

**Regional Initiative for the Assessment of Climate Change Impacts on Water Resources & Socio-Economic Vulnerability in the Arab Region**

**RICCAR**  
Regional Initiative for the Assessment of  
Climate Change Impacts on Water Resources and  
Socio-Economic Vulnerability in the Arab Region

**WEBINAR SERIES ON  
CLIMATE CHANGE ANALYSIS USING GIS TOOLS**

**Module 5:**  
Accessing global and regional climate datasets and  
platforms

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## Webinar Series

- **Module 1:** RICCAR regional climate modelling and hydrological modelling datasets: An introduction
- **Module 2:** Viewing NetCDF regional climate modeling datasets in GIS
- **Module 3:** Extracting tabular data from NetCDF climate files for use in other models and applications
- **Module 4:** Creating a regional climate model ensemble using GIS and extreme events indices
- ✓ **Module 5:** [Accessing global and regional climate datasets and platforms](#)
- **Module 6:** RICCAR integrated vulnerability assessment methodology

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## Module 5: Contents

- What is CORDEX?
- Accessing and navigating the ESGF open source platform
- Accessing maps and dataset from the RICCAR Data Portal

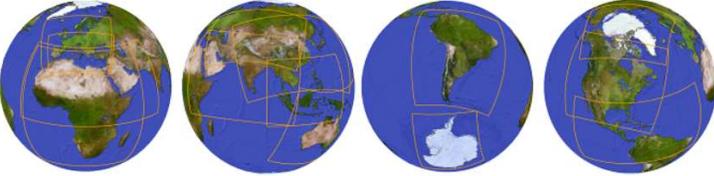
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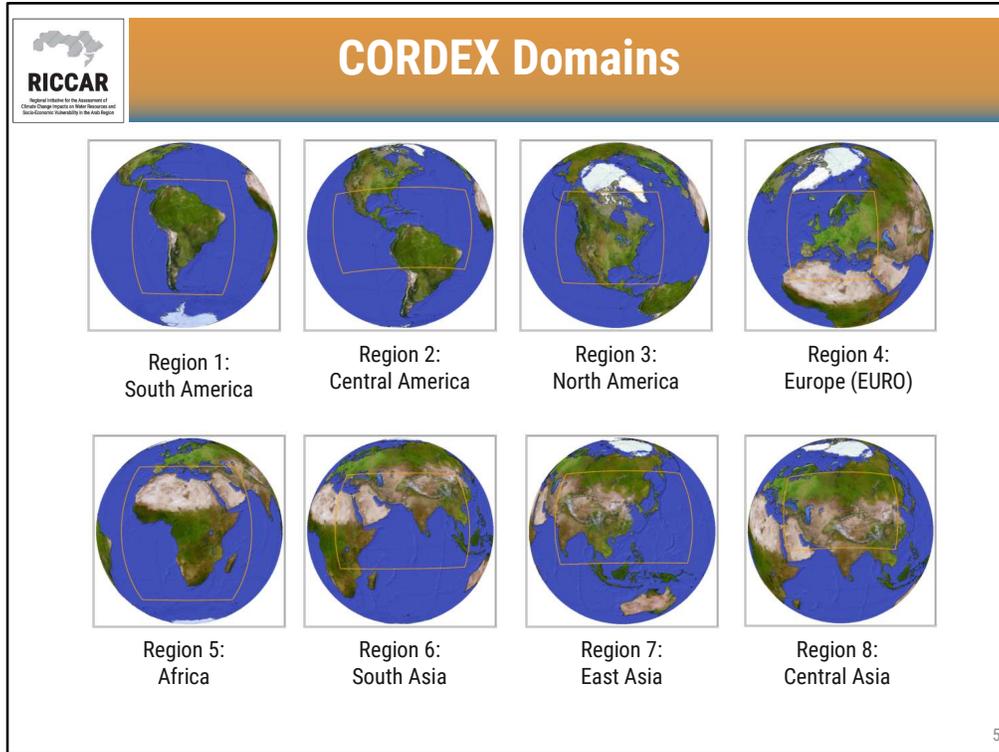
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## What is CORDEX?

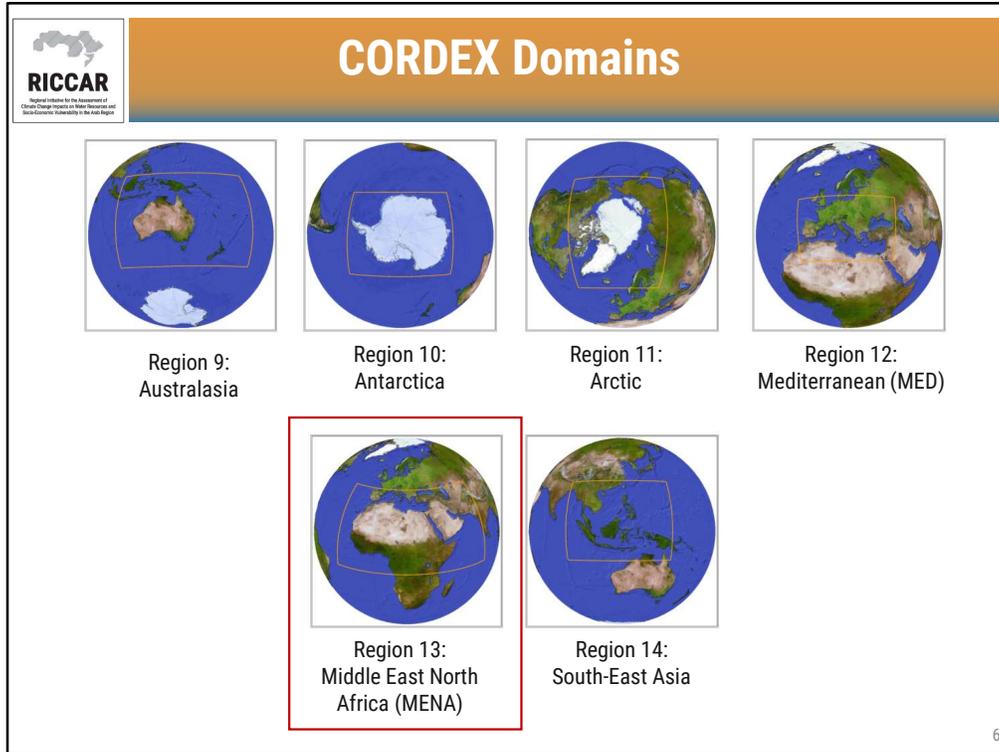
- **Coordinated Regional Downscaling Experiment (CORDEX)**
  - Initiated by World Climate Research Program (WCRP) in 2009
  - Need for coordinated framework for evaluating and improving regional climate downscaling techniques



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A "domain" is a region for which the regional downscaling is taking place, for example the African "domain" covers the whole of the African continent. Although some domains tend to partially overlap with other domains, each domain has its own set of modelling boundary conditions and differences in resultant outputs.



RICCAR data is nested within the Region 13: Middle East North Africa domain

Note that the upcoming Mashreq Domain RCM outputs will not be considered part of CORDEX.



## MENA-CORDEX Contributors

Acronym	Contributor	Country	Contact
BOUN	Bogazici University, Istanbul	Turkey	Levent Kurnaz
CLMcom	CLM Community / Centro EuroMediterraneo sui Cambiamenti Climatici (CMCC), Capua	Italy	Edoardo Bucchignani
GERICS	Climate Service Center, Hamburg	Germany	Andreas Haensler
CYI	Energy Environment & Water Research Center (EEWRC), The Cyprus Institute, Nicosia	Cyprus	George Zittis
DMN	Direction de la Météorologie Nationale, Casablanca	Morocco	Fatima Driouech
ICBA	International Centre for Biosaline Agriculture, Dubai	United Arab Emirates	Rashyd Zaaboul
SMHI	Rossby Centre, Swedish Meteorological and Hydrological Institute (SMHI), Norrköping	Sweden	Grigory Nikulin

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## MENA-CORDEX Simulations

Institute	RCM	Spatial resolution	Driving GCM	Driving experiments	Period
BOUN	RegCM4-4	0.44°	MPI-ESM-MR	RCP4.5 / RCP8.5	2006-2100
BOUN	RegCM4-4	0.44°	HadGEM2-ES	RCP4.5 / RCP8.5	2006-2100
CLMcom	CCLM4-21	0.22° / 0.44°	CMCC-CM	RCP4.5	2006-2100
GERICS	REMO2009	0.44°	MPI-ESM-LR	RCP2.6 / RCP4.5 / RCP8.5	2006-2100
CYI	WRF351	0.44°	CESM1	RCP4.5 / RCP8.5	2006-2100
DMN-MOR	ALADIN	0.44°	CNRM-CM5	RCP4.5 / RCP8.5	2006-2100
ICBA	WRF36	0.44°	CESM1	RCP4.5 / RCP8.5	2006-2100
SMHI	RCA4	0.44°	CNRM-CM5	RCP4.5 / RCP8.5	2006-2100
SMHI	RCA4	0.44°	EC-EARTH	RCP2.6 / RCP4.5 / RCP8.5	2006-2100
SHMI	RCA4	0.22°	EC-EARTH	RCP8.5	2006-2100
SHMI	RCP4	0.44°	GFDL-ESM2M	RCP4.5 / RCP8.5	2006-2100
SHMI	RCP4	0.22°	GFDL-ESM2M	RCP8.5	2006-2100

Based on CMIP5

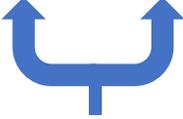
- Scenarios listed only include the projected datasets (not historical)
- Note that only the SMHI and BOUN datasets are available for public use at present
- Only the SMHI datasets were bias-corrected and used for RICCAR
- CMIP 5: Coupled Model Intercomparison Project 5 (most recently completed global modelling outputs)



## Coming soon: CMIP6

At **minimum**, climate modelling outputs must consider

- 1 historical modelling output (1950-2014)
- 1 projected modelling output (2015-2100)
  - 2 projections: SSP5-8.5 and SSP1-2.6



Shared socio-economic pathways

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- First outputs expected 2021
- Unclear if new RCMs will be released for CORDEX-MENA domain



## Why access CORDEX (raw RCM) datasets?

- Additional climate parameters (i.e. wind speed, relative humidity)
- Smaller spatial resolution (i.e.  $0.11^\circ$  /  $\sim 12.5$  km)
- Smaller temporal resolution (i.e. 1 hr, 3 hr, 6 hr)

Do not mix bias-corrected modelling outputs with raw RCM outputs

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The slide features a header with the text "ESGF" in white on an orange background. Below this, the "Earth System Grid Federation" logo is displayed, consisting of the letters "ESGF" in a colorful, 3D font. To the left of the letters is a stylized globe made of a grid of colored squares. In the top left corner, there is a small logo for "RICCAR" with the text "Regional Institute for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region".

Database containing largest archive of climate data world-wide

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- CORDEX data is available from the ESGF database (English only).

