Training on
Spatial and temporal climate change analysis using CORDEX regional climate models for Bangladesh

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Training Coordinator
Climate change and Hydrology Group Lead
On behalf of the team, 13 December 2021

TRAINING ON

Spatial and temporal climate change analysis using CORDEX regional climate models over South Asia

7–11 June 2021 | Microsoft Teams

Organized by Met Office – UK and International Centre for Integrated Mountain Development (ICIMOD)

"If you can't measure it, you can't manage it"

Peter Drucker

Why climate change data is important

It tells us future climate projections

To understand change in major climatic parameters (heat waves)

To understand impacts on different sectors (water, floods, drought)

To design adaptation plans against climate change impacts

Scientific knowledgebase

Program agenda

Objective: To build underpinning knowledge and skills for analysing regional climate change projections using CORDEX regional climate model simulations

Date	Agenda
Day 1, 13 June	Opening and key presentations CORDEX data extraction and management
Day 2, 14 June	Selection of representative CORDEX models (APHRODITE-reference datasets) Seasonal and annual biases estimation
Day 4, 15 June	Future climate change estimation Visualization of future scenario based on selected models, Uncertainty analysis

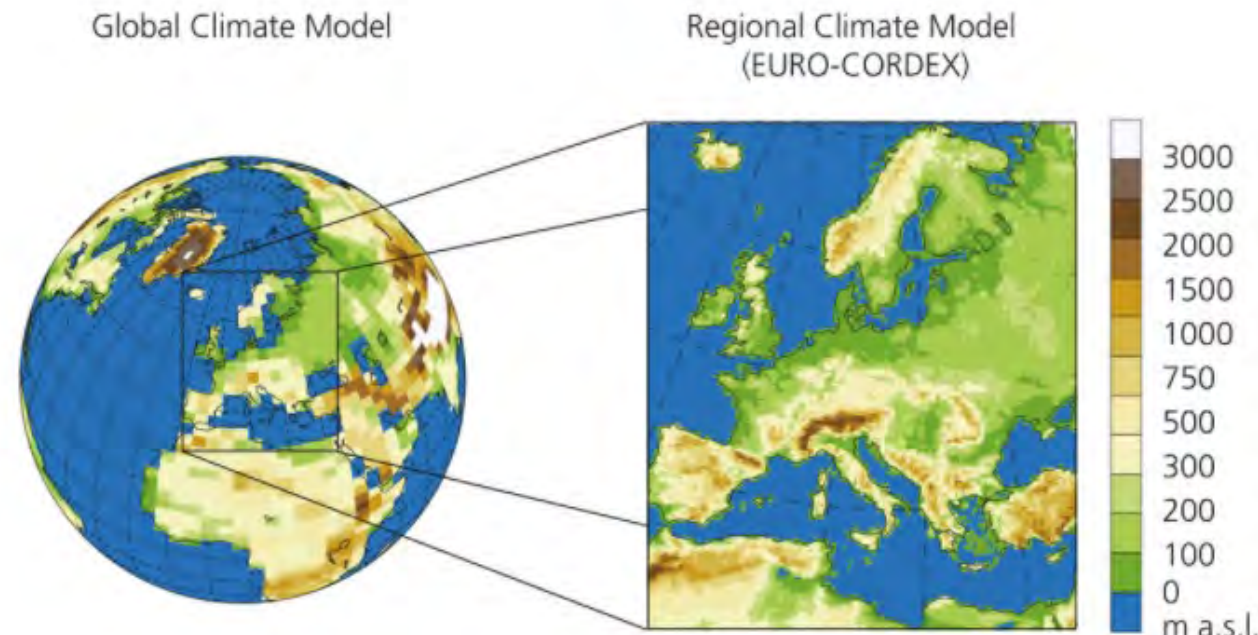# Present challenges of climate change assessment

Global climate models – coarse resolution

Downscaling generates high resolution climate datasets for impact assessment

Climate datasets are huge in size and require high computational facilities

Lack of datasets readily available for impact assessment

Lack of required skill and capacity

Global Climate Model

Regional Climate Model (EURO-CORDEX)

3000
2500
2000
1500
1000
750
500
300
200
100
0
m a.s.l.

