

# Reflection of June 2021 Training

(Training on spatial and temporal climate change analysis using CORDEX regional climate models over South Asia)

## DHM Team

- Bikash Nepal
- Sajina Shakya
- Sudarshan Humagain
- Nirmala Regmi

21 June 2022

**Himalaya Drishya Hotel**

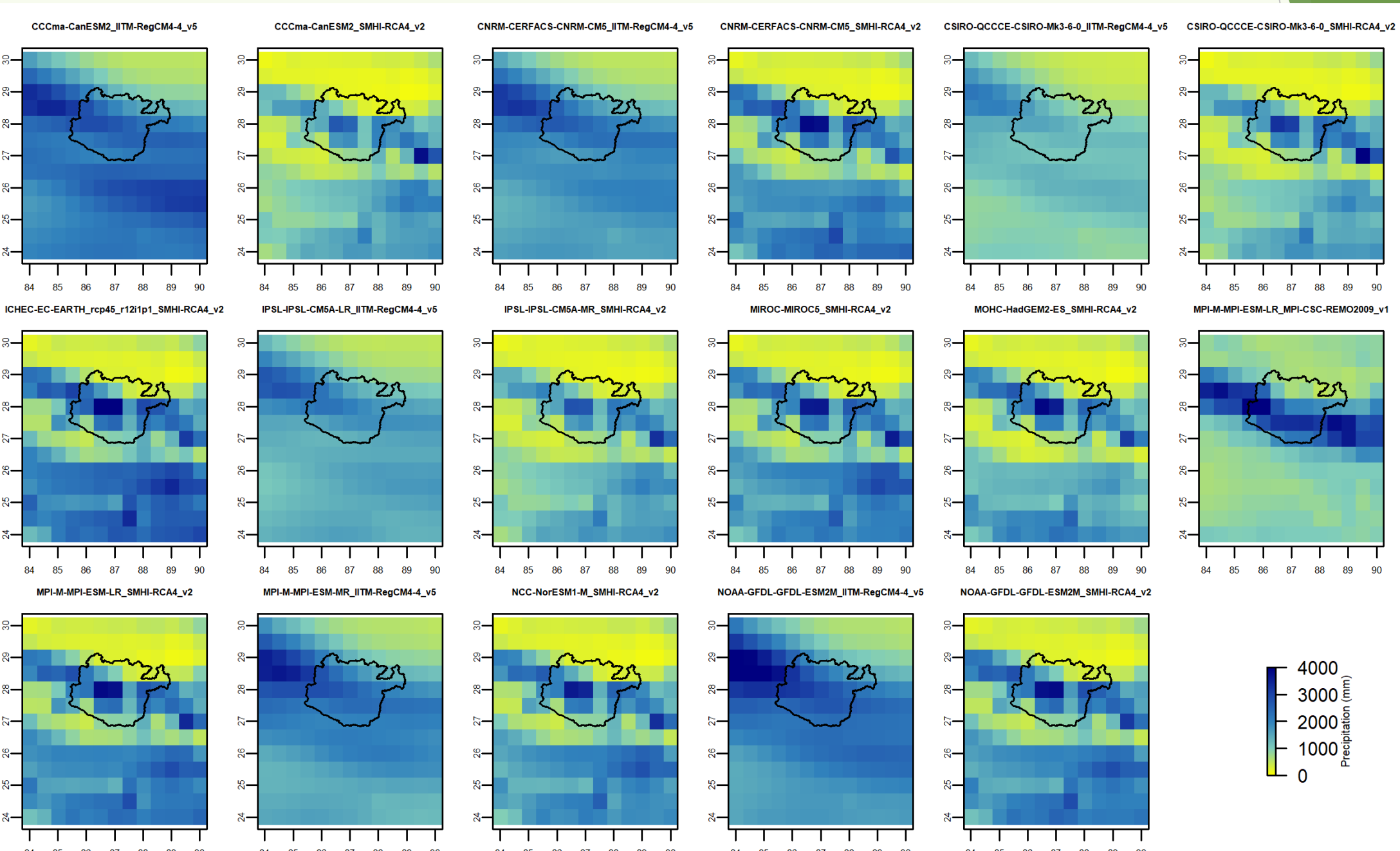
## Objective of the training:

To build knowledge and skills for analyzing climate change projections using CORDEX regional climate models.

