2nd THIRD POLE CLIMATE FORUM

Third Pole Region Climate Monitoring for JJAS and October 2024

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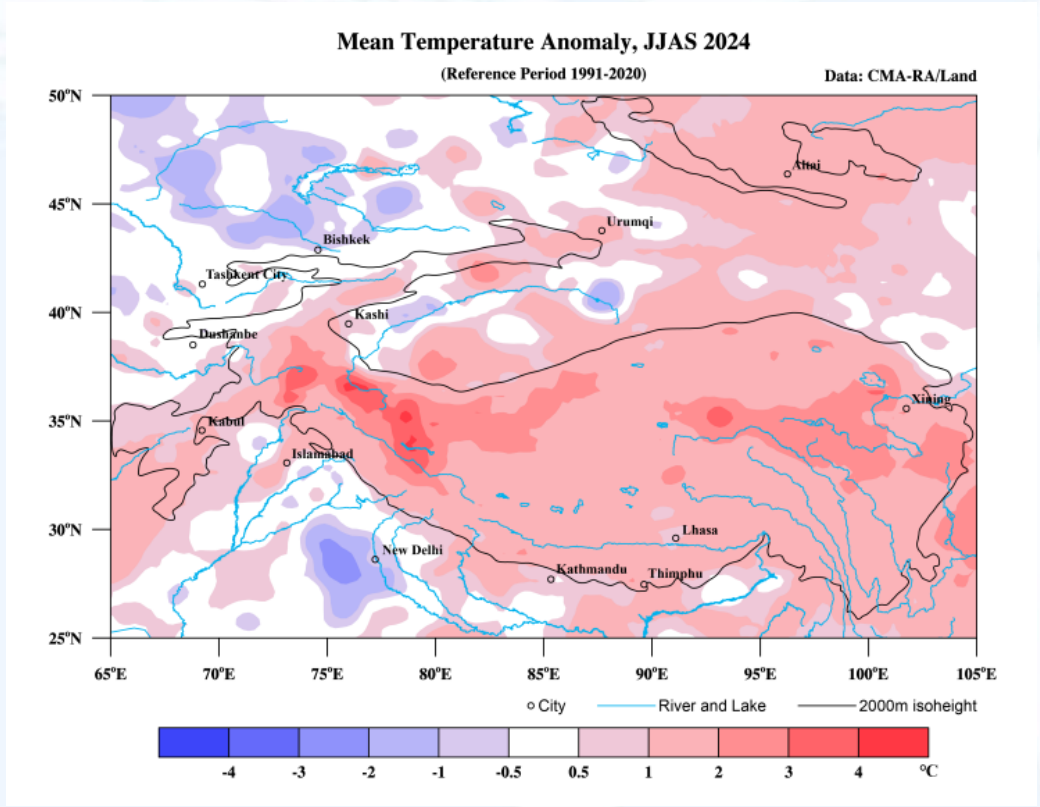
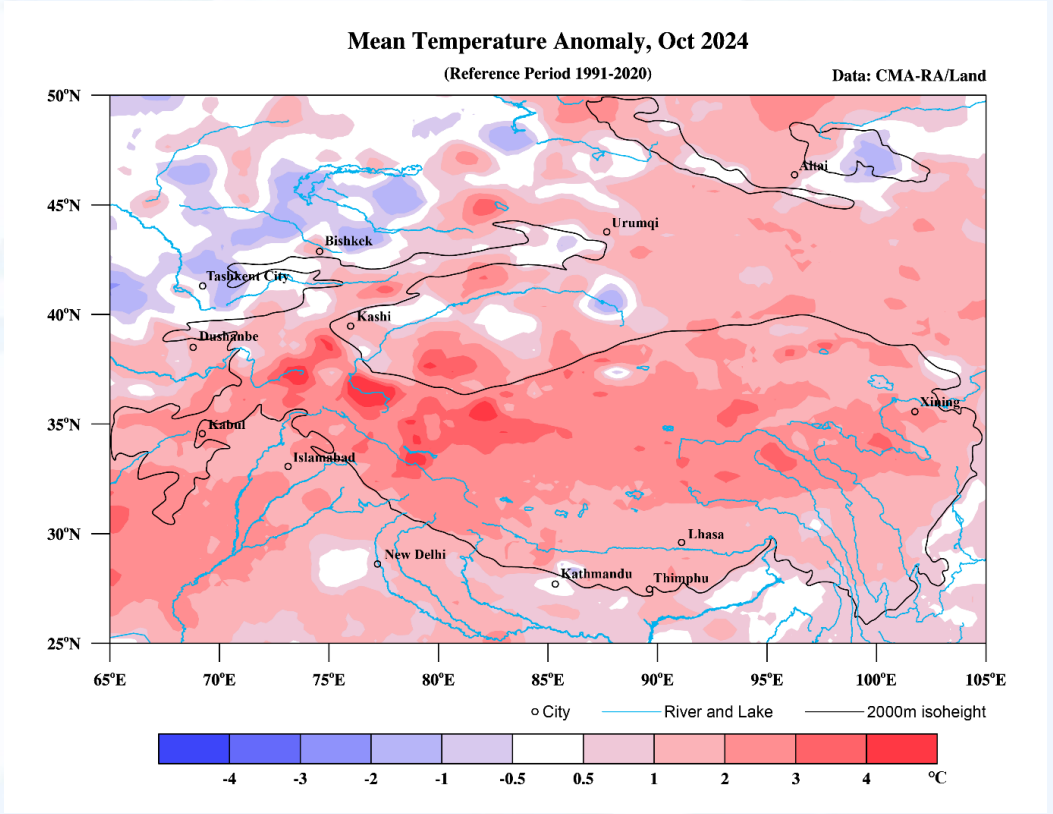
Content

- Climate conditions for JJAS and October in 2024
  - Surface air temperature (SAT)
  - Precipitation
  - Snow cover
- Monitoring of circulation and external forcing
  - Main circulation characters around TPR during summer 2024
  - External forcing factors
- Conclusion

Surface air temperature (SAT) anomalies: JJAS and October, 2024

- **JJAS 2024: Most of the Third Pole region experienced above normal SAT**, except for the southwestern and northwestern part of the region **below normal**.
- **Oct 2024**: Overall above-normal pattern dominated the region, **with significantly higher than normal** in the western and central TPCR, but northwestern Third Pole region was lower than normal.