Challenges..

17 CORDEX model (pr, tas) : 350 GB

3.2 GB

3.2 GB

3.2 GB

.nc format   10 GB

**17 RCM x
4 climate variables (pr, tas, tasmax, tasmin)**

CORDEX datasets in Regional Database System
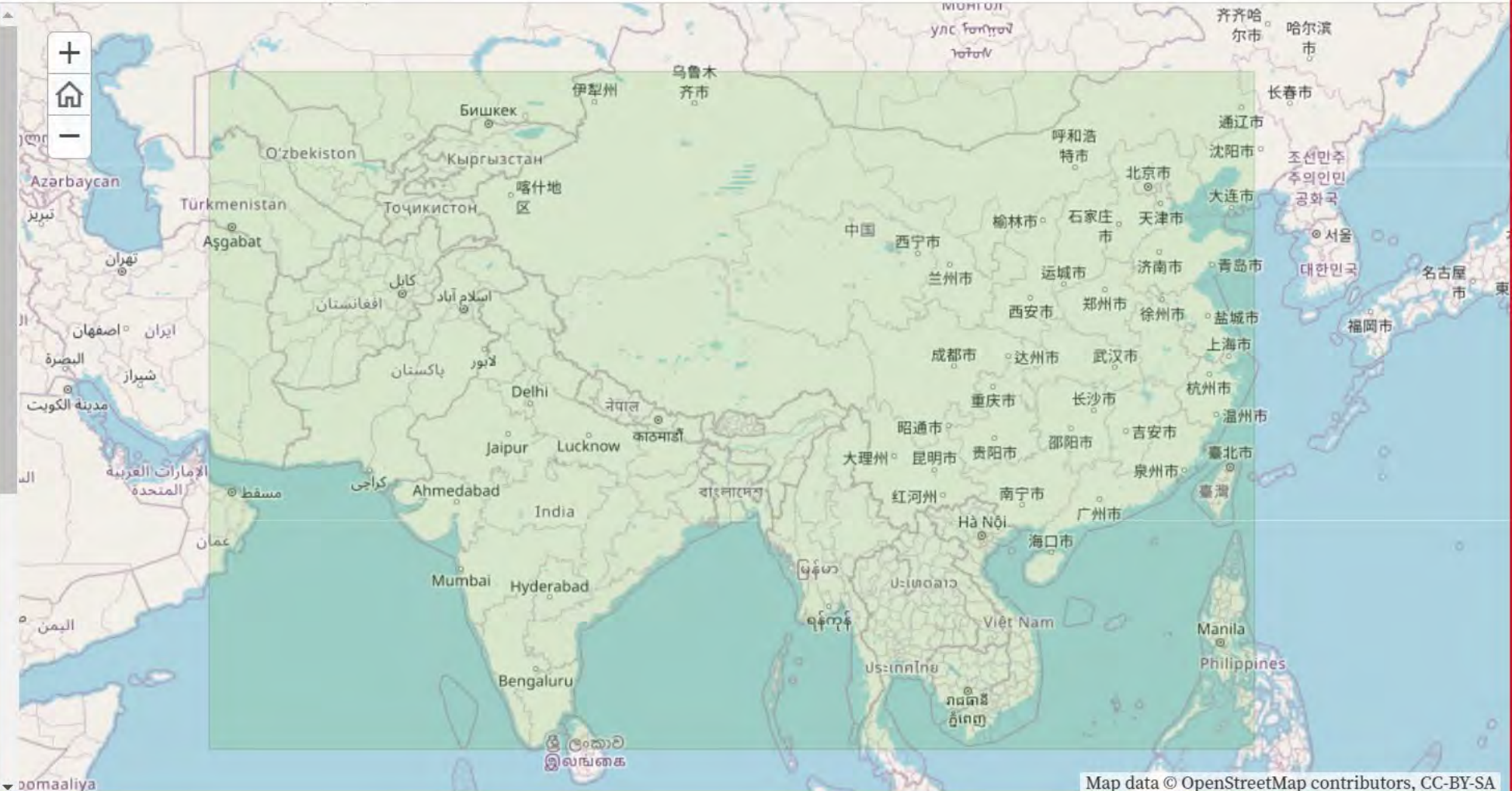
Chittgong