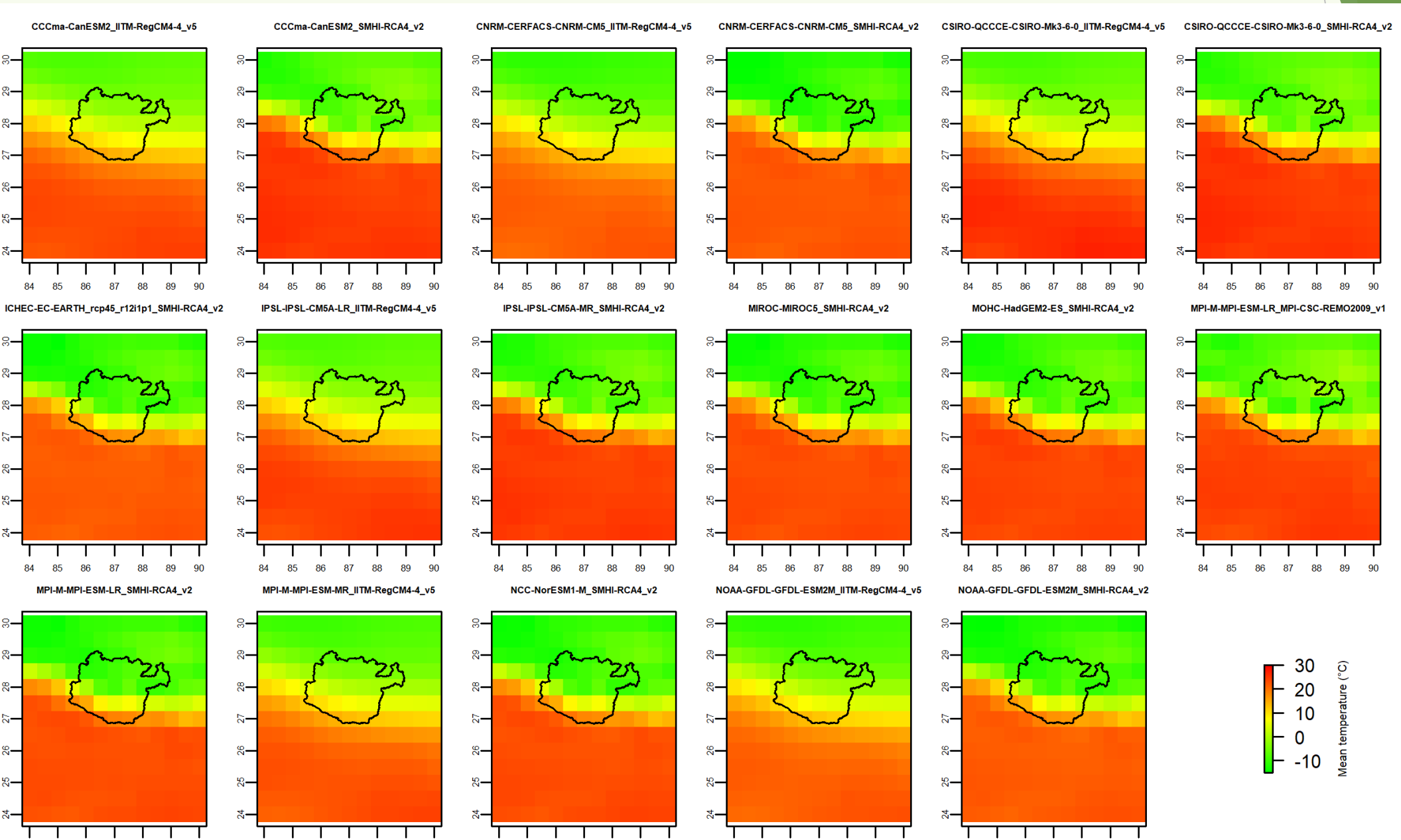
## What we learned?

- ▶ How climate model projections are prepared.
- ▶ Selection of representative models for our area of interest.
- ▶ Spatial and temporal variability of present and future climate change.
- ▶ Interpretation of uncertainty analysis.