**Coming soon: CORDEX Technical Note**

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**Guidelines for Accessing  
CORDEX Regional Climate Projections**

**المبادئ التوجيهية للحصول  
على اسقاطات CORDEX  
على المناخية الإقليمية**

**TECHNICAL NOTE**

**مذكرة تقنية**

Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

المبادرة الإقليمية لتقييم أثر التغيرات المناخية والاقتصادية على الموارد المائية والتنمية في المنطقة العربية

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## CORDEX data nodes on ESGF

- SMHI-NSC, Sweden
  - <https://esg-dn1.nsc.liu.se/projects/esgf-liu/>
- DKRZ, Germany
  - <https://esgf-data.dkrz.de/projects/esgf-dkrz/>
- BADC, UK
  - <https://esgf-index1.ceda.ac.uk/projects/esgf-ceda/>
- IPSL, France
  - <https://esgf-node.ipsl.upmc.fr/projects/esgf-ipsl/>

All nodes contain  
same CORDEX  
datasets

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- Several data nodes are available for use. Personal preference is the SMHI database.

Hosted by **I.U NSC SMHI** Powered by **ESGF** and **CoG**

Welcome, **Guest** | [Login](#) | [Create Account](#)

### ESGF@LiU in cooperation with SMHI

You are at the **ESG-DM1.NSC.LIU.SE** node [Technical Support](#)

[Home](#) [About Us](#) [Contact Us](#)

#### ESGF@LiU in cooperation with SMHI

**Search & Download Data**

Simple Text Search   [More search options](#)

The Earth System Grid Federation (ESGF) maintains a global system of federated data centers that allow access to the largest archive of climate data world-wide.

ESGF portals like this one provide access to the output of the climate models contributing to the next assessment report of the Intergovernmental Panel on Climate Change IPCC through the Coupled Model Intercomparison Project CMIP. The WGM Infrastructure Panel is the official CMIP document home.

This ESGF datanode, at the National Supercomputer Centre, Linköping, is Sweden's first datanode in the ESGF framework, and is part of the European IS-ENES Infrastructure. It is a joint activity of NSC and the Swedish Meteorological and Hydrological Institute (SMHI). NSC is an independent organization within Linköping University (LiU), and is funded by the Swedish Research Council via SNIC (Swedish National Infrastructure for Computing).



#### Search Data

The following projects require an **ESGF Account** ([create account](#)) and some also require a **Group Registration** (see links in table below) to access their data.

Search data for...	Register to...
All project	(see below for project-specific registration details)
<b>CMIP6:</b> Coupled Model Intercomparison Project Phase 6 <ul style="list-style-type: none"><li>CMIP6 Data Search</li></ul>	
<b>CMIP5:</b> Coupled Model Intercomparison Project Phase 5 <ul style="list-style-type: none"><li>CMIP5 Data Search</li></ul>	CMIP5 Research CMIP5 Commercial
<b>CORDEX:</b> Coordinated Regional Climate Downscaling Experiment <ul style="list-style-type: none"><li>CORDEX Data Search</li></ul>	Please perform an HTTP download of a single file to register for CORDEX access. Registration links will follow soon.
<b>SPECS:</b> Seasonal-to-decadal climate Prediction for the improvement of European Climate Services <ul style="list-style-type: none"><li>SPECS Data Search</li></ul>	Please perform an HTTP download of a single file to register for SPECS access. Registration links will follow soon.
<b>CLIPC:</b> Climate Information Platform for Copernicus <ul style="list-style-type: none"><li>CLIPC Data Search</li></ul>	This data is <b>publicly available</b> without registration.

**ESGF@LiU Tags:** None

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The federated data search is accessible from the "Search and Download Data" widget on the right of the page through the "Search with options" link.

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# Data search

Enter Text:

Display  results per page [\[ More Search Options \]](#)

Show All Replicas  Show All Versions  Search Local Node Only (including All Replicas)

The search returned 0 results.

**Manual search**

**Data filters**

- Project +
- Product +
- Domain +
- Institute +
- Driving Model +
- Experiment +
- Experiment Family +
- Ensemble +
- RCM Model +
- Downscaling realisation +
- Time Frequency +
- Variable +
- Variable Long Name +
- CF Standard Name +
- Datanode +

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## Data filters

CORDEX (146562)

Product +

Domain +

Institute +

Driving Model +

Experiment +

Experiment Family +

Ensemble +

RCM Model +

Downscaling realisation +

Time Frequency +

Variable +

Variable Long Name +

CF Standard Name +

Datanode +

Because CORDEX was selected on home page, only CORDEX will be listed as a project option

Number indicates total available modelling outputs (based on currently selected filters)

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Similarly, for CORDEX data, under “Product”, there will only be 1 option: “output”.

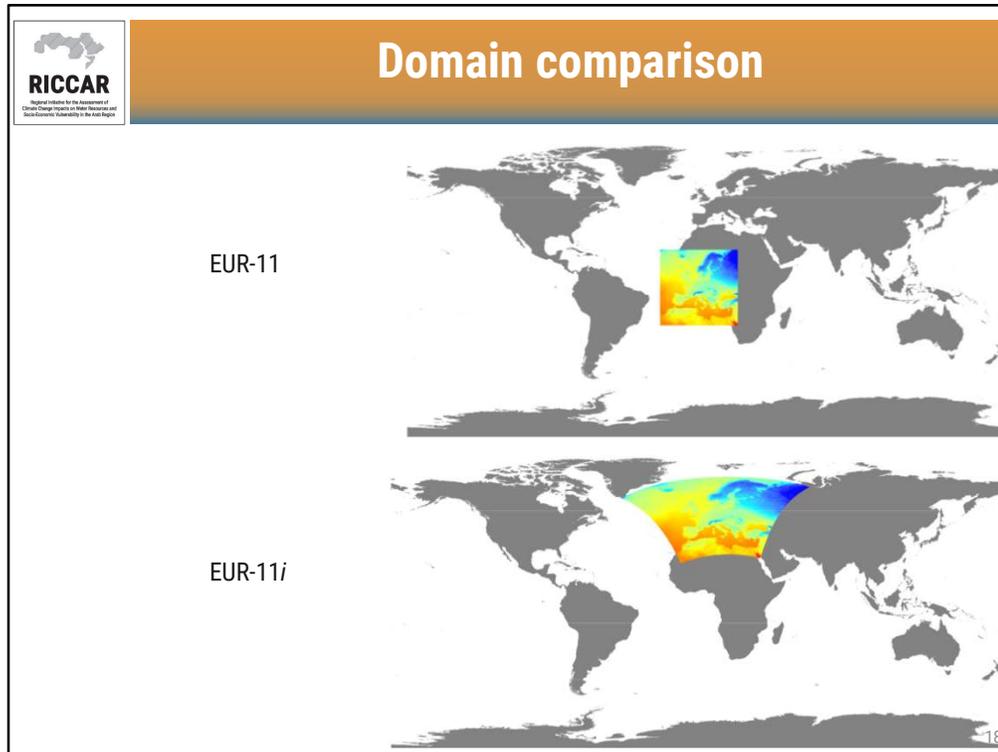


## Data filters: Domain

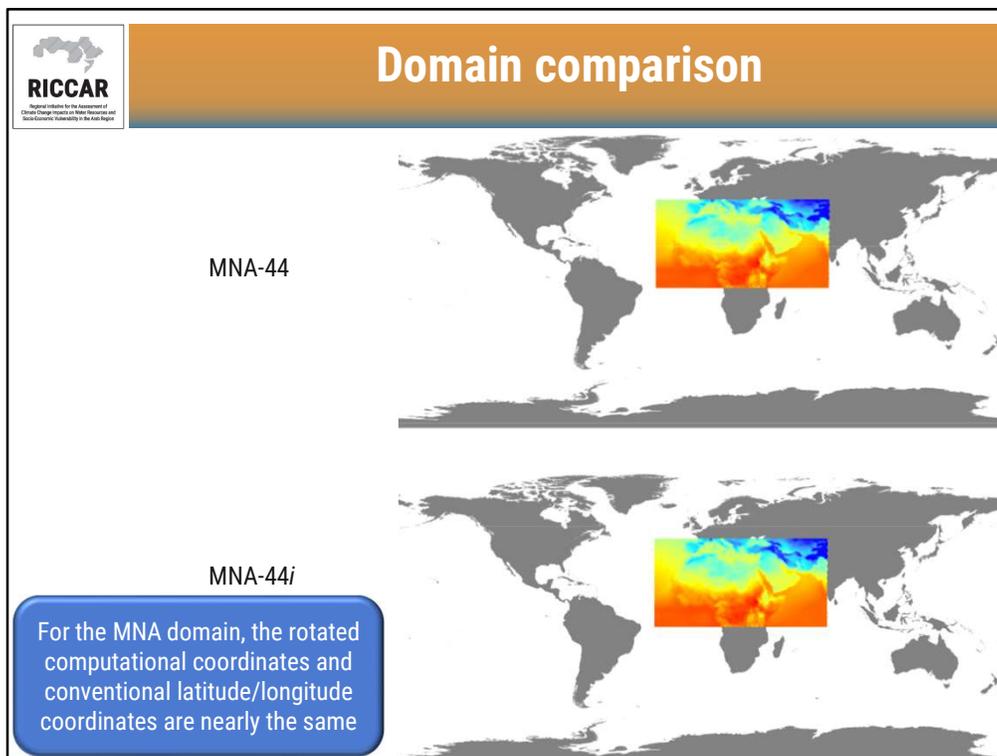
- Domain abbreviation followed by the spatial resolution
  - 11: 0.11° (~12.5 km)
  - 22: 0.22° (~25 km)
  - 44: 0.44° (~25 km)
- Domains without an *i* following are in native computational grid (may differ from conventional latitude/longitude)
- Domains with an *i* following have been interpolated to conventional latitude/longitude (often available for monthly and seasonal data only)

Project	Project
Product	Product
Domain	Domain
<input type="checkbox"/> AFR-22 (4651) <input type="checkbox"/> AFR-44 (14490) <input type="checkbox"/> AFR-44i (3796) <input type="checkbox"/> ANT-44 (2263) <input type="checkbox"/> ANT-44i (364) <input type="checkbox"/> ARC-44 (4352) <input type="checkbox"/> ARC-44i (2249) <input type="checkbox"/> AUS (199) <input type="checkbox"/> AUS-22 (4595) <input type="checkbox"/> AUS-44 (3299) <input type="checkbox"/> AUS-44i (3123) <input checked="" type="checkbox"/> CAM-22 (2632) <input type="checkbox"/> CAM-44 (4264) <input type="checkbox"/> CAM-44i (2436) <input type="checkbox"/> CAS-22 (1160) <input type="checkbox"/> CAS-44 (227) <input type="checkbox"/> EAS-22 (1229) <input checked="" type="checkbox"/> EAS-44 (2911) <input checked="" type="checkbox"/> EAS-44i (89) <input type="checkbox"/> EUR-11 (26548) <input type="checkbox"/> EUR-11i (1650)	<input type="checkbox"/> EUR-11 (1650) <input type="checkbox"/> EUR-22 (1220) <input type="checkbox"/> EUR-44 (13326) <input type="checkbox"/> EUR-44i (3760) <input type="checkbox"/> MED-11 (6) <input type="checkbox"/> MNA-22 (735) <input type="checkbox"/> MNA-22i (420) <input type="checkbox"/> MNA-44 (1684) <input type="checkbox"/> MNA-44i (624) <input type="checkbox"/> NAM-11 (118) <input type="checkbox"/> NAM-22 (1398) <input type="checkbox"/> NAM-44 (2525) <input type="checkbox"/> NAM-44i (788) <input type="checkbox"/> SAM-20 (36) <input type="checkbox"/> SAM-22 (2762) <input type="checkbox"/> SAM-44 (6593) <input type="checkbox"/> SAM-44i (2852) <input type="checkbox"/> SEA-22 (2444) <input type="checkbox"/> WAS-22 (6629) <input type="checkbox"/> WAS-44 (7526) <input type="checkbox"/> WAS-44i (4486)
Institute	Institute
Driving Model	Driving Model
Experiment	Experiment
Experiment Family	Experiment Family
Ensemble	Ensemble
RCM Model	RCM Model
Downscaling realisation	Downscaling realisation
Time Frequency	Time Frequency
Variable	Variable
Variable Long Name	Variable Long Name
CF Standard Name	CF Standard Name

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- Domain EUR-11 is based on a rotated domain for computational purposes. The coordinates are rlon and rlat rather than longitude (lon) and latitude (lat). Thus, the resultant raster is in a different projection than the background shapefile (which is in WGS84).



