PRECIPITATION/ TEMPERATURE OUTLOOK FOR TP REGION

OVERVIEW (JJAS 2025)

OUTLOOK (DJF 2025/26)

The 4th Session of the Third Pole Climate Forum (TPCF4)
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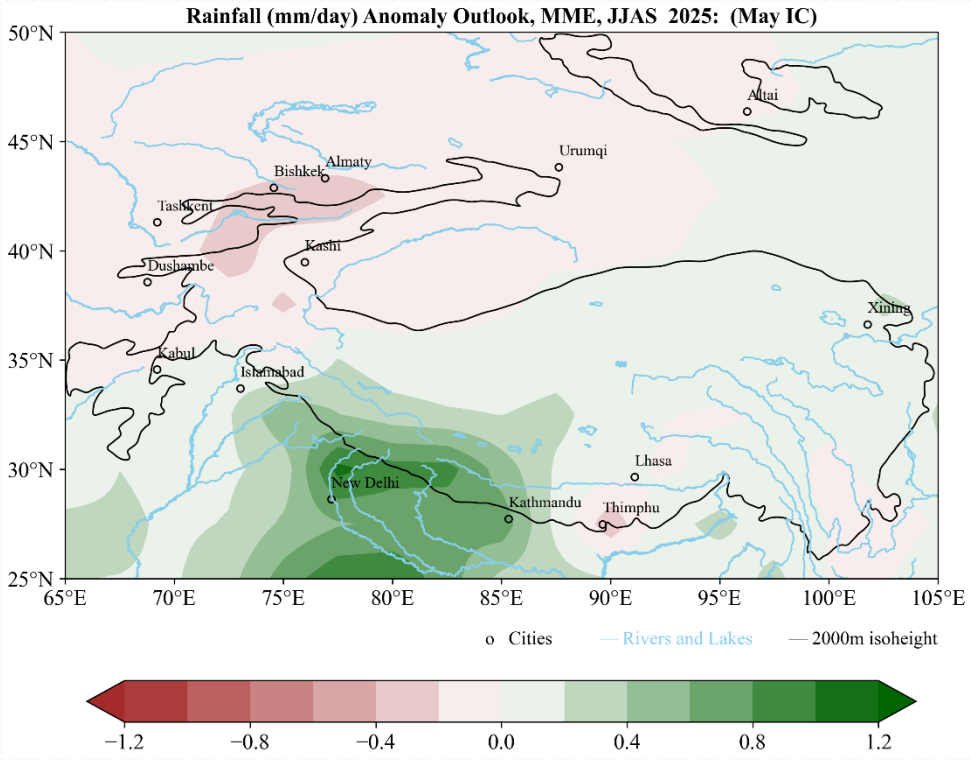
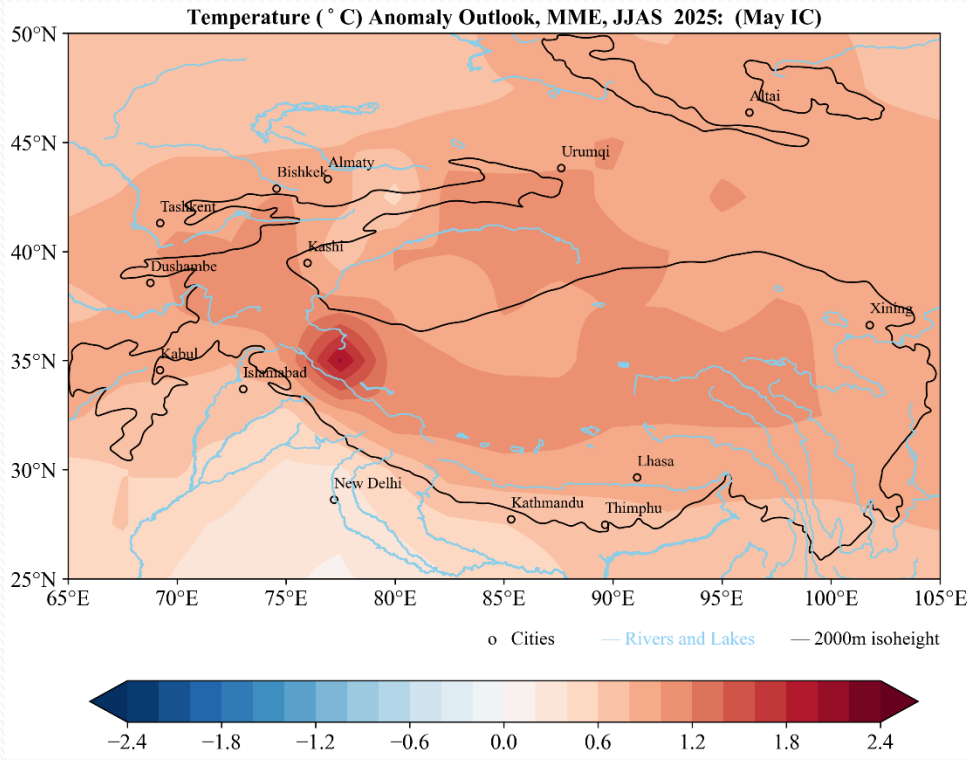
Outline

- Overview JJAS 2025
- Outlook Logistics (DJF 2025/26)
- DJF Outlook for TP Region
- Outlooks Comparison
- Highlights

Overview JJAS 2025

Deterministic precipitation /temperature outlook (JJAS, 2025)

