



CMIP6

The 6th phase of the Coupled Model Intercomparison Project (CMIP6) has begun. A new design has been introduced which allows to tackle several scientific challenges by coordinating multiple Model Intercomparison Projects (MIPs) within CMIP. These "CMIP6 endorsed MIPs" profit from predefined basic experiments as well as the generalised data standards in CMIP and define their own experiments. As during the 5th phase of CMIP, the German Federal Ministry of Education and Research (BMBF) is supporting the German climate research.

The WebGUI

The enhanced complexity in the CMIP design translates into the project's data request and the data processing workflow. The WebGUI helps to maintain an overview of the more than 2000 variables requested by the endorsed MIPs for the numerous experiments and guides the user through the various steps of the post-processing workflow.

Requested Variables Volume Estimate Variable Mapping Post-Processing

Select MIP(s)

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

More than 20 MIPs

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
- abrupt4xCO2
- amip
- historical
- piControl
- 1pctCO2-4xext

More than 240 experiments

The varying needs of the different MIPs and the large number of experiments lead to a complex structure of the CMIP6 data request. The web-based GUI guides through the steps of generating a customized data request, thereby facilitating the use of the Data Request Python API (DreqPy). This python library is being provided by the WGCM Infrastructure Panel.

Excel Sheets of the requested variables

Long name	units	Variable name	dimensions
Near-Surface Air Temperature	K	tas	longitude latitude time height2m
Surface Air Pressure	Pa	ps	longitude latitude time

Requested Variables Volume Estimate Variable Mapping Post-Processing

Grid Specifications

Default Apply Selection

259200 Ocean: number of horizontal mesh points.

60 Ocean: number of vertical levels.

The expected data volume can be estimated for the MIPs to be supported as well as the experiments to be conducted taking into account customized compression ratio and grid specifications. Hereby, also the python library DreqPy is being used.

The rhs shows an example calculation for all MIPs, experiment amip and default grid specifications.

Calculate Volume Estimate

Detailed Volume Estimate for MIPs and Experiments

- CFMIP : 2.754 Tb
- HighResMIP : 2.742 Tb
- CMIP : 1.923 Tb
- VIACSAB : 1.865 Tb
- PMIP : 0.894 Tb
- AerChemMIP : 0.803 Tb
- DynVar : 0.248 Tb
- GMMIP : 0.047 Tb
- DAMIP : 0.034 Tb
- RFMIP : 0.031 Tb
- C4MIP : 0.022 Tb
- ISMIP6 : 0.004 Tb

Combined Request: 6.856 Tb

Volume Estimate for Experiments

amip : 6.856 Tb

Combined Request: 6.856 Tb

Climate Variable Mapping Post-Processing Config Tables

CMIP6_CV.json #Controlled Vocabulary

```

"required_global_attributes":{
  "source_id",
  "experiment_id",
  "institution_id", ...
}
    
```

Required attributes

Setting

source_id X AWI-CM-1-0-HR

experiment_id X AWI

institution_id

AWI

BNU

Create config table

config_table

```

source_id="AWI-CM-1-0-HR"
institution_id="AWI"
mip_era="CMIP6"
    
```

Requested Variables	Volume Estimate	Variable Mapping	Post-Processing	Config Tables
Climate model output configuration	Post-processing tool configuration			
Create customized data request	Calculate Data Volume of customized data request	Generate Mapping and Diagnostic Tables required for CDO application	Generate script fragments based on CDO and WebGUI entries	Generate a configuration file for CMOR application

Climate Variable Mapping Post-Processing Config Tables

Select Project

CMIP6 Select

Select Mapping-Tables/Recipe-Tables

- MPI-ESM: ECHAM6
- MPI-ESM: HAMOCC
- MPI-ESM: JSBACH
- MPI-ESM: MPIOM
- MPI-ESM-1-2: ECHAM6
- MPI-ESM-1-2: HAMOCC

Current Selection

ECHAM6 (MPI-ESM)

File: MPI-ESM_echam6_CMIP6_MappingTable.zip

Select Data Request (optional)

Upload Configuration File (optional)

