

# **CORDEX archiving: achievements, status and perspectives**

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# CORDEX archiving: history

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- in 2009-2010 the first CORDEX archiving specifications were built on experience gained from the PRUDENCE, ENSEMBLES and NARCCAP projects (RCMs)
- the first idea was about a central data portal + a number of regional databanks
- soon advantages of geographically-distributed, metadata-based searchable archives as the Earth System Grid Federation (ESGF) for CMIP5 become evident
- CORDEX archiving was adjusted towards CMIP5 as much as possible but still keeping necessary downscaling details (2011-2103)
- the main focus now is on ESGF (September 2013, first CORDEX data available), although other regional CORDEX data portals also exist

# CORDEX-data team

**development of the CORDEX archiving infrastructure was an joint effort of a number of European groups with coordination by the IS-ENES2 FP7 project**

- Martin Juckes and Stephen Pascoe (BADC, UK)
- Ole B. Christensen (DMI, Denmark)
- Stephanie Legutke and Stephan Kindermann (DKRZ, Germany)
- Sebastien Denvil (IPSL, France)
- Grigory Nikulin and Michael Kolax (SMHI, Sweden)
- Prashanth Dwarakanath and Torgny Faxén (NSC-LIU, Sweden)
- and many more ....



# CORDEX Archive Design

2009, 6 pages, including a variable list

## CORDEX Archive Design

The following recommendations apply both to CORDEX runs driven by ERA-Interim and CMIP5-GCMs, in terms of : variables to be saved, output format and frequency, file naming and archiving.

(a) Three classes of data are defined:

Core, relevant to all communities: monthly and seasonal means;

Tier 1, relevant to most communities: daily surface/selected upper air data;

2014, present version, 26 pages (no variable list)

## CORDEX Archive Design

Version 3.1, 3 March 2014

O.B. Christensen<sup>1</sup>, W.J. Gutowski<sup>2</sup>, G. Nikulin<sup>3</sup>, and S. Legutke<sup>4</sup>

### 1 Introduction

This document specifies technical aspects of CORDEX archive file and data formats, as well as archive content<sup>a</sup>. It includes a common naming system, the Data Reference Syntax (DRS), which allows the identification of data sets wherever they

# CORDEX Variable List

- the list includes 60 variables + static fields (land sea mask etc.)

## 2009

### Tier 1: Daily average output.

- 2-metre air temperature (K)
- Maximum 2-metre air temperature (for the 24 hour period preceding the write point)
- Minimum 2-metre air temperature (for the 24 hour period preceding the

## 2014

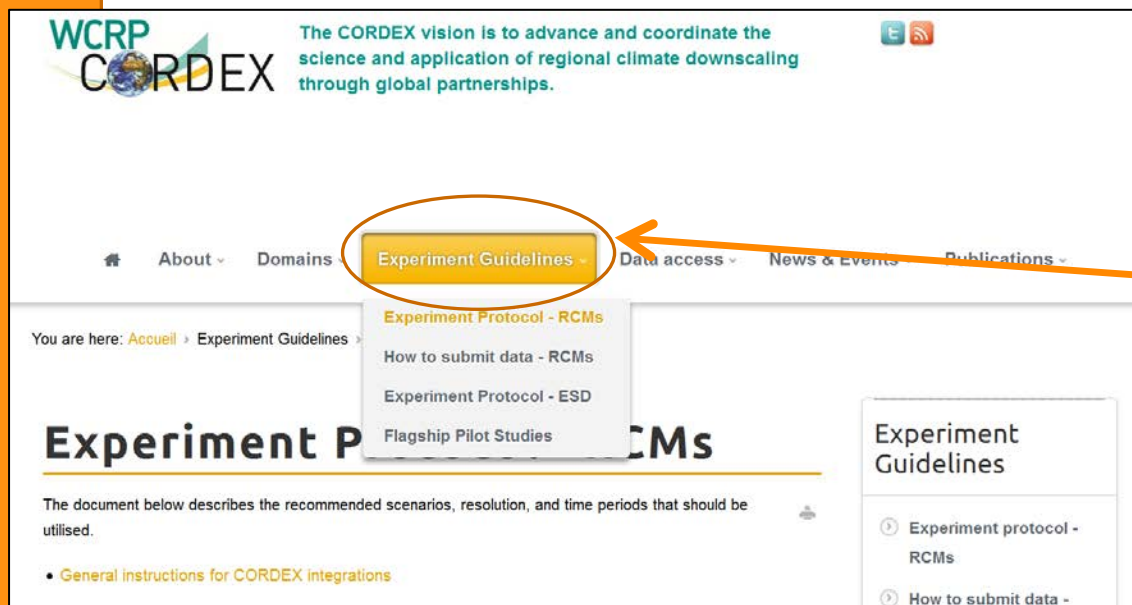
### CORDEX: requested variables

output variable name	units	Tier 2		Tier 1		Core				fx	long_name
		frq [1/day]	ag	frq [1/day]	ag	frq [1/mon]	ag	frq [1/sem]	ag		
tas	K	8	i	1	8	1	m*8	1	s*8		Near-Surface Air Temperature
tasmax	K			1		1	m	1	s		Daily Maximum Near-Surface Air Temperature
tasmin	K			1		1	m	1	s		Daily Minimum Near-Surface Air Temperature
pr	kg m <sup>-2</sup> s <sup>-1</sup>	8	a	1		1		1			Precipitation
ps	Pa	8	i	1	8						Surface Air Pressure
psl	Pa	8	i	1	8	1	m*8	1	s*8		Sea Level Pressure
huss	1	8	i	1	8	1	m*8	1	s*8		Near-Surface Specific Humidity
hurs	%	8	i	1	8	1	m*8	1	s*8		Near-Surface Relative Humidity

# CORDEX web site

[www.cordex.org](http://www.cordex.org)

CORDEX  
documentation for  
the RCM and ESD  
communities



The CORDEX vision is to advance and coordinate the science and application of regional climate downscaling through global partnerships.