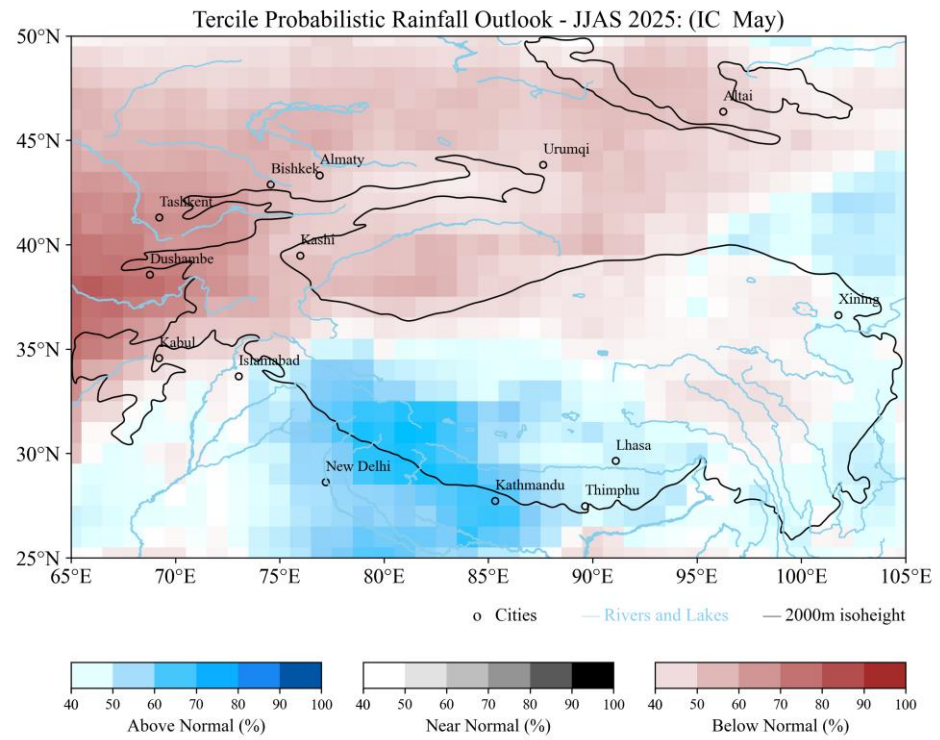


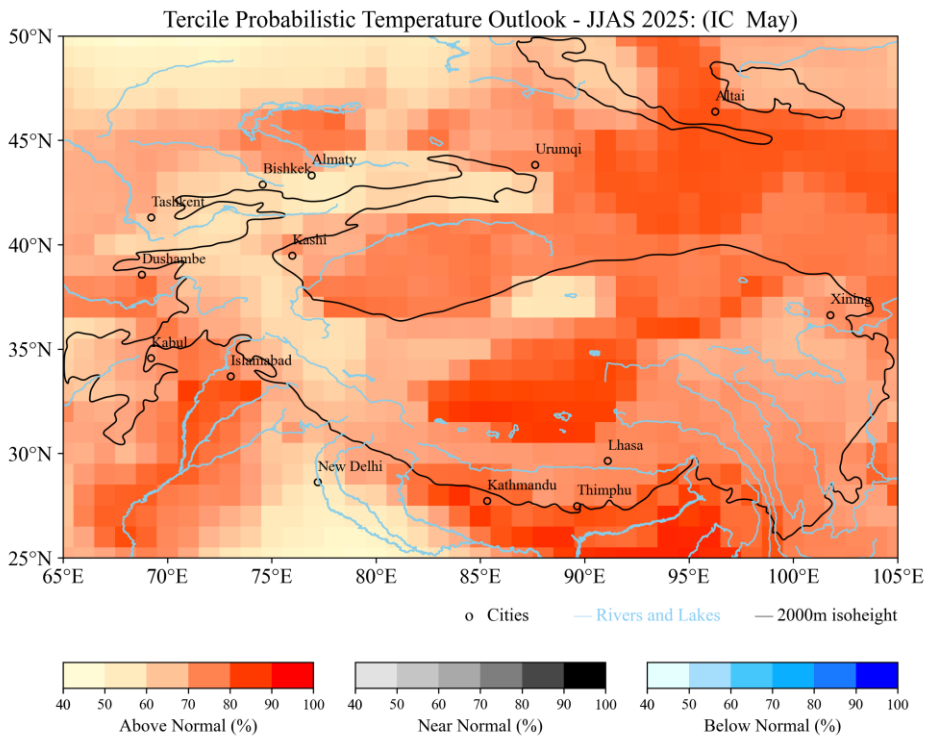


- Above normal precipitation is expected over southern and eastern TP region, with maximum anomaly over the southwestern part (northwestern part of South Asia).
- Surface temperature is expected to remain above normal across most parts of the TP region with maximum deviation over the Karakoram ranges.

Parameter	R	IA	RMSE
Precipitation	0.63	0.24	0.97
Temperature	0.78	0.73	0.32

Probabilistic precipitation/temperature outlook (JJAS, 2025)

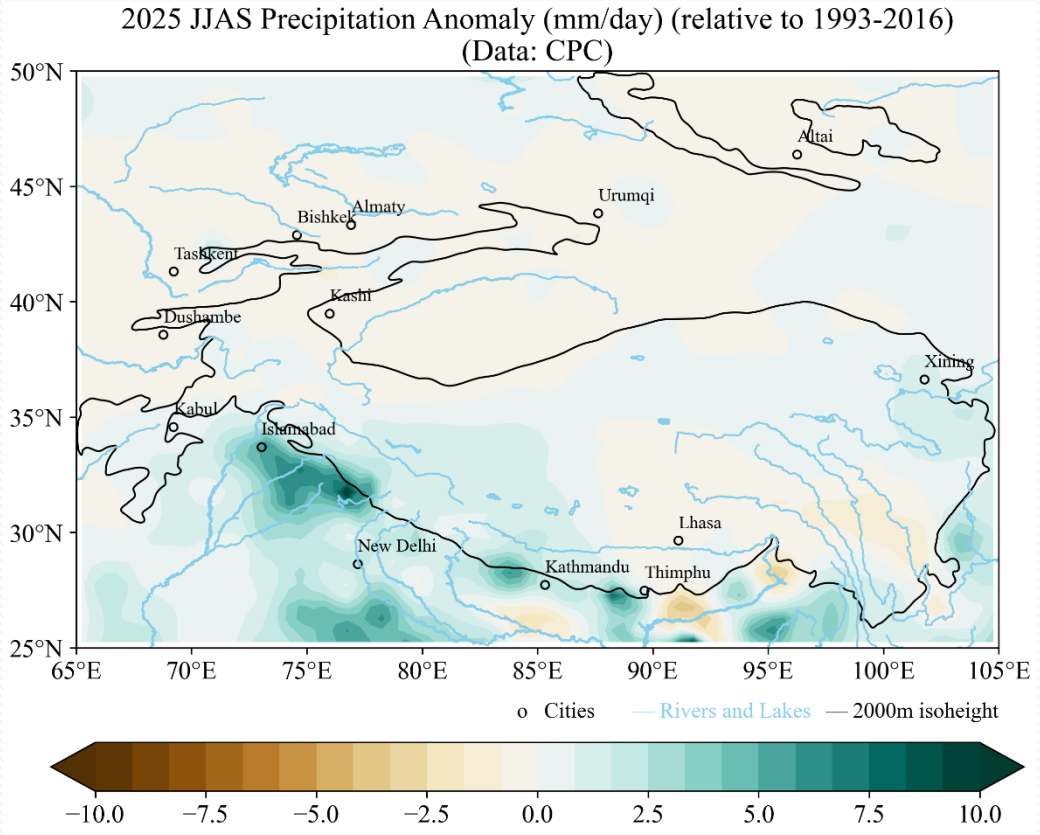


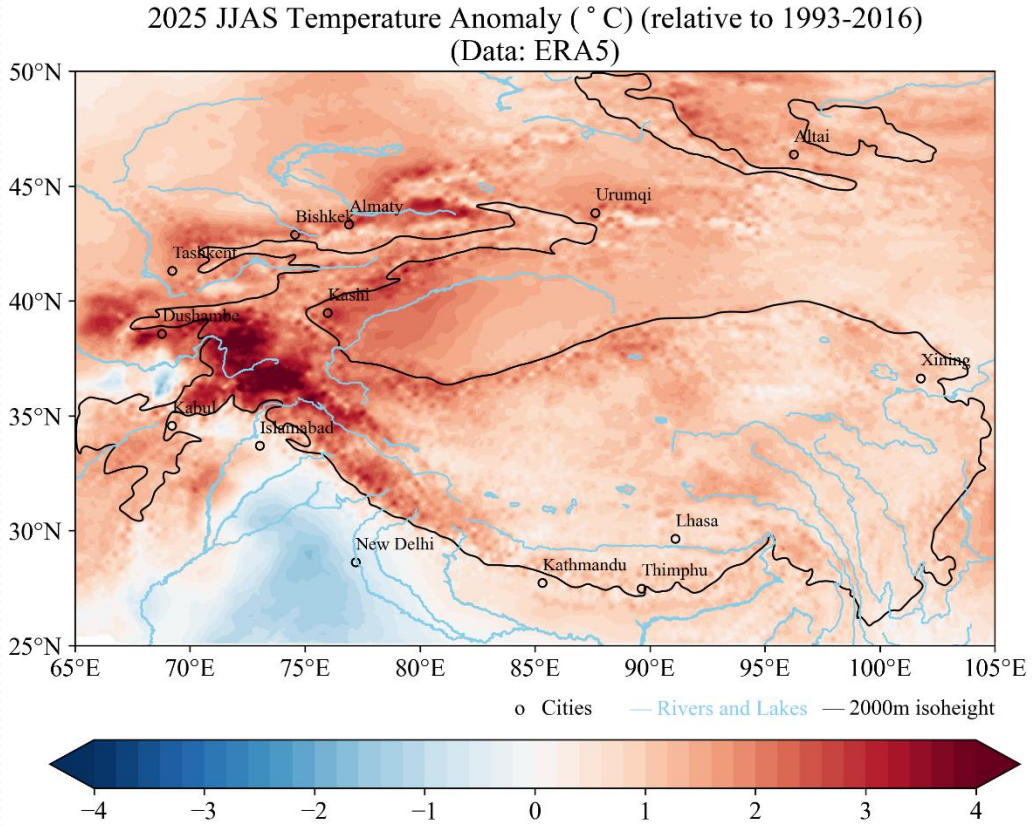


- Tercile probability map predicts the likelihood of above normal precipitation over eastern and southwestern parts of TP region. Below normal precipitation is more likely over the northern/northwestern parts.

