



DKRZ

DEUTSCHES
KLIMARECHENZENTRUM

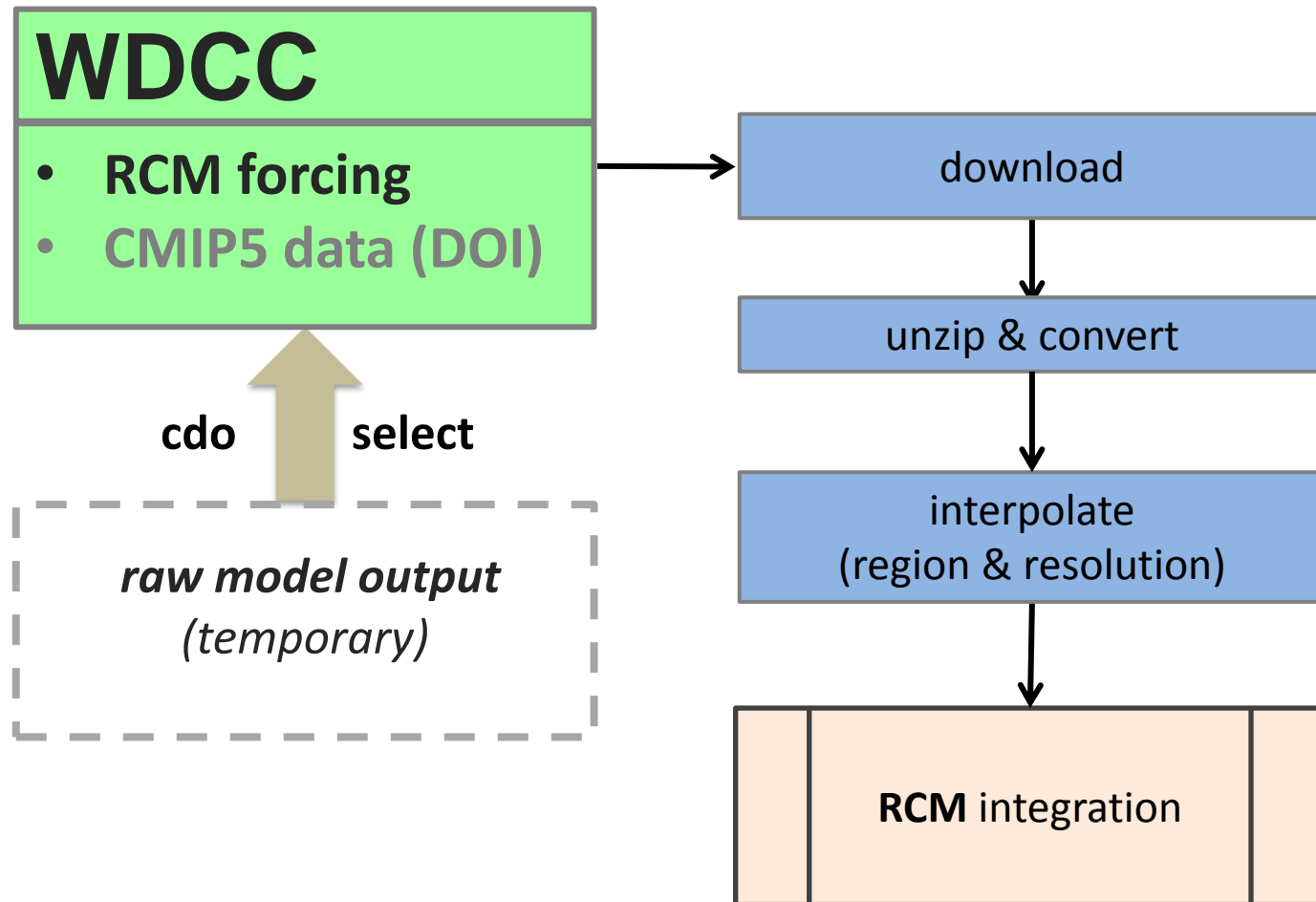
CMIP forcing data for regional modelling in WDCC/Cera

model support & data management@dkrz

outline

- workflow: MPI-ESM → WDCC → RCM
- Cordex: subset of CMIP5 experiments
- requested variables by CMIP5
- variables provided by WDCC / Cera
- experiments, periods and realizations (WDCC)
- Data size
- ENES-portal → WDCC → cera download
- ESG search: 6hrLev

Workflow CMIP5 RCM forcing



RCM data is in native format (GRIB) and gnu-zipped
atmospheric data is at model level

CORDEX experiments (as subset of CMIP5 experiments)