WCRP CORDEX

Home About Domains **Experiment Guidelines** Data access News & Events Publications

You are here: Accueil > Experiment Guidelines >

**Experiment Protocol - RCMs**

- How to submit data - RCMs
- Experiment Protocol - ESD
- Flagship Pilot Studies

**Experiment Protocol - RCMs**

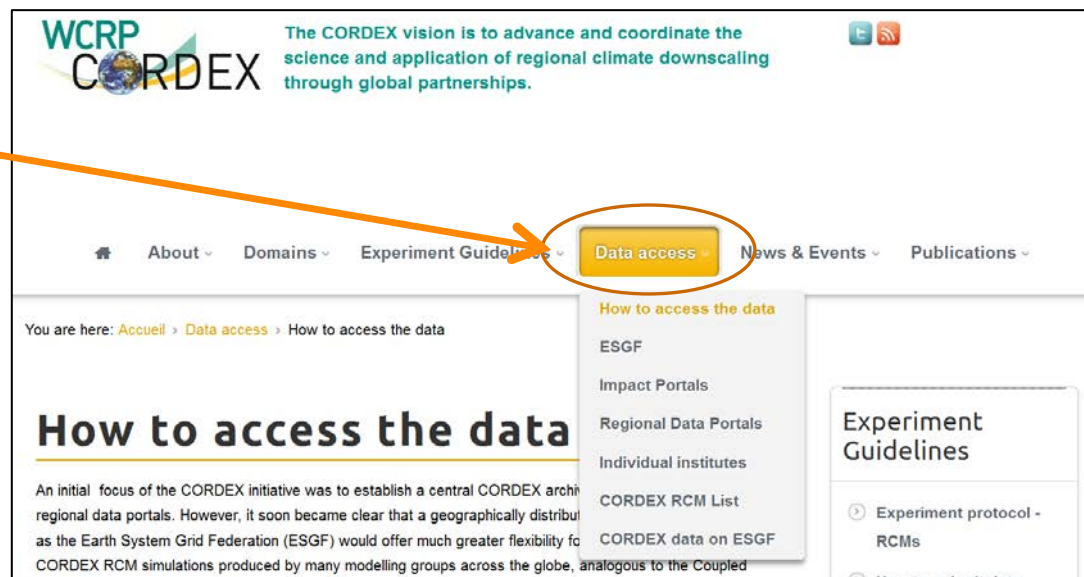
The document below describes the recommended scenarios, resolution, and time periods that should be utilised.

- General instructions for CORDEX integrations

Experiment Guidelines

- Experiment protocol - RCMs
- How to submit data -

CORDEX Data  
for users



The CORDEX vision is to advance and coordinate the science and application of regional climate downscaling through global partnerships.

WCRP CORDEX

Home About Domains Experiment Guidelines **Data access** News & Events Publications

You are here: Accueil > Data access > How to access the data

**How to access the data**

An initial focus of the CORDEX initiative was to establish a central CORDEX archive of regional data portals. However, it soon became clear that a geographically distributed as the Earth System Grid Federation (ESGF) would offer much greater flexibility for CORDEX RCM simulations produced by many modelling groups across the globe, analogous to the Coupled

How to access the data

- ESGF
- Impact Portals
- Regional Data Portals
- Individual institutes
- CORDEX RCM List
- CORDEX data on ESGF

Experiment Guidelines

- Experiment protocol - RCMs
- How to submit data -

# CORDEX data

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## CORDEX simulations can be accessed using:

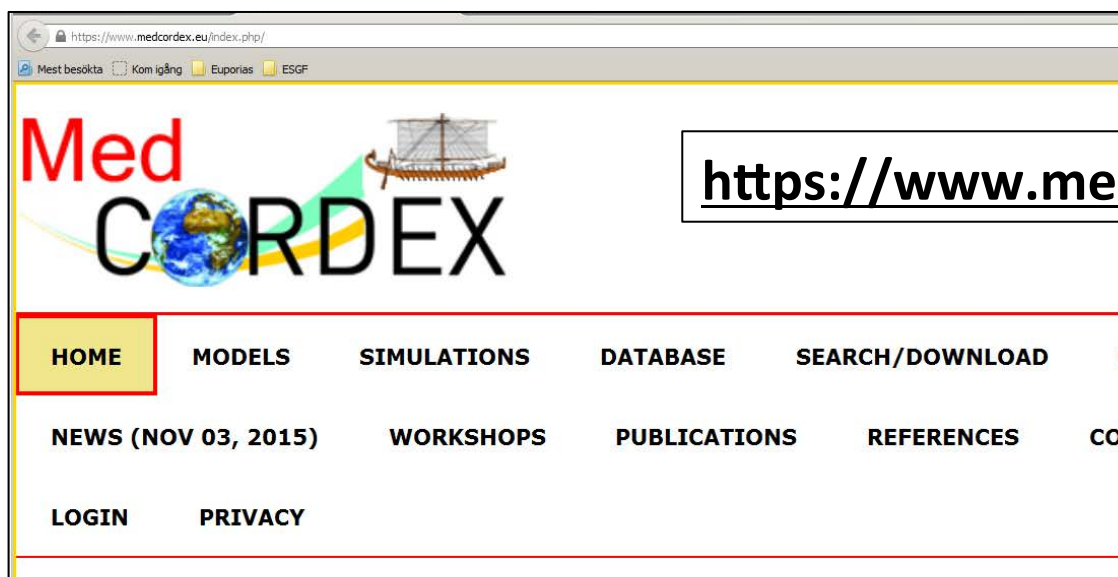
1. Earth system Grid Federation (ESGF)
2. Regional Data Portals (Med-CORDEX, South and East Asia)
3. Impact portals (only the ESGF segment)
4. Servers at Individual modelling groups

The CORDEX-ESGF segment was delayed and 3 regional data portals have been already established when first CORDEX simulations were published on ESGF:

- Med-CORDEX
- East Asia CORDEX
- South Asia CORDEX

During downtime of ESGF (June 2015 – January 2016) all portals were operational

# Med-CORDEX data portal



<https://www.medcordex.eu>

- Med-CORDEX simulations are available only at the portal
- users should be approved (quick response)
- Terms of Use (ToU): non-commercial for all datasets
- There is an advanced search, web-based post-processing (CDO etc.) and different statistics (simulations, variables, files etc.)