- The likelihood of above normal temperature over most of the TP region with maximum departure over the southwestern part (Pakistan) the southern part (Nepal and Bhutan), the central Tibetan Plateau and the northeastern parts (Mongolia and adjoining parts of China).

Observed Precipitation/Temperature Anomalies

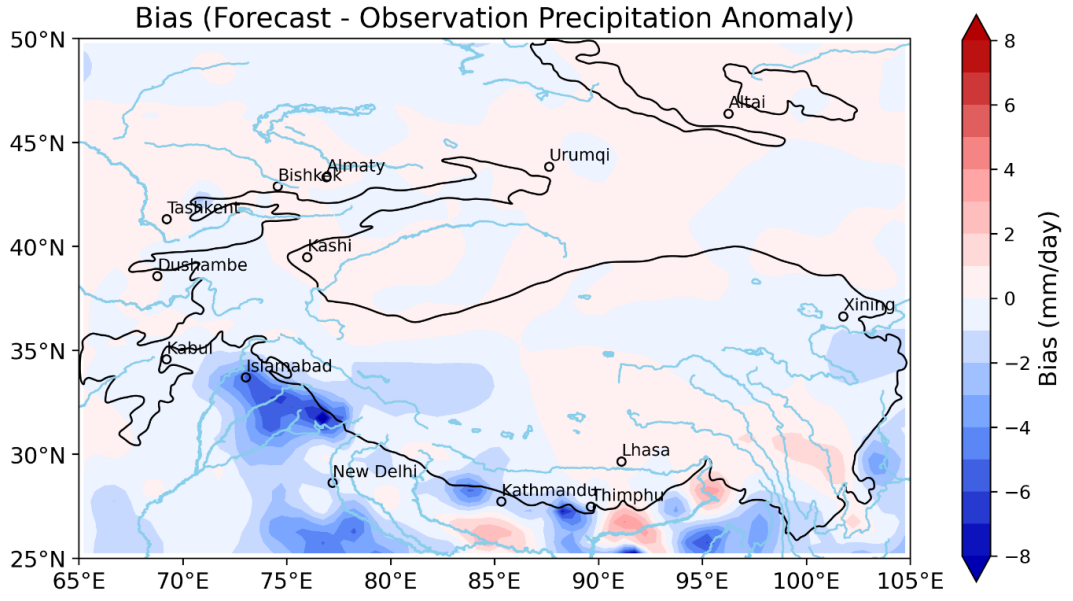


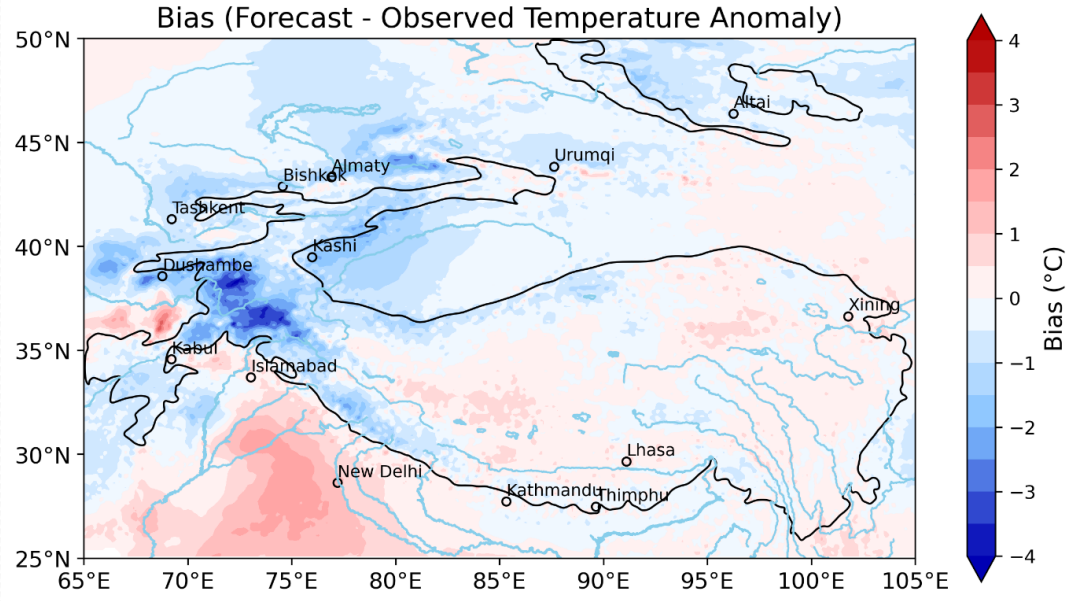


- Above normal precipitation is observed over southern and eastern TP region, with maximum anomaly over the southwestern part.

- Above normal temperature was observed across most parts of the TP region with maximum deviation over the Karakoram ranges.
- However, the southwestern part of the region experienced below normal temperature.

Bias in Outlook (Precipitation/Temperature)





- The MME outlook and the observed precipitation anomalies show strong agreement across most of the central and northern parts of the TP region.
- In contrast, the southern areas exhibit notable differences, where the MME outlook underestimates the observed precipitation amounts.
- Nevertheless, the forecast still captures the correct qualitative pattern of wetter-than-normal conditions in those regions.

- The temperature outlook also aligns well with the observed anomalies, though it slightly underestimates temperatures over the western part of the region.
- Conversely, in the southwestern TP region, the MME outlook overestimates the observed temperatures, indicating a false-alarm warm signal.

Outlook Logistics (DJF 2025/26)

Models Used and mode of Outlook

Modelling Centre	Modelling System	Ens (Hind/Fore)
APCC	SCOPS	10/10
BOM	ACCESS-S2	3/11
CMCC	SPS3.5	40/50
CWA	TCWB1Tv1.1	30/30
ECCC	CANSIPSv3	20/20
HMC	SL-AV	10/20
KMA	GLOSEA6GC3.2	12/42
METFR	SYS9	25/51
MGO	MGOAM2.4	10/10
NASA	GEOS-S2S-2.1	4/10
PNU	CGCMv2	35/35
UKMO	GLOSEA6	28/42

- ***Quantitative Forecast Methodology:***
  - Simple Composite Method (SCM)

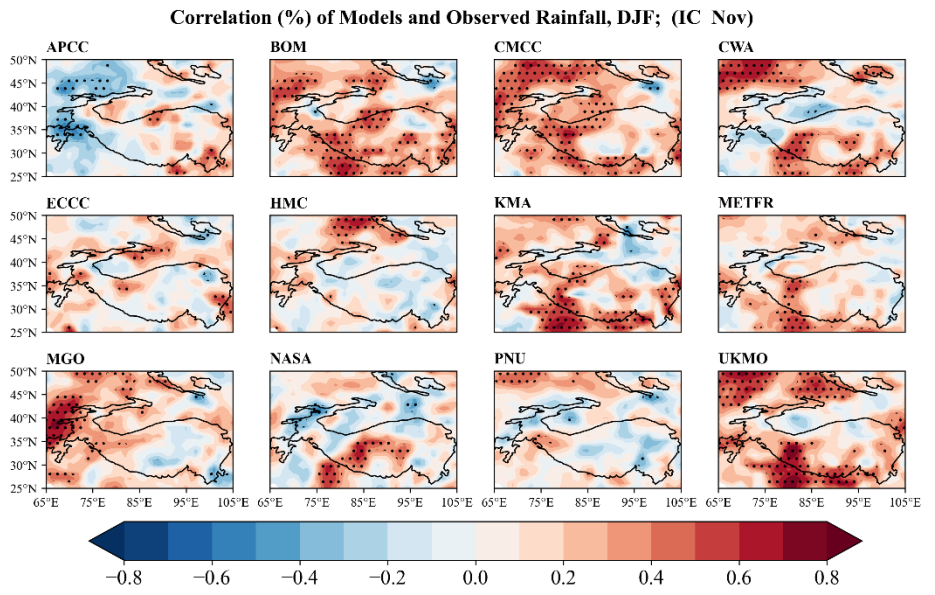
$$F_t = \frac{1}{N}\sum_{i=1}^{N}(F_{i,t} - \bar{F_i})$$