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# Convert grid from rotated to conventional

<https://agrimetsoft.com/Cordex%20Coordinate%20Rotation>

Agricultural and Meteorological Software

Home Products Services About FAQ

1500+ PowerPoint Infographics  
PowerPoint Infographic Templates

### Rotation of Coordinates Based On CORDEX Domains

If you have several CORDEX NetCDF files and you want to extract data from it so you can use two methods. Usually in these files you have latitude as two-dimensional variables and longitude as one-dimensional variables so: Search your latitude and longitude and find the proper cell in two dimension variables(latitude) then find the grid number from two dimension variable. Then you can use *NetCDF* to read data from the main variable such as pr, tmax, etc... You can use [Down To File](#) and [CORDEX Data Extractor](#) to do this method and this process will be done in the below code. But you can use another method for using Matlab or [Python Extractor](#). In this method, you should convert your regular coordinate to rotated coordinate and then find the Grid Numbers in *lat/lon*.

This tool can convert non-rotated coordinate to rotated coordinate and vice versa. The pivot of rotation is based on CORDEX domain(or you can change it). For extracting data from CORDEX netcdf files, you should convert your regular coordinate to rotated coordinate by this tool and then extract your data by using rotated coordinate and *lat/lon* variables in your file. You can extract data by any language programming or you can use *Netcdf Extractor* in this website.

For checking the correctness of the tool, you can use [TLC\(Top Left Corner\)](#) of each domain in [CORDEX Domain](#) and convert non-Rotated to rotated and vice versa.

If you want extract data from [CORDEX NetCDF](#) files you can do it simply by using [CORDEX Data Extractor](#)

If you have further question please contact with [kalsomeen57@gmail.com](mailto:kalsomeen57@gmail.com)

Cordex Domain: South Asia (SAS)

- Can convert point location coordinates using free tool shown.
- Conversion of entire NetCDF (or raster) requires MatLab program or proprietary software from Agrimetsoft. (Can see website shown for more details.)



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Data filters

Select climate parameter either  
by its abbreviation (Variable) or  
full name (Variable Long Name)

Ensemble	+
RCM Model	+
Downscaling realisation	+
Time Frequency	+
Variable	-
<input type="checkbox"/> acldwnt (6) <input type="checkbox"/> alb (72) <input type="checkbox"/> areacella (207) <input type="checkbox"/> cape (15) <input type="checkbox"/> cdnctop (7) <input type="checkbox"/> cfr (3) <input type="checkbox"/> cfr1000 (2) <input type="checkbox"/> cfr200 (5) <input type="checkbox"/> cfr300 (2) <input type="checkbox"/> cfr400 (2) <input type="checkbox"/> cfr500 (5) <input type="checkbox"/> cfr600 (2) <input type="checkbox"/> cfr700 (2) <input type="checkbox"/> cfr850 (5) <input type="checkbox"/> cfr875 (2) <input type="checkbox"/> cfr900 (2) <input type="checkbox"/> cfr925 (2) <input type="checkbox"/> cfr950 (2) <input type="checkbox"/> cfr975 (2) <input type="checkbox"/> ch (560) <input type="checkbox"/> clce (3)	
Variable Long Name	+
CF Standard Name	+
Datanode	+

Ensemble	+
RCM Model	+
Downscaling realisation	+
Time Frequency	+
Variable	+
Variable Long Name	-
<input type="checkbox"/> (170) <input type="checkbox"/> 2-m specific humidity (36) <input type="checkbox"/> 2m Dew Point Temperature (20) <input type="checkbox"/> Accumulated downwelling LW flux at top (6) <input type="checkbox"/> Accumulated snow (9) <input type="checkbox"/> Accumulated total grid scale snow and ice (6) <input type="checkbox"/> Air Temperature (10065) <input type="checkbox"/> Air temperature (108) <input type="checkbox"/> Atmosphere Grid-Cell Area (206) <input type="checkbox"/> Atmospheric Boundary Layer Thickness (4) <input type="checkbox"/> Avg evaporation (36) <input type="checkbox"/> Avg latent heat flux (36) <input type="checkbox"/> Avg sensible heat flux (36) <input type="checkbox"/> Avg soil moisture 1 (36) <input type="checkbox"/> Capacity of Soil to Store Water (58) <input type="checkbox"/> Clear-Sky Surface Downwelling Longwave	
CF Standard Name	+
Datanode	+



## Common CORDEX Variables

Variable	Units	Long Name
tas	K	Near-Surface Air Temperature
tasmax	K	Daily Maximum Near-Surface Air Temperature
tasmin	K	Daily Minimum Near-Surface Air Temperature
pr	kg m <sup>-2</sup> s <sup>-1</sup>	Precipitation
hurs	%	Near-Surface Relative Humidity
sfcWind	m s <sup>-1</sup>	Near-Surface Wind Speed
sfcWindmax	m s <sup>-1</sup>	Daily Maximum Near-Surface Wind Speed
clt	%	Total Cloud Fraction
sund	s	Duration of sunshine
prhmax	kg m <sup>-2</sup> s <sup>-1</sup>	Daily Maximum Hourly Precipitation Rate
evspsblpot	kg m <sup>-2</sup> s <sup>-1</sup>	Potential Evapotranspiration
mrros	kg m <sup>-2</sup> s <sup>-1</sup>	Surface Runoff
mrro	kg m <sup>-2</sup> s <sup>-1</sup>	Total Runoff

Full list at: [https://is-enes-data.github.io/CORDEX\\_variables\\_requirement\\_table.pdf](https://is-enes-data.github.io/CORDEX_variables_requirement_table.pdf)

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- Note that potential evapotranspiration, surface runoff, and total runoff from CORDEX is based on the RCM outputs themselves, whereas evapotranspiration and runoff data from RICCAR is based on regional hydrological modelling.
- Preferred to select “near-surface” measurements (i.e. tas; near-surface air temperature) instead of “surface” (i.e. ts: surface temperature) because surface considers conditions of the ground surface itself. Near-surface concerns the air near the ground.



## Data filters: Experiment

Evaluation: ERA-Interim data  
Historical: 1950-2005  
RCPs: 2006-2100 for each RCP

Evaluation data helps to determine bias in each RCM

- Project
- Product
- Domain
- Institute
- Driving Model
- Experiment 
  - evaluation (16229)
  - historical (45649)
  - rcp26 (20753)
  - rcp45 (23197)
  - rcp85 (40734)
- Experiment Family
- Ensemble
- RCM Model
- Downscaling realisation
- Time Frequency
- Variable
- Variable Long Name



## Data filters: Time Frequency

1 hr:	1-hourly
3 hr:	3-hourly
6 hr:	6 hourly
day:	Daily
fx:	Time independent
mon:	monthly
sem:	Seasonally

- Project +
- Product +
- Domain +
- Institute +
- Driving Model +
- Experiment +
- Experiment Family +
- Ensemble +
- RCM Model +
- Downscaling realisation +
- Time Frequency -
  - 1hr (512)
  - 3hr (5545)
  - 6hr (6649)
  - day (44851)
  - fx (2353)
  - mon (48368)
  - sem (38284)
- Variable +
- Variable Long Name +
- CF Standard Name +
- Datanode +

The screenshot shows the ESGF@LIU/CORDEX search interface. On the left is a sidebar with filter categories: Project, Product, Domain, Institute, Driving Model, Experiment, Experiment Family, Ensemble, RCM Model, Downscaling realisation, Time Frequency, Variable, Variable Long Name, CF Standard Name, and Datanode. The 'Domain' filter is set to 'MNA-44 (16)', 'Experiment' to 'rcp85 (16)', and 'Variable' to 'tas (16)'. The search bar contains 'Enter Text:' and 'Search' buttons. Below the search bar, search constraints are listed: 'MNA-44', 'tas', and 'rcp85'. Search options include 'Show All Replicas', 'Show All Versions', and 'Search Local Node Only (Including All Replicas)'. The results section shows 16 total results, with the first six displayed. Each result includes a dataset ID, Data Node, Version, Total Number of Files, and links for 'Show Metadata', 'List Files', 'THREDDS Catalog', and 'WGET Script'. A '25' page indicator is visible in the bottom right corner of the interface.

Search results with MNA-44 domain, tas variable, and RCP8.5 experiment selected as filters

The screenshot shows the ESGF@LIU/CORDEX search interface. On the left is a sidebar with filters for Project, Product, Domain, Institute, Driving Model, Experiment, Experiment Family, Ensemble, RCM Model, Downscaling realisation, Time Frequency, Variable, Variable Long Name, CF Standard Name, and Datanode. The 'tas' variable is selected. The main area shows search results for 'tas' with 16 total results. Two results are expanded to show file details:

- cordex.output.MNA-44.SMHI.CNRM-CERFACS-CNRM-CM5.rcp85.r11p1.RCA4.v1.sem.tas**  
Data Node: esg-dn1.nsc.liu.se  
Version: 20131030  
Total Number of Files (for all variables): 10  
Full Dataset Services: [ Show Metadata ] [ List Files ] [ THREDDS Catalog ] [ WGET Script ]
- cordex.output.MNA-44.SMHI.CNRM-CERFACS-CNRM-CM5.rcp85.r11p1.RCA4.v1.day.tas**  
Data Node: esg-dn1.nsc.liu.se  
Version: 20131030  
Total Number of Files (for all variables): 19  
Full Dataset Services: [ Show Metadata ] [ Hide Files ] [ THREDDS Catalog ] [ WGET Script ]

The expanded results show a list of files with columns for file name, size, tracking ID, and download options (Single File Access, HTTP Download, OpenDAP Download).

