

Adequacy of ROM, a RESM, in capturing the precipitation extremes in Himachal Pradesh, India

Jyoti Sharma and Pankaj Kumar

Earth and Environmental Department

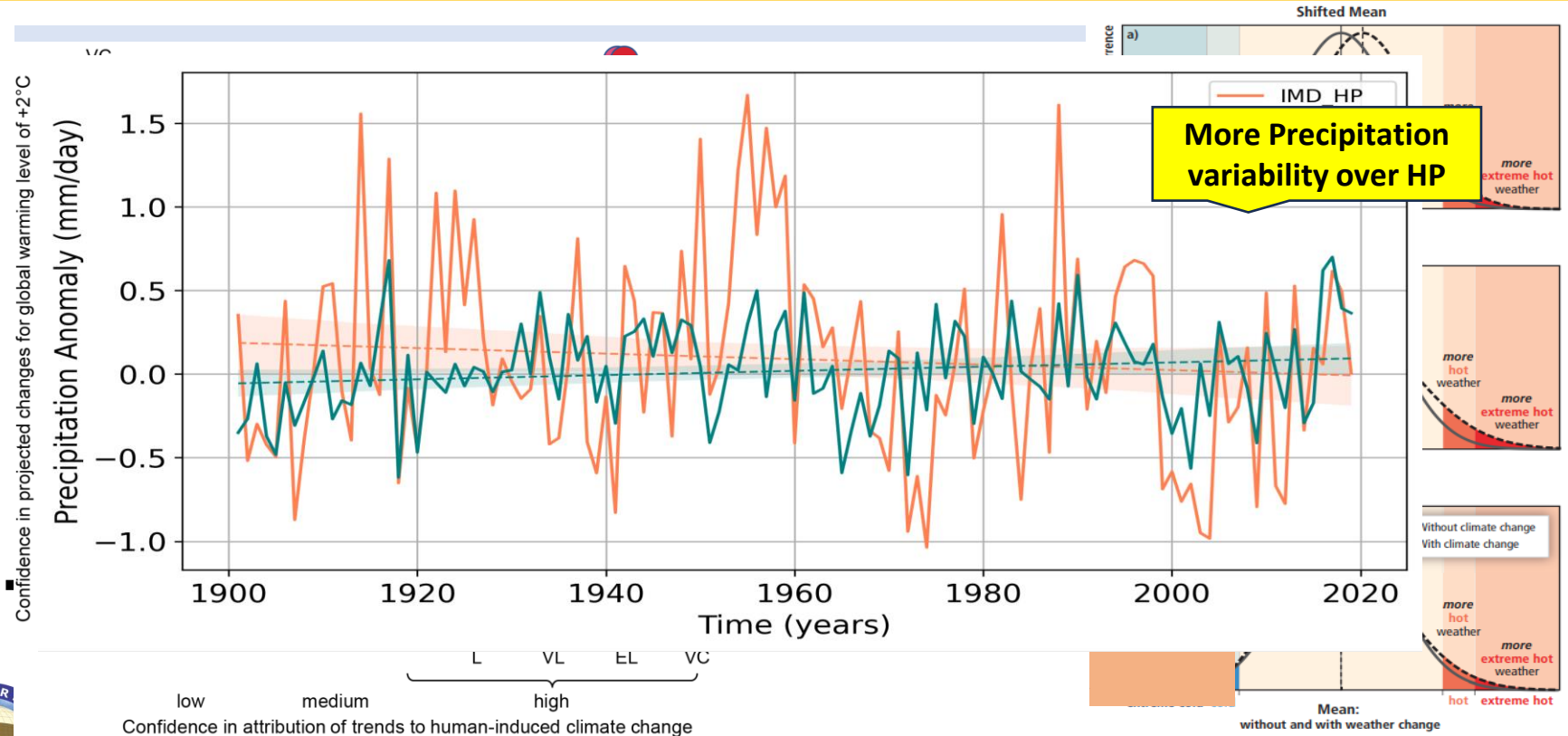
Indian Institute of Science Education and Research Bhopal, India



Slide Sequence

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Introduction: Precipitation Extreme (PE)