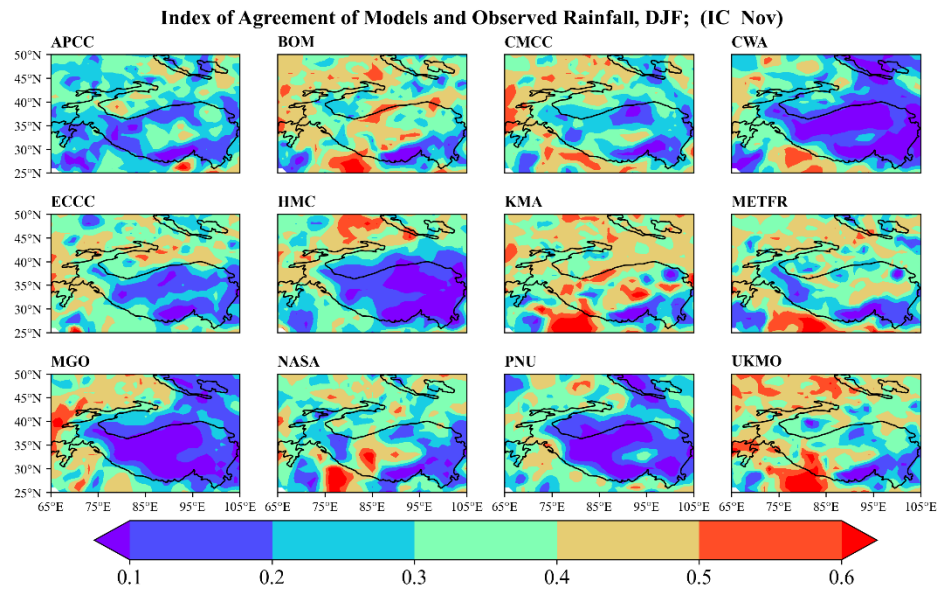
- ***Probabilistic Forecast Methodology***
  - The probabilistic forecast is prepared based on the Below/Near/Above Normal categories, utilizing all the ensemble members of the participating models.

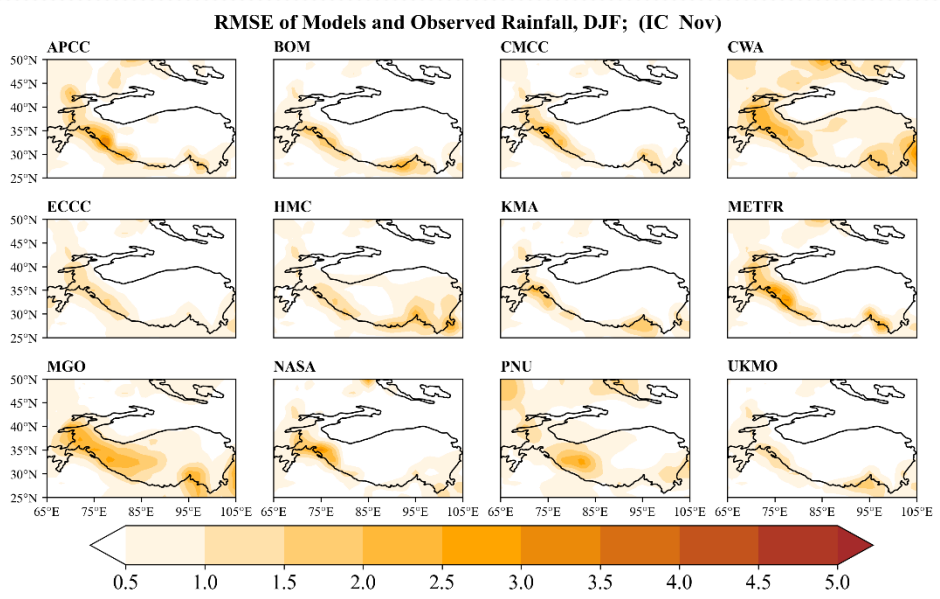
- Models with optimal performance are selected based on the statistics:
  - Correlation, Index of Agreement, and RMSE

- Observe Data:
  - CPC (Precipitation)
  - ERA5 (Temperature)