17 CORDEX model runs were extracted for the Koshi basin

The dataset is already shared

ws (C:) > CORDEX_Training_2021_DHAKA

Name	Date modified	Type
Code	12/12/2021 7:45 PM	File folder
Data_daily	12/12/2021 7:45 PM	File folder
Data_monthly	12/12/2021 7:46 PM	File folder
Output	12/12/2021 7:53 PM	File folder
Reference	12/12/2021 7:46 PM	File folder
Shapefile	12/12/2021 7:46 PM	File folder

ws (C:) > CORDEX_Training_2021_DHAKA > Data_monthly > RCP8.5 > tas

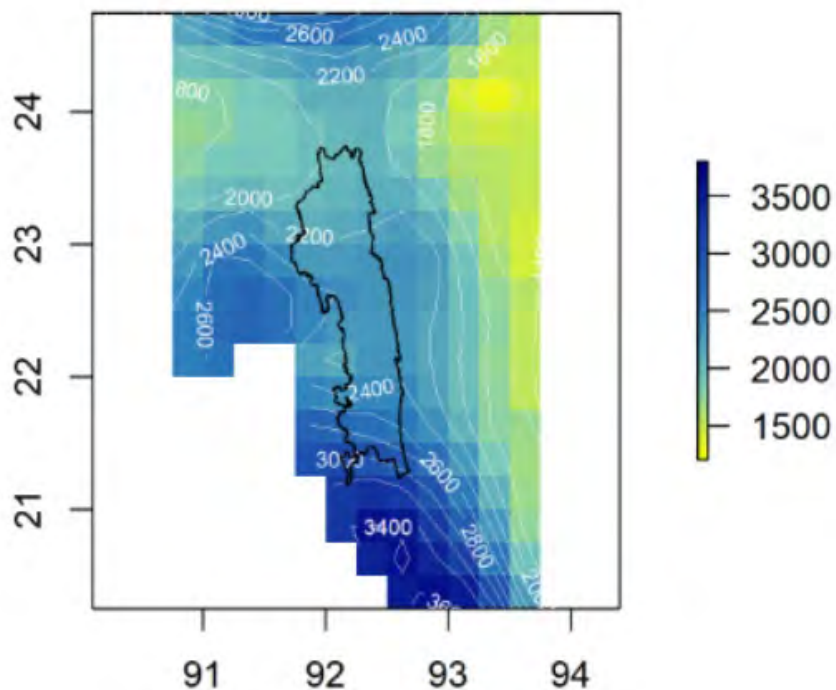| Name	Date modified	Type	Size
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C_mon_CHT_tas_WAS-44_IPSL-IPSL-CM5...	12/10/2021 10:35 AM	NC File	800 KB
C_mon_CHT_tas_WAS-44_MIROC-MIROC...	12/10/2021 10:35 AM	NC File	799 KB
C_mon_CHT_tas_WAS-44_MOHC-HadGE...	12/10/2021 10:35 AM	NC File	788 KB
C_mon_CHT_tas_WAS-44_MPI-M-MPI-ES...	12/10/2021 10:35 AM	NC File	800 KB

Annual Precipitation (mm)

Expectation from this training

Climate change **science** and projections

Extraction of CORDEX datasets

Analyze data using **R** programming language

Select relevant CORDEX model using reference data

Analyse the data for the **historic** period

Understand the **change in the future periods**

Temporal aggregation (monthly, yearly)