Objective

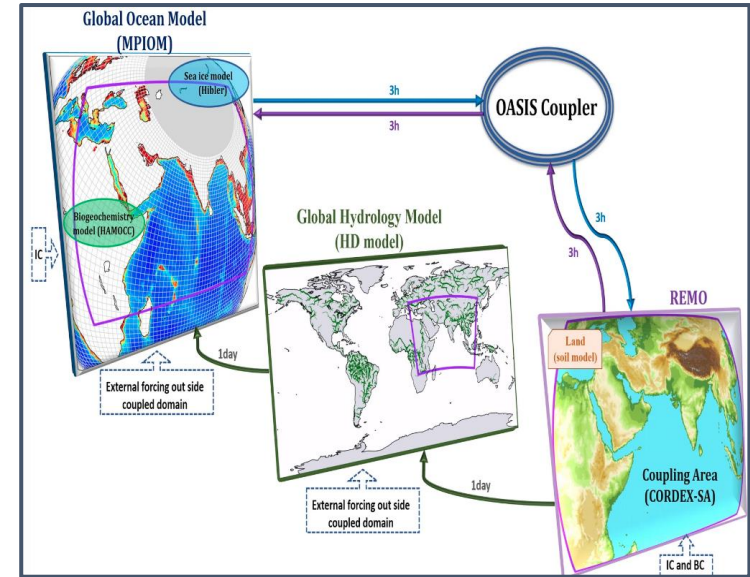
To check the performance of ROM, a RESM, in capturing the precipitation extremes in Himachal Pradesh, India

Model and Data Used

- ROM is a Regional Earth System Model (RESM), comprises of Regional Atmosphere Model (REMO), the Max Planck Institute Ocean Model (MPIOM), and the Hydrological Discharge (HD) model which are coupled via OASIS coupler (Sein et al., 2015).
- The study experiment was simulated on the CORDEX-SA Domain at the 0.22 horizontal resolution and the boundary conditions forced by ERA-5.

S.No	Dataset	Dataset Type	Spatial Resolution	Temporal Resolution	Time Period
1	ROM	ESM	0.22°*0.22°	3hourly, Daily	1980-2017
2	IMD	Observational	0.25°*0.25°	Daily	1901-2022
3	MSWEP	Re-analysis	0.1°*0.1°	3hourly	1979-till date

Details of dataset used



Systematic representation of Regional Earth System Model (RESM) over the CORDEX- South Asia region (kumar et al., 2022)

Methodology

Precipitation Indices Calculation:

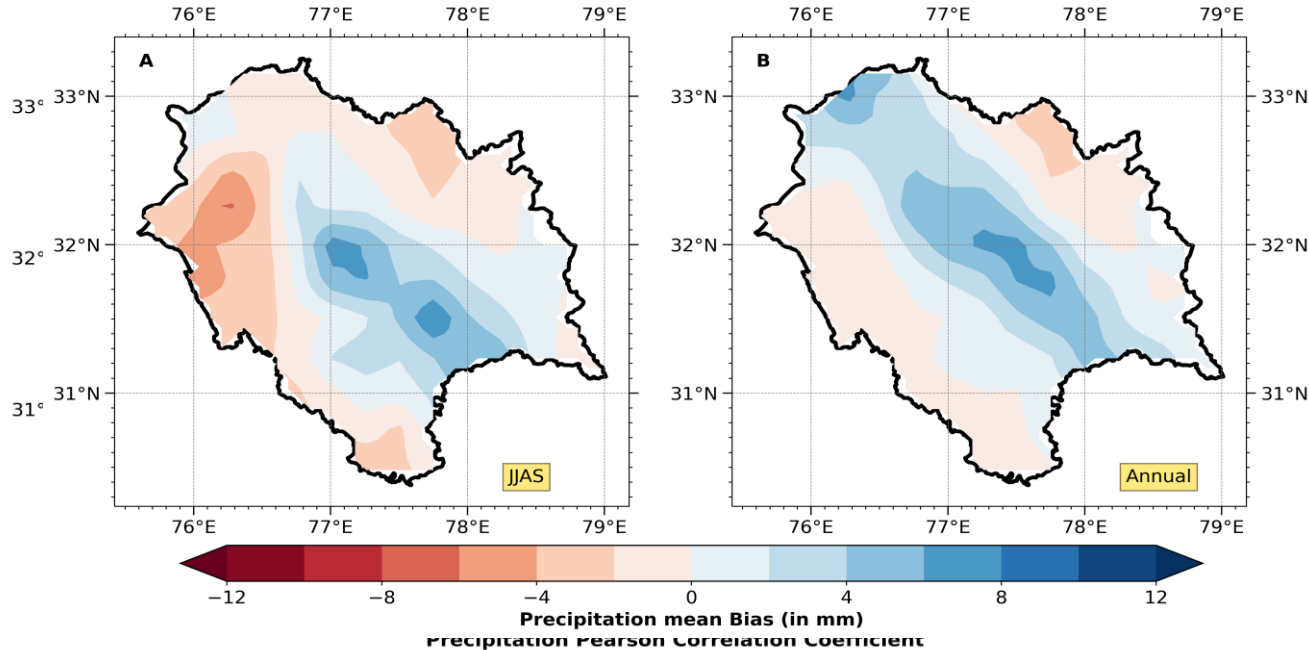
Four ETCCDI Indices were selected to calculate the PEs. These are:

- 1. Consecutive Dry Days:** Maximum length of dry spell, maximum number of consecutive days with $RR < 1\text{mm}$.
- 2. Consecutive Wet Days:** Maximum length of wet spell, maximum number of consecutive days with $RR \geq 1\text{mm}$.
- 3. 95th Percentile Precipitation:** $RR > 95p$
- 4. 99th Percentile Precipitation:** $RR > 99p$

Statistical Analysis

Pearson correlation coefficient, bias (standardized and percentage), and the significance test were also calculated to compare the model results with observations.

Performance of ROM over HP



Mann-Kendall Test:
No significant trend

ROM provided higher precipitation values at elevational transitions level

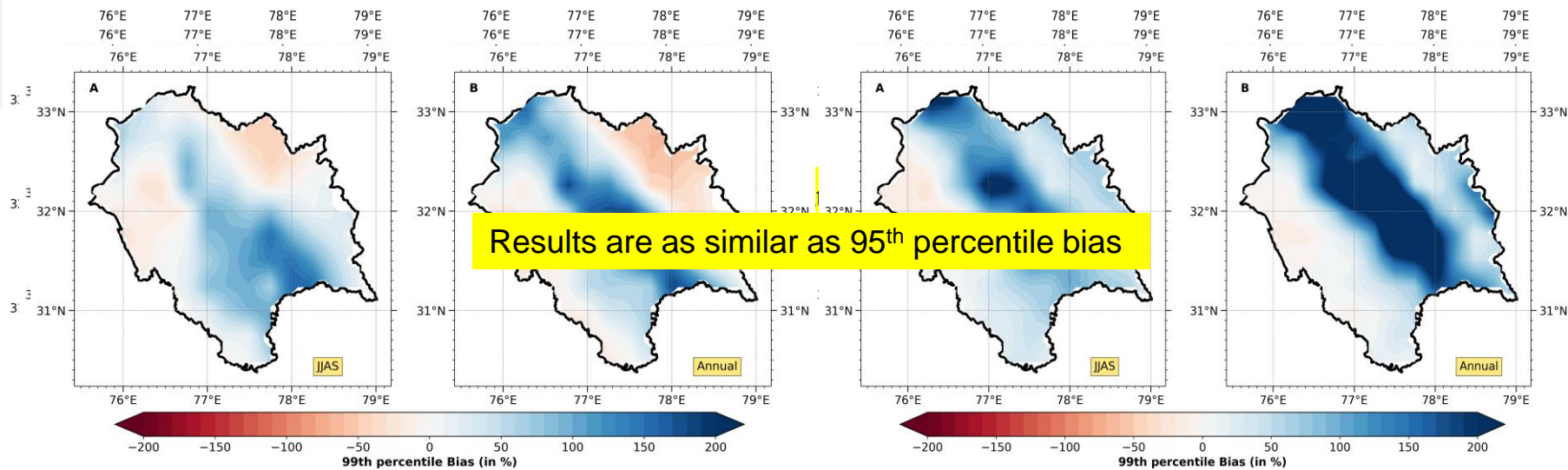
High Correlation regions coincide with regions having the network of ample observational stations

Mean Precipitation Bias of ROM with IMD Dataset

taset



Results



99th Percentile Precipitation Bias of ROM w.r.t IMD (left) and ROM w.r.t MSWEP (right)

THANK YOU 😊