Model selection criteria for precipitation outlook

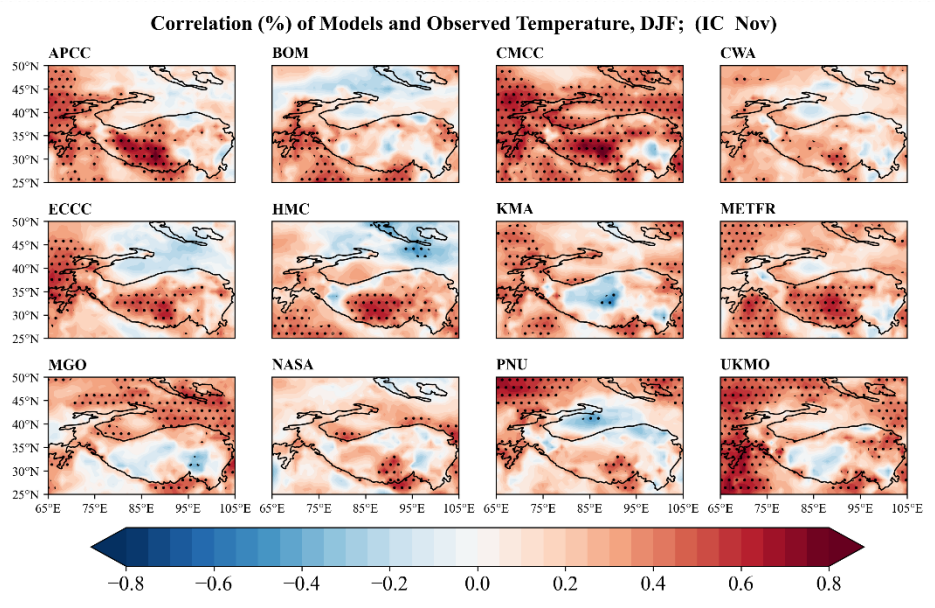


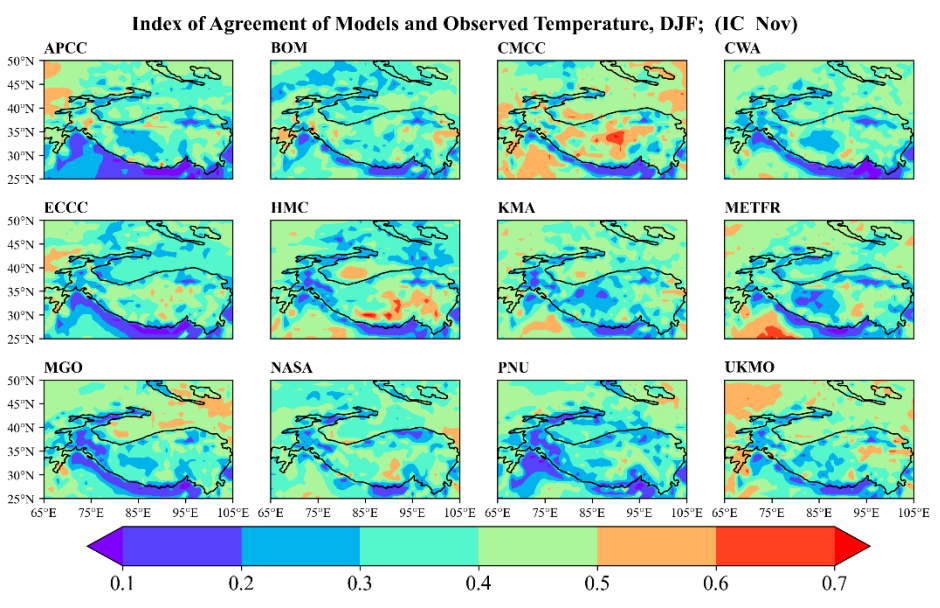


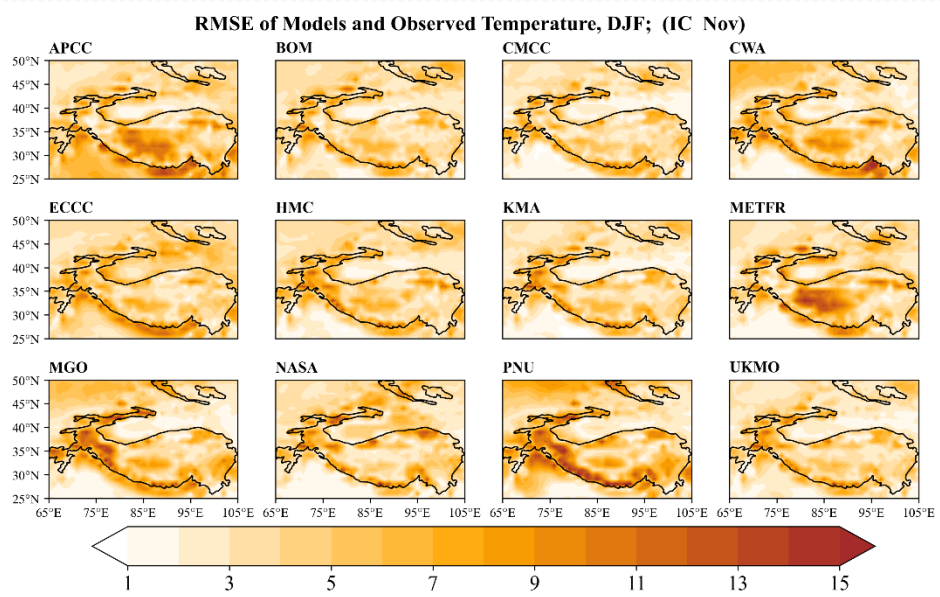


Models	Correlation	IOA	RMSE	Rank_Corr	Rank_IA	Rank_RMSE	Total_Rank
BOM	0.70	0.39	0.27	3	2	2	7
KMA	0.56	0.44	0.23	6	1	1	8
CMCC	0.74	0.35	0.33	1	5	5	11
UKMO	0.61	0.39	0.27	5	3	3	11
ECCC	0.73	0.31	0.36	2	6	6	14
NASA	0.34	0.35	0.28	10	4	4	18
METFR	0.48	0.29	0.39	9	7	7	23
MGO	0.68	0.18	0.73	4	11	11	26
HMC	0.15	0.24	0.47	11	8	9	28
PNU	0.51	0.21	0.59	8	10	10	28
APCC	-0.19	0.23	0.45	12	9	8	29
CWA	0.52	0.16	0.79	7	12	12	31