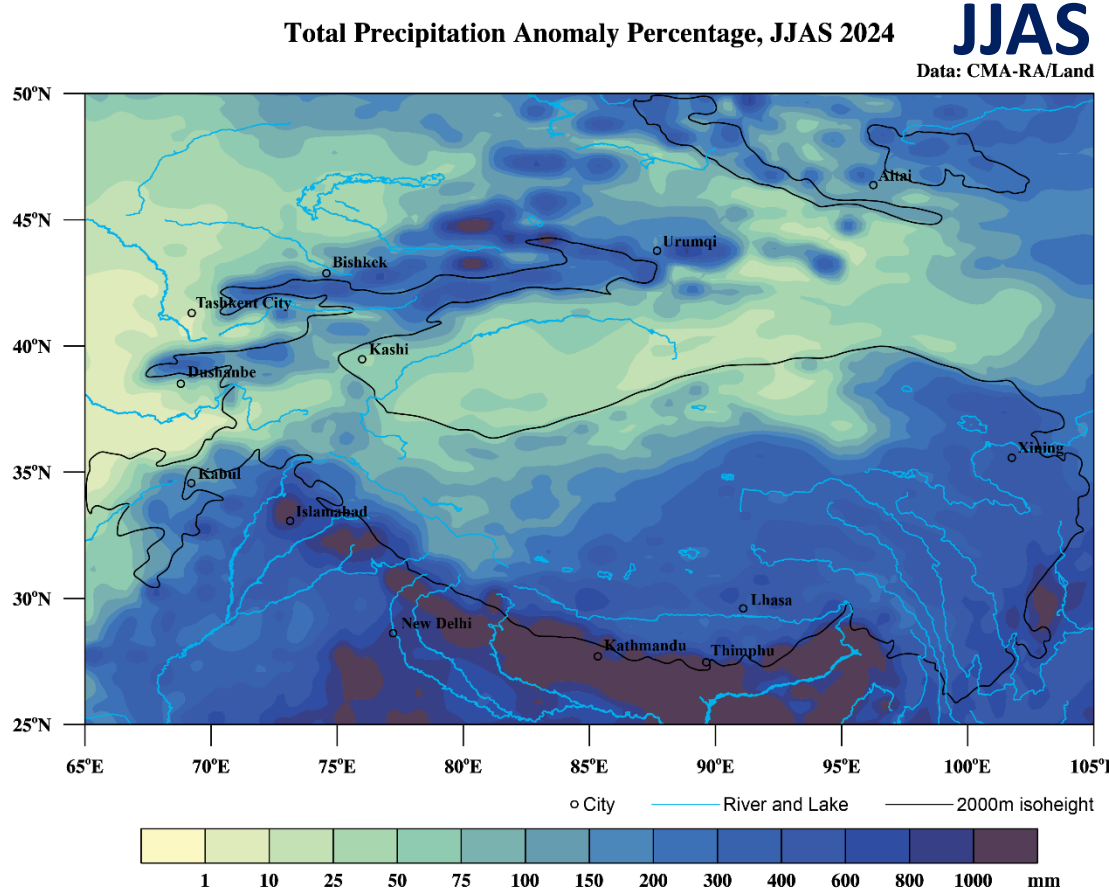


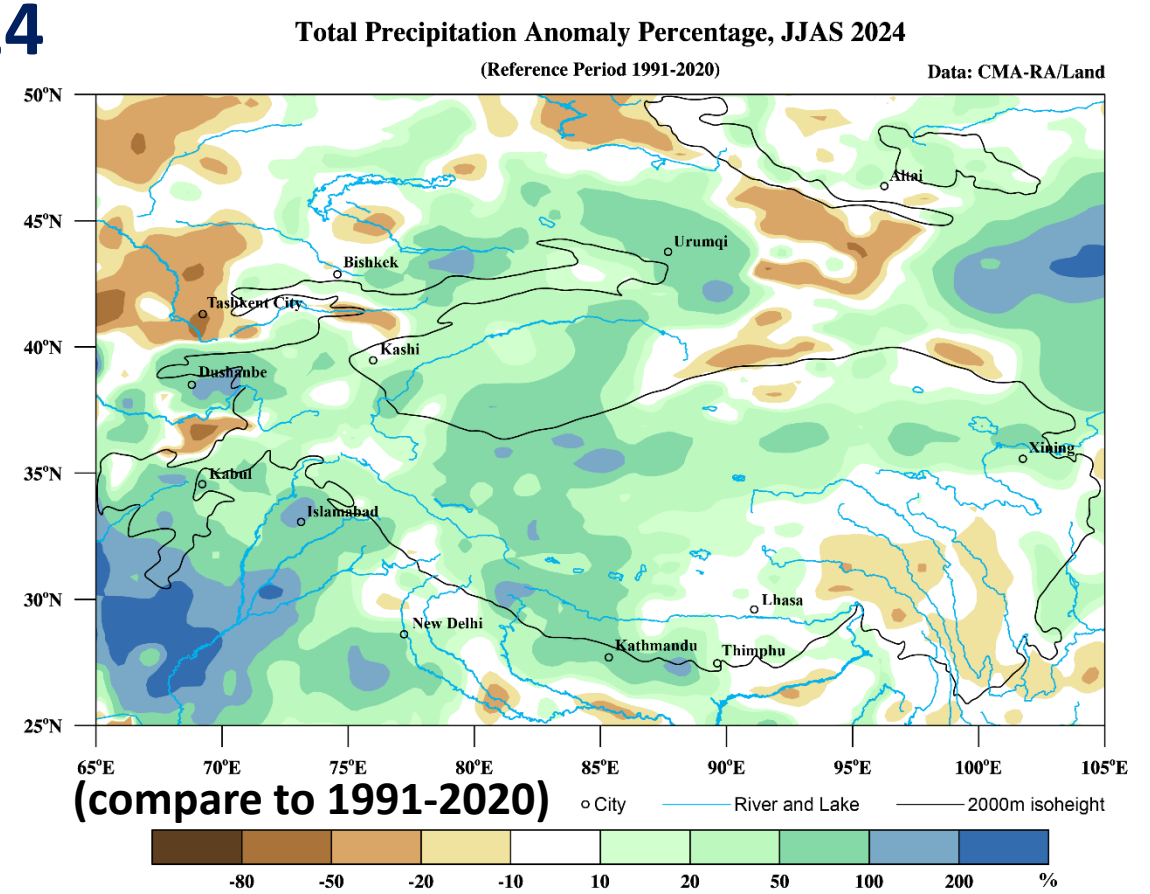


Surface air temperature anomalies in JJAS(left) and October(right) (relative to 1991-2020)

(Data source: CMA-RA/Land,)

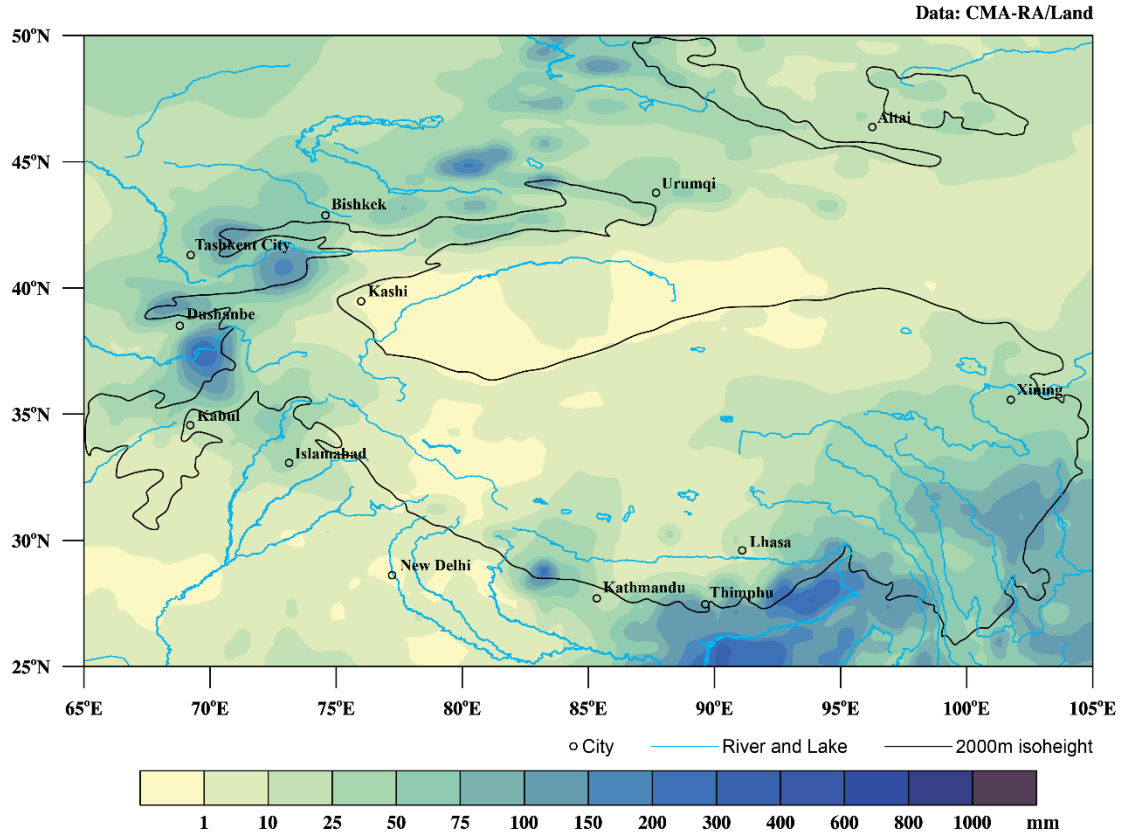
Total precipitation(left) and anomaly percentage(right), JJAS 2024

