INTRODUCTION
Introduction (1/2)

The Arab Domain RCM is available in 50kmx50km and 25kmx25km

As the dynamics of interaction atmosphere/water and atmosphere/land varies, it is common to produce models for each interaction separately (Land and Sea).

In a model the cells/grids should be defined as “Land” and “Sea”

The definition of Land and Sea is done during the original set-up of the RCM over the domain (whether the RCM is used directly or bias-corrected).

Introduction (2/2)

RICCAR work focuses on modelling on “Land”; thus, when conducting the bias-correction, sea grids or water bodies are masked.

This process is called Land-Sea Masking and it uses 50% threshold, i.e., a grid that includes 50% and more of sea is considered sea and goes into the ocean/sea modeling results or representation.

Now to move from RCM to country-level studies, it is assumed that we are working on Land, thus the analysis is done on gridboxes that are defined as “land.”
Data on EGFS (1/3)

The example that will be used for this presentation is for
- Precipitation
- RCP 8.5
- For the mid-century (2046-2065) and
- End of the century (2081-2100)

To produce this data from the EGFS it required the following steps:
- From the MNA-44 database (50x50km)
- Using three driving models
  - CNRM-CERFACS-CNRM-CM5
  - ICHEC-EC-EARTH
  - NOAA-GFDL-GFDL-ESM2M
- The historic or base-line data for each model
- The RCP 8.5 for each model for the two time periods
Data on EGFS (2/3)

To be noted there are historical/base-line data are available for each driving model (GCM), thus an ensemble of the three models is required for the historical data.

Also an ensemble from the three models should be done for the second time period (2046-2065) and the end of the century time period (2081-2100).

The change between the time-periods and the base-line could be calculated either between the ensembles (ensemble of the second time period subtracted from the ensemble of the historical data)

Or

the subtraction could be done before constructing the ensemble (one driving model for the second period subtracted from the same driving model of the historical data)
Data on EGFS (3/3)
Non-bias corrected

Example: Precipitation RCP 8.5 for 2046-2065 and 2081-2100

Data from SMHI
Bias corrected

Example: Precipitation RCP 8.5 for 2046-2065 and 2081-2100
Non-Bias corrected v/s Bias corrected

COUNTRY-LEVEL CLIMATE MODEL MAPS
Focus on coastal areas
Country-level Climate models (1/2)

WRS receives country requests from countries for country-level climate model maps.

If the country will conduct its own bias-correction (with their own bias-correction method), the data could be provided in its original form (non-bias corrected), which is available in the EGFS portal (converted to raster files in-house).

Otherwise, the bias-corrected data received from SMHI could also be provided of the area of the interest.

Country-level Climate models (2/2)

The responses to country requests would be from the RCM is not clipped by the country’s boundaries, i.e., area of interest (requested data) is larger than the country’s boundaries cut by the boundaries of the surrounding gridboxes.

There’s no downscaling done for this data, but simply a zooming to the area of interest.

The bias-corrected data has the water bodies clipped from the study area, since the modeling has been processed for “Land” grids only.
Examples

Example: Precipitation RCP 8.5 for 2046-2065 and 2081-2100

For Libya
Examples

Example: Precipitation RCP 8.5 for 2046-2065 and 2081-2100
For Libya

Example: Precipitation RCP 8.5 for 2046-2065 and 2081-2100
For Lebanon
Examples

Example: Precipitation RCP 8.5 for 2046-2065 and 2081-2100
For Lebanon

CONCLUSION
Conclusion

The purpose of this study is to provide a common base for decision makers across the region.

Every country can (or already has) climate projection results on national-level, but this is the first work covering the Arab region specifically, thus providing an opportunity for cooperation using the same outputs.

Using regional climate model for the Arab region is better base for negotiations/planning than global models.

The work is not designed to be used on country level, but a country could use the RCM for downscaling rather than the GCM.

THANK YOU