Model selection criteria for temperature outlook

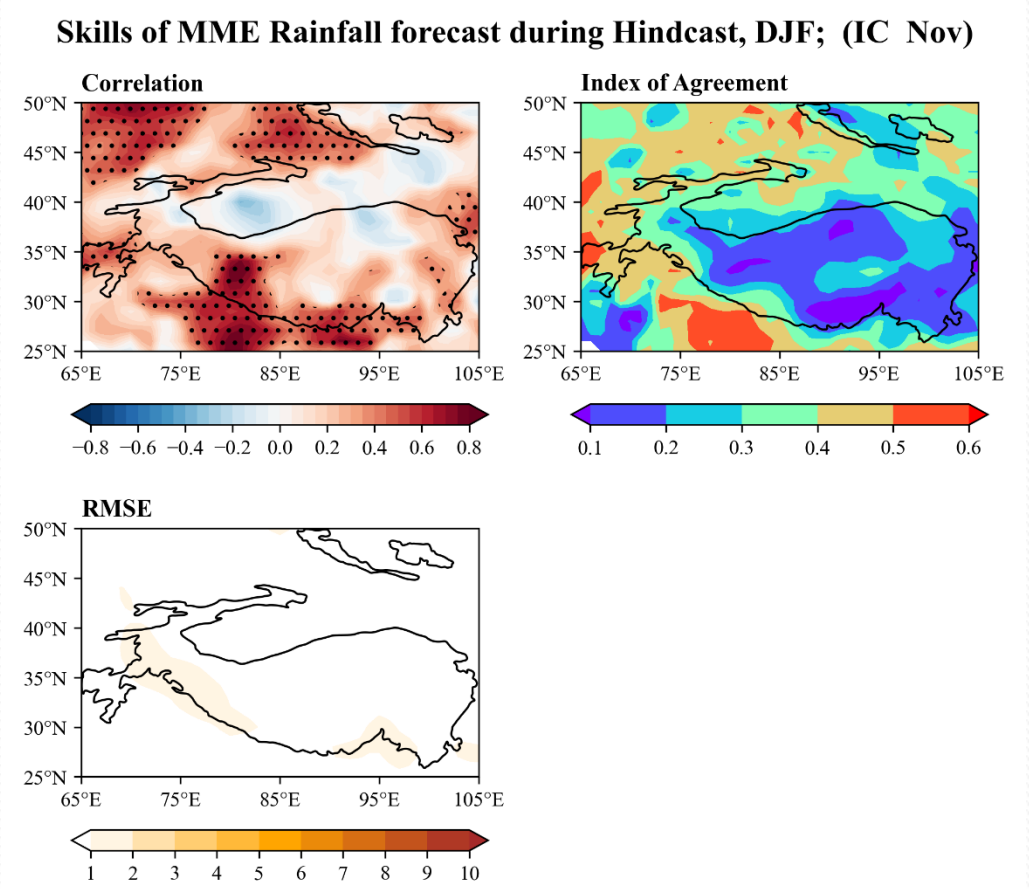


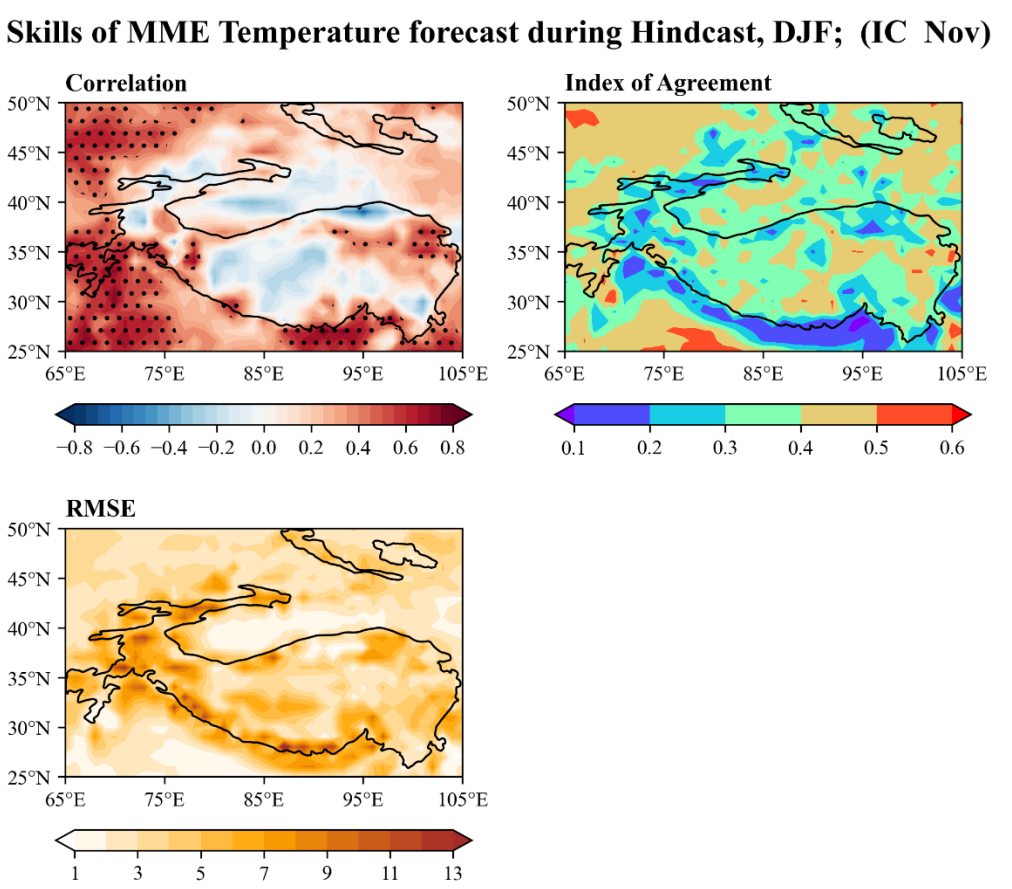




Models	Correlation	IOA	RMSE	Rank_Corr	Rank_IA	Rank_RMSE	Total_Rank
CMCC	0.45	0.58	0.78	2	2	1	5
UKMO	0.39	0.58	0.82	3	1	2	6
KMA	0.34	0.51	0.84	4	3	3	10
MGO	0.46	0.47	1.72	1	6	8	15
HMC	0.19	0.49	1.12	7	5	5	17
BOM	0.18	0.49	1.16	8	4	6	18
PNU	0.30	0.43	1.86	5	8	9	22
ECCC	0.14	0.46	1.55	10	7	7	24
CWA	0.10	0.36	0.93	11	11	4	26
METFR	0.15	0.39	2.14	9	9	10	28
APCC	0.26	0.34	2.89	6	12	12	30
NASA	0.07	0.38	2.24	12	10	11	33

Statistics for the MME data

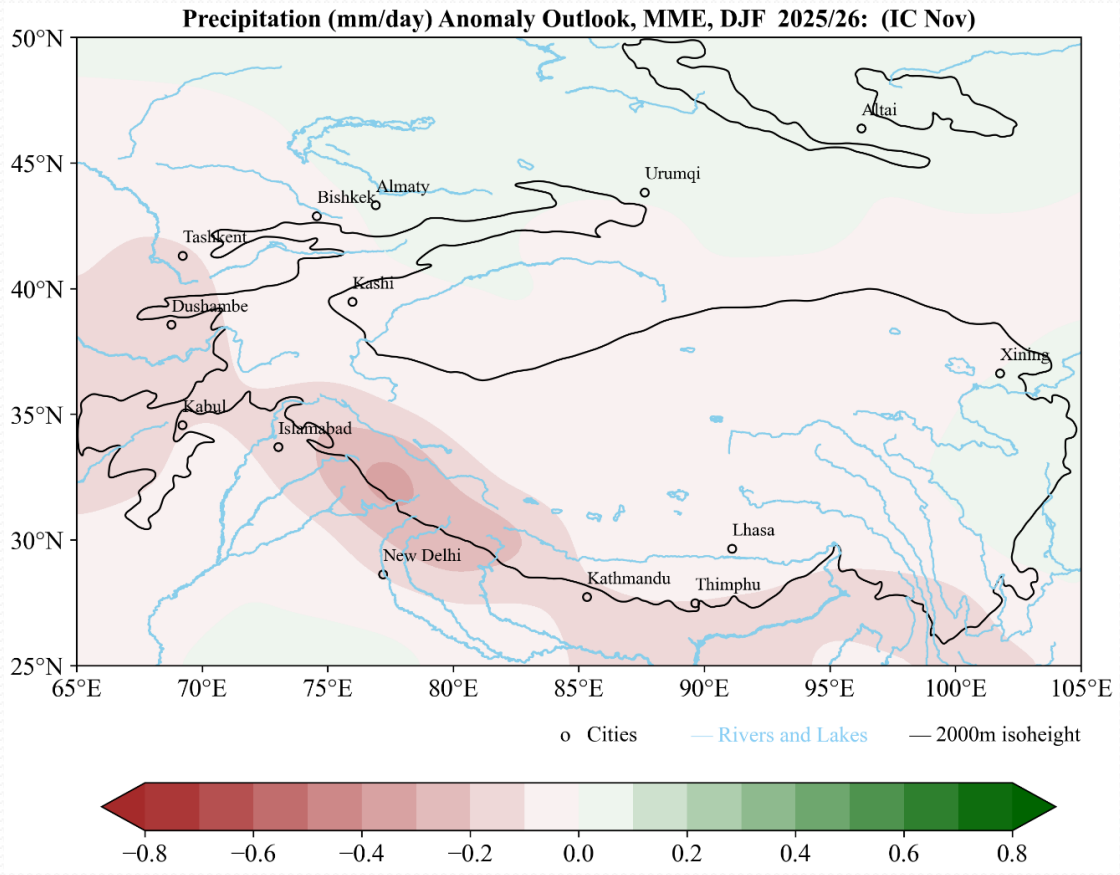


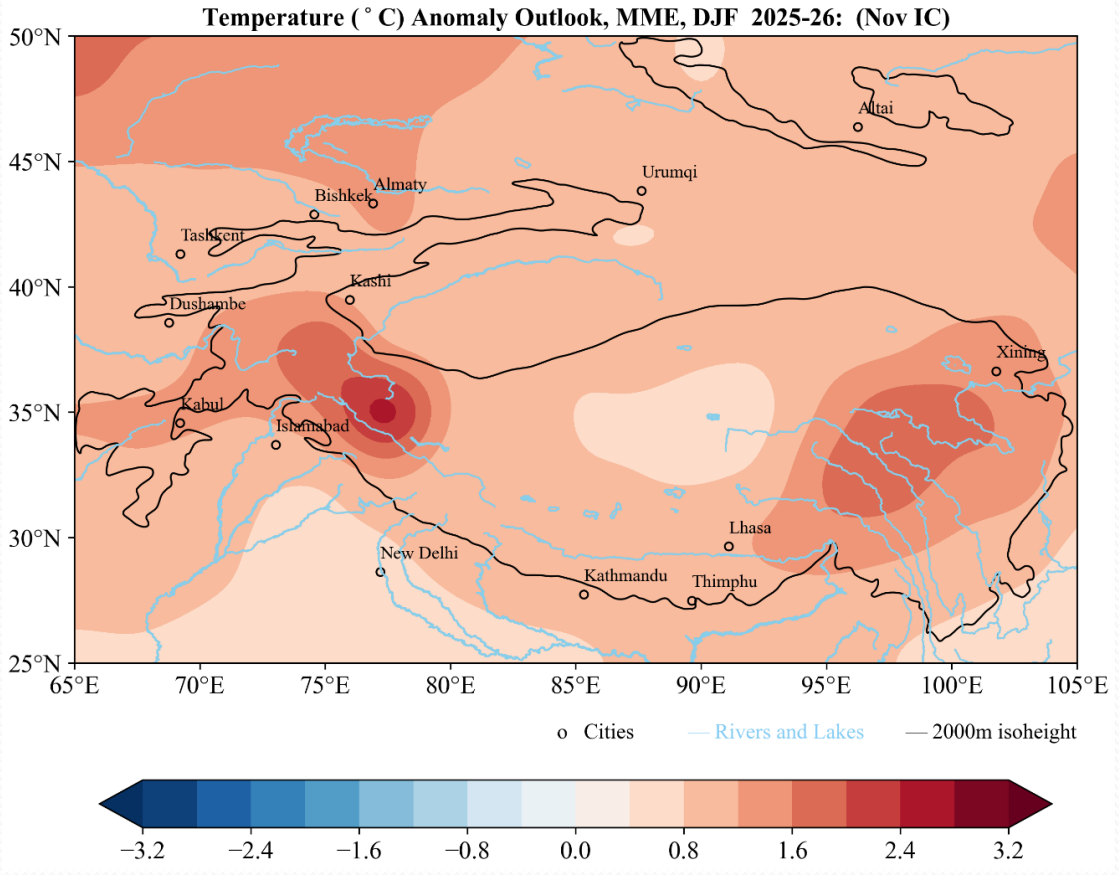


Parameter	R	IA	RMSE
Precipitation	0.72	0.30	0.38
Temperature	0.50	0.55	0.89

DJF Outlook for TP Region

Deterministic Outlook (Precipitation/Temperature)