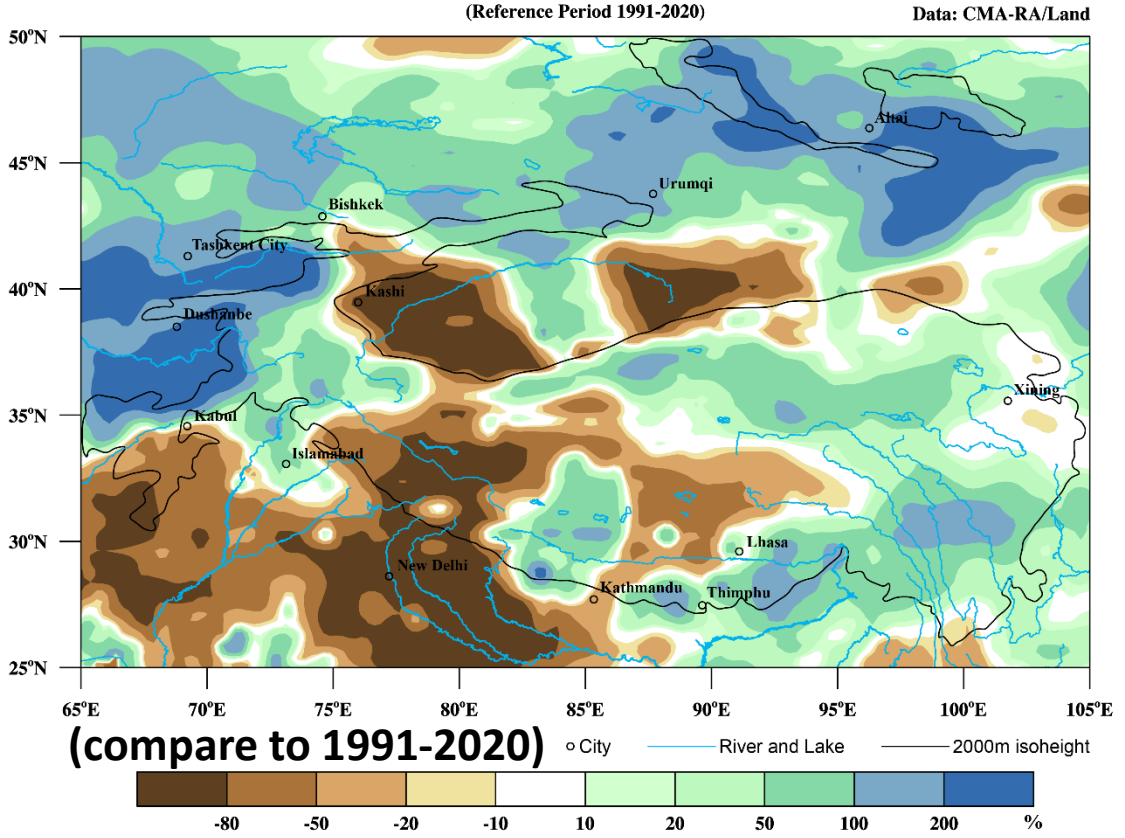




- The precipitation **was above normal** across most of the Third Pole region, with the exception of the northwestern edge, parts of the central to the northern areas, and some regions in the southeast.
- **The southwestern and northeastern area experienced significantly wetter conditions**, with precipitation surpassing the normal by 100% to 200%, and in certain localized areas, by more than 200%.
- The northern and northwestern regions generally exhibited **negative anomalies** ranging from 20% to 50%, with partially exceeding 50%.

Total precipitation(left) and precipitation anomaly(right) percentage, October 2024

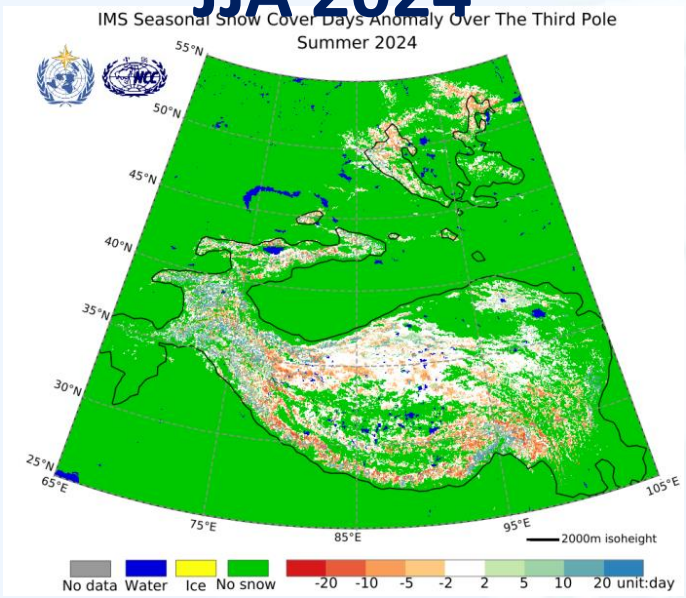




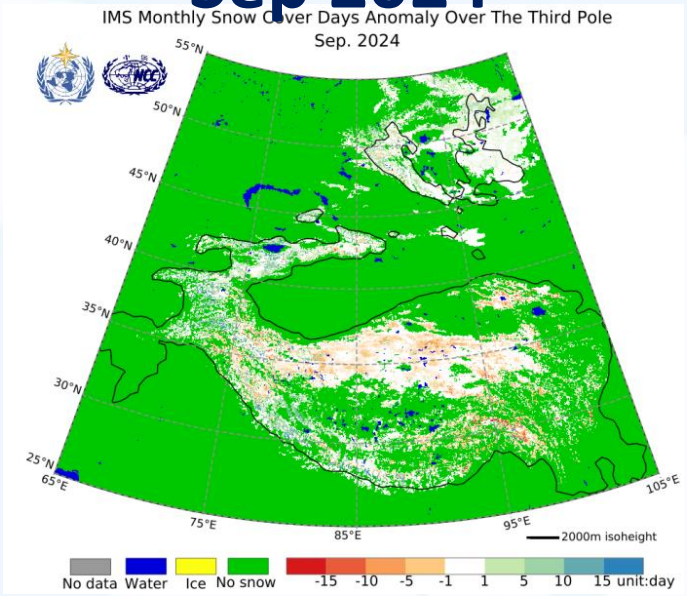
- The pattern of precipitation anomalies was nearly the opposite of that observed during JJAS.
- The most significant **negative precipitation anomalies** were recorded in the central and southwestern parts of the Third Pole region, with some areas experiencing reductions exceeding 80%. Conversely, **precipitation levels were above normal** in other regions, with particularly notable positive anomalies occurring in parts of the western and northeastern Third Pole region, where increases surpassed 200%.