# Precipitation of Chatara Basin- historical period (1976-2005) all models

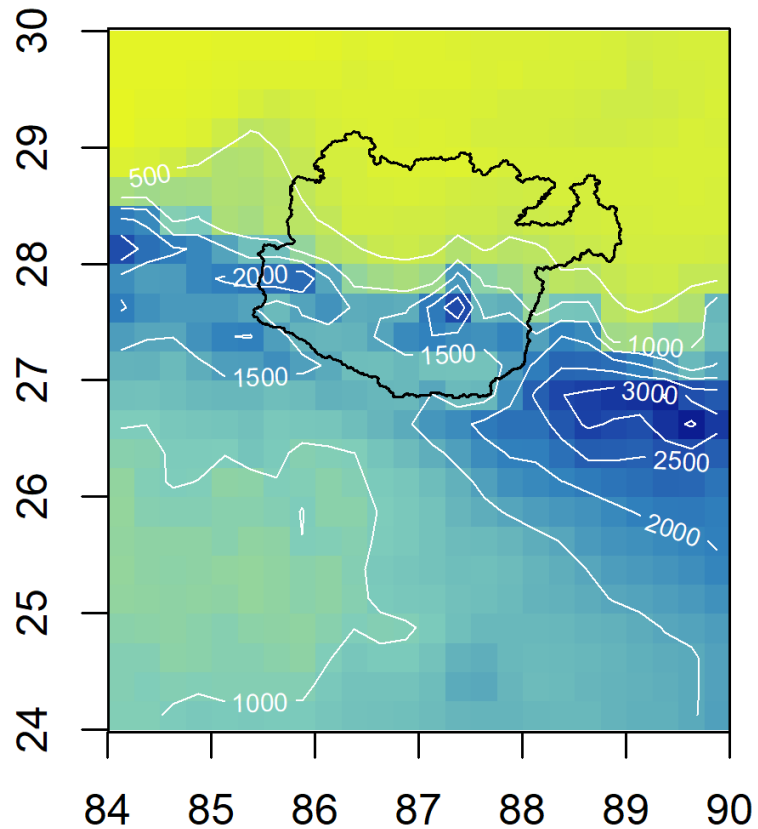


# Temperature of Chatara Basin- historical period (1976-2005) all models

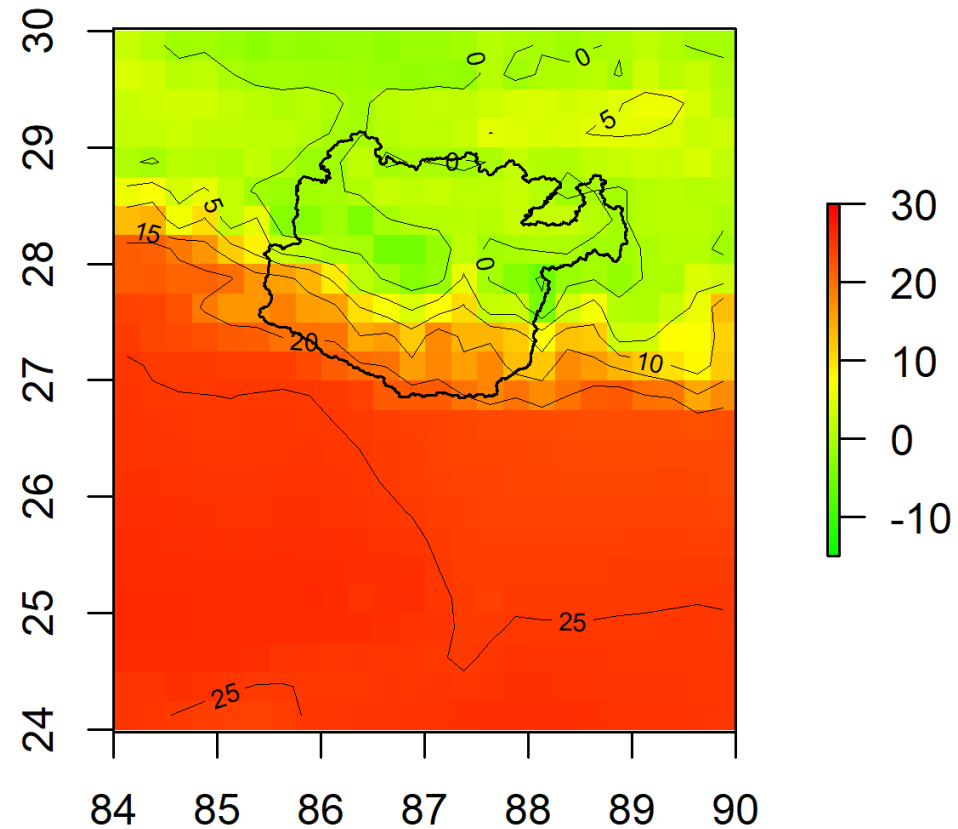


# Aphrodite annual values- reference period (1976-2005)

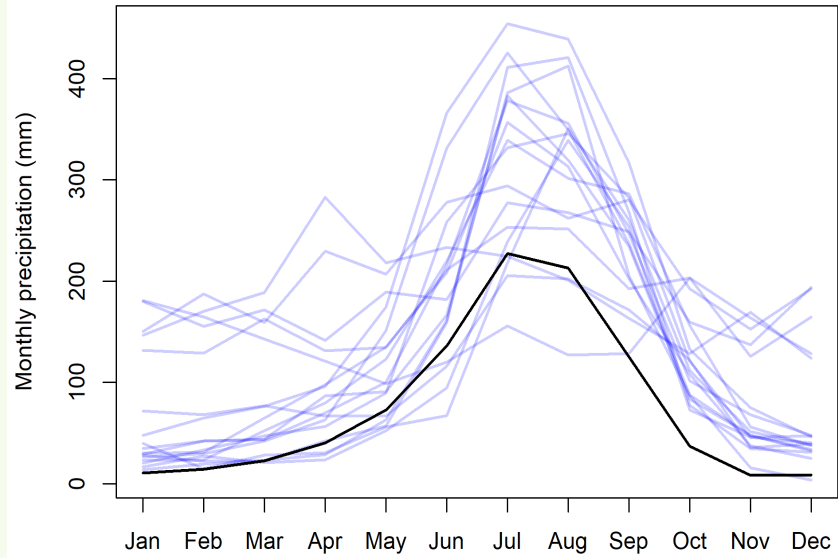
## Annual Precipitation (mm)



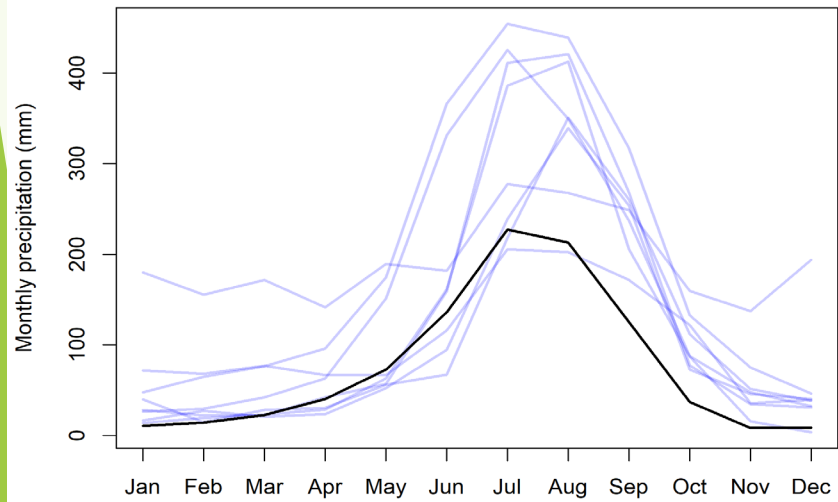
## Annual mean temperature (°C)