File Name	Size	Tracking ID	Download Options
tas_MNA-44_CNRM-CERFACS-CNRM-CM5_rcp85_r11p1_SMHI-RCA4_v1_day_20060101-20101231.nc	56901618	79d312cd-138b-40de-aa51-b5e9e9d06a5de	Single File Access, HTTP Download, OpenDAP Download
tas_MNA-44_CNRM-CERFACS-CNRM-CM5_rcp85_r11p1_SMHI-RCA4_v1_day_2010101-20151231.nc	56984777	d3381436-1769-449b-baf9-5845f15c0fc	Single File Access, HTTP Download, OpenDAP Download
tas_MNA-44_CNRM-CERFACS-CNRM-CM5_rcp85_r11p1_SMHI-RCA4_v1_day_20160101-20201231.nc	56927109	af9d0d2d-fd08-49e7-b39c-b29ef441d34	Single File Access, HTTP Download, OpenDAP Download
tas_MNA-44_CNRM-CERFACS-CNRM-CM5_rcp85_r11p1_SMHI-RCA4_v1_day_2020101-20251231.nc	56953952	87ae6127-0f56-432d-8045-279e7eb4ecc8	Single File Access, HTTP Download, OpenDAP Download
tas_MNA-44_CNRM-CERFACS-CNRM-CM5_rcp85_r11p1_SMHI-RCA4_v1_day_20260101-20301231.nc	57042659	c5ad300e1917ccc9391148d951aa22a7441c3157675600ca48c49a43749	Single File Access, HTTP Download, OpenDAP Download
tas_MNA-44_CNRM-CERFACS-CNRM-CM5_rcp85_r11p1_SMHI-RCA4_v1_day_20310101-20351231.nc	57048174	160949ef4ecc-4c38-9386-124d95840f55	Single File Access, HTTP Download, OpenDAP Download

- Select “List Files” to show the available NetCDF files. Daily data is often in 5-year periods as shown.
- Naming convention is similar to RICCAR NetCDF files.



## Data download

- Anyone can search for data online
- Data download requires website registration

Powered by  and 

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- The ESGF is open-access.
- To create account, link is in upper right corner of website.

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 Welcome, **Guest** | Login | Create Account

ESG-DN1.NSC.LIU.SE Home You are at the ESG-DN1.NSC.LIU.SE node **Technical Support**

### Create User Profile

Please provide the information below to request a CoG account.  
 Required fields are in **bold**.  
 Upon submission, an OpenID will be automatically assigned to you: you will need that OpenID to login.  
 The following characters are not allowed: < > & # % { } | ! \$

**Please note that if you are logging in with a previously granted ESGF OpenID, CoG requires that Institution, City, and Country be added to your account.**

**User Information**

**User Name** [ 5 to 30 characters, letters, digits and @/./\_ only. Please note that the username is used to build a unique OpenID that you will use to login. If your chosen username is not available, you will be automatically assigned a similar one. ]

**First Name**

**Last Name**

**Email**

**Password** [ At least 8 characters are required ]

**Confirm Password** [ Must match the password ]

**Institution**

**Department**

**City**

**State**

**Country**

**Interest Keywords** [ A short list of science fields you are involved with (60 characters maximum). Example: Software Engineering, Grid Computing, Climate Change ]

**Interest Statement** [ A short paragraph describing your professional interests (1000 characters maximum). ]

Subscribe to COG Email List?  [ 'cog\_info', low traffic list ]

Do not list me among project members

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- Remaining fields are self-explanatory
- COG is the website front of the ESGF. Subscribing to the email list is optional.

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## Bias-corrected data from CORDEX

Currently available only for Europe domain

Search data for...

All project

CMIP6: Coupled Model Intercomparison Project Phase 6

- [CMIP6 Data Search](#)

CMIP5: Coupled Model Intercomparison Project Phase 5

- [CMIP5 Data Search](#)

CORDEX: Coordinated Regional Climate Downscaling Experiment

- [CORDEX Data Search](#)

SPECS: Seasonal-to-decadal climate Prediction for the improvement of European Climate Services

- [SPECS Data Search](#)

CLIPC: Climate Information Platform for Copernicus

- [CLIPC Data Search](#)

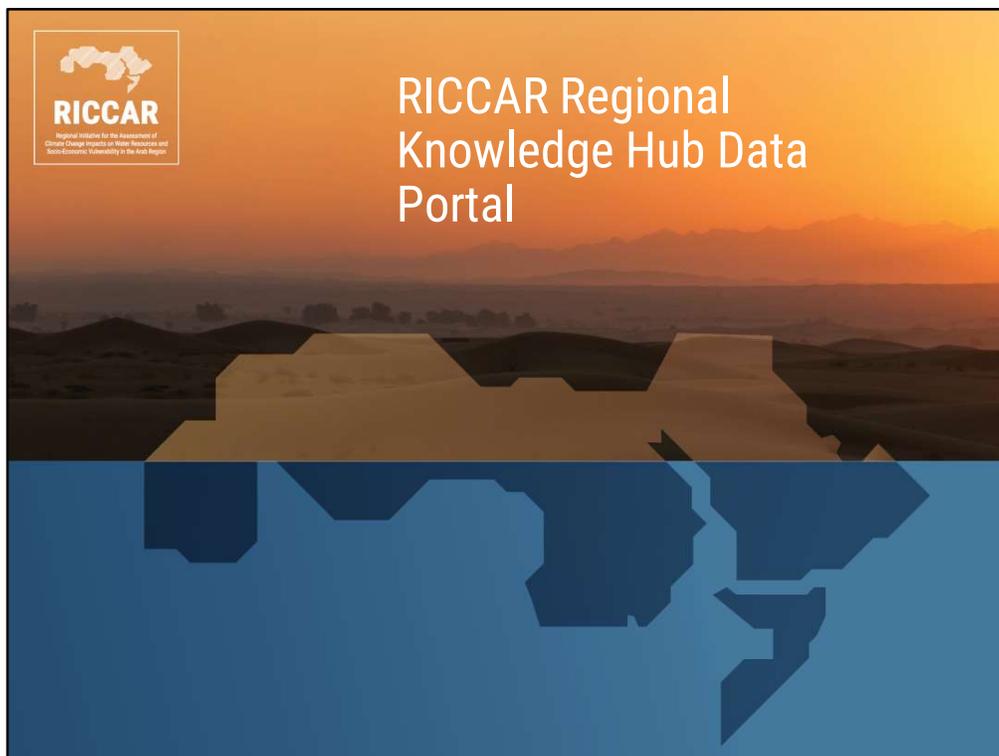
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- Select “All project” on ESGF data node home page.

The screenshot shows a web interface with a 'Project' dropdown menu. The menu is open, displaying a list of climate projects with checkboxes and their respective counts in parentheses. A red box on the left contains the text 'Select CORDEX-Adjust project for bias-corrected data', with a red arrow pointing to the 'CORDEX-Adjust (1148)' option in the list.

Project Name	Count
<input type="checkbox"/> ACME	(23)
<input type="checkbox"/> BioClim	(2)
<input type="checkbox"/> CDAT-sample	(1)
<input type="checkbox"/> CMIP3	(29331)
<input type="checkbox"/> CMIP5	(54838)
<input type="checkbox"/> CORDEX	(146562)
<input type="checkbox"/> CORDEX-Adjust	(1148)
<input type="checkbox"/> CORDEX-Reklies	(5575)
<input type="checkbox"/> CREATE-IP	(58)
<input type="checkbox"/> EUCLIPSE	(41)
<input type="checkbox"/> GeoMIP	(754)
<input type="checkbox"/> ISIMIP2a	(13808)
<input type="checkbox"/> ISIMIP2b	(93993)
<input type="checkbox"/> ISIMIP3b	(12)
<input type="checkbox"/> LUCID	(318)
<input type="checkbox"/> MPI-GE	(55111)
<input type="checkbox"/> MiKlip	(5568)
<input type="checkbox"/> NARR Hydrology	(85)
<input type="checkbox"/> NEX	(10)
<input type="checkbox"/> NEXGDDP	(3)
<input type="checkbox"/> PMIP3	(336)

- CORDEX-Reklies refers to a high-resolution dynamical downscaling project for the . EURO-CORDEX domain (ReKliEs-De: Regionale Klimaprojektionen Ensemble für Deutschland). Coverage includes Germany and relevant water basins.
- Other climate databases are available for users.



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# RICCAR Regional Knowledge Hub Data Portal

RICCAR OVERVIEW KNOWLEDGE RESOURCES MEETINGS & EVENTS KNOWLEDGE NODES PARTNERS CONTACT US عربي

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**ريكار**  
Regional Initiative for the Assessment of  
Climate Change Impacts on Water Resources and  
Socio-Economic Vulnerability in the Arab Region

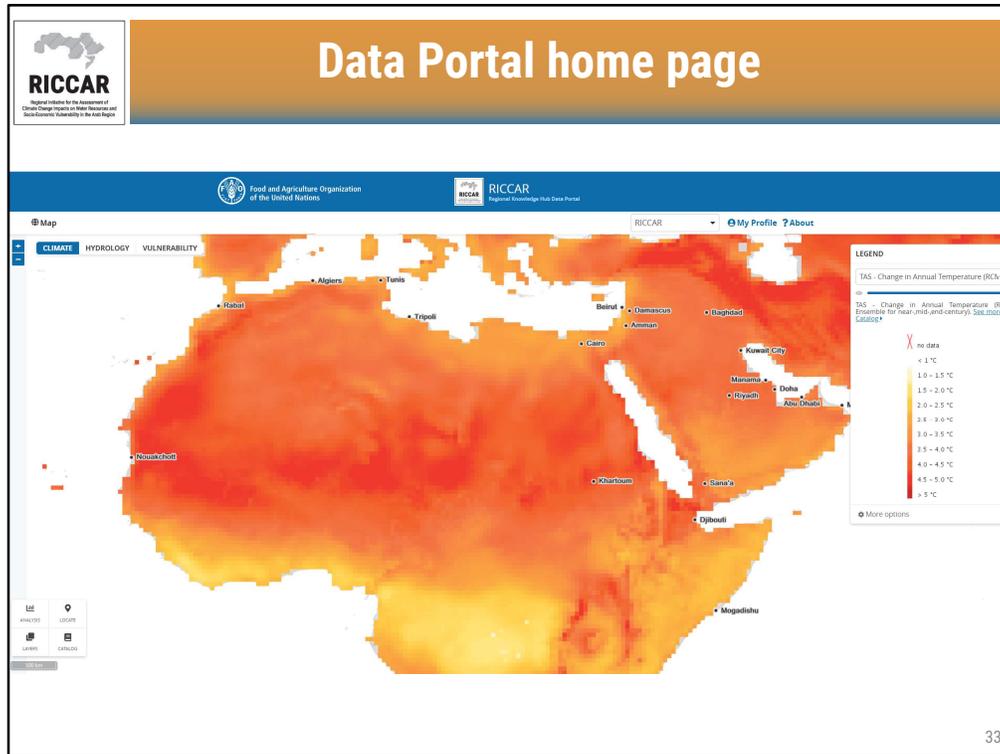
**RICCAR**  
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Water Resources and Socio-Economic Vulnerability in the Arab Region

REGIONAL INITIATIVE FOR THE ASSESSMENT OF CLIMATE CHANGE IMPACTS ON WATER RESOURCES AND SOCIO-ECONOMIC VULNERABILITY IN THE ARAB REGION