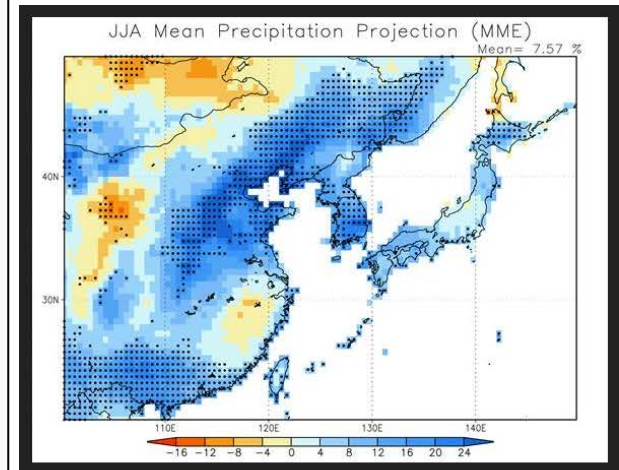
The last file was upload on 13th of May 2016. As of today:

- the repository contains **127692** data files for a total of **4928 GB**
- have been downloaded **414055** data files for a total of **13788 GB**
- **87** Med-CORDEX users (out of the **177** registered) and **43** HyMeX users downloaded data



# East Asia CORDEX data portal

[cordex-ea.climate.go.kr](http://cordex-ea.climate.go.kr)



- register and download
- Terms of Use: non-commercial for all datasets at the portal
- Some EAS-CORDEX data is available on ESGF (unrestricted)
- there are plots with evaluation and projected changes (individual RCMs and MME)
- web-based plotting

# South Asia-CORDEX data portal



## CONTACT

CORDEX: Coordinated Regional Climate Downscaling Experiment

CORDEX South Asia

CORDEX, conceived under WCRP has 3 primary aims:

CORDEX South Asia Training Workshop

- users should be approved
- Terms of Use not provided (a link to the CORDEX ToU)
- Some South Asia-CORDEX data is available on ESGF (unrestricted)

# ESGF

- an international collaboration that develops, deploys and maintains software infrastructure for the management, dissemination, and analysis of model output and observational data
- Peer-To-Peer architecture(p2p): geographically-distributed, decentralized database (many data nodes, no central archive)
- ESGF's primary goal is to facilitate advancements in Earth System Science
- mid June 2015 - January 2016 was downtime due to a security issue
- back to operation since February 2016 (not all nodes)

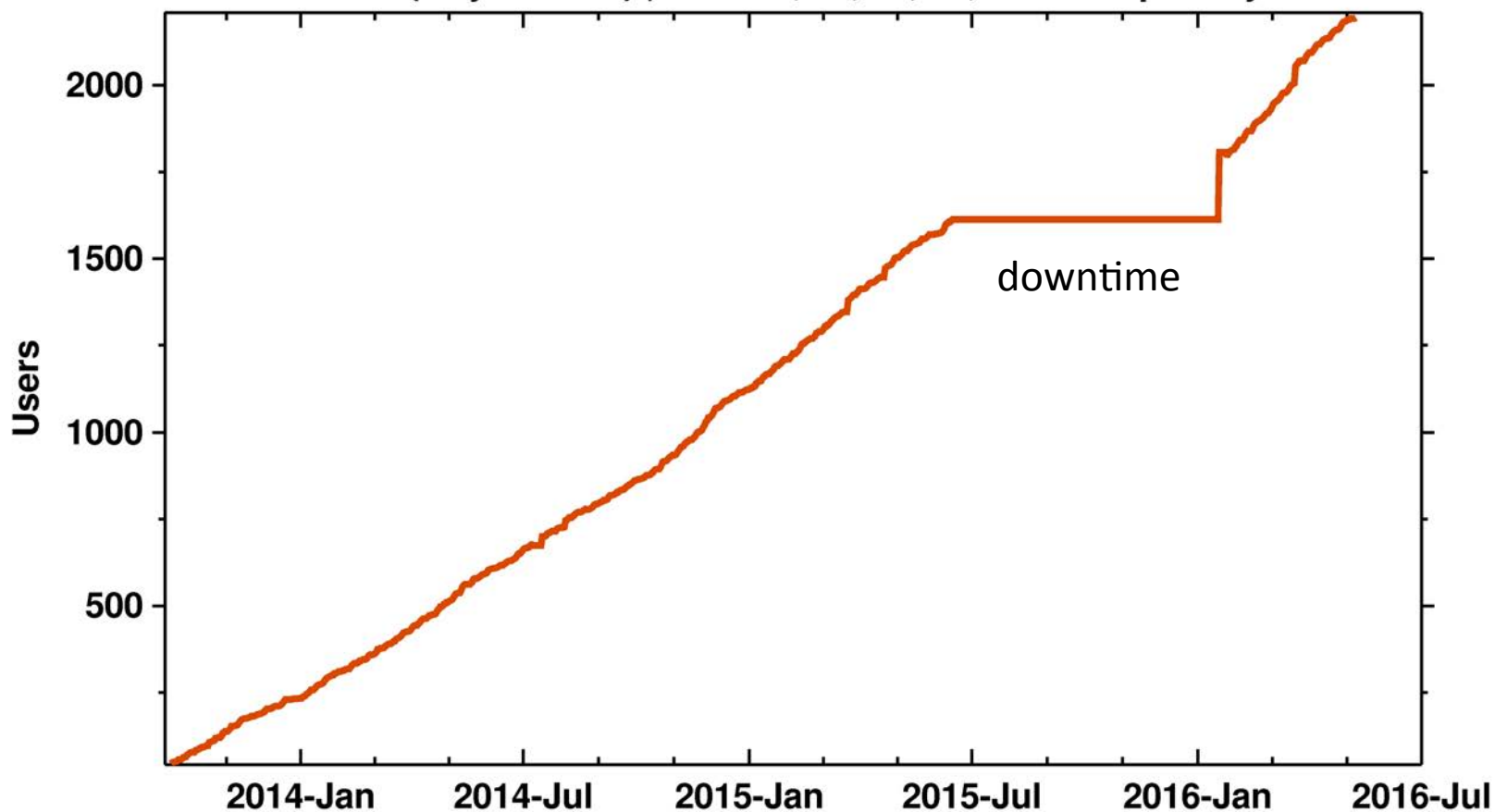
<http://esgf.llnl.gov/>



# CORDEX-ESGF

- **CORDEX-ESGF** is in operation since mid September 2013
- CORDEX data can be accessed in the same way as CMIP5, Obs4MIPs, Ana4MIPs
- 2200 users in the CORDEX-ESGF group (10 May 2016)