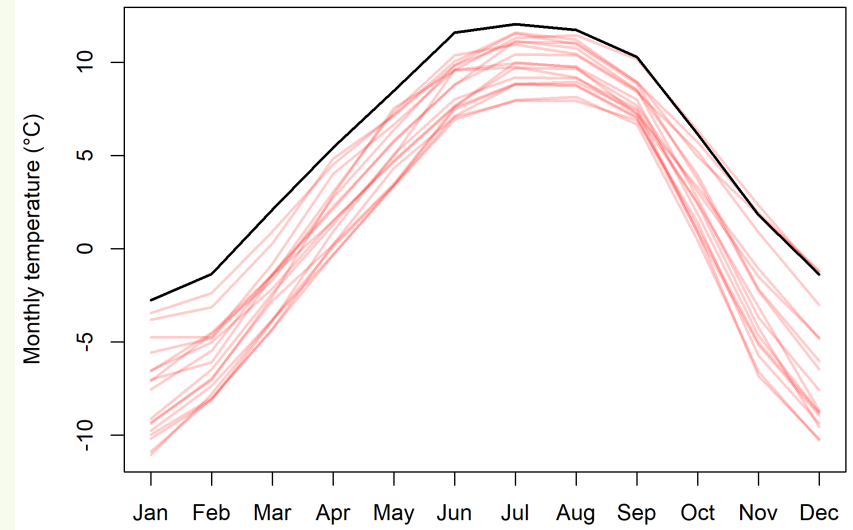
**Climatology of 17 CORDEX models**



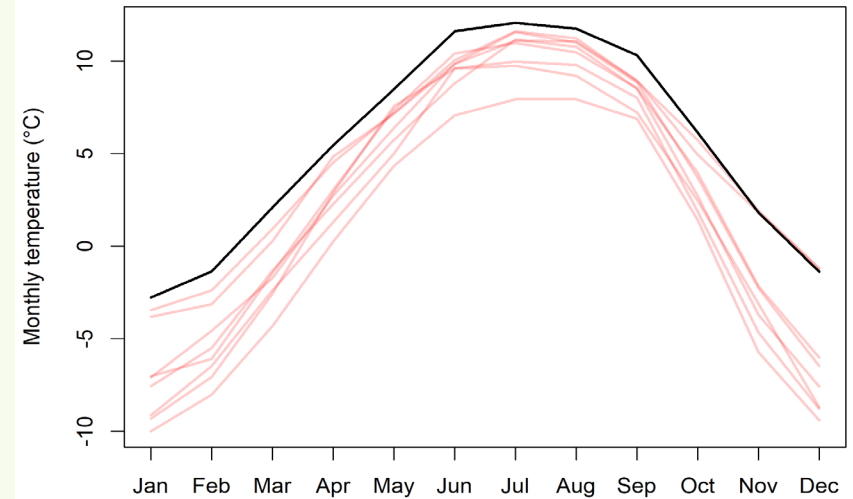
**Climatology of 8 CORDEX models**



**Climatology of 17 CORDEX models**

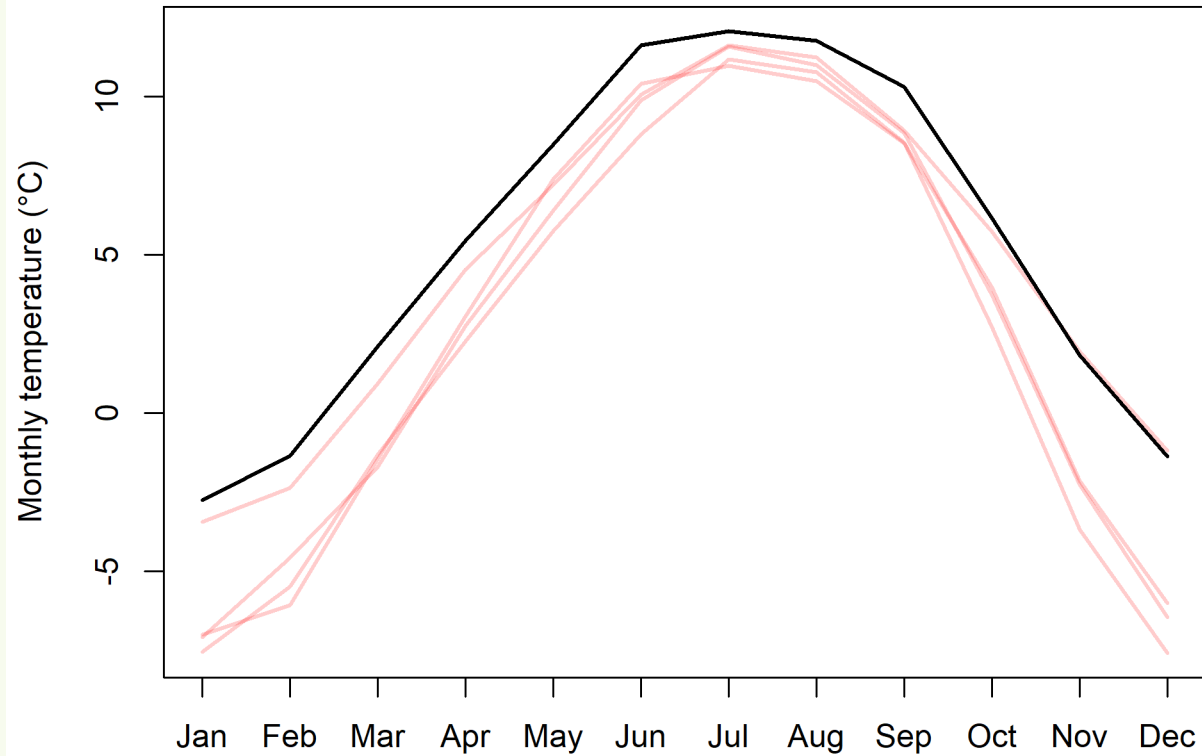