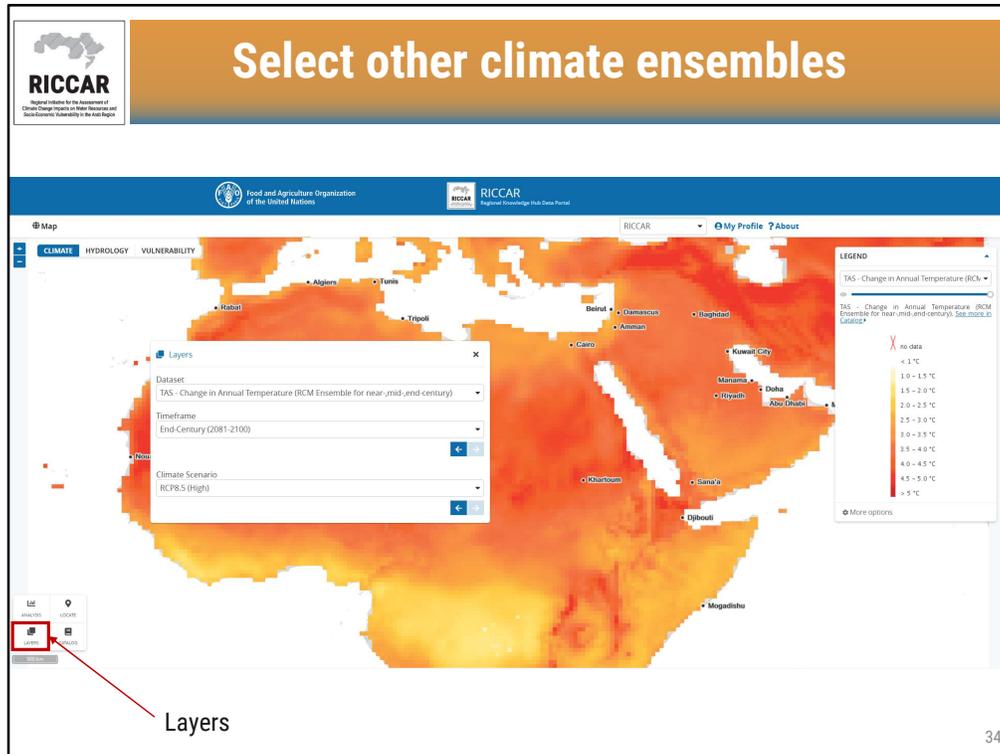
Partners Overview Meetings & Events **Data Portal**

**KNOWLEDGE RESOURCES**

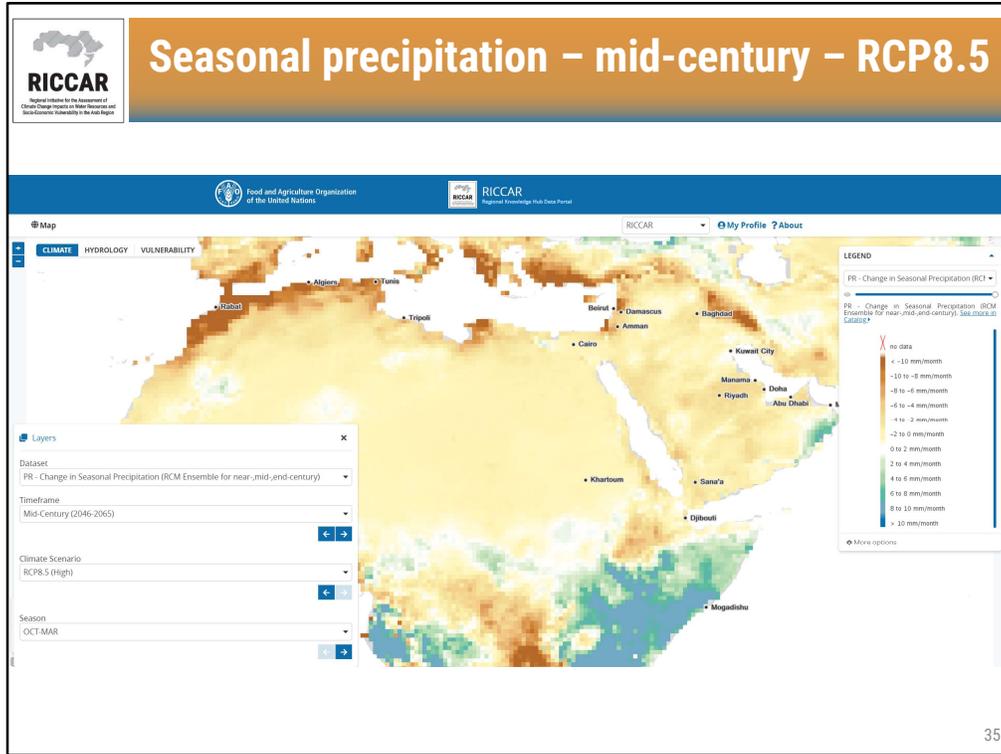
32

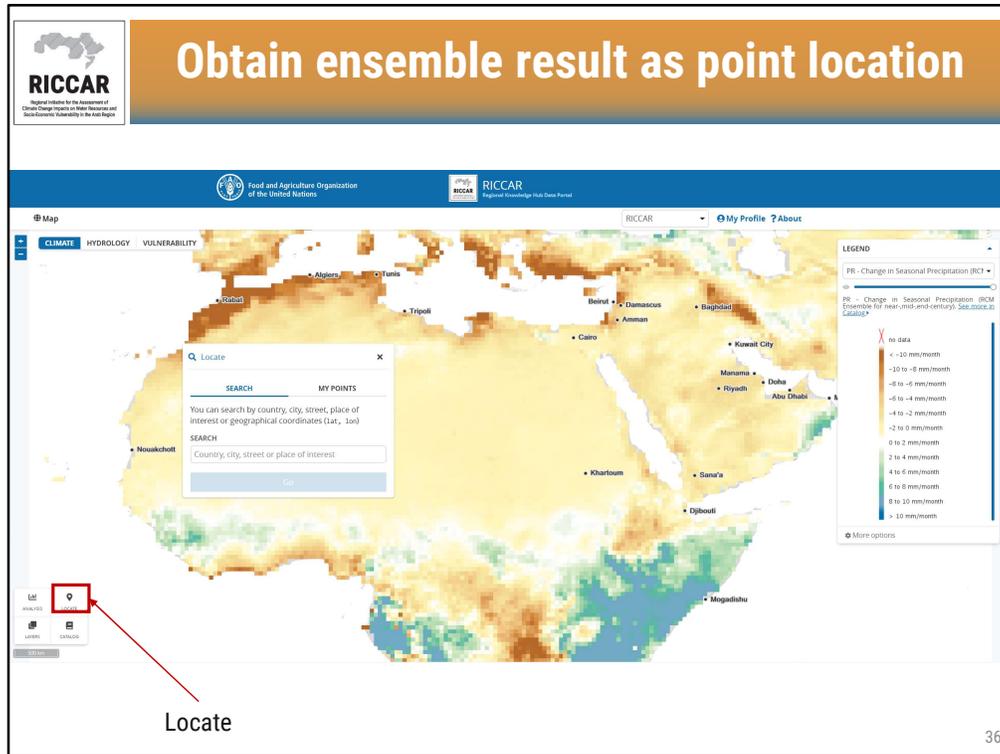


- Data portal is maintained by FAO (one of RICCAR partners).
- Can view climate data and hydrology data ensembles as well as vulnerability assessment data.

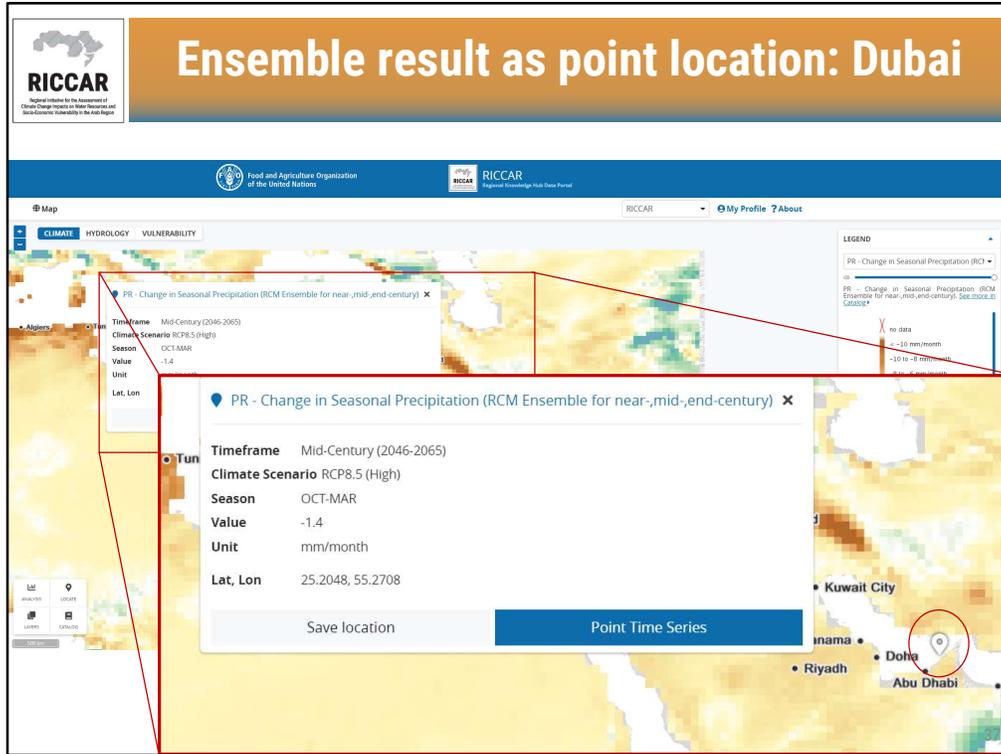


- Note that although the RICCAR regional knowledge hub has a mirror website in Arabic, there are no current plans to develop an Arabic mirror site for the data portal. The data portal is solely available in English.
- Improvements to the data portal are ongoing. If you have suggestions for improvement, please send an email.





- Can obtain data at point location by name or by geographic latitude, longitude coordinates
- Note that only major cities can be located by name, using only commonly used international spelling.



**Time series (point location): Dubai**

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Food and Agriculture Organization of the United Nations

RICCAR  
Regional Knowledge Hub Data Portal

map RICCAR My Profile ? About

CLIMATE HYDROLOGY VULNERABILITY

Algeria Tunisia Tripoli Beirut Damascus Cairo Amman Kharkov Samara Djbouti

**New Analysis**

SELECT OPERATION: Point Time Series  
OPERATION DESCRIPTION: Retrieve time-series on selected point.

LAYER	PLACE	PARAMETERS
Dataset		R10 - Annual Count of 10 mm precipitation days (RCM Ensemble for
Climate Scenario		RCP8.5 (High)

Run Operation

LEGEND: R10 - Seasonal Count of 10 mm precipitation days (Global Climate Model: 1951 to 2100). See model in Catalog.