Plot relevant maps

Uncertainty analysis

Work flow
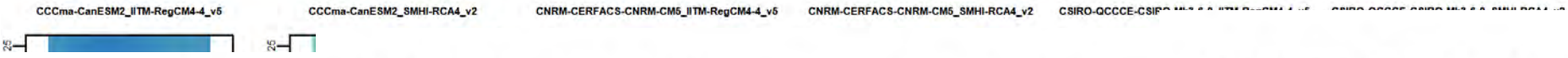
Change in annual temperature for RCP8.5
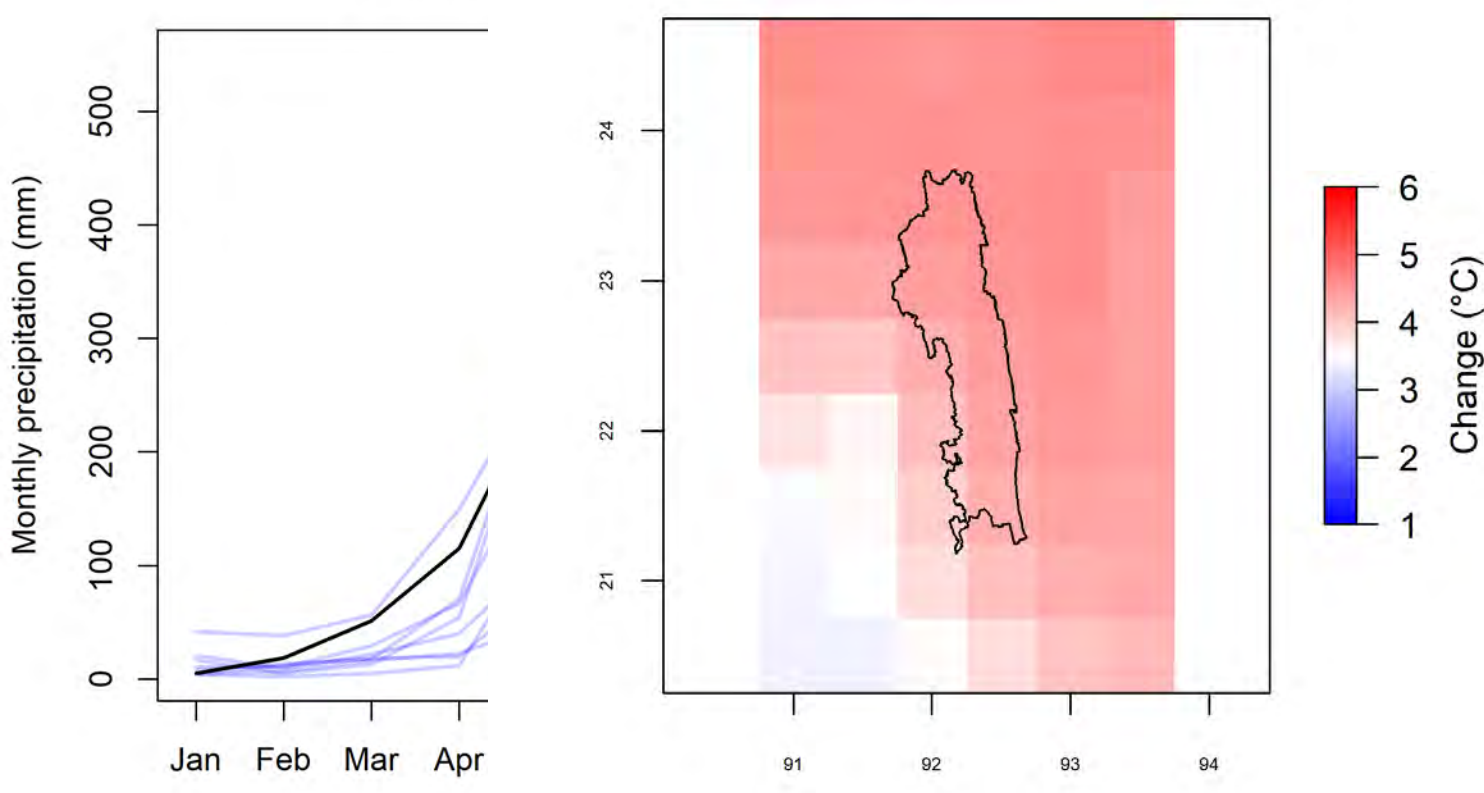
Change in annual temperature for RCP4.5
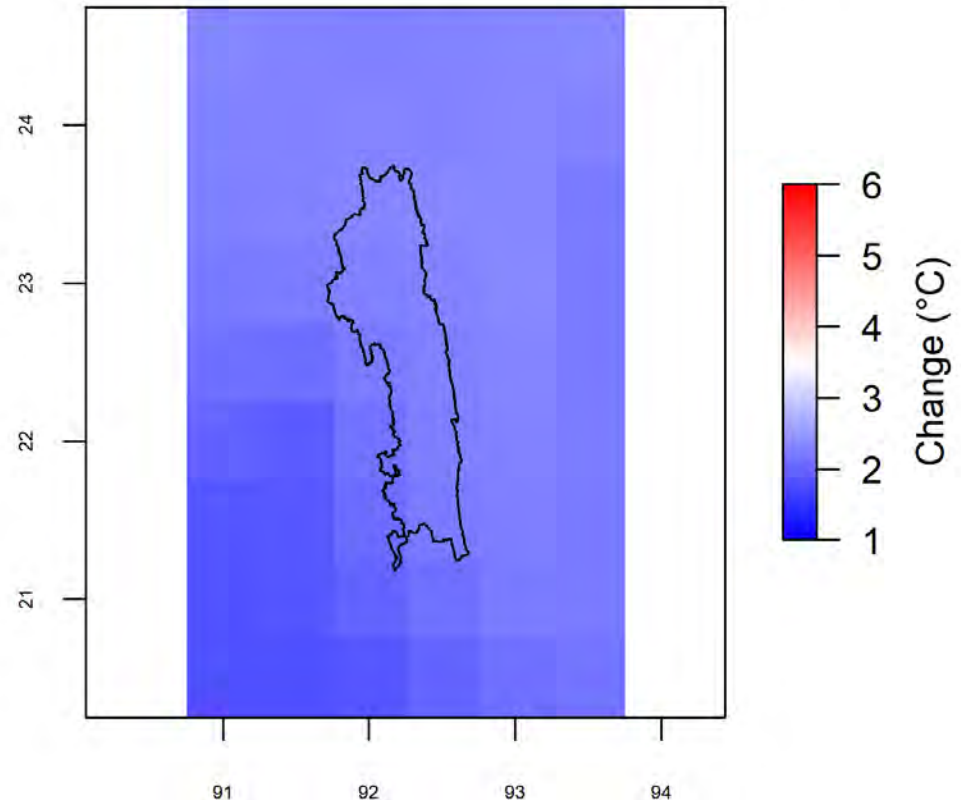
Co-creating knowledgebase