**Climatology of 8 CORDEX models**

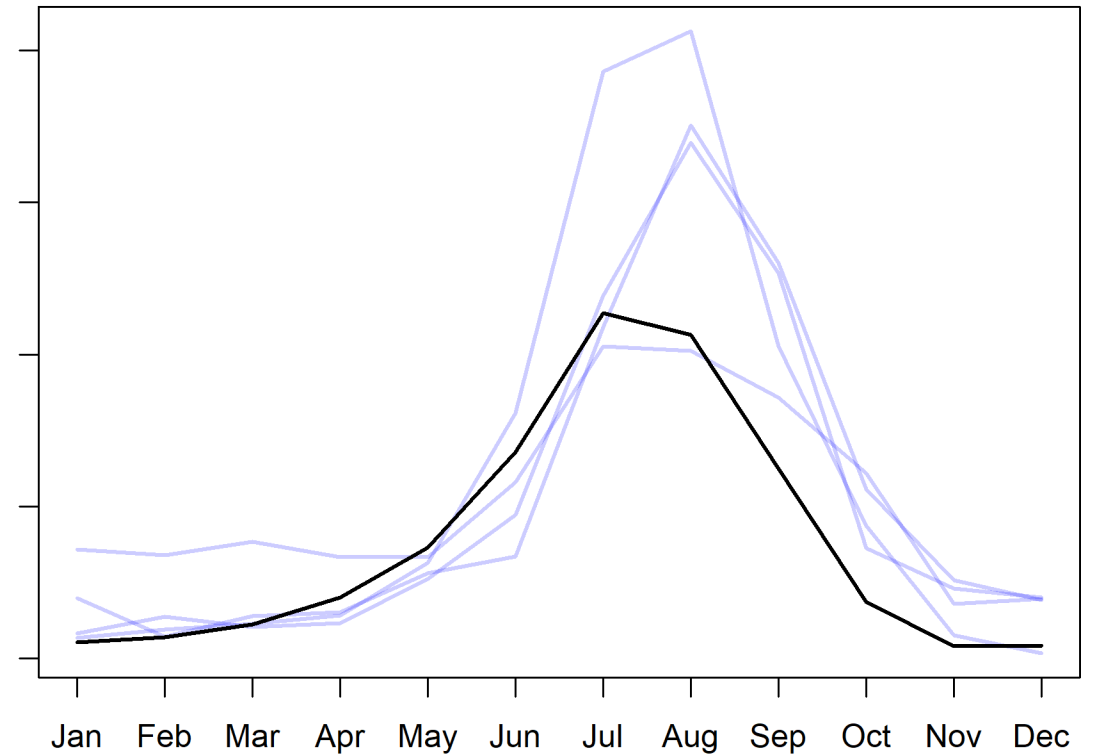


# Climatology of Selected 4 models

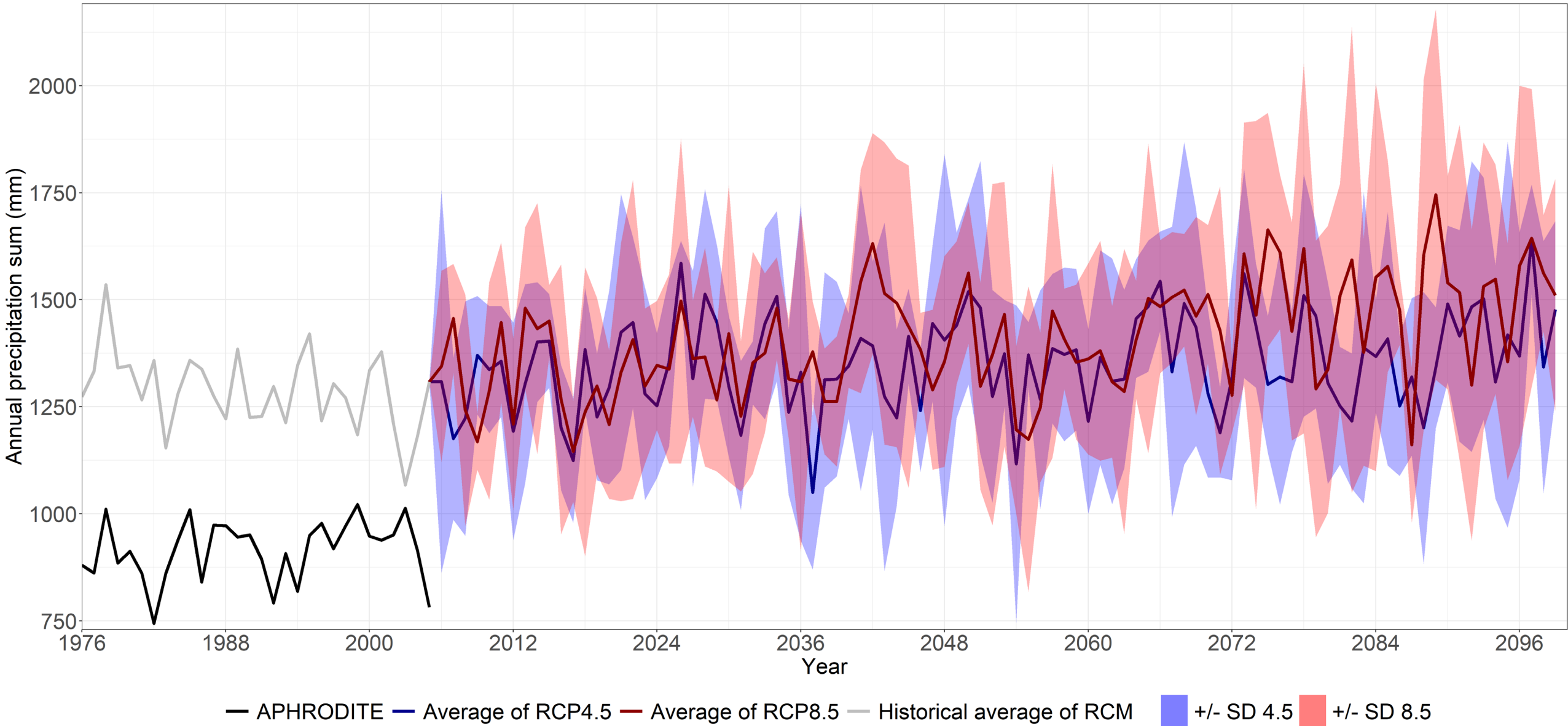
## Climatology of 4 selected CORDEX models