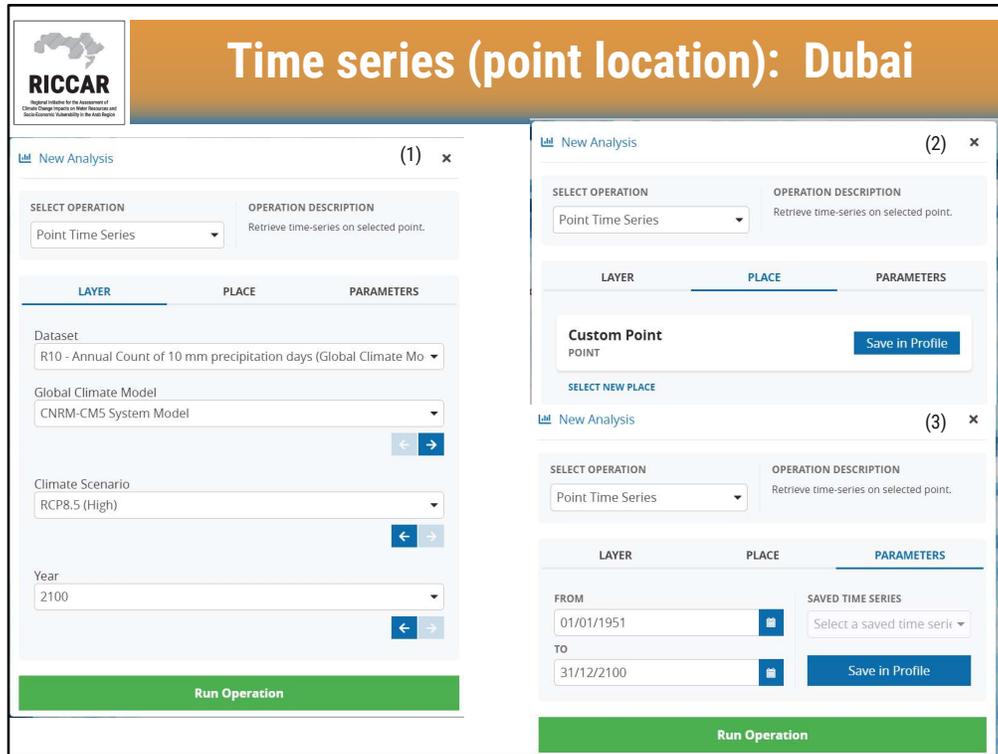
- no data
- 0 days/season
- 0 - 3 days/season
- 3 - 6 days/season
- 6 - 9 days/season
- 9 - 12 days/season
- 12 - 15 days/season
- 15 - 18 days/season
- 18 - 21 days/season
- 21 - 24 days/season
- 24 - 27 days/season
- 27 - 30 days/season
- > 30 days/season

List

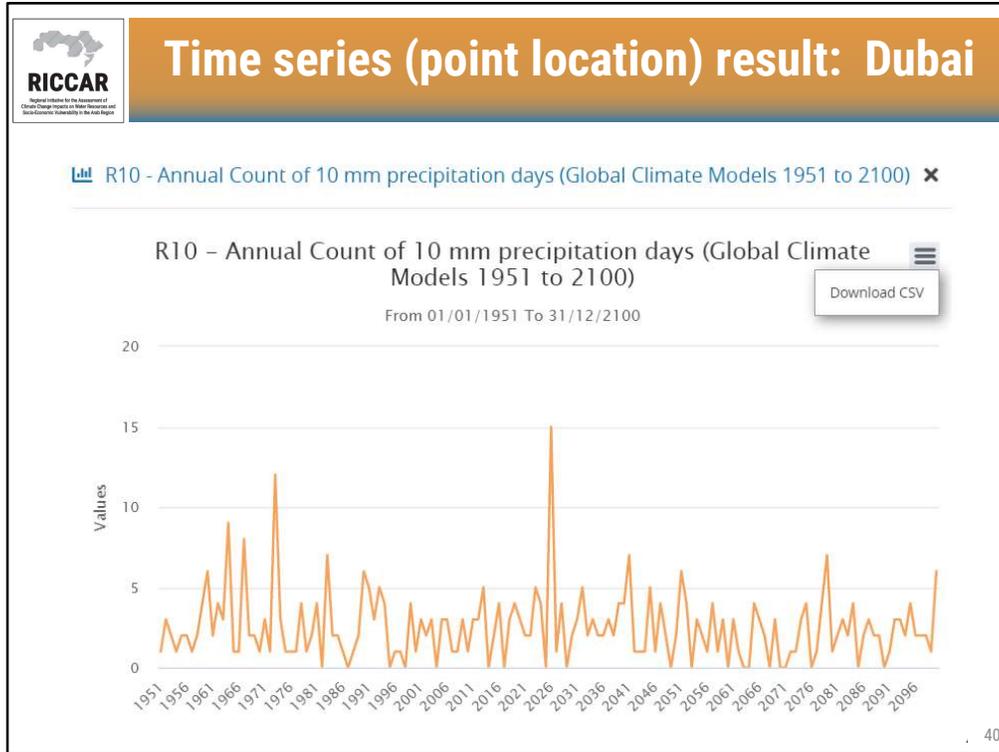
Analysis

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- Currently only available for extreme climate indices
- Requires account registration (upper right corner)



1. Select dataset (only currently available for extreme climate indices), the driving GCM, and the climate scenario. (Note that year is not applicable.)
  2. Select point location.
  3. Select time period
- Note that parameters can be saved to user profile.
  - Note that only 1 driving GCM can be completed at a time.
  - It is planned to improve the analysis tool (i.e. remove “year” for step 1).

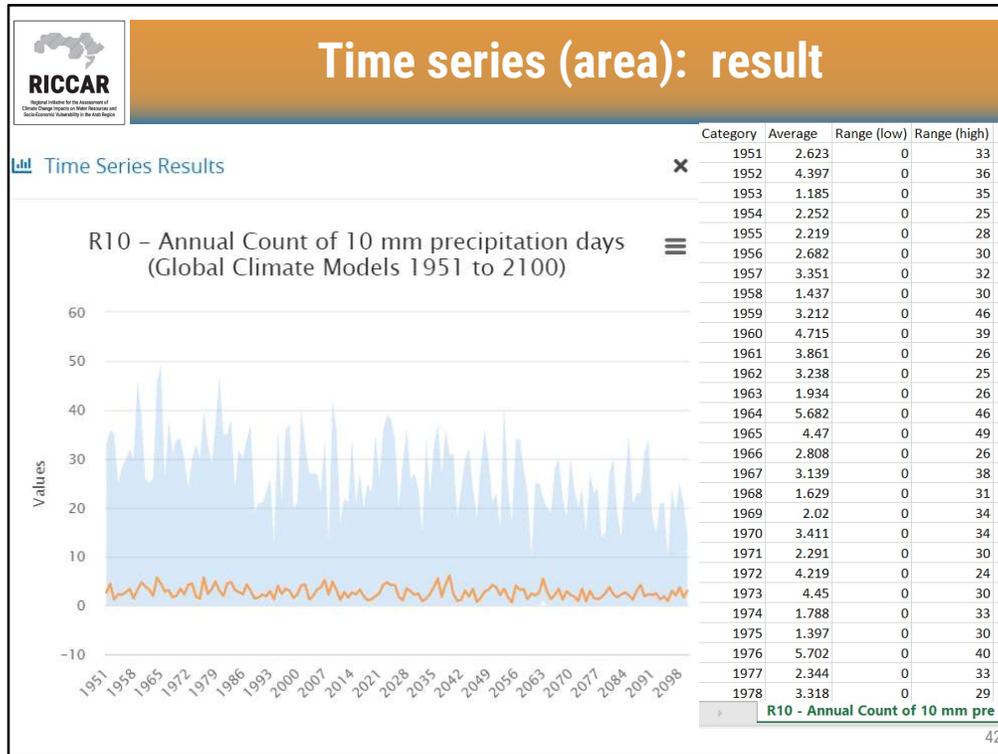


- Result can be exported to .csv file

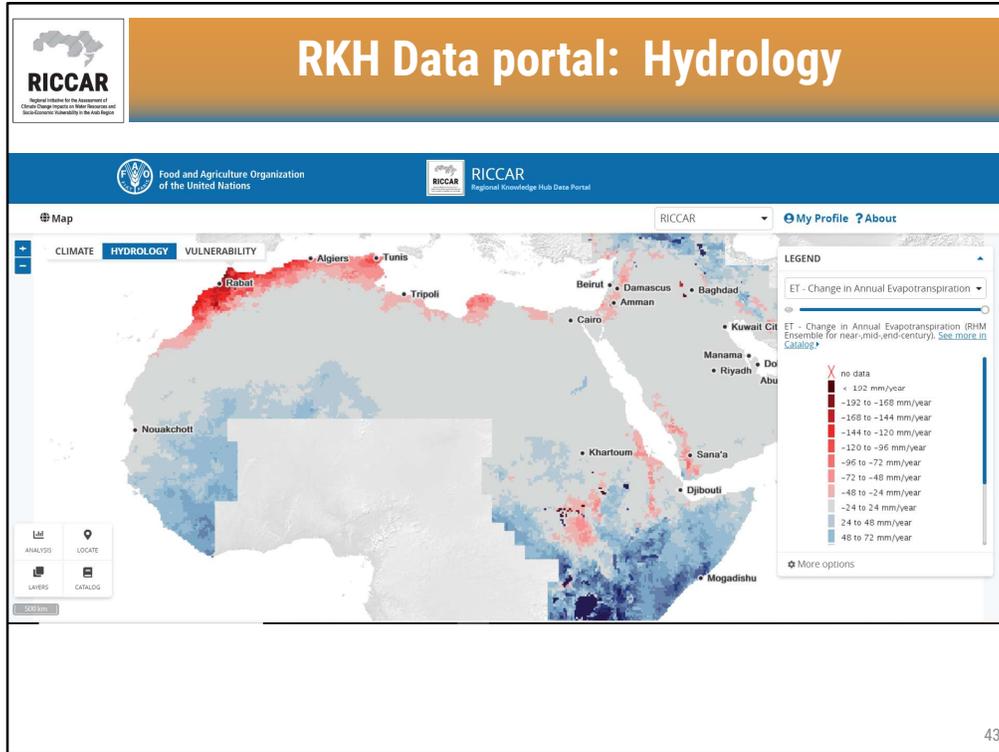
The screenshot displays the RICCAR web interface for performing a time series analysis over a specific area. The main header is 'Time series (area)'. The 'New Analysis' window is open, showing the 'Area Time Series' operation selected. The 'Select Area' window is also open, showing options to 'DRAW' or 'UPLOAD SHAPEFILE'. The 'Run Operation' button is visible at the bottom of the 'New Analysis' window.

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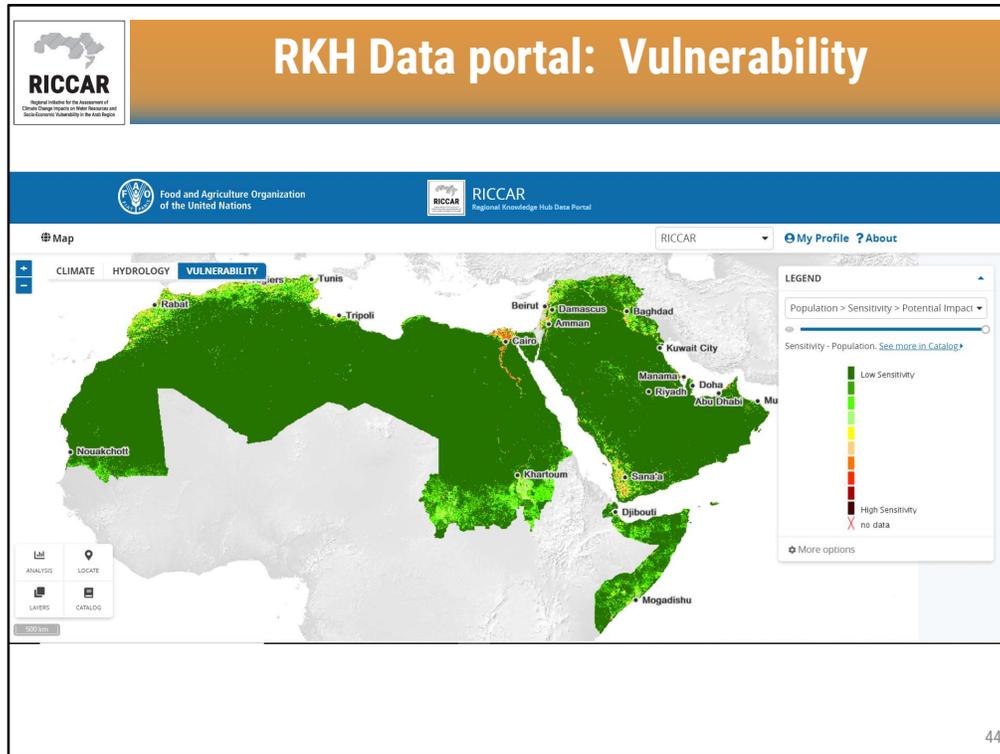
- Area can be defined by drawing a polygon on the screen or by uploading a shapefile (i.e. basin boundaries).
- Note is it recommended to use only simple shapefiles with only 1 polygon rather than multiple non-continuous polygons (i.e. multiple cropland areas).