- Amip
- Historical
- RCPs: 2.6, 4.5, 8.5
- Decadals: 1980, 1990, 2005

GCM (MPI-ESM) resolutions

- MPI-ESM-**LR**: 192 x 96 x 47
- MPI-ESM-**MR**: 192 x 96 x 95

MPIOM: GR15

MPIOM: TP04

example: CORDEX experiments at DKRZ

like REMO and CCLM

- AFR-44 ~ 50 km 214 x 221 x 35
- AFR-22 ~ 25 km 418 x 432 x 35
- EUR-11 ~ 12 km 450 x 438 x 40

Variables requested by CMIP5 project

FX: (constants)

- land / sea – mask
- orography
- glacier mask
- soil moisture (field capacity)

Atmosphere (model level, 6-hourly):

- surface pressure
- temperature
- specific humidity
- u- and v- winds

Additional data provided by WDCC/Cera

Atmosphere (6-hourly):

- mass fraction of cloud liquid water in air
- mass fraction of cloud ice in air

Soil (6-hourly):

- soil temperature (model layer)
- soil moisture content
- skin_reservoir_water_content

Additional data provided by WDCC/Cera



Surface:

- surface temperature on land or land-ice
- sea surface temperature
 - sea ice area fraction
 - surface snow thickness where sea ice
 - surface temperature of sea ice

Ocean data is on a 6-hourly basis with one value per day

provided 6-hr data in native format

Experiments ,	Periods,	Realizations		
		LR		MR
➤ amip	1979 - 2008	r1	r1-3	r1
➤ historical	1949 - 2005	r1	r1-3	r1-2
➤ rcp26	2006 - 2101	r1	r1-3	r1
➤ rcp45	2006 - 2101	r1	r1-3	r1-2
➤ rcp85	2006 - 2101	r1	r1-3	r1-2
➤ decadal 1980	1981 - 2010	r1-3	r1-3	r1 - 1990
➤ decadal 1990	1991 - 2000	r1-3	r1-3	r1
➤ decadal 2005	2006 - 2035	r1-3	r1-3	r1 - 2015

requested   provided

Code list for cera code type "ECHAM6_RCM_forcing"

FILES	GRIB CodeNo.	Acronym	Description or CF-Std. Name	Unit
fx	4	slm	sea_land_mask	0 1
	9	glac	glacier_mask	0 1
	11	mrsofc	soil_moisture_content_at_field_capacity	m
	129	geosp	surface_geopotential	m / s*s
c5_133	133 ★	hus	specific_humidity	kg/kg
	134	ps	surface_air_pressure	Pa
c5	130 ★	ta	air_temperature	★ K
	138 ★	svo	atmosphere_relative_vorticity	★ 1/s
	155 ★	sd	divergence_of_wind	★ 1/s

★ model level

spherical harmonics ★

Code list for Cera code type "ECHAM6_RCM_forcing"

GRIB

Files

CodeNo.	Acronym	Description or CF-Std. Name	Unit
etc	102	tsice surface_temperature_of_sea_ice	K
	139	tsl surface_temperature_where_land_or_land_ice	K
	140	mrso soil_moisture_content	m
	141	lwsnl liquid_water_content_of_snow_layer_where_land	m
	153	★ clw mass_fraction_of_cloud_liquid_water_in_air	kg/kg
	154	★ cli mass_fraction_of_cloud_ice_in_air	kg/kg
	193	wl lwe_thickness_of_canopy_water_amount	m
	103	★ tos sea_surface_temperature	K
	210	★ sic sea_ice_area_fraction	0-1
	211	★ sit sea_ice_thickness	m
	214	★ sni surface_snow_thickness_where_sea_ice	m
jsb	68	tsl soil_temperature (5 soil layer)	K

model level

daily update of values (mpiom)

size matters?

RCM data in WDCC/Cera is native GRIB, gnu-zipped

Data size in GB/year

file	LR	MR
• c5_133	2.4	5
• c5	1.8	3.7
• etc	0.5	0.65
• land	0.09	0.09
total:	5	9.5

same data in NetCDF(3): **32 GB/year** **63 GB/year**

zipped GRIB vs. CMOR2 is about 1:6

CF-conversion-script can be downloaded from Cera database

IS-ENES portal

<https://verc.enes.org/data/>



THE ENES PORTAL Service for Climate Modeling in Europe

HOME | COMMUNITY | MODELS | **DATA** | COMPUT.

You are here: Home → Data

Quick data access

- ESGF gateways
- IS-ENES data search
- ESGF data nodes
- CMIP5 forcing data
- AR4 data archives



Max-Planck-Institut
für Meteorologie

MPI-M: The Max-Planck-Institut of Meteorology is located in Hamburg, Germany. It provides model output from ECHAM6, which is suited as forcing data. The data is hosted by the WDC. The link below leads to the metadata summary including in turn a link (at the bottom of the section) to a user interface where the forcing data can be searched and downloaded. For additional information contact: legutke (AT) dkrz.de

Explore the data of the MPI-M...