Snow Cover conditions :
Anomalies of the number of snow cover days (NSCD)

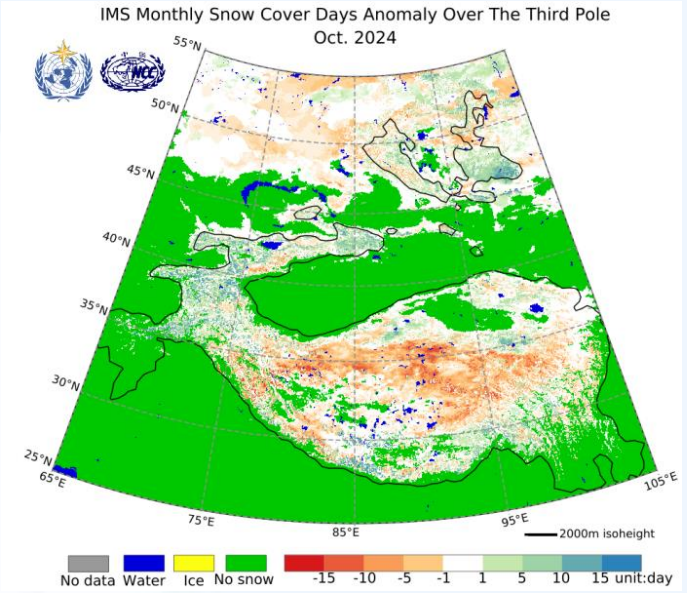
JJA 2024



Sep 2024



Oct 2024



(compare to 2005-2020)

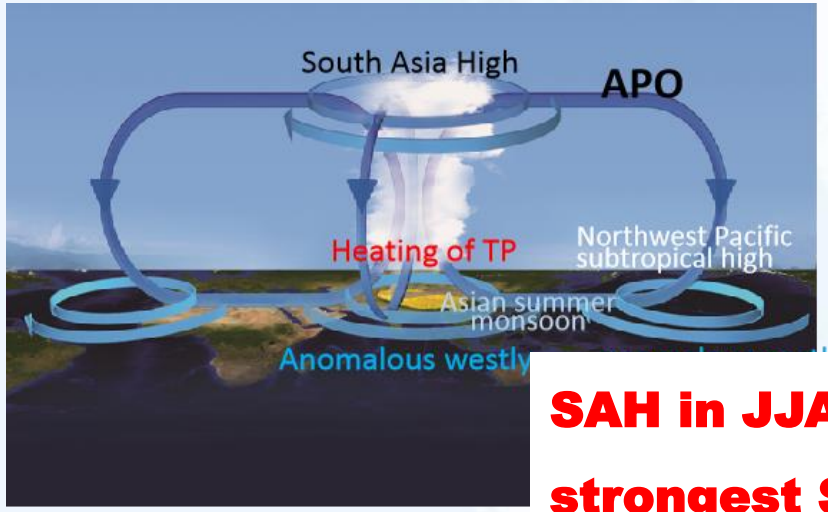
(Data source: IMS/NSIDC)

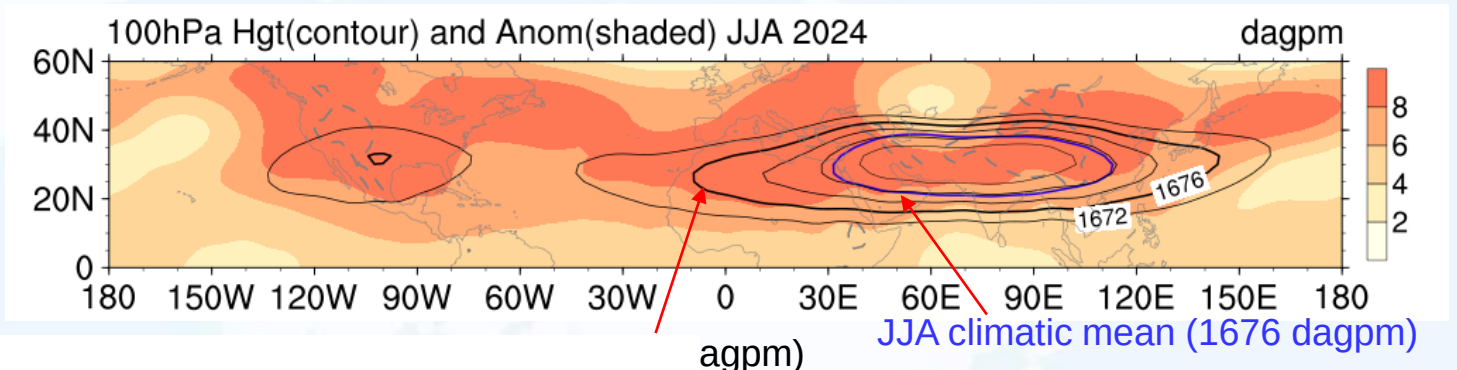
- In 2024 summer, the NSCD was mainly below normal across TP core region, with anomalies of 5-20 days in the **southern part**, and the NSCD in vast areas from the western to middle part were below to near normal.

- In September, the areas with less NSCD were mainly located in the central part of TPCR.
- While in October**, the negative anomalies** not only increased in amplitude but also extended to the northwestern part of the region, and the NSCD in parts of the northeastern region and the western TPCR remained above normal

Monitoring of circulation and external forcing

Main circulation around TPR in JJA: South Asia High (SAH)