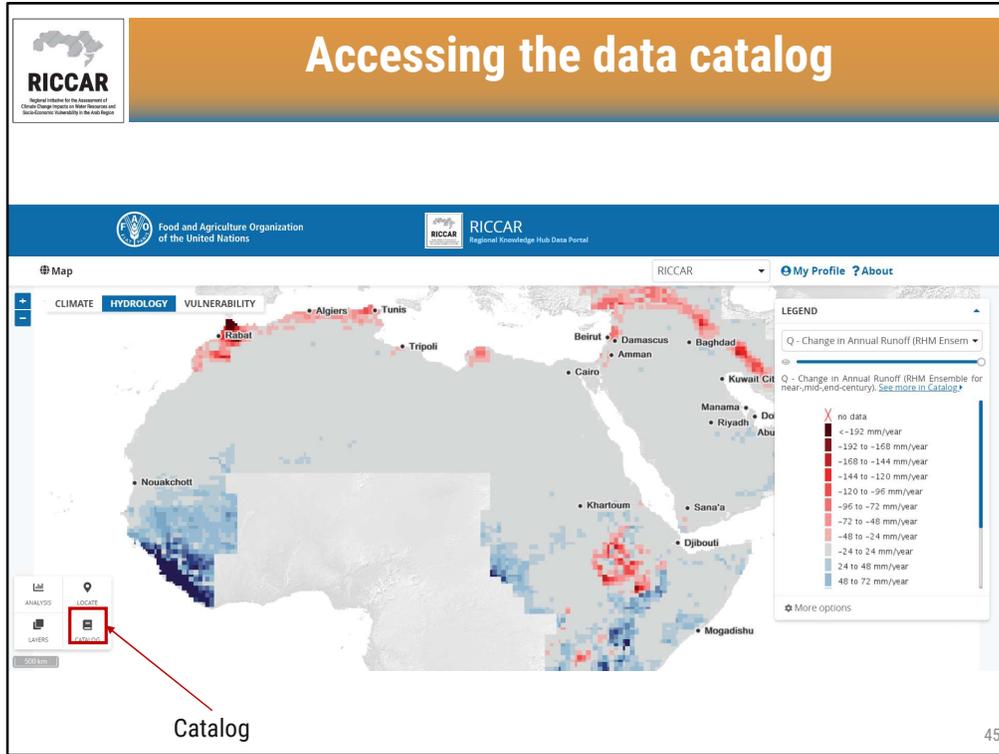
- Result based on a manually drawn polygon around the Jordan River Basin.
- Results for the GFDL-ESM2M driving GCM.
- Graphical results shown in data portal with orange line indicating the areal average and the blue shaded area showing the range.
- Results can be exported as .csv file.
- Currently only available for extreme climate indices (not temperature nor precipitation).



- Can obtain ensemble outputs (reference period, near-century, mid-century, or end-century) based on 2 different regional hydrological models (RHM): VIC and HYPE.
- Available results include evapotranspiration and runoff.
- Current view is evapotranspiration, end-century, RCP8.5, using the HYPE model.



- Vulnerability assessments to be discussed during module 6.
- Current view is the population density indicator.



- Current view is runoff, end-century, RCP8.5, using the VIC model.

**Accessing the data catalog**

RICCAR Regional Knowledge Hub Data Portal

Food and Agriculture Organization of the United Nations

Back to map > Catalog > CDD - Change in Annual Maximum Length of Dry Spell (RCM Ensemble for near-,mid-,end-century) RICCAR My Profile About

**Description**  
CDD - Change in Annual Maximum Length of Dry Spell (RCM Ensemble for near-,mid-,end-century)

**Additional Information**

Timeframe	Climate Scenario		
Near-Century (2016-2035)	RCP8.5 (High)		<a href="#">Download</a> <a href="#">See on map</a>
Near-Century (2016-2035)	RCP4.5 (Moderate)		<a href="#">Download</a> <a href="#">See on map</a>

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- Can download rasters of the climate and hydrology ensembles.
- NetCDF files are not yet available online but currently working on it.
- Can download raster of the vulnerability assessment indicators and outputs for actual values, classified values, indicator factsheets, and statistical data. (More to be discussed about vulnerability assessments during module 6.)



## RKH Data Portal Demographics

Month/Year	Algeria	Bahrain	Djibouti	Egypt	Iraq	Jordan	Kuwait	Lebanon	Libya	Morocco	Oman	Palestine	Saudi Arabia	Sudan	Syria	Tunisia	UAE
Total Users																	
Sep-19	-	-	-	2	-	1	-	3	-	-	-	-	-	-	-	1	-
Oct-19	-	-	-	7	-	1	-	13	-	-	-	-	-	-	-	-	2
Nov-19	-	-	-	5	-	7	-	4	-	-	-	2	-	-	-	-	4
Dec-19	-	-	-	7	-	3	-	7	-	3	-	-	4	-	-	5	-
Jan-20	-	1	-	9	4	2	-	16	-	-	-	-	-	-	-	-	1
Feb-20	-	-	-	5	-	2	-	3	-	1	-	-	1	1	-	-	1
Mar-20	-	-	-	8	2	1	-	5	-	-	-	-	-	-	-	-	1
Apr-20	-	-	-	5	1	-	1	6	-	-	-	-	1	-	-	-	10
May-20	-	-	-	9	-	-	-	1	-	2	-	-	1	-	-	-	-
Jun-20	2	3	1	3	4	3	1	11	2	2	2	2	-	1	8	2	7

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- The RKH data portal was launched in March 2019, but analytics have been tracked only since September 2019.

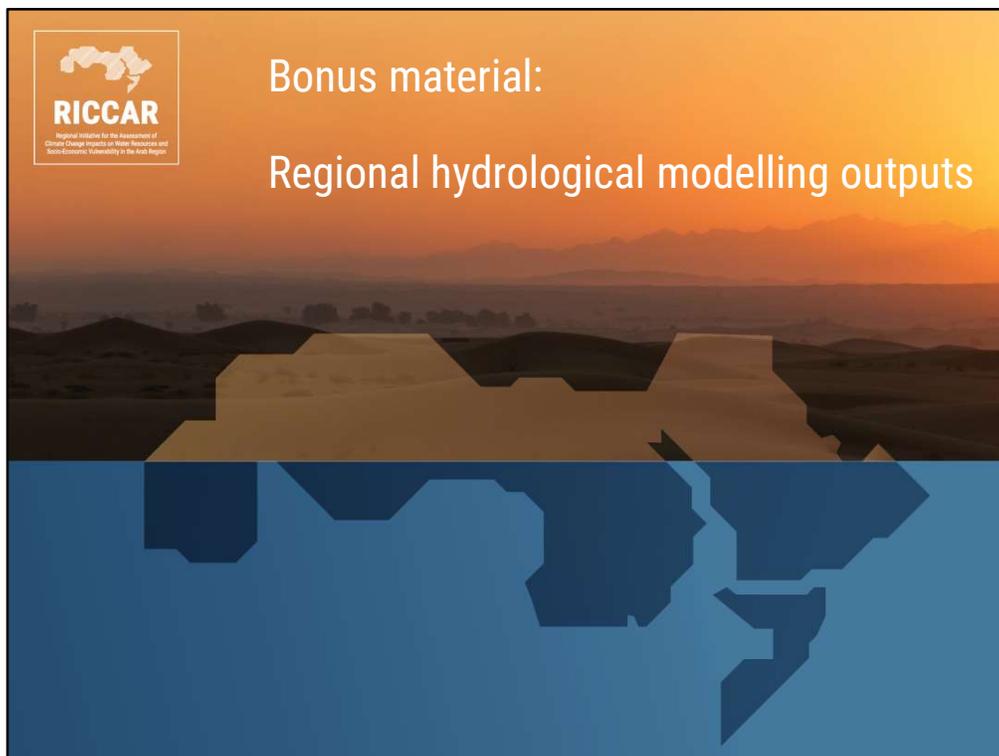


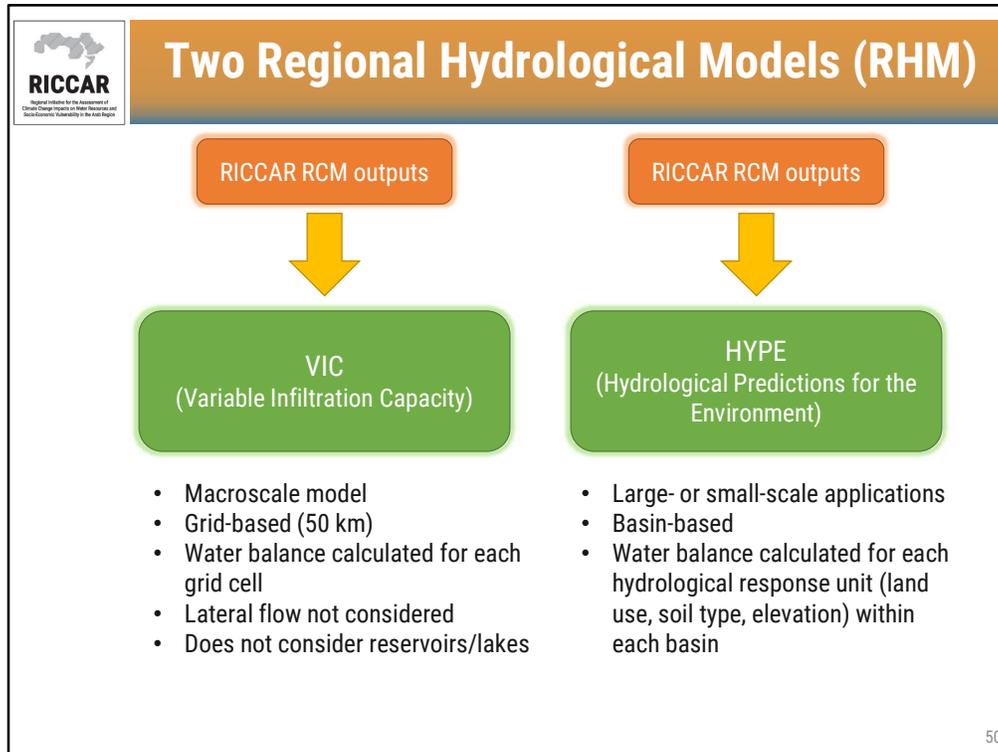
## RKH Data Portal Demographics

	Total users		New users		Sessions	
	Globally	Arab States	Globally	Arab States	Globally	Arab States
Sep-19	22	7	19	7	135	36
Oct-19	54	23	46	19	267	76
Nov-19	67	22	55	20	296	58
Dec-19	141	29	114	19	339	68
Jan-20	51	33	40	29	115	70
Feb-20	31	14	18	8	61	30
Mar-20	23	17	16	12	46	33
Apr-20	36	24	31	22	62	47
May-20	30	13	26	12	47	19
Jun-20	92	54	85	50	120	67

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- Users outside the Arab region include Europe (primarily Italy and Germany), other countries within the Arab/MENA domain (most in Ethiopia), and users from the USA, India, and South Korea.