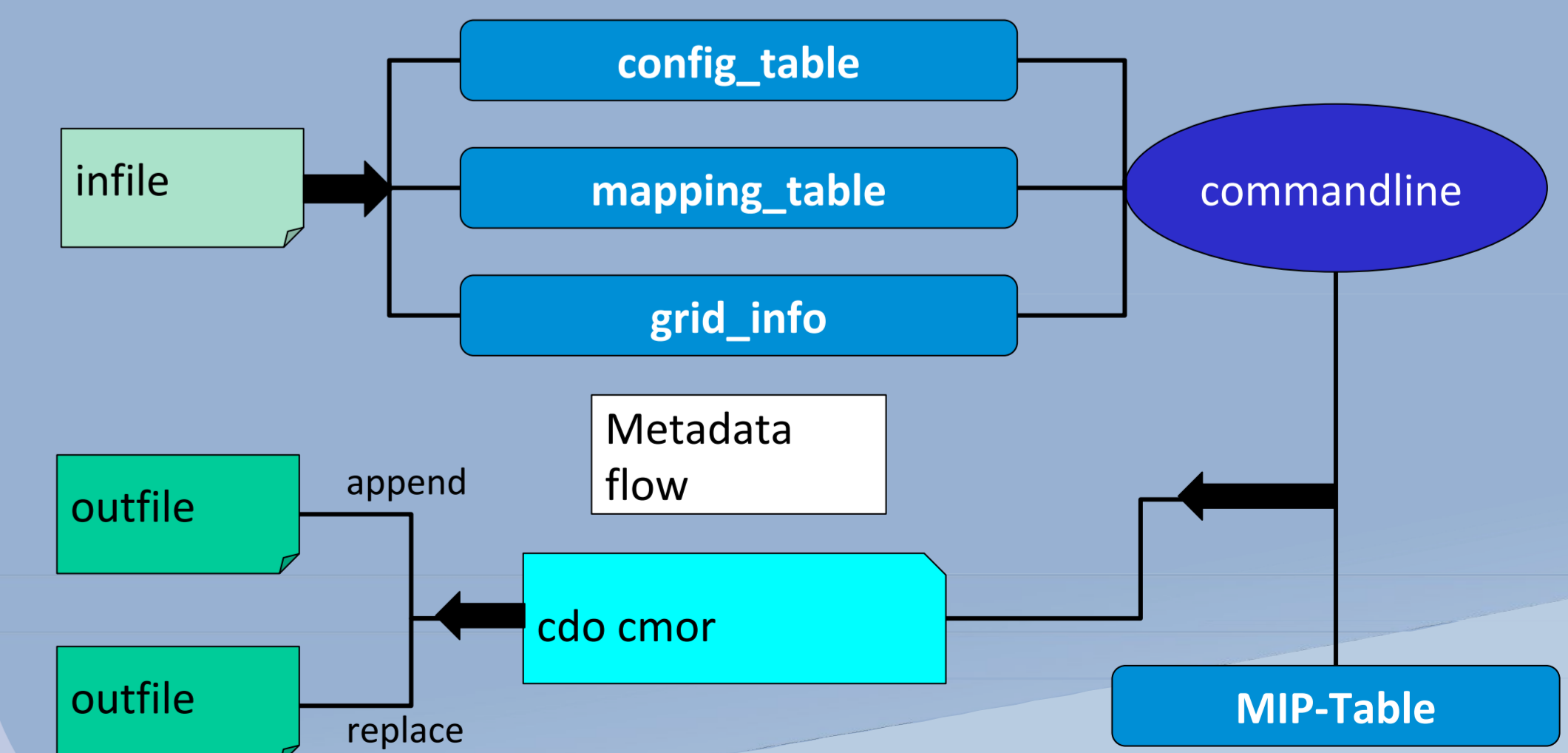
Create Script Templates

Dagnostic for MPI-ESM ECHAM6

CMOR-rewrite for MPI-ESM ECHAM6

```

cn='tas ts'
for var in $cn; do
  (if_requested $member $atmmod Amon $var $chunk || continue
  cdo cmor, Amon, \
  cmor_name=$var, \
  info= config_table, \
  mapping_table= mapping_table \
  infile )&
done
    
```



Requested Variables Volume Estimate Variable Mapping Post-Processing Config Tables

Short Name	Long Name	Table	Last Edited	Availability	Edit
tas	Near-Surface Air Temperature	Amon	03.04.2018, 12:32 by sfjm	✓	Edit
ts	Surface Temperature	Amon	03.04.2018, 13:58 by fw	✓	Edit
tasmin	Daily Minimum Near-Surface Air Temperature	Amon	03.04.2018, 12:33 by ms	✓	Edit

Availability	Model Variable Name	Post-Processing Recipe	Model Variable Units
Available	temp2	tas= temp2+273.15	degC

CMOR Variable-Attribute 'comment' (optional):

Test Kommentar vc.

Submit

Editor's Note

Read in from an old Mapping Table

The WebGUI provides the possibility to map request variables ("CMOR variables") to their model counterparts. Diagnostic recipes that can be interpreted by the CDO operators "expr" and "exprf" can be entered as well. Several users can work simultaneously. User changes will be logged and can thus be reverted. Updates to the request variable definitions introduced by new versions of the data request will be displayed.

The variable mapping can be downloaded as plain text or in json format.

Select Model and Submodel for Project CMIP6

Model: ICON/MESSy

Submodel: Select Submodel

Generate

MPI-ESM MPI-M Earth System Model

ECHAM6

Generate

mapping_table

Model variable	CMOR variable
name=temp2 units="degC"	cmor_name=tas project_MIP_table=Amon
name=temp units="degC"	cmor_name=ts project_MIP_table=Amon
name=U2M units="km s-1"	cmor_name=uas project_MIP_table=Amon