## Climatology of 4 selected CORDEX models

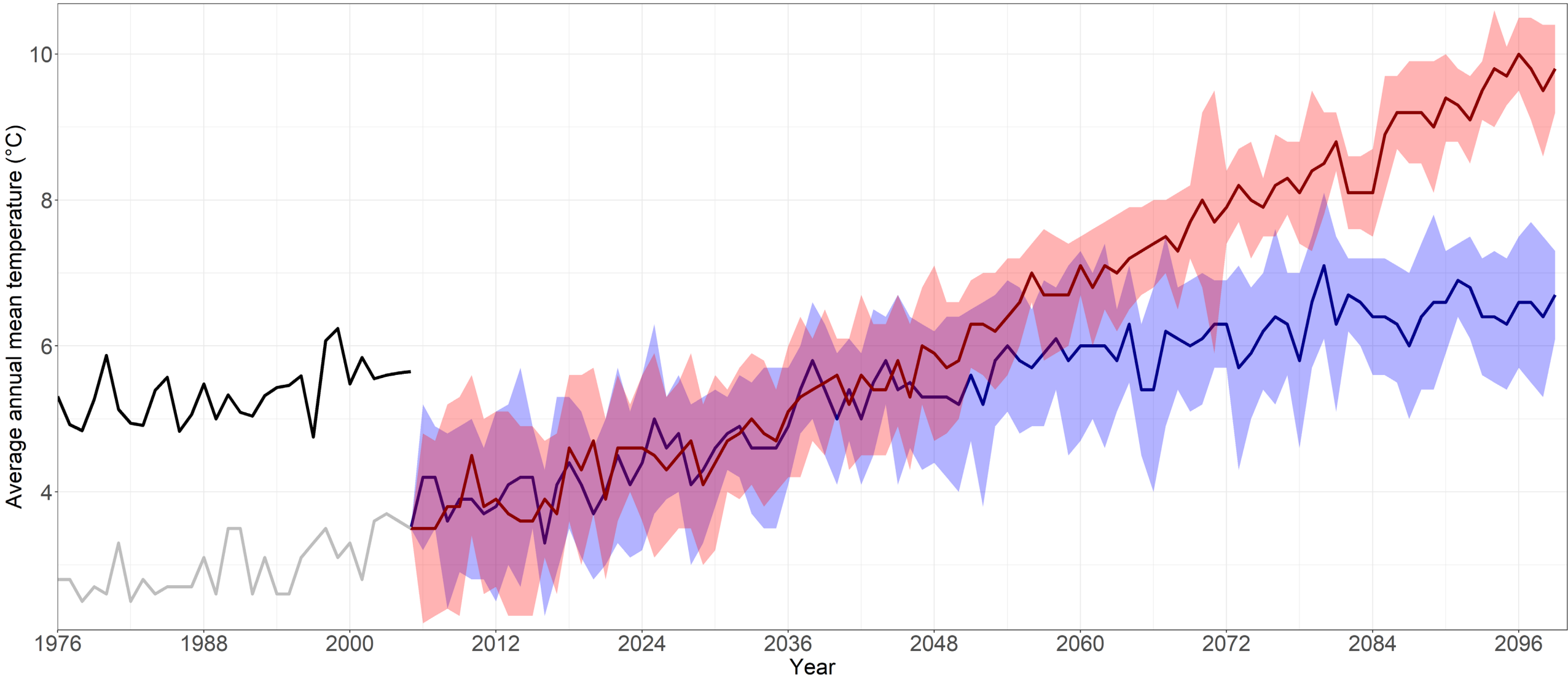


# Ensemble band plot for precipitation





# Ensemble band plot for mean temperature



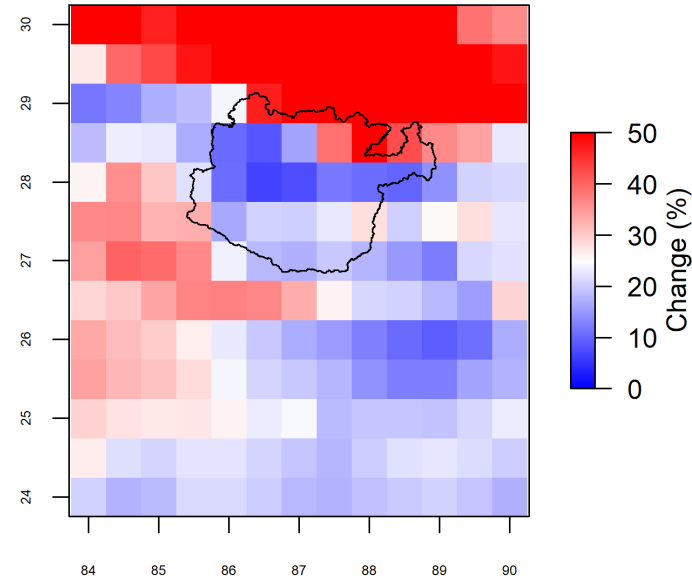
— APHRODITE temperature — Average of RCP4.5 — Average of RCP8.5 — Historical average of RCM +/- SD 4.5 +/- SD 8.5

# Delta change between future period(2070-2099) and reference period (1976-2005)

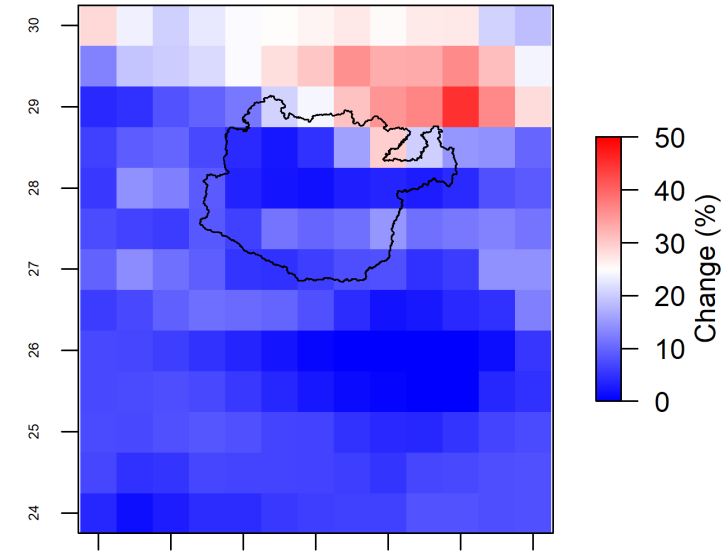