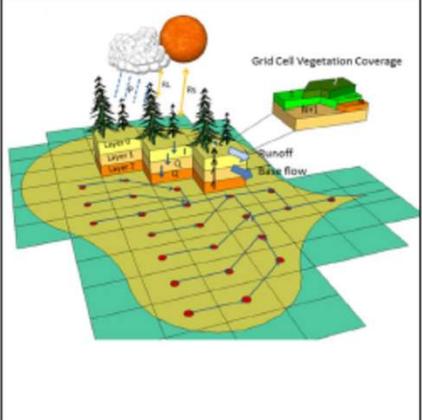


- Both the VIC and HYPE models used the bias-corrected RCM outputs from RICCAR as data input.
- Often asked which RHM output to use. RICCAR used both models for comparative purposes because of the high uncertainties in the results due to limited observed data (evapotranspiration and runoff). Similarly, it is generally advised to use both outputs for comparison for other studies within the Arab region. However, if time/budget only allows for 1 RHM, I recommend the HYPE model results due to the model characteristics described.
- The goal of modelling was to produce reasonable representation of change in hydrological processes across the region. The RHM approach does not replace the need to carry out local studies that address water resources management in more detail but it does help to identify key areas that would potentially benefit from more detailed studies.

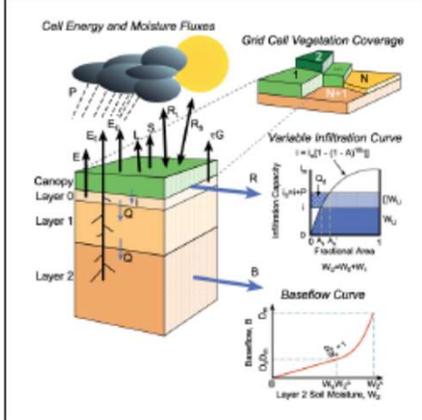


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## VIC conceptual model and hydrologic processes



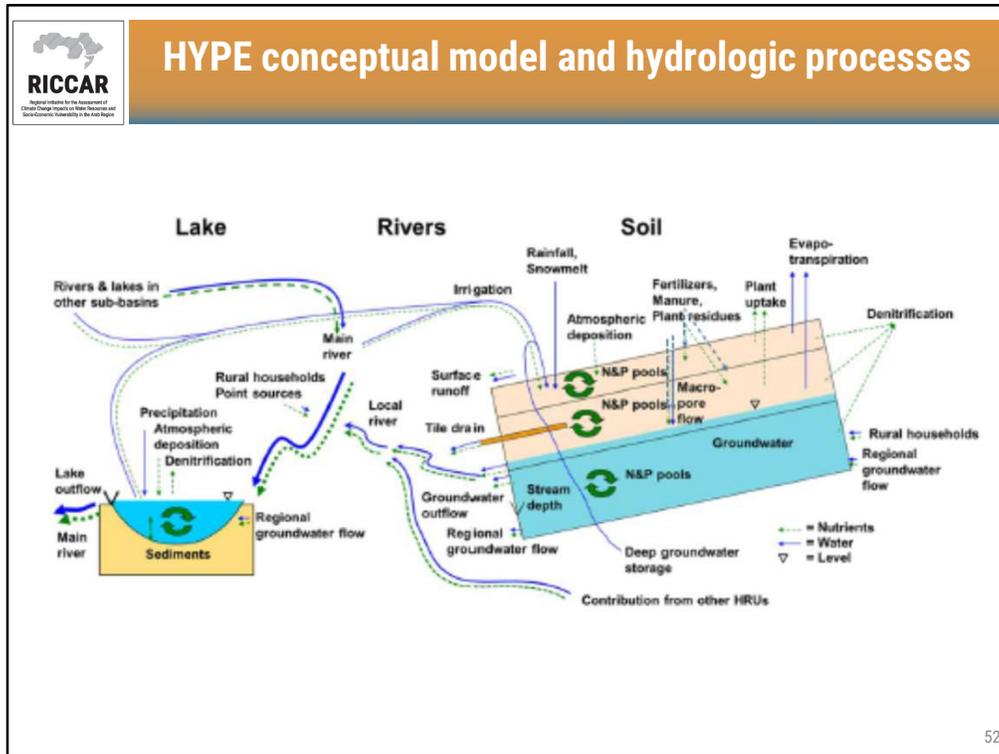
Source: Hamlet et al., 2010



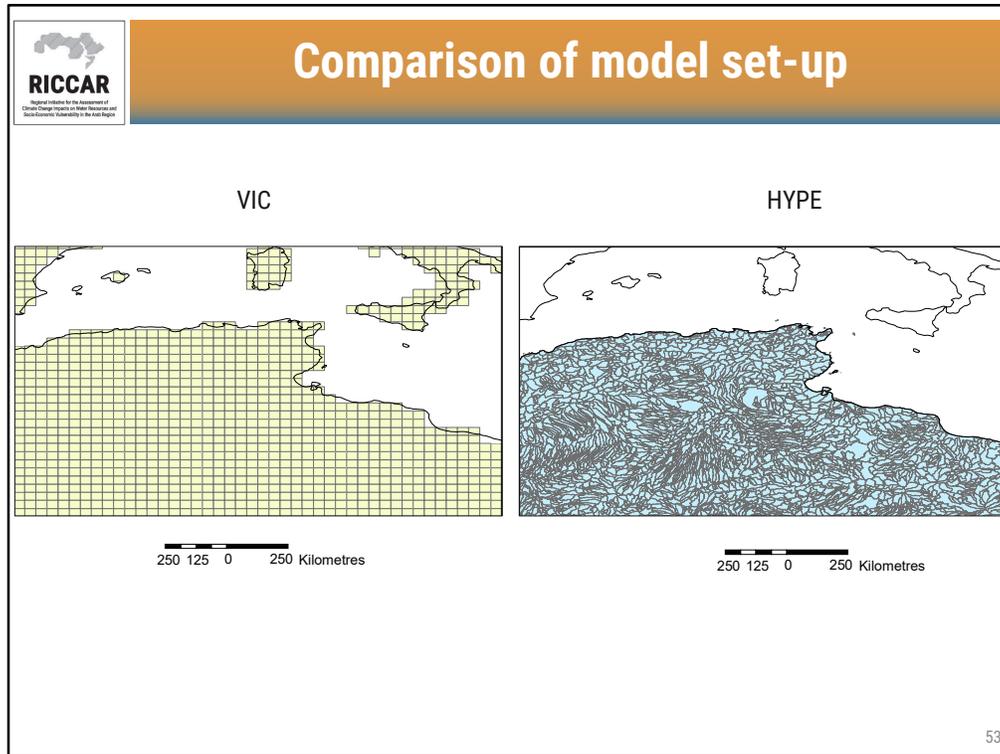
Source: University of Washington Computational Hydrology Group, 2016

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- For more information refer to the Technical Note (shown on last slide), available in English only.

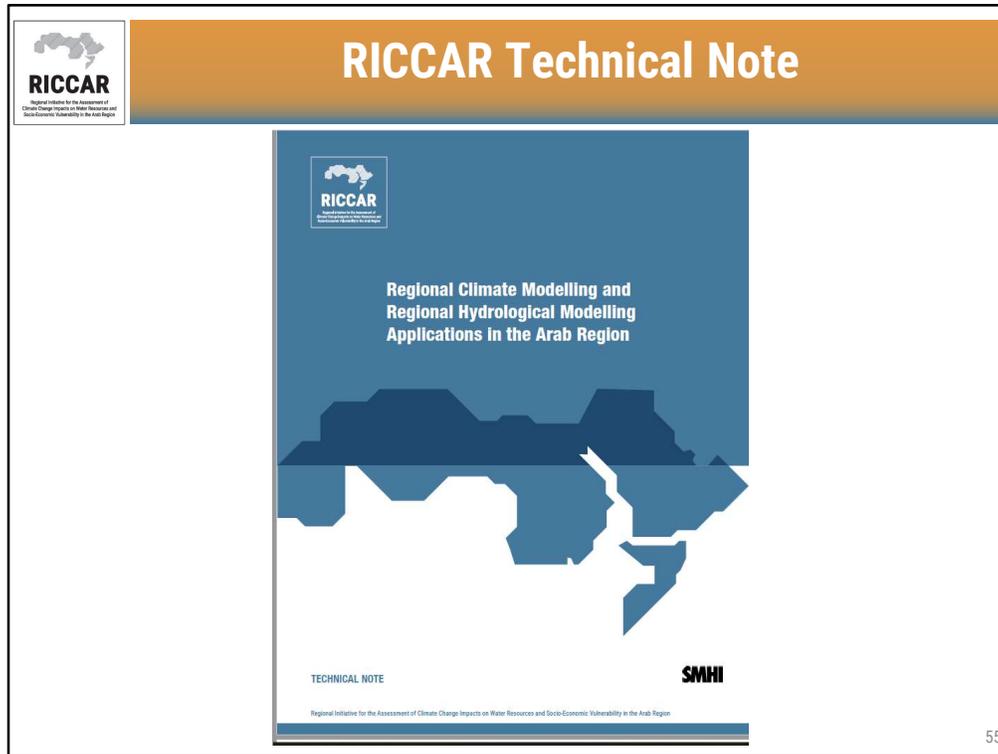


- For more information refer to the Technical Note (shown on last slide), available in English only.



- VIC grid based on  $0.44^\circ$  /  $\sim 50$  km (same as the RCM outputs)
- HYPE subbasins obtained from HydroSHEDS database





- For more details on climate and hydrological modelling, refer to the Technical Note.
- [http://www.riccar.org/regional-climate-modelling-and-regional-hydrological-modelling-applications-arab-region?language\\_content\\_entity=en](http://www.riccar.org/regional-climate-modelling-and-regional-hydrological-modelling-applications-arab-region?language_content_entity=en)



The slide features a background image of a desert landscape at sunset. In the foreground, there is a stylized map of the region. The text 'Thank You' is centered at the top. Logos for RICCAR and UN ESCWA are present in the corners. Contact information for Marlene Ann Tomaszewicz is provided in the bottom left.

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**ريكار**  
المعهد الإقليمي لتقييم الأثر المناخي على  
الموارد المائية والقطاعات الاقتصادية  
والاجتماعية في المنطقة العربية

**Thank You**

Marlene Ann Tomaszewicz  
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Water Resources Section  
Climate Change and Natural Resource Sustainability Cluster  
UN Economic and Social Commission for Western Asia (ESCWA)  
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