Cera project page

M & D
Modelle & Daten

**World Data Center
for Climate, Hamburg**

CERA

WDC

Not logged in ([Login](#)) | [Process List](#)

[CERA UI Home](#) | [WDCC Home](#) | [Impressum](#)

CERA project information for CMIP5_RCM_forcing_MPI-ESM

Project details

Acronym
Name
Description

project / format
MPI-ESM resolutions
ensemble members
dataset content
how to convert (cdo sp2gp)

Keywords:
RCM-forcing
CMIP5
CORDEX
ECHAM6
amip
historical
rcp26
rcp45
rcp85
decadal

AMOC) CMIP5 experiments
ACH/MPIOM/HAMOC) experiments performed at DKRZ in the
mip-pcmdi.llnl.gov/cmip5/experiment_design.html .
able. They are stored in native GRIB-format (e.g. spectral).
model versions of MPI-ESM.
T63L47 (192 x 96 gridpoints; 47 vertical layers) for ECHAM6/
th T63L95 (192 x 96 gridpoints; 95 vertical layers) for ECHAM6/
stands for the parametrisation or physics variant of the exp
fer only with respect to their restart files.
1 .._rcm_c5 contains: divergence, vorticity, and air temperature
ressure
and ice temperature; sea ice thickness/area fraction; soil mo
4 .._rcm_land contains: temperature (3 soil levels),
5 .._rcm_soil contains: land (veg- and detritus-mass, organic (soil organic) and soil moisture at field capacity .
dataset.
to dv2uv ...').
Spectral to gridpoint transformation can be done with cdo sp2gp in
Click here to browse experiments

Available data

Click here to browse experiments

Selecting particular datasets



Related CERA entries for RCM_CMIP5_historical-MR

Include: Datasets Dataset Groups Additional Info | Sort by: Acronym Descending

	Acronym / Name	Type	Progress
<input type="checkbox"/>	c5_convert_rcm c5_convert_rcm: Convert c5_convert_rcm: direct download only	additional_info	complete
<input checked="" type="checkbox"/>	hist-MR_rcm_fx historical-MR_rcm_fx: RCM fixed fields select	dataset	complete
<input type="checkbox"/>	hist_r1i1p1-MR_eh6_rcm_c5 historical_r1i1p1-MR_echam6_rcm_c5: RCM forcing variables from ECHAM6/MPIOM	dataset	complete
<input type="checkbox"/>	hist_r1i1p1-MR_eh6_rcm_c5_133 historical_r1i1p1-MR_echam6_rcm_c5_133: RCM forcing variables from ECHAM6/MPIOM	dataset	complete
<input type="checkbox"/>	hist_r1i1p1-MR_eh6_rcm_etc historical_r1i1p1-MR_echam6_rcm_etc: RCM forcing variables from ECHAM6/MPIOM	dataset	complete
<input type="checkbox"/>	hist_r1i1p1-MR_jsb_rcm_land historical_r1i1p1-MR_jsbach_rcm_land: RCM forcing variables from ECHAM6/MPIOM	dataset	complete
<input type="checkbox"/>	hist_r2i1p1-MR_eh6_rcm_c5 historical_r2i1p1-MR_echam6_rcm_c5: RCM forcing variables from ECHAM6/MPIOM	dataset	complete
<input type="checkbox"/>	hist_r2i1p1-MR_eh6_rcm_c5_133 historical_r2i1p1-MR_echam6_rcm_c5_133: RCM forcing variables from ECHAM6/MPIOM	dataset	complete
<input type="checkbox"/>	hist_r2i1p1-MR_eh6_rcm_etc historical_r2i1p1-MR_echam6_rcm_etc: RCM forcing variables from ECHAM6/MPIOM	dataset	complete
<input checked="" type="checkbox"/>	hist_r2i1p1-MR_jsb_rcm_land historical_r2i1p1-MR_jsbach_rcm_land: RCM forcing variables from ECHAM6/MPIOM select	dataset	complete

add to process list

dataset order form and temporal selection

<input type="button" value="Delete selected"/>		<input type="button" value="Clear selection"/>			<input type="button" value="Sort by date"/>	<input type="button" value="Sort by name"/>
		Dataset	Size	Request	Date	
<input type="checkbox"/>		hist_r2i1p1-MR_jsb_rcm_land	5135943726	364934	14-02-2012	
<input type="checkbox"/>		hist-MR_rcm_fx	147808	364933	14-02-2012	
		Dataset	Size	Request	Date	
<input type="button" value="Delete selected"/>		<input type="button" value="Clear selection"/>			<input type="button" value="Sort by date"/>	<input type="button" value="Sort by name"/>