Number of users registered in the ESGF-CORDEX group  
2200 users (May 10 2016) | Max: 49, 34, 26, 19, 11 users per day



# CORDEX ESGF nodes

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- Tier 1 nodes (graphical search interface) , May 2016:
  - [esg-dn1.nsc.liu.se](http://esg-dn1.nsc.liu.se) (SMHI-NSC-LIU, Sweden)
  - [esgf-data.dkrz.de](http://esgf-data.dkrz.de) (DKRZ, Germany)
  - [esgf-index1.ceda.ac.uk](http://esgf-index1.ceda.ac.uk) (CEDA, UK)
  - [esgf-node.ipsl.fr](http://esgf-node.ipsl.fr) (IPSL, France)
- Tier 2 nodes (only data, no graphical search interface):
  - [cordexesg.dmi.dk](http://cordexesg.dmi.dk) (DMI, Denmark)
  - [data.meteo.unican.es](http://data.meteo.unican.es) (Univ. of Cantabria, Spain)
  - [esg-cccr.tropmet.res.in](http://esg-cccr.tropmet.res.in) (IITM, India, not in operation)

It doesn't matter from which of the index nodes CORDEX simulations can be accessed, a federative system, no central archive, links lead to the same files

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How to access the CORDEX data:

“Data access” section on [www.cordex.org](http://www.cordex.org)



# ESGF training workshop for CORDEX Asia

- 4-5 December 2014, WMO Regional Training Centre, Nanjing University of Information Science and Technology, China (funding: WMO, WCRP, MARIS, NUIITS)
- 23-25 February 2016, Jeju International Convention Center, Jeju, Korea, hosted by National Institute of Meteorological Sciences at Korea Meteorological Administration (funding: WCRP, NIMS, IS-ENES2)
- Technical workshops: setting up ESGF node, quality control and publication of CORDEX simulations on ESGF

Nanjing, December 2014



Jeju, February 2016



# CORDEX ESGF search interface

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<b>Project</b>	-
<input type="checkbox"/> CORDEX (62200)	
<b>Product</b>	+
<b>Domain</b>	+
<b>Institute</b>	+
<b>Driving Model</b>	+
<b>Experiment</b>	+
<b>Experiment Family</b>	+
<b>Ensemble</b>	+
<b>Model</b>	+
<b>Downscaling realisation</b>	+
<b>Time Frequency</b>	+
<b>Variable</b>	+
<b>Variable Long Name</b>	+
<b>CF Standard Name</b>	+
<b>Datanode</b>	+

# CORDEX ESGF search interface

12 of the 14 CORDEX domains

<b>Project</b>	-
<input type="checkbox"/> CORDEX (62200)	
<b>Product</b>	+
<b>Domain</b>	+
<b>Institute</b>	+
<b>Driving Model</b>	+
<b>Experiment</b>	+
<b>Experiment Family</b>	+
<b>Ensemble</b>	+
<b>Model</b>	+
<b>Downscaling realisation</b>	+
<b>Time Frequency</b>	+
<b>Variable</b>	+
<b>Variable Long Name</b>	+
<b>CF Standard Name</b>	+
<b>Datanode</b>	+

Domain	
<input checked="" type="checkbox"/>	AFR-44 (10784)
<input checked="" type="checkbox"/>	ANT-44 (1231)
<input checked="" type="checkbox"/>	ARC-44 (3257)
<input checked="" type="checkbox"/>	AUS-44 (171)
<input checked="" type="checkbox"/>	CAM-44 (1712)
<input checked="" type="checkbox"/>	CAS-44 (171)
<input checked="" type="checkbox"/>	EAS-44 (747)
<input checked="" type="checkbox"/>	EUR-11 (6844)
<input checked="" type="checkbox"/>	EUR-44 (9860)
<input checked="" type="checkbox"/>	MNA-22 (700)
<input checked="" type="checkbox"/>	MNA-44 (1551)
<input checked="" type="checkbox"/>	NAM-44 (2527)
<input checked="" type="checkbox"/>	SAM-44 (1440)
<input checked="" type="checkbox"/>	WAS-44 (3647)



# CORDEX ESGF search interface

12 of the 14 CORDEX domains

RCMs

<b>Project</b>	-
<input type="checkbox"/> CORDEX (62200)	
<b>Product</b>	+
<b>Domain</b>	+
<b>Institute</b>	+
<b>Driving Model</b>	+
<b>Experiment</b>	+
<b>Experiment Family</b>	+
<b>Ensemble</b>	+
<b>Model</b>	+
<b>Downscaling realisation</b>	+
<b>Time Frequency</b>	+
<b>Variable</b>	+
<b>Variable Long Name</b>	+
<b>CF Standard Name</b>	+
<b>Datanode</b>	+

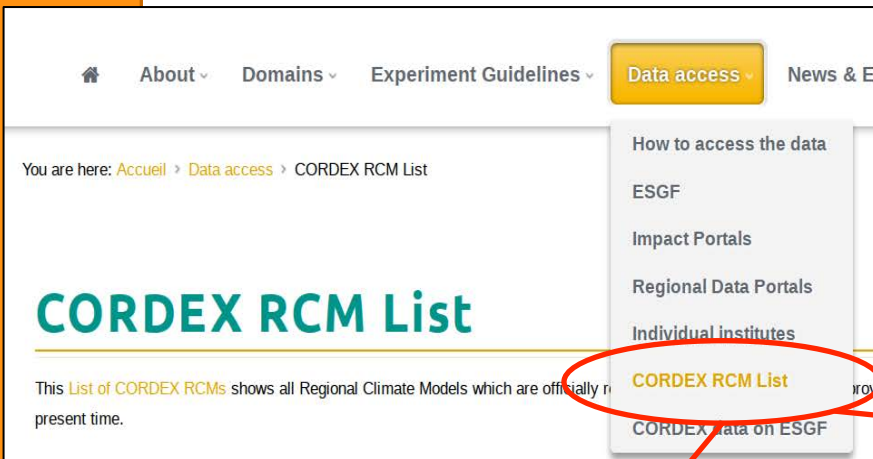
Domain
<input checked="" type="checkbox"/> AFR-44 (10784)
<input checked="" type="checkbox"/> ANT-44 (1231)
<input checked="" type="checkbox"/> ARC-44 (3257)
<input checked="" type="checkbox"/> AUS-44 (171)
<input checked="" type="checkbox"/> CAM-44 (1712)
<input checked="" type="checkbox"/> CAS-44 (171)
<input checked="" type="checkbox"/> EAS-44 (747)
<input checked="" type="checkbox"/> EUR-11 (6844)
<input checked="" type="checkbox"/> EUR-44 (9860)
<input checked="" type="checkbox"/> MNA-22 (700)
<input checked="" type="checkbox"/> MNA-44 (1551)
<input checked="" type="checkbox"/> NAM-44 (2527)
<input checked="" type="checkbox"/> SAM-44 (1440)
<input checked="" type="checkbox"/> WAS-44 (3647)