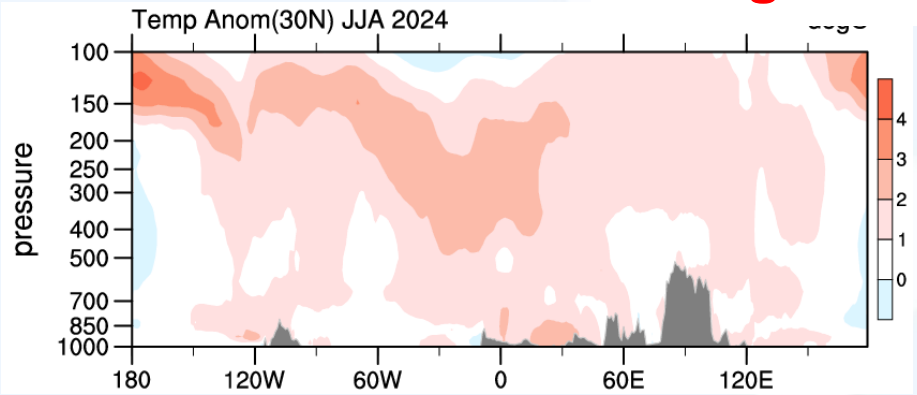


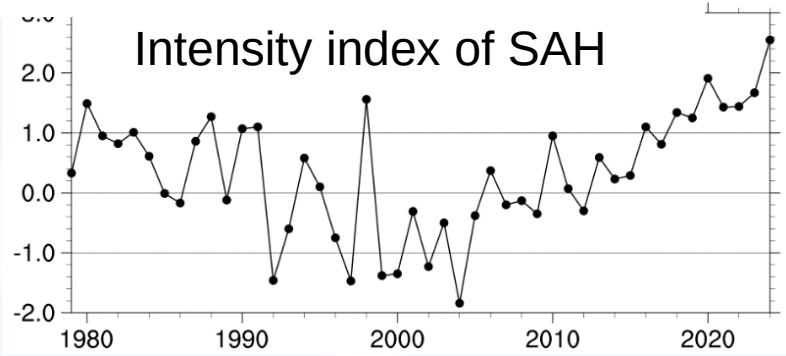


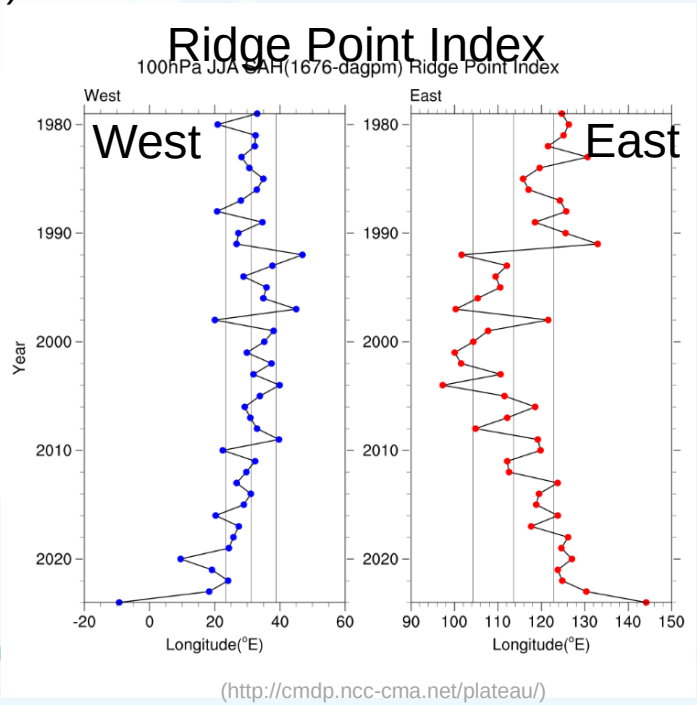
agpm)

JJA climatic mean (1676 dagpm)

SAH in JJA 2024 is the largest and strongest SAH since 1980.

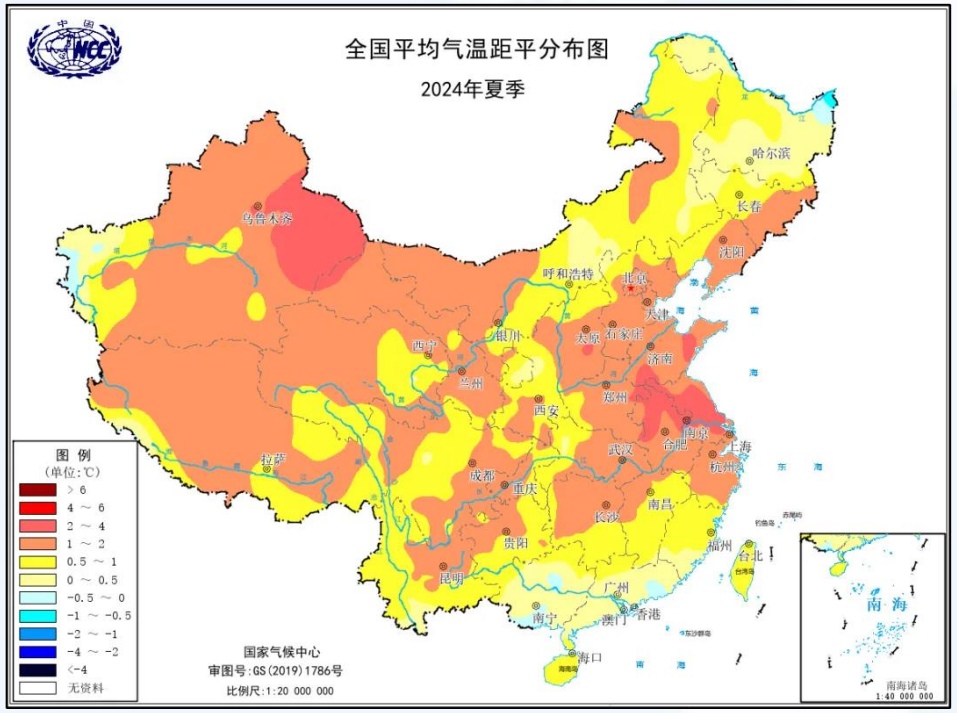


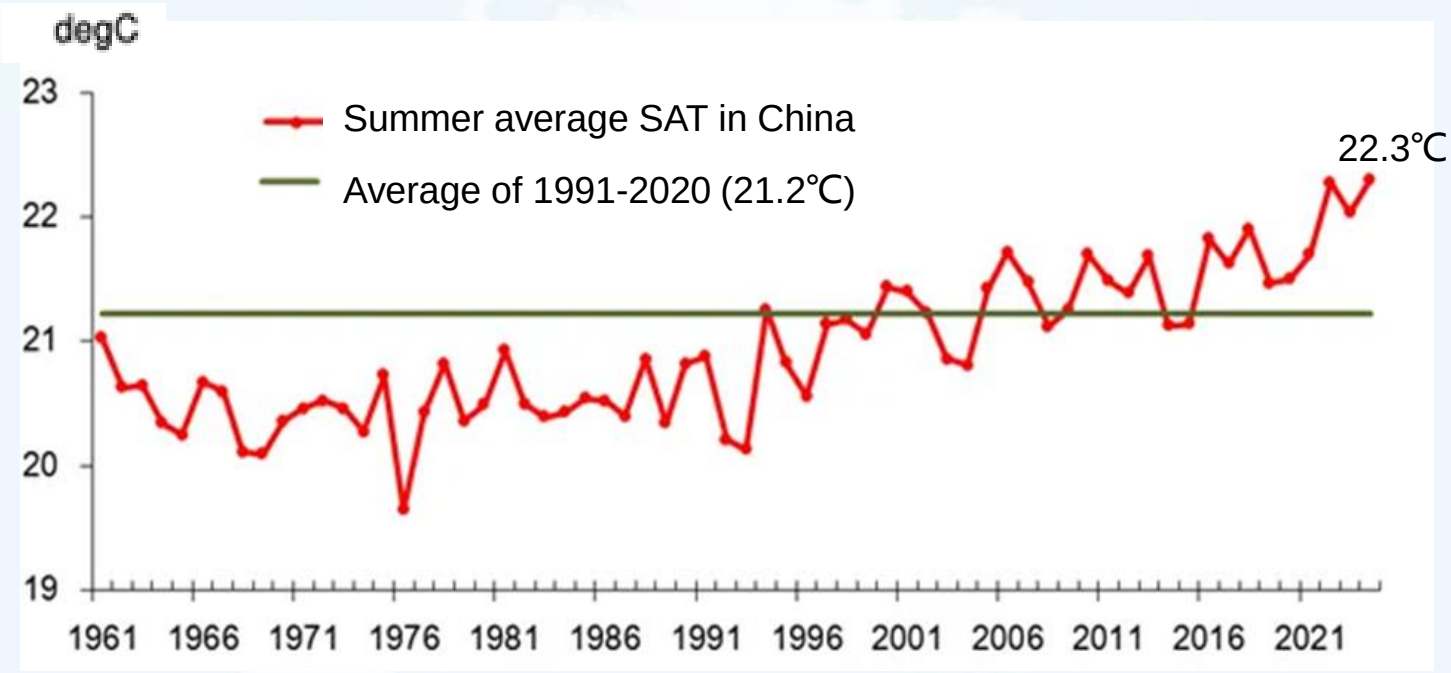




(http://cmdp.ncc-cma.net/plateau/)