Dataset Order Form - hist_r2i1p1-MR_jsb_rcm_land

1. Temporal selection

Period #	Start date	End date	Date format	Increment	# of timesteps
<input type="text" value="1"/>	1949-01	2005-12	YYYY-MM	1 month(s)	684

Download type Complete dataset Part of dataset

Time period start

Time period end

Temporal selection based on records numbers instead of date/time is available [here](#).

download



World Data Center
for Climate, Hamburg



[CERA UI Home](#) | [WDCC Home](#)

Dataset Order Form - hist_r2i1p1-MR_jsb_rcm_land

Download overview

Dataset	hist_r2i1p1-MR_jsb_rcm_land
Time period	1949-01 to 1951-12 (records 1-36)
Regional limitation	Not supported
Output format	GRIB1 zipped; recs separated

[Change options ...](#)

>>> Start Download <<<

Please note:

Equivalent [jblob](#) command:

```
jblob --dataset hist_r2i1p1-MR_jsb_rcm_land --rmin 1 --rmax 36
```


Advanced Search

Important Notice

CMIP5 data has been quality checked for level one (QCL1) which guarantees minimal conformance. The data is currently being quality checked for level two (QCL2) to assure consistency. As a consequence of this process, data may be withdrawn from the archive and/or replaced with corrected data without notice. Please refer to [this documentation](#) for more information regarding CMIP5 quality assurance procedure.

Search: for: **6hrLev**

To conduct a search, select a category from the pull down menu and/or enter free text into the the text box.

Search Categories

- Project **CMIP5**
- < Any Project
CMIP5
- + Institute
- + Model
- Experiment **historical**
- < Any Experiment
historical
- Frequency
- > 6-hourly
- + Product
- + Realm
- Variable
- > air temperature
- > eastward wind
- > northward wind
- > specific humidity
- > surface air pressure
- Ensemble **r1i1p1**
- < Any Ensemble
r1i1p1

Total Number of Results: 15

1-10 of 15 results | 11-15

1. **project=CMIP5, model=MRI-CGCM3, Meteorological Research Institute, experiment=historical, time_frequency=6hr, modeling_realm=atmos, ensemble=r1i1p1, version=20111019**
MRI-CGCM3 model output prepared for CMIP5 historical
 Data Center: ESG-PCMDI
2. **project=CMIP5 / IPCC Fifth Assessment Report, model=IPSL-CM5A-LR, Institut Pierre-Simon Laplace, experiment=historical, time_frequency=6hr, modeling_realm=atmos, ensemble=r1i1p1, version=20110406**
 Data Center: ESG-BADC
 Mirror Data Center: ESG-PCMDI
3. **project=CMIP5, model=HadGEM2-ES, Met Office Hadley Centre, experiment=historical, time_frequency=6hr, modeling_realm=atmos, ensemble=r1i1p1, version=20110921**
 Data Center: ESG-BADC
4. **project=CMIP5, model=NorESM1, Norwegian Climate Centre (NorClim), experiment=historical, time_frequency=6hr, modeling_realm=atmos, ensemble=r1i1p1, version=20110901**
 Data Center: ESG-WDCC
 Mirror Data Center: ESG-PCMDI
5. **project=CMIP5 / IPCC Fifth Assessment Report, model=CSIRO-Mk3.6, Commonwealth Scientific and Industrial Research Organization/Queensland Climate Change Centre of Excellence (CSIRO-QCCCE), experiment=historical, time_frequency=6hr, modeling_realm=atmos, ensemble=r1i1p1, version=20111220**

Files Download

Download all files for the selected datasets. Optionally use a wildcard expression to filter the filenames (example: use *.nc to select all files with extension nc).

RCM forcing in native GRIB

Advantages:

- ✓ rapid availability (well before QC)
- ✓ small data amount
- ✓ monthly records available (instead of timeseries)
- ✓ GRIB is a widely used format, previous converters can be used

Drawbacks:

- no QC, only indirectly, when model output has passed QC
- GRIB has to be converted into NetCDF

Links to data services

- **ENES-Portal:**
 - <https://verc.enes.org/data>
- **Cera user interface:**
 - <http://cera-www.dkrz.de/WDC/ui/Index.jsp>
- **RCM forcing Daten:**
 - http://cera-www.dkrz.de/WDC/ui/Project.jsp?proj=CMIP5_RCM_forcing_MPI-ESM
- **joblob Doku & Download:**
 - <http://cera-www.dkrz.de/CERA/joblob>