Model
<input type="checkbox"/> ALADIN52 (590)
<input type="checkbox"/> CCLM4-8-17 (4108)
<input type="checkbox"/> CRCM5 (1255)
<input type="checkbox"/> HIRHAM5 (4340)
<input type="checkbox"/> MAR352 (197)
<input type="checkbox"/> MOHC-HadGEM3-RA (342)
<input type="checkbox"/> MOHC-HadRM3P (2270)
<input type="checkbox"/> RACMO21P (1424)
<input type="checkbox"/> RACMO22E (2036)
<input type="checkbox"/> RACMO22T (1436)
<input type="checkbox"/> RCA4 (37838)
<input type="checkbox"/> RCA4-SN (1150)
<input type="checkbox"/> REMO2009 (3354)
<input type="checkbox"/> RRCM (215)
<input type="checkbox"/> RegCM4-2 (45)
<input type="checkbox"/> RegCM4-3 (236)
<input type="checkbox"/> CNRM-ALADIN53 (422)
<input type="checkbox"/> WRF331F (686)

# CORDEX RCM list

All CORDEX RCM groups have to provide info to [cordex-registration@cordex.org](mailto:cordex-registration@cordex.org)

1. Full institution name
2. Short institution name (acronym)
3. Contact person and e-mail
4. RCM name (acronym)
5. **Terms of Use:** unrestricted or non-commercial only
6. CORDEX domains you are interested in.



text list

html list

## CORDEX Models overview

Information automatically generated based on ESGF CORDEX registration sheet.

To register CORDEX simulations please contact [cordex-registration /at/ smhi.se](mailto:cordex-registration/at/smhi.se)

Timestamp: # 2016-05-04 14:43:11 #

Model Name	Institute	Institution Name
AUTH-LHTEE-WRF321B	AUTH-LHTEE	Aristotle University of Thessaloniki, Laboratory of Heat Transfer and Environment
AUTH-MC-WRF371	AUTH-MC	Aristotle University of Thessaloniki, Department of Meteorology & Climatology
AWI-HIRHAM5	AWI	Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research
BCCR-WRF331	BCCR	Uni Research and the Bjerknes Centre for Climate Research
BCCR-WRF331C	BCCR	Uni Research and the Bjerknes Centre for Climate Research
BCCR-WRF361	BCCR	Uni Research and the Bjerknes Centre for Climate Research
CCCma-CanRCM4	CCCma	CCCma (Canadian Centre for Climate Modelling and Analysis, Victoria, BC, Canada)

```
# List of CORDEX RCMs (short, machine readable version)
# Do not change this file - it is auto-generated based on the contents
# of the CORDEX RCM registration sheet
# To register CORDEX simulations please contact cordex-registration /at/
# Timestamp: 2016-05-04 14:43:11
# -----
# model id          institute id      ToU
# -----
AUTH-LHTEE-WRF321B  AUTH-LHTEE      unknown
AUTH-MC-WRF371      AUTH-MC          unrestricted
AWI-HIRHAM5          AWI              unrestricted
BCCR-WRF331          BCCR            unrestricted
BCCR-WRF331C         BCCR            unrestricted
BCCR-WRF361          BCCR            unrestricted
CCCma-CanRCM4        CCCma            unrestricted
CHMI-ALADIN53        CHMI            non-commercial
CLMcom-CCLM4-8-17    CLMcom          non-commercial
CNRM-ALADIN52        CNRM            non-commercial
CNRM-ALADIN53        CNRM            non-commercial
CNRM-ARPEGE52        CNRM            unrestricted
CNRM-RCSM4           CNRM            non-commercial
CRP-GL-WRF331A       CRP-GL          unrestricted
CSIRO-CCAM           CSIRO           unrestricted
CUNI-RegCM4-2        CUNI            unknown
DHMZ-RegCM4-2        DHMZ            non-commercial
DMI-HIRHAM5          DMI             unrestricted
ENEA-RegCM4-3        ENEA            non-commercial
```

# What's available ?



The CORDEX vision is to advance and coordinate the science and application of regional climate downscaling through global partnerships.

[Home](#)
[About](#)
[Domains](#)
[Experiment Guidelines](#)
[Data access](#)
[News & E](#)

You are here: [Accueil](#) > [Data access](#) > CORDEX data on ESGF

## CORDEX data on ESGF

To find a table showing the CORDEX data available on the ESGF [click here](#).

- How to access the data
- ESGF
- Impact Portals
- Regional Data Portals
- Individual institutes
- CORDEX RCM List
- CORDEX data on ESGF**

- automatically generated once a week or when a larger number of new datasets published
- many thanks to DKRZ for providing this service