surface air temperature anomalies of China
JJA 2024



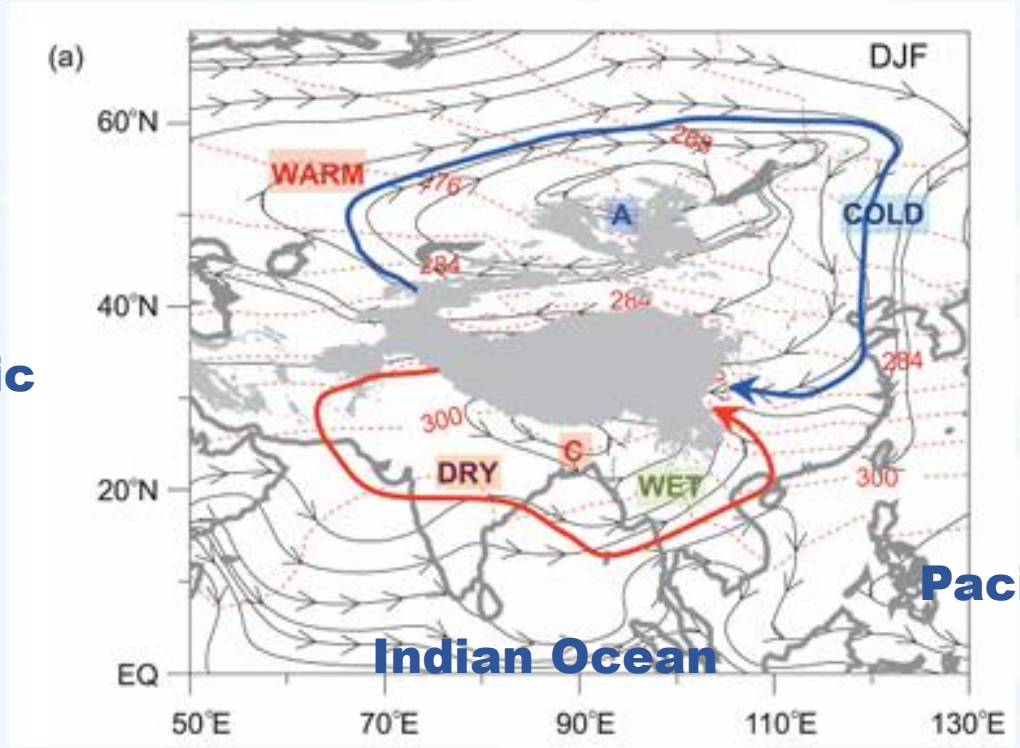


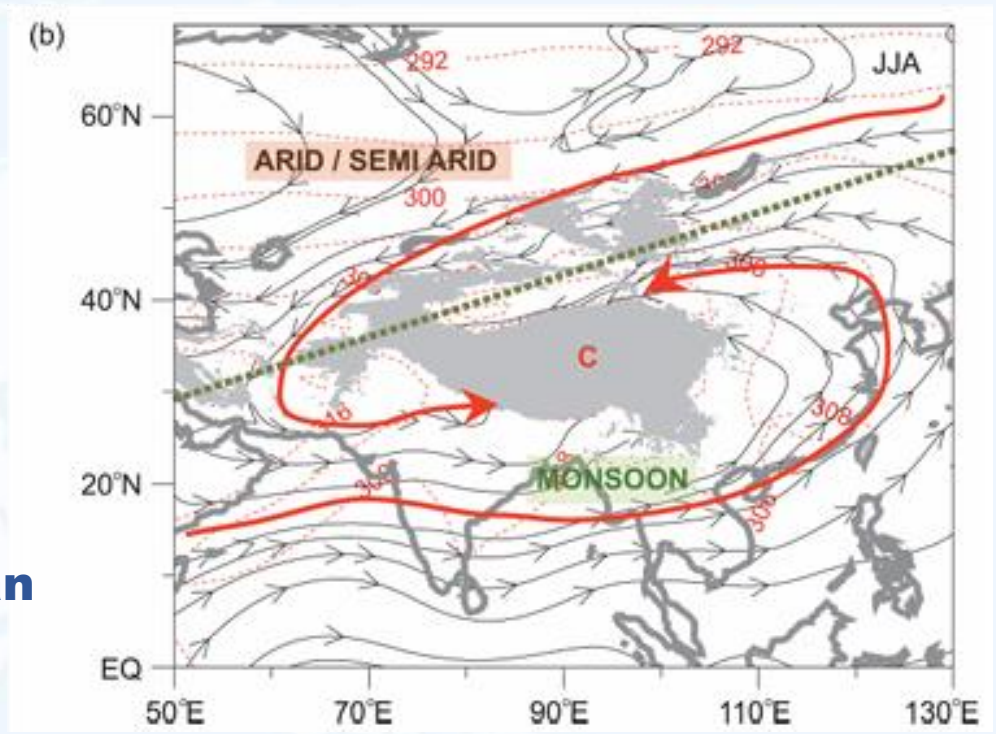
The summer average SAT was 22.3℃ in China. This **is the hottest summer** since 1961.

Monitoring of circulation and external forcing

Winter mechanical forcing

Summer thermal forcing

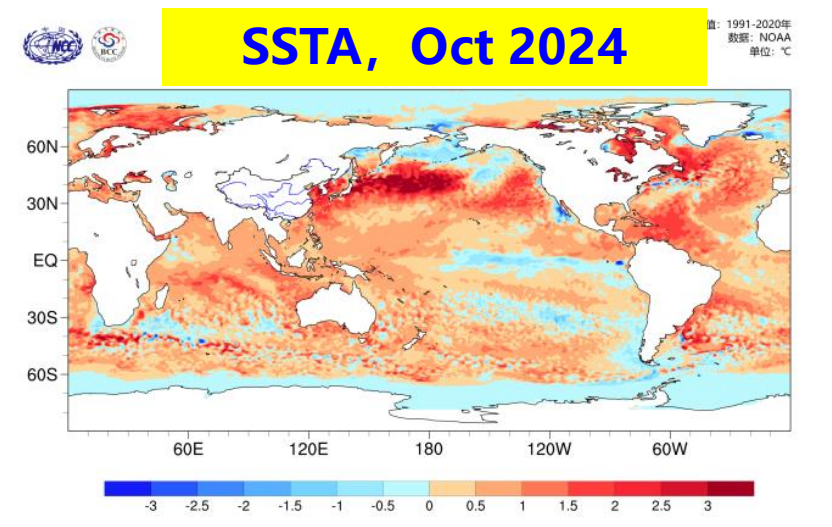




Distributions at 850 hPa of potential temperature (K) and stream fields composed of wind deviations from the corresponding zonal means based on ERA–Interim reanalysis for 1979–2010. (Wu, et al., 2015)

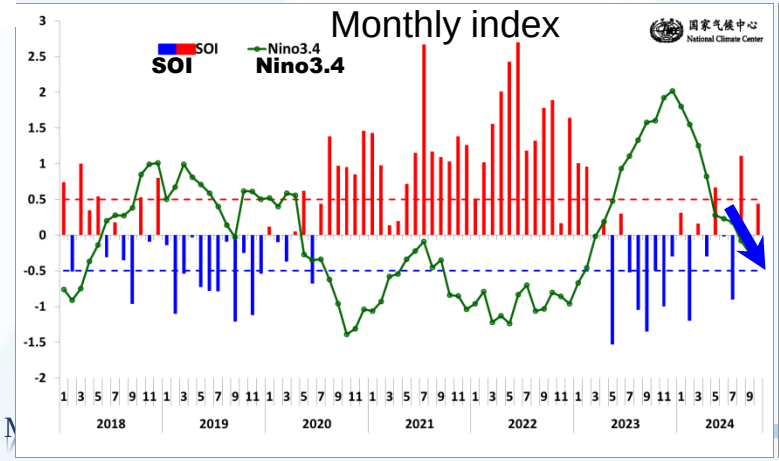
Monitoring of circulation and external forcing