	CCCma.CanESM2 _SMHI.RCA4_v2	CSIRO.QCCCE.CSI RO.Mk3.6.0_IITM. RegCM4.4_v5	CSIRO.QCCCE.CSI RO.Mk3.6.0_SMHI .RCA4_v2	IPSL.IPSL.CM5A.M R_SMHI.RCA4_v2
delta_pr_RCP4.5	18.59	-6.14	3.03	11.36
delta_tas_RCP4.5	3.2	2.99	3.51	3.96
delta_pr_RCP8.5	26.52	-5.47	12	32.31
delta_tas_RCP8.5	5.63	4.6	5.62	7.35

# Change in annual precipitation and temperature between future period(2070-2099) and reference period (1976-2005)

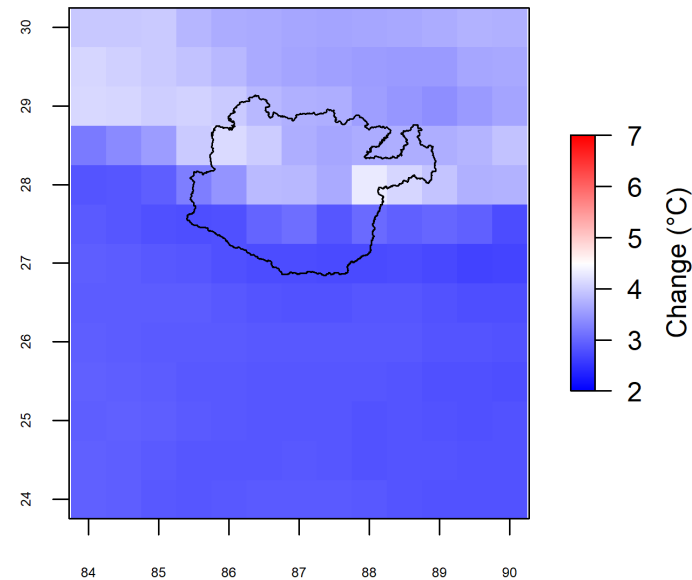
### Change in annual precipitation for RCP8.5