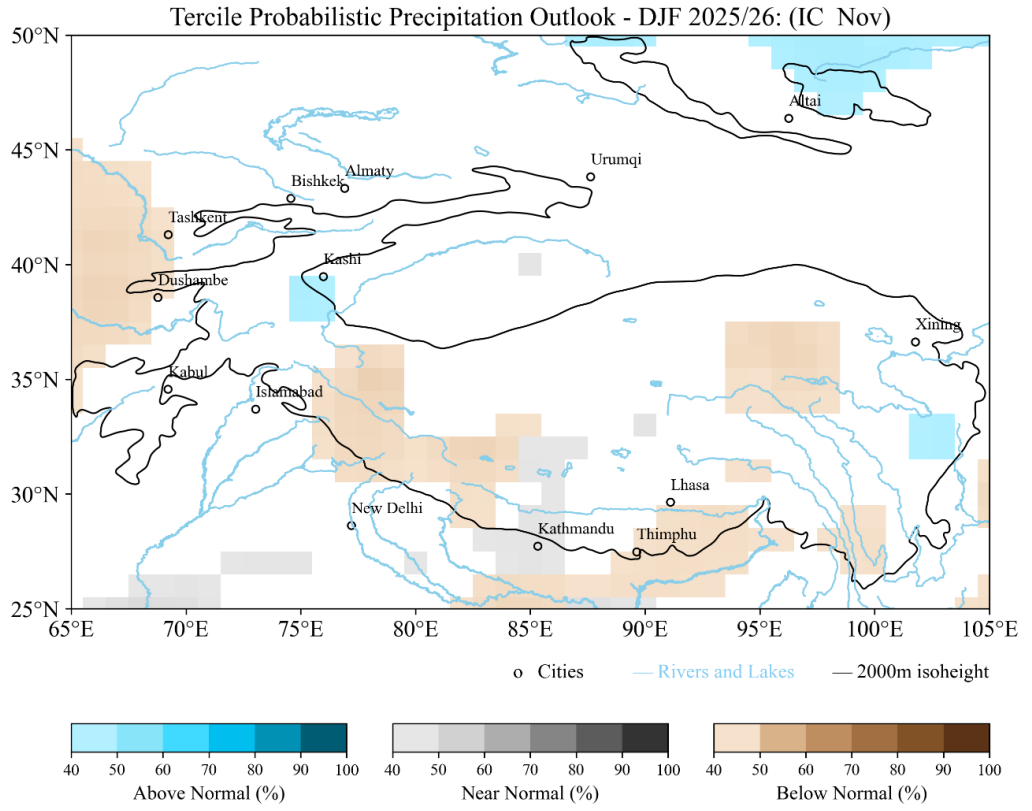


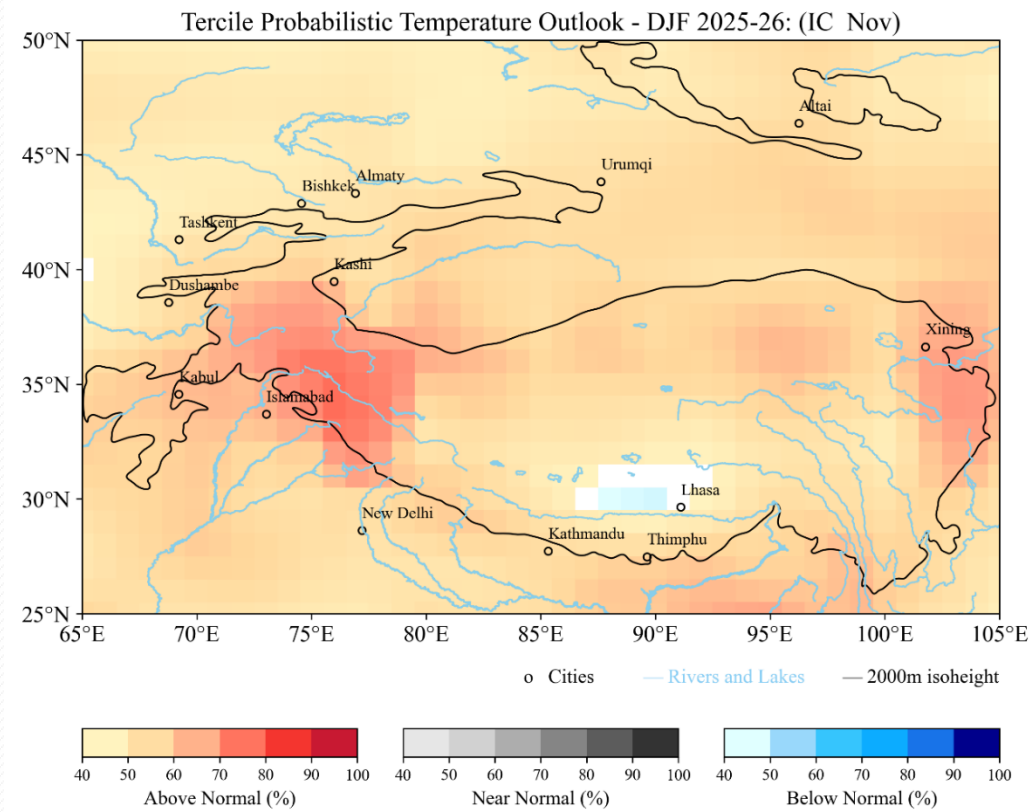


- Below normal precipitation is expected over southern and western TP region. Nearly normal precipitation is expected over central to northern and eastern TP region.

- SAT is expected to remain above normal across most parts of the TP region, with maximum departure over the northwestern South Asia and some parts of eastern TP region.

Probabilistic Outlook (Precipitation/Temperature)





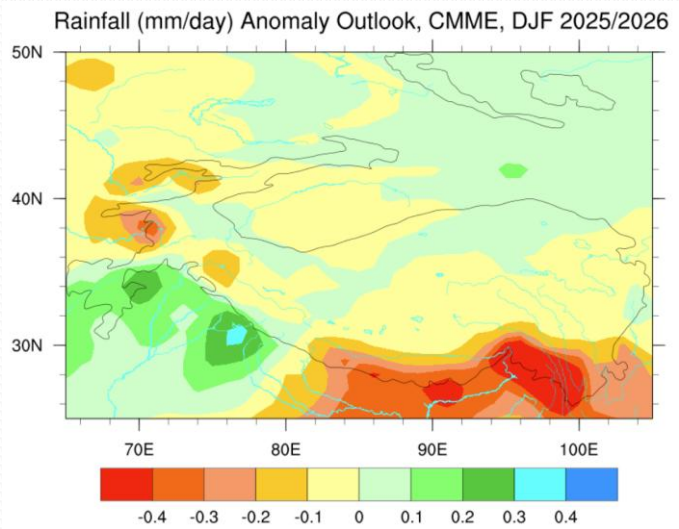
- Tercile probability map predicts the likelihood of below normal precipitation over southern and western parts of TP region. Northeastern regions may get above normal precipitation during the season.

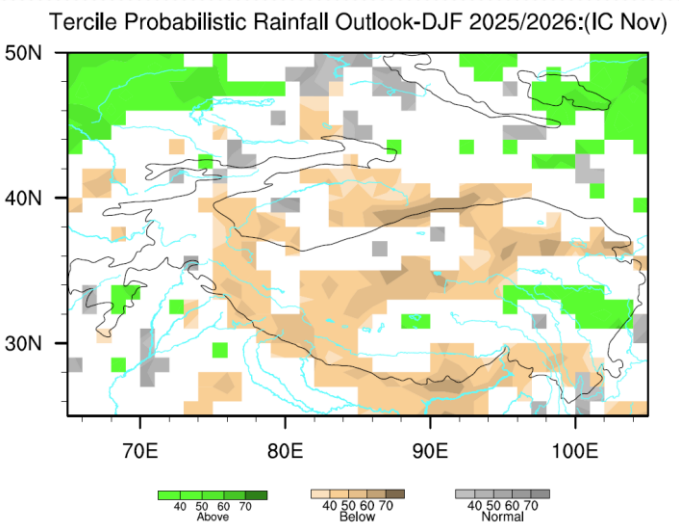
- Above normal temperature over most of the TP region with maximum likelihood over the western part (HKH ranges) and the eastern part of the region.