## CORDEX - ESGF data availability overview

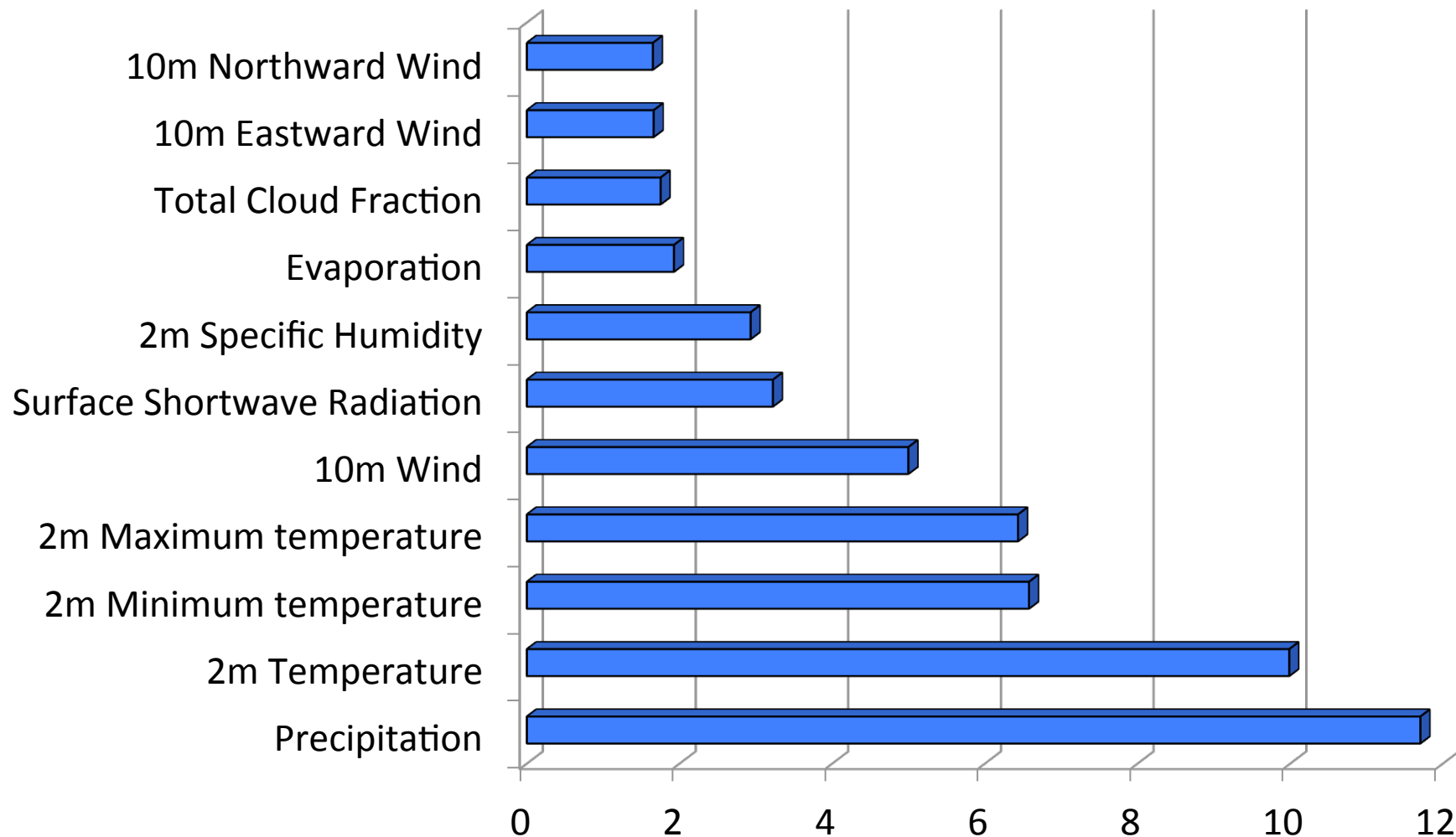
- sorted by domains -

Information retrieved from ESGF index nodes at # 2016-05-04 14:43:21 #

Domain	Model	Driving Model
AFR-44	CCLM4-8-17	CNRM-CERFACS-CNRM-CM5
AFR-44	CCLM4-8-17	ECMWF-ERAINT
AFR-44	CCLM4-8-17	ICHEC-EC-EARTH
AFR-44	CCLM4-8-17	MOHC-HadGEM2-ES
AFR-44	CCLM4-8-17	MPI-M-MPI-ESM-LR
AFR-44	CRCM5	CCCma-CanESM2
AFR-44	CRCM5	ECMWF-ERAINT
AFR-44	CRCM5	MPI-M-MPI-ESM-LR
AFR-44	HIRHAM5	ECMWF-ERAINT
AFR-44	HIRHAM5	ICHEC-EC-EARTH
AFR-44	HIRHAM5	NCC-NorESM1-M
AFR-44	MOHC-HadGEM3-RA	ECMWF-ERAINT
EUR-11	RACMO22E	ICHEC-EC-EARTH
EUR-11	RACMO22E	MOHC-HadGEM2-ES
EUR-11	RCA4	CNRM-CERFACS-CNRM-CM5
EUR-11	RCA4	ECMWF-ERAINT
WAS-44	REMO2009	MPI-M-MPI-ESM-LR
WAS-44i	MOHC-HadRM3P	ECMWF-ERAINT
ARC-44	RRCM	ECMWF-ERAINT
ARC-44i	HIRHAM5	ECMWF-ERAINT
ARC-44i	MAR352	ECMWF-ERAINT