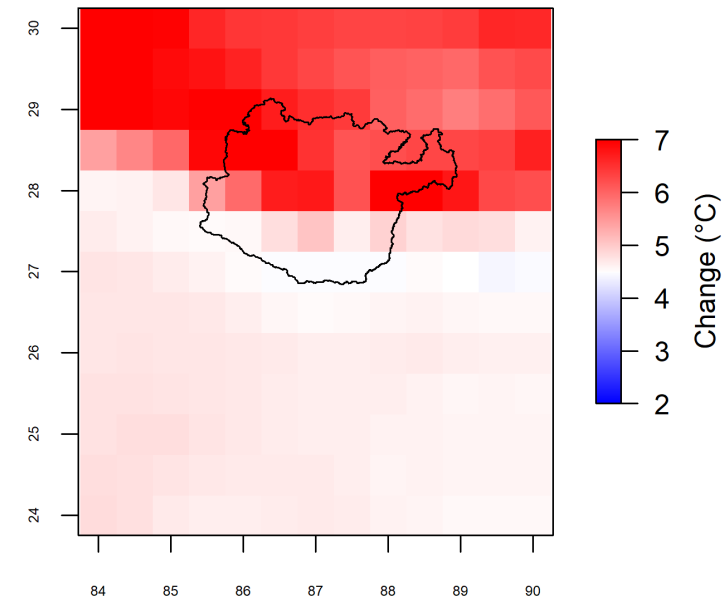
### Change in annual precipitation for RCP4.5



### Change in annual temperature for RCP4.5

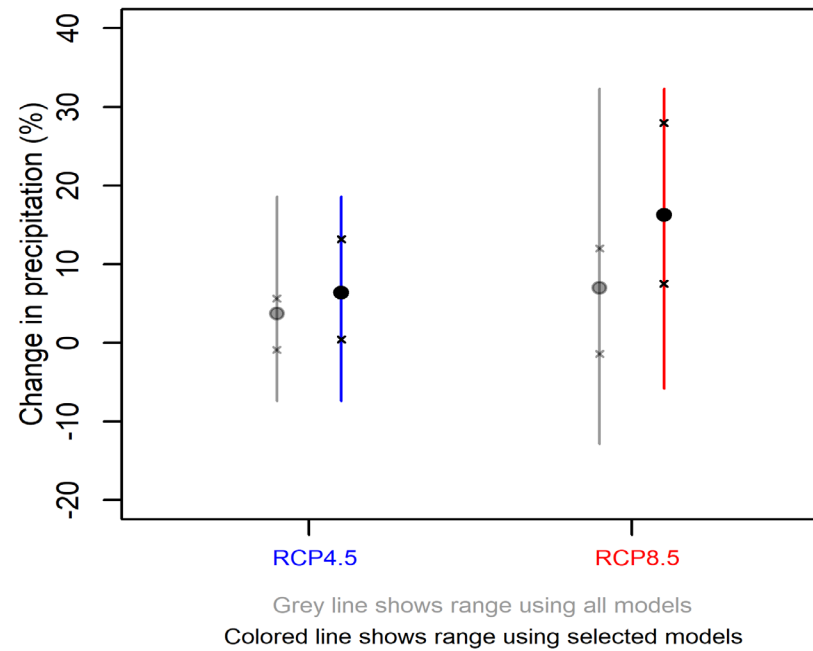


### Change in annual temperature for RCP8.5

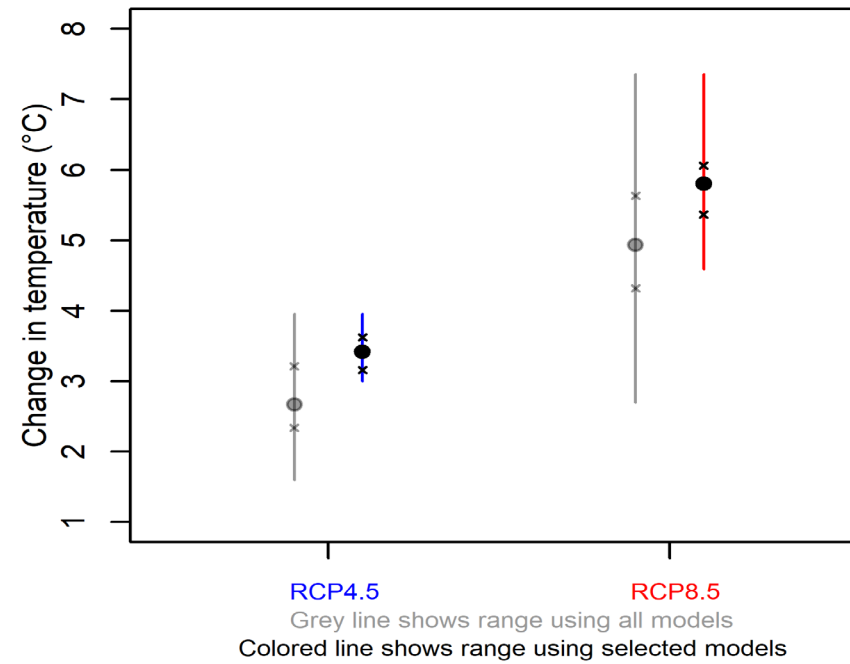


# Uncertainty Analysis

Scatter plot with min-max error bars



Scatter plot with min-max error bars



## Summary

- ▶ R codes provided in the training were useful for data analysis and visualization.
- ▶ We are able to prepare CORDEX datasets in areas of interest and compare with reference datasets.
- ▶ We can visualize spatial and temporal variation in climate change projections.
- ▶ We can interpret uncertainty in models results.
- ▶ We can analyze climate projections and produce information products to meet institutional need.

**Thank you !**