Outlooks Comparison

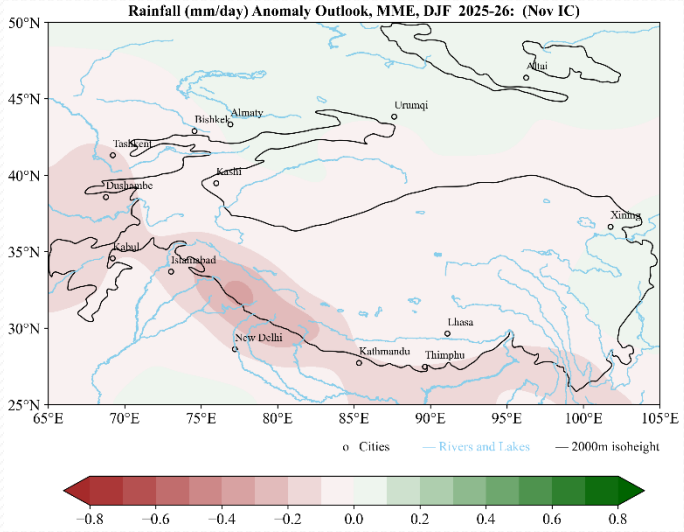
Deterministic/Probabilistic Precipitation Forecast

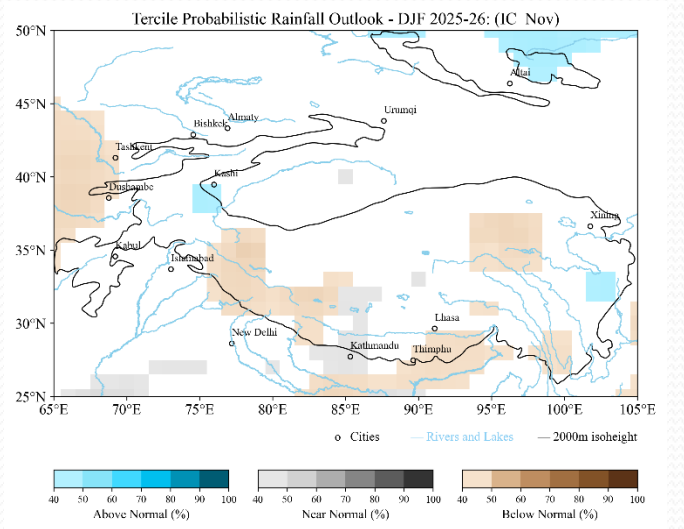
CMA





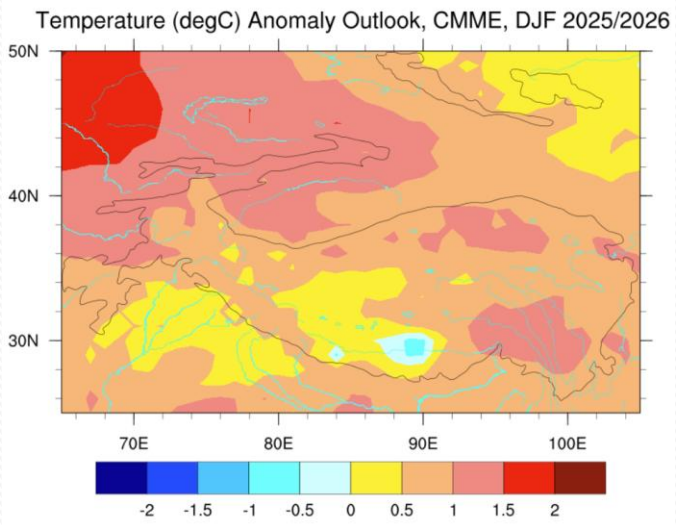
PMD

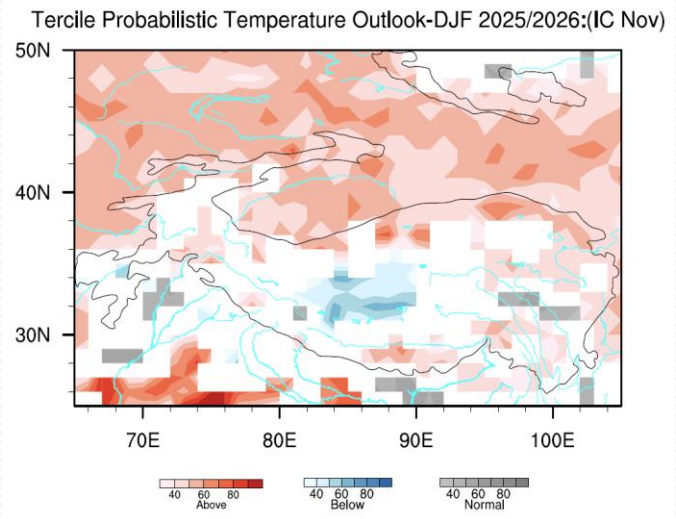




Deterministic/Probabilistic Temperature Forecast

CMA





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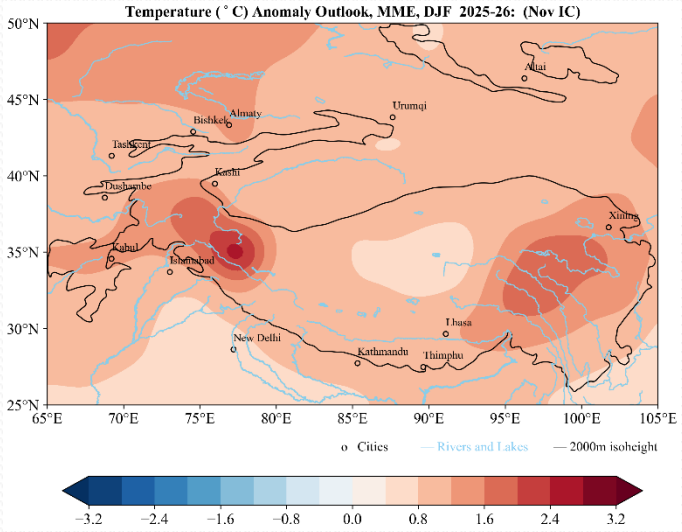

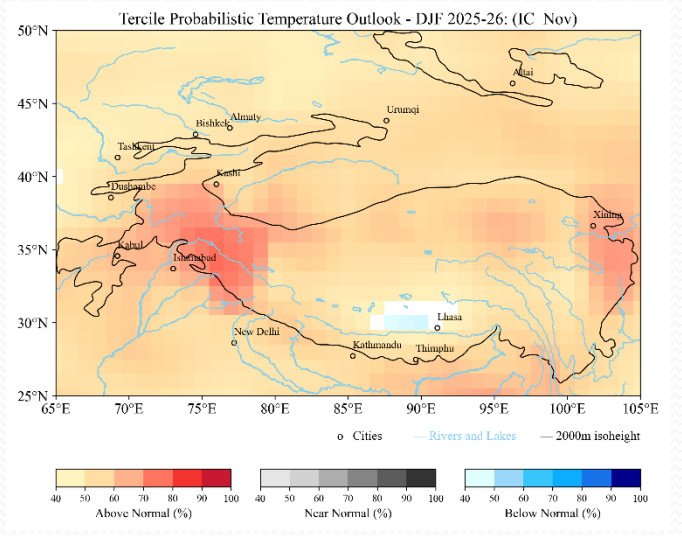

Highlights

- It is expected to have below normal precipitation over the southern and western TP region, with maximum negative anomaly along the HKH ranges. In contrast, the CMA outlook is projecting above normal precipitation over the southwestern TP region.

- Nearly normal precipitation is expected over central to northern and eastern TP region.

- Above normal SAT expected across most parts of the TP region, with maximum departure, exceeding 2°C, is expected over Karakoram region and some parts of eastern and northwester TP region.

- The highest probabilities for precipitation are centered over the southern areas (Nepal and Bhutan), the western TP region.

Thank You