# Most popular CORDEX variables

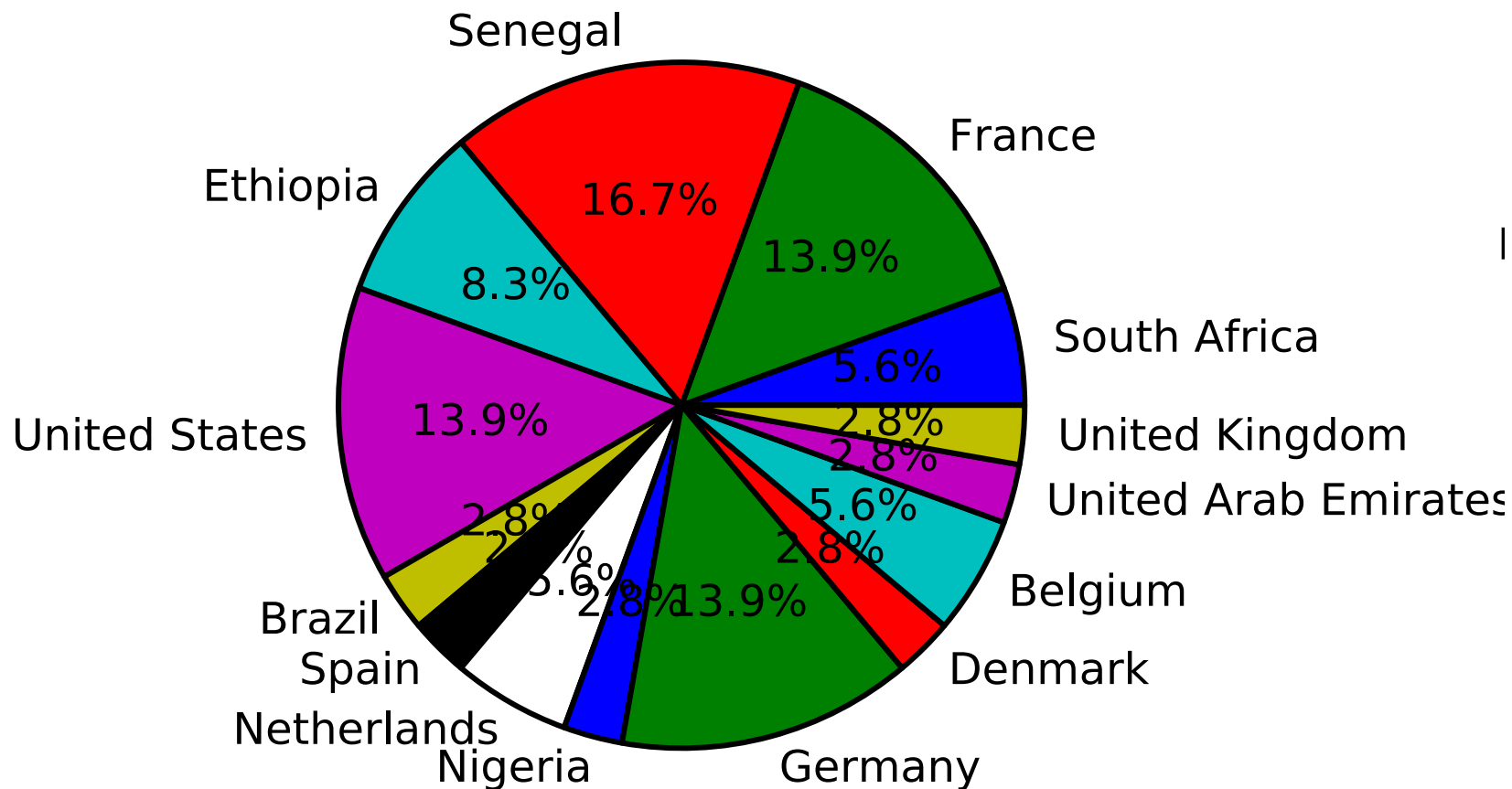
11 variables are about 50% of total CORDEX downloads  
(based on 7 CORDEX domains, ~130 simulations, SMHI-RCA4)



Percentage of total CORDEX downloads

# Download statistics for CORDEX-Africa

geolocation by IPs



# Impact Portals

- CORDEX simulations available on ESGF can also be accessed via [climate4impact.eu](http://climate4impact.eu) with an user friendly interface (registration on ESGF)
- web-based post-processing
- a tool for statistical downscaling is promised

The screenshot shows the 'is-enes' portal, described as 'Exploring climate model data'. The header includes the logo and navigation links for LinkedIn, IS-ENES, Contact, and Sign in. A main navigation bar contains links for Home, Data discovery, Downscaling, Documentation, Help, About us, and Sign in, along with a search bar. Below this is a secondary bar with Search, Catalogs, Explore your own catalogs or files, Map & Plot, and Processing. The main content area features a 'Selected filters' section with a 'Project : CORDEX' filter. Below this is a 'Filters' section with various categories: Project (1), Parameter (69), Frequency (6), RCP/Experiment (5), Domain (27), Model (16), Access (4), Date, Geobox, Text, and a '> more...' link. A 'Quick select' section shows three options: CMIP5 (Coupled Model Intercomparison Project Phase 5, Long term global climate change runs), CORDEX (Coordinated Regional Climate Downscaling Experiment, Long term regional climate change runs), and CLIPC (Climate Information Platform for Copernicus). The CORDEX option is currently selected. At the bottom, a status bar indicates 'Found 62390 datasets. Displaying page 1 of 2496.'



# Bias-adjusted (corrected) CORDEX simulations

- a common question: “Where can I get bias-adjusted CORDEX data?”
- many methods and many groups run BC but usually BC simulations are not easily available to a wider community
- 2<sup>nd</sup> CORDEX SAT meeting (Feb 2015): “**CORDEX-Adjust**” project on ESGF
- work is ongoing and the first BC CORDEX simulations should be available soon on ESGF (summer 2016 )

## Just a test configuration

Project	-
<input checked="" type="checkbox"/> CORDEX-Adjust (48)	
Product	+
Institute	+
Model	+
Experiment	+
Experiment Family	+
Time Frequency	+
Realm	
CMIP Table	
Variable	+
Ensemble	+
Variable Long Name	+
CF Standard Name	+
Datanode	+

CORDEX-Adjust	
Bias Adjustment -	
<input type="checkbox"/>	v1-SMHI-DBS43-EOBS10-1981-2010 (8)
<input type="checkbox"/>	v1-SMHI-DBS43-MESAN-1989-2010 (8)
<input type="checkbox"/>	v1-SMHI-DBS43-WFDEI-1981-2010 (16)
<input type="checkbox"/>	v1-SMHI-QM658-MESAN-1989-2010 (8)
<input type="checkbox"/>	v2-SMHI-DBS43-WFDEI-1981-2010 (8)

Variable -	
<input type="checkbox"/>	prAdjust (24)

BC info is included to one element “Bias Adjustment”:  
**“BC\_name” - “OBS” - “Period”**

variable names: **pr --> prAdjust**

# Bias-adjusted (corrected) CORDEX simulations

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Project	-
<input checked="" type="checkbox"/> CORDEX-Adjust (48)	
Product	+
Institute	+
Model	+
Experiment	+
Experiment Family	+
Time Frequency	+
Realm	
CMIP Table	
Variable	+
Ensemble	+
Variable Long Name	+
CF Standard Name	+
Datanode	+

CORDEX-Adjust	
Bias Adjustment -	
<input type="checkbox"/>	v1-SMHI-DBS43-EOBS10-1981-2010 (8)
<input type="checkbox"/>	v1-SMHI-DBS43-MESAN-1989-2010 (8)
<input type="checkbox"/>	v1-SMHI-DBS43-WFDEI-1981-2010 (16)
<input type="checkbox"/>	v1-SMHI-QM658-MESAN-1989-2010 (8)
<input type="checkbox"/>	v2-SMHI-DBS43-WFDEI-1981-2010 (8)

