPI-ESM1.2 MPI-M Earth System Model	Select Sub-Model	Edit Generate
 Max-Planck-Institut für Meteorologie MPI-ESM2 MPI-M Earth System Model	Select Sub-Model	Edit Generate
 ICON/MESSy	ICON-MESSy	Edit Generate
 Max-Planck-Institut für Meteorologie MPI-ESM1 MPI-M Earth System Model	Select Sub-Model	Edit Generate
 CONSORTIUM FOR BI-KILL SCALE MODELING CCLM	COSMO-CLM	Edit Generate

Template script fragments

- Automatic creation of diagnostic and cmor rewrite template out of recipe table
- Automatic creation of data request settings out of recipe table and CMIP6 data request, further customizable by user

Diagnostic

- One block per diagnostic
- Test if variable is requested (data request, timeslice, user configuration)
- Find inputfile
- cdo commands:
 - **cdo merge** in case of multiple inputfiles
 - **cdo expr/exprf**

CMOR rewrite

- One block per MIP table and input file (or diagnosed variable)
- Test if variable is requested (data request, timeslice, user configuration)
- Find inputfile
- **cdo cmor** call



DKRZ

 CMIP6
 Data Request
 WebGUI

[Logout ms](#)

Build Post-Processing template scripts and configuration

Instructions to automatically build post processing (diagnostic, CMOR rewrite) script fragments out of the variable mapping tables:

- (1) **Select Project:** Select the project for which the script fragments have to be generated.
- (2) **Generate Mapping-Tables:** Select the Models/Submodels you want the script fragments to be generated for.
- (3) **Generate Data Request (optional):** In case you want the processing of each variable to be dependent on the project's official data request, generate a customized data request.
- (4) **Upload Configuration File (optional):** You can upload previously created configuration files. The configuration for the new data request selected under (3) will be appended.
- (5) **Initiate Scripts Creation:** Submit your selected options by clicking the **Select Script Templates** button.

Select Project

Current Selection

CMIP6 (Climate Model Intercomparison Project Phase 6)

Generate or Select Mapping-Tables/Recipe-Tables

Select at least one registered Submodel

Add a comment (optional)

Generate Tables

AWI-CM-1-0-HR: AWI-CM
 AWI-CM-1-0-HR: FESOM
 EMAC2-53-AerChem: EMAC
 EMAC2-53-AerChem: MPIOM
 ICON-MESSy: ICON-MESSy

Alternatively or additionally select formerly generated Mapping-Tables/Recipe-Tables.

**CMIP6
Data Request**



... I want to support CMIP and SIMIP ...
... I want to conduct the historical experiment ...



Variable Mapping



... I run the model MPI-ESM-1-2-HR...

... These variables are requested:

CMIP6 Data Request

... Available model output and diagnostic ...



diagnose.h (optional)
cmor_rewrite.h

Data Request
Config (optional)



... Mapped variables: **Variable Mapping**
... This variables are requested: **CMIP6 Data Request**



Config Table



... I run the model MPI-ESM-1-2-HR...
... I work for the MPI-M ...



Run_historical.sh

...
c6_diag_day_tslsi.h
c6_diag_Amon_fco2antt.h

diagnose.h (optional)
cmor_rewrite.h

**UserSettings in
Data Request
Config (optional)**



... Integrate script fragments in runscript and add custom diagnostic ...

diagnose.h (optional)
cmor_rewrite.h

... Information about model & institute:

Config Table

... I do not have 1-hourly output for the 2nd realisation r2i1p1f1:

**UserSettings in
Data Request
Config (optional)**

Data Request Config - *CMIP6_historical_requested_vars.conf*

```
#####  
EXP=historical  
#####  
  
DREQSETTINGS  
SIday      : SIday      = slice: piControl030,piControl050,piControl100,piControl140  
sispeed    : SIday      = slice: piControl100  
Emon       : Emon       = slice: TOTAL  
Emon       : hus        = slice: piControl100  
thetaot300 : Emon       = False  
EmonZ      : EmonZ      = False  
Amon       : no2        = False  
  
USERSETTINGS  
# ---> Specify your settings for Experiment historical here  
sispeed    : SIday      = slice: piControl100,1900010100-1914123124  
day        : day = False  
Lmon       : echam6     = False  
Elhr       : r2ilplf1   = False  
# <---- Specify your settings for Experiment historical here
```



Thanks for your attention!