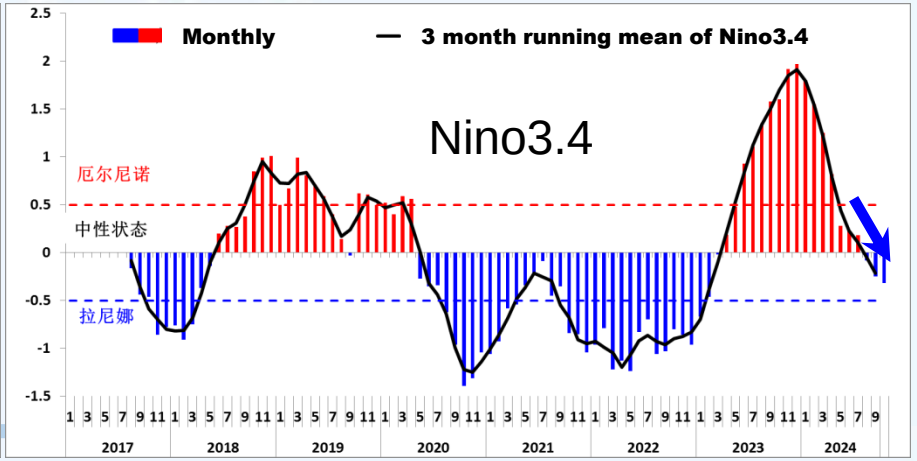
ENSO



	Nino3.4	3 month running mean of Nino3.4	Nino3	Nino4	SOI
2023.11	1.92	1.85	2.11	1.48	-1.0
2023.12	2.02	1.91	2.10	1.43	-0.3
2024.01	1.80	1.79	1.91	1.50	0.31
2024.02	1.55	1.53	1.48	1.26	-1.20
2024.03	1.25	1.21	1.03	0.93	0.16
2024.04	0.82	0.78	0.61	0.8	-0.3
2024.05	0.28	0.44	-0.09	0.7	0.67
2024.06	0.23	0.23	-0.18	0.63	-0.02
2024.07	0.18	0.11	-0.11	0.60	-0.9
2024.08	-0.08	-0.10	-0.28	0.48	1.11
2024.09	-0.25	-0.22	-0.06	0.16	-0.12
2024.10	-0.32		-0.08	0.13	0.44

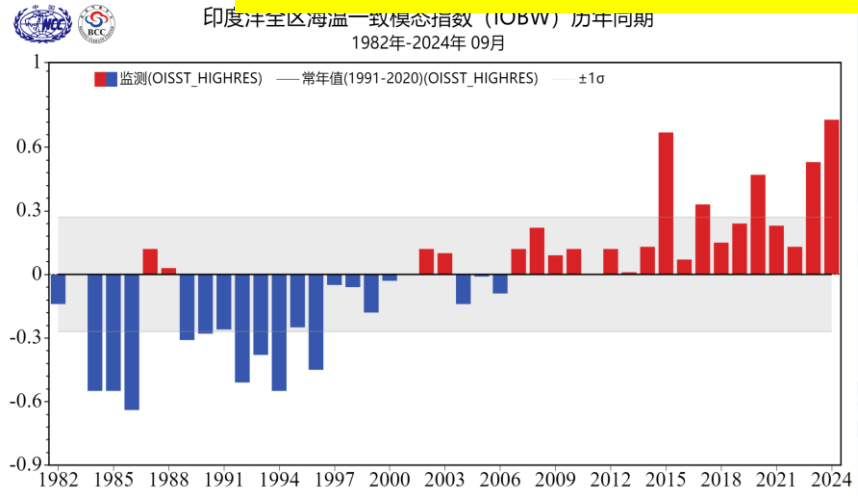
- Nino3.4 kept decreasing to −0.32 in Oct and its 3 month running mean decreasing to −0.22.
- SOI: 0.44