Variable -	
<input type="checkbox"/>	prAdjust (24)

BC info is included to one element “Bias Adjustment”:  
“**BC\_name**”-“**OBS**”-“**Period**”

variable names: **pr** --> **prAdjust**

- **BC is a controversial approach**
- **still debated**
- **no best BC method ?**
- **BC-related uncertainties unclear**



# Climate indices

- there are many climate indices defined by different communities
- different software packages to calculate different indices
- Can we provide a set of climate indices for the CORDEX simulations in a coordinated way?
- the main problem is that there is no standard definition of metadata for the climate indices (standard and long names etc.)
- work on development of common metadata standards for the climate indices is ongoing in the CLIPC project (Climate Information Platform for Copernicus; <http://www.clipc.eu/>)

## Metadata description for climate indices<sup>1</sup> according to the Climate & Forecasting (CF) convention – variable names and attributes

Draft version 5 May 2016

<u>Variable name</u>	<u>Expert Team Index name</u>	<u>Expert Team Definition</u>	<u>Index units (user-friendly)</u>	<u>calculation frequency</u>	<u>long_name (standardised)</u>	<u>CF units</u>	<u>CF standard_name</u>	<u>CF cell-method</u>
fd	Frost days	Count when TN < 0°C	days	ann/sea/mon	Number of Frost Days (Tmin < 0C)	1	number_of_days_with_air_temperature_below_threshold	time: minimum within days time: sum over days
fd0	Frost days	Count when TN < 0°C	days	ann/sea/mon	Number of Frost Days (Tmin < 0C)	1	number_of_days_with_air_temperature_below_threshold	time: minimum within days time: sum over days
fd2	Frost days 2	Count when TN < 2°C	days	ann/sea/mon	Number of Frost Days (Tmin < +2C)	1	number_of_days_with_air_temperature_below_threshold	time: minimum within days time: sum over days
fdm2	Hard freeze	Count when TN < -2°C	days	ann/sea/mon	Number of Hard Freeze Days (Tmin < -2C)	1	number_of_days_with_air_temperature_below_threshold	time: minimum within days time: sum over days

# Climate indices

- there are many climate indices defined by different communities
- different software packages to calculate different indices
- Can we provide a set of climate indices for the CORDEX simulations in a coordinated way?
- the main problem is that there is no standard definition of metadata for the climate indices (standard and long names etc.)
- work on development of common metadata standards for the climate indices is ongoing in the CLIPC project (Climate Information Platform for Copernicus; <http://www.clipc.eu/>)

## Metadata description for climate indices<sup>1</sup> according to the Climate & Forecasting (CF) convention – variable names and attributes

Draft version 5 May 2016

<u>Variable name</u>	<u>Expert Team Index name</u>	<u>Expert Team Definition</u>	<u>Index units (user-friendly)</u>	<u>calculation frequency</u>	<u>long_name (standardised)</u>	<u>CF units</u>	<u>CF standard_name</u>	<u>CF cell-method</u>
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a “CORDEX-Index” project on ESGF ?

# Empirical Statistical Downscaling (ESD)

- ESD is an integral part of CORDEX, not only RCMs
- however, up to now only RCM simulations are available (ESGF+portals)
- ESD community is very diverse: many different methods, more “local” downscaling compared to size of the CORDEX domains
- common metadata for ESD methods, Data Reference Syntax (DRS) are in development

## **Suggestion for the extension of the *CORDEX Archive Design* document**

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José Manuel Gutiérrez, IFCA-CSIC/UC, [gutierjm@unican.es](mailto:gutierjm@unican.es)

Chris Jack, University of Cape Town, [cjack@csag.uct.ac.za](mailto:cjack@csag.uct.ac.za)

Sixto Herrera, Universidad de Cantabria, [herrerass@unican.es](mailto:herrerass@unican.es)

Version 1.03; January 29, 2016

The following text suggests several extensions for the current<sup>1</sup> CORDEX Archive Design to include needed aspects for ESD data. The section number corresponds to the defined in the CORDEX Archive Design document.

- still a lot of work
- many technical aspects are different between RCM and ESD

# CMIP6

- **CORDEX** is a CMIP6-Endorsed Model Intercomparison Project (MIP)
- a diagnostic MIP (no new experiments but specific output)

## WCRP COORDINATED REGIONAL DOWNSCALING EXPERIMENT (CORDEX)

### Application for CMIP6-Endorsed MIPs

*Date: 31 March 2015*

- 30 years of the pre-industrial experiment
- 1950-2014, the historical simulations
- 2015-2100, the scenario runs (RCP26, 45 and 85)

we may expect some changes to the CORDEX archive design to be close to the CMIP6 specifications as much as possible (simplifies CORDEX data management using tools developed in CMIP6)

- CMIP6 GCM data is expected in 2018

# CORDEX output variables

---

**CORE:** 43 variables (monthly and seasonal, ESGF/portals)

**TIER1:** 60 variables (daily, ESGF/portals)

**TIER2:** 16 variables (3-hr) and 36 variables (6-hr): available by request from the CORDEX RCM groups (some available on ESGF)

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- ocean variables were not defined from the beginning, only atmospheric ones, should be included (ocean variables are available from the Med-CORDEX portal only )

# Thank you for your attention

## Questions ?



The screenshot shows the WCRP CORDEX website. The header features the WCRP CORDEX logo on the left, a mission statement in the center, and social media icons on the right. Below the header is a navigation bar with a home icon and links to About, Domains, Experiment Guidelines, Data access, News & Events, and Publications. The main content area is divided into two sections: a large image of a globe on the left and a 'CORDEX News' section on the right. The news section contains a list of recent events and announcements.

**WCRP CORDEX**

The CORDEX vision is to advance and coordinate the science and application of regional climate downscaling through global partnerships.

[Home](#) [About](#) [Domains](#) [Experiment Guidelines](#) [Data access](#) [News & Events](#) [Publications](#)

### CORDEX News

- ICRC-CORDEX 2016 Register now! Registration deadline 1st May 2016
- CORDEX ECS May 19th
- EURO-CORDEX General Assembly 2016
- ICRC-CORDEX 2016: Notification of successful abstracts and