Learning together   Working together   Building together

Institutional capacity building

Resource persons

ICIMOD

UK Met Office

IITM- Pune

BUET, Bangladesh

SMHI

Resource persons

Training Coordinator

Santosh Nepal

Resource persons

ICIMOD

Saurav Pradhananga

Kabi Raj Khatiwada

Mandira Singh Shrestha
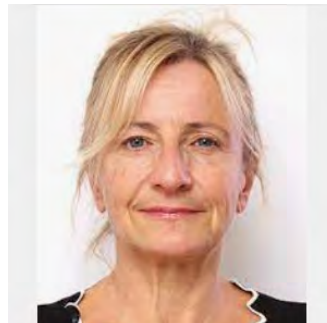
Iréne Lake, CORDEX Office

J Sanjay

Saiful Islam, BUET

Grigory Nikulin, SMHI

Thank you

Let's protect the pulse

Project	+
Product	+
Domain	−

☑ WAS-44 (17)

Institute −

☐ IITM (6)
☐ MPI-CSC (1)
☐ SMHI (10)

Driving Model −

☐ CCCma-CanESM2 (2)
☐ CNRM-CERFACS-CNRM-CM5 (2)
☐ CSIRO-QCCCE-CSIRO-Mk3-6-0 (2)
☐ ICHEC-EC-EARTH (1)
☐ IPSL-IPSL-CM5A-LR (1)
☐ IPSL-IPSL-CM5A-MR (1)
☐ MIROC-MIROC5 (1)
☐ MOHC-HadGEM2-ES (1)
☐ MPI-M-MPI-ESM-LR (2)
☐ MPI-M-MPI-ESM-MR (1)
☐ NCC-NorESM1-M (1)
☐ NOAA-GFDL-GFDL-ESM2M (2)

| Experiment	+
Experiment Family	+
Ensemble	+

RCM Model −

☐ RCA4 (10)
☐ REMO2009 (1)
☐ RegCM4-4 (6)

Downscaling Realisation	+

Time Frequency −

☑ day (17)

Variable −

☑ tas (17)

Variable Long Name	+

Enter Text: [ ]

? | Search | Reset | Display [10 ▾] results per page | [**More Search Options**]

☐ Show All Replicas   ☐ Show All Versions   ☐ Search Local Node Only (Including All Replicas)

Search Constraints: ✖ WAS-44 | ✖ day | ✖ tas | ✖ historical

Total Number of Results: 17
-1- 2 Next >>
Please login to add search results to your Data Cart
Expert Users: you may display the search URL and return results as XML or return results as JSON

1. **cordex.output.WAS-44.MPI-CSC.MPI-M-MPI-ESM-LR.historical.r1i1p1.REMO2009.v1.day.tas**
Data Node: esgf1.dkrz.de
Version: 20140918
Total Number of Files (for all variables): 9
Full Dataset Services: [Show Metadata] [List Files] [THREDDS Catalog] [WGET Script] [Globus Download]

2. **cordex.output.WAS-44.IITM.CSIRO-QCCCE-CSIRO-Mk3-6-0.historical.r1i1p1.RegCM4-4.v5.day.tas**
Data Node: esg-cccr.tropmet.res.in
Version: 20170113
Total Number of Files (for all variables): 11
Full Dataset Services: [Show Metadata] [List Files] [THREDDS Catalog] [WGET Script] [LAS Visualization]

3. **cordex.output.WAS-44.IITM.CNRM-CERFACS-CNRM-CM5.historical.r1i1p1.RegCM4-4.v5.day.tas**
Data Node: esg-cccr.tropmet.res.in
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4. **cordex.output.WAS-44.IITM.MPI-M-MPI-ESM-MR.historical.r1i1p1.RegCM4-4.v5.day.tas**
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Version: 20170321
Total Number of Files (for all variables): 11
Full Dataset Services: [Show Metadata] [List Files] [THREDDS Catalog] [WGET Script] [LAS Visualization]

5. **cordex.output.WAS-44.IITM.IPSL-IPSL-CM5A-LR.historical.r1i1p1.RegCM4-4.v5.day.tas**
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Version: 20161130
Total Number of Files (for all variables): 11
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6. **cordex.output.WAS-44.IITM.CCCma-CanESM2.historical.r1i1p1.RegCM4-4.v5.day.tas**
Data Node: esg-cccr.tropmet.res.in
Version: 20160824
Total Number of Files (for all variables): 11
Full Dataset Services: [Show Metadata] [List Files] [THREDDS Catalog] [WGET Script] [LAS Visualization]

7. **cordex.output.WAS-44.IITM.NOAA-GFDL-GFDL-ESM2M.historical.r1i1p1.RegCM4-4.v5.day.tas**
Data Node: esg-cccr.tropmet.res.in
Version: 20170311
Total Number of Files (for all variables): 11
Full Dataset Services: [Show Metadata] [List Files] [THREDDS Catalog] [WGET Script] [LAS Visualization]

8. **cordex.output.WAS-44.SMHI.ICHEC-EC-EARTH.historical.r12i1p1.RCA4.v2.day.tas**
Data Node: esg-dn1.nsc.liu.se
Version: 20140225
Total Number of Files (for all variables): 11
Full Dataset Services: [Show Metadata] [List Files] [THREDDS Catalog] [WGET Script]

9. **cordex.output.WAS-44.SMHI.MOHC-HadGEM2-ES.historical.r1i1p1.RCA4.v2.day.tas**