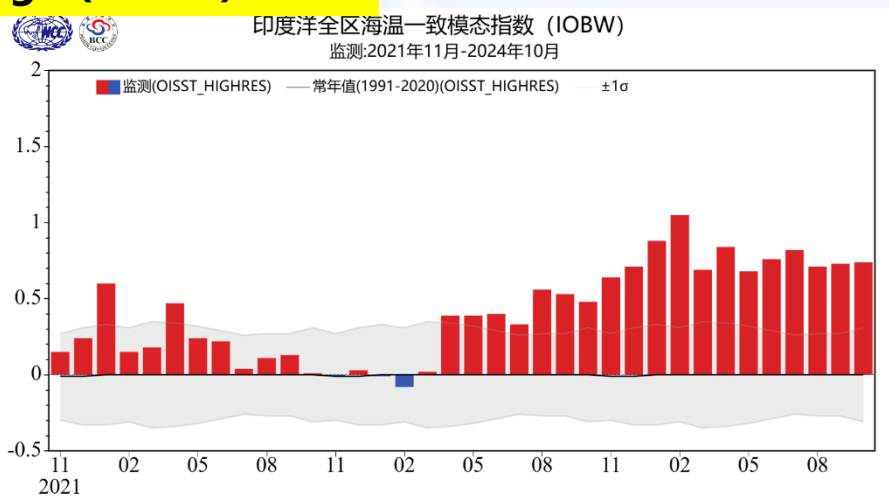




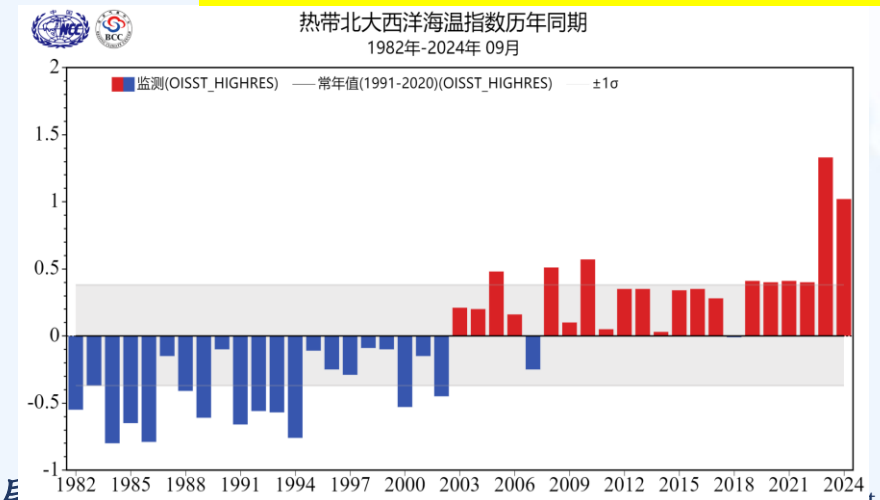
Monitoring of other SST indices

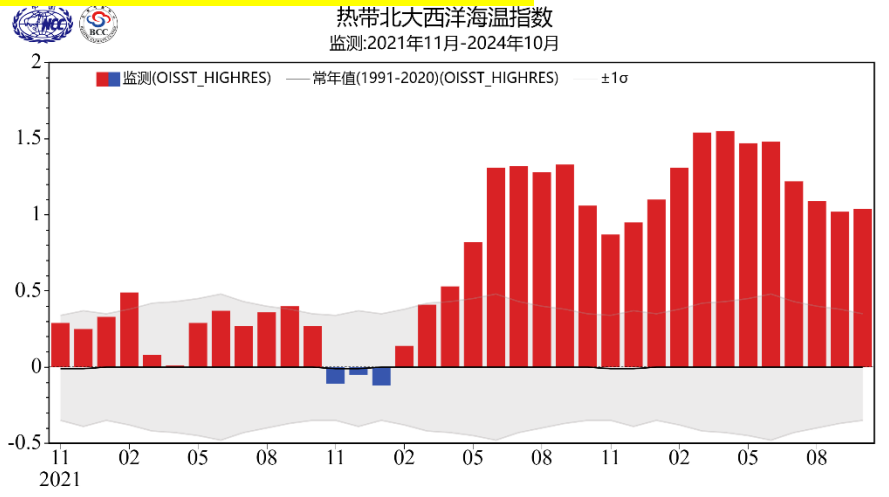
Indian Ocean Basin Warming （IOBW）





Tropical Northern Atlantic Index（TNA）

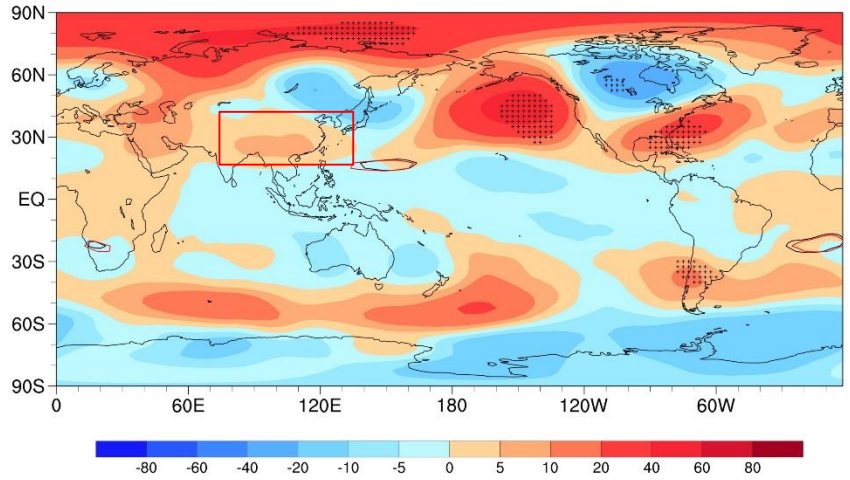




Potential impact of external forcing

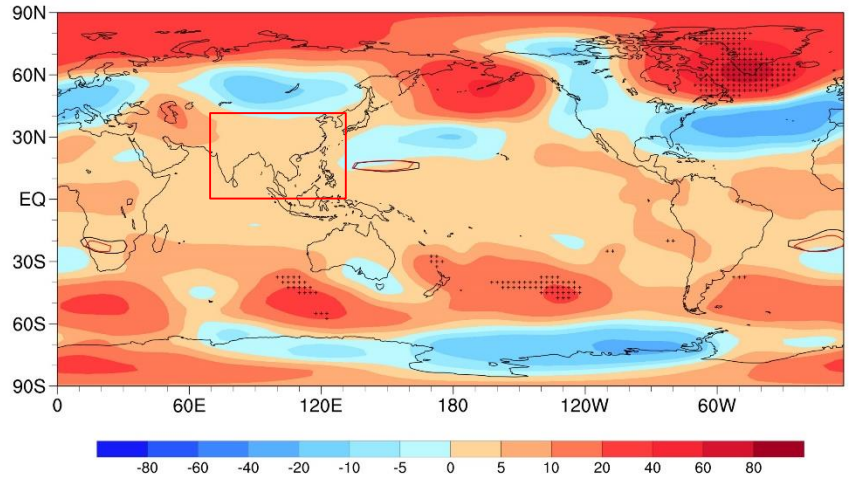
Weak La Nina

Composite of H500 in DJF



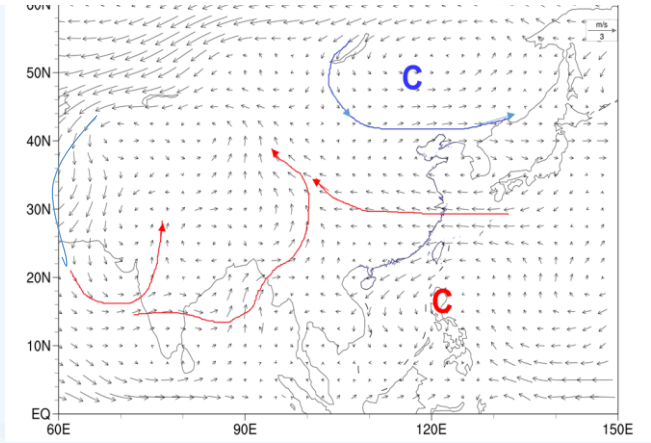
Positive TNA

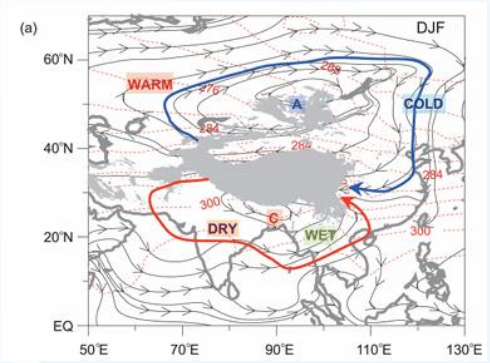
Composite of H500 in DJF



Weak La Nina+ Warmer Indian Ocean

Composite of 850hPa wind anomalies in DJF





- Weak La Nina
- Warm IOBW
- Warm TNA

→ Warm and dry?

Potential impact on DJF

Conclusion

Temperature:

- In the JJASO, 2024, most of the TPCR **experienced higher surface air temperature**.

Precipitations:

- **For JJAS 2024,** precipitation was above normal across most of the TP region, with the exception of the northwestern edge, parts of the central to the northern areas, and some regions in the southeast. **In October,** the pattern of precipitation anomalies was nearly the opposite of that observed during JJAS.

Snow:

- The NSCD was **mainly below normal** across TP core region in summer, September and October 2024.

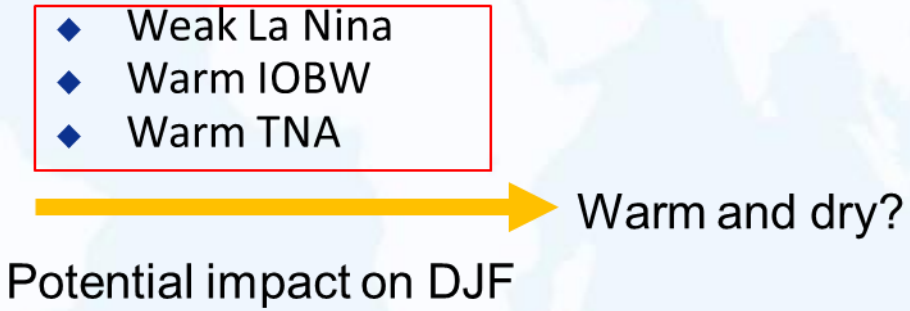
Conclusion

Summer circulation around TP:

- The temperature from lower to upper troposphere was higher than normal above TP and surrounding area.
- **South Asia High** in JJA 2024 **is the largest and strongest since 1980.**

External forcing

- ENSO: Weak La Nina
- IOBW: positive phase
- TNA: positive phase



WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

Thank you

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World Meteorological Organization
Organisation météorologique mondiale

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