



5th THIRD POLE CLIMATE FORUM

High-Impact Events (HIE) in the past DJFMAM

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01 June, 2026



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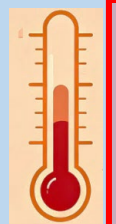




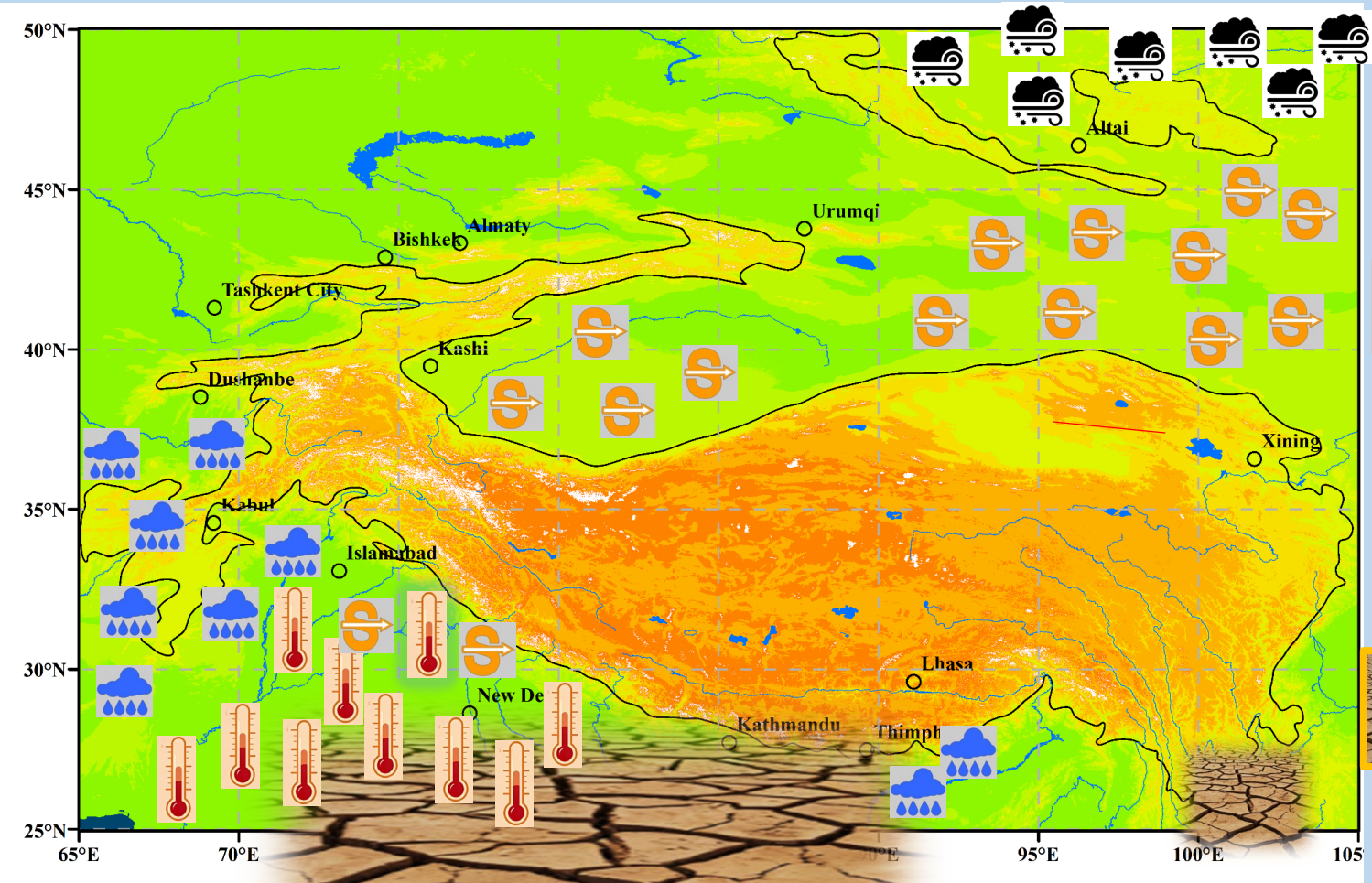
Main HIEs of the TPR in the past DJFMAM



From late March to early April, heavy rainfall and flash floods struck all eight regions of Afghanistan and northwestern Pakistan. India witnessed 79 and 87 heavy rainfall events during March and April, respectively, with the majority of these events concentrated over the northeastern region of the country.



Heat wave conditions prevailed over parts of western and east-central India during March and intensified during April. Extreme heatwaves stroke India in April and May.



A snowstorm event started on 21 February 2026 across multiple provinces in Mongolia.



Six sand-dust weather events during winter and eight in spring affected Mongolia and northern China. During April 2026, severe dust storms struck parts of Rajasthan and Uttar Pradesh in India.

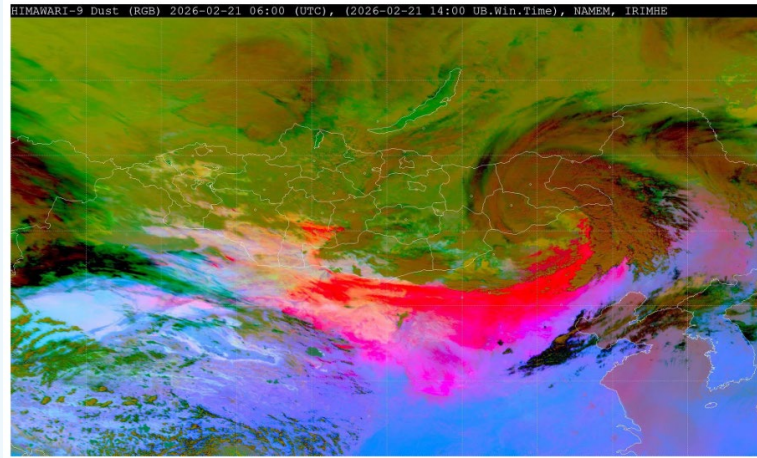


December 2025–February 2026 was exceptionally dry across India, with seasonal rainfall remaining well below normal. In February, moderate to severe meteorological drought occurred over the western part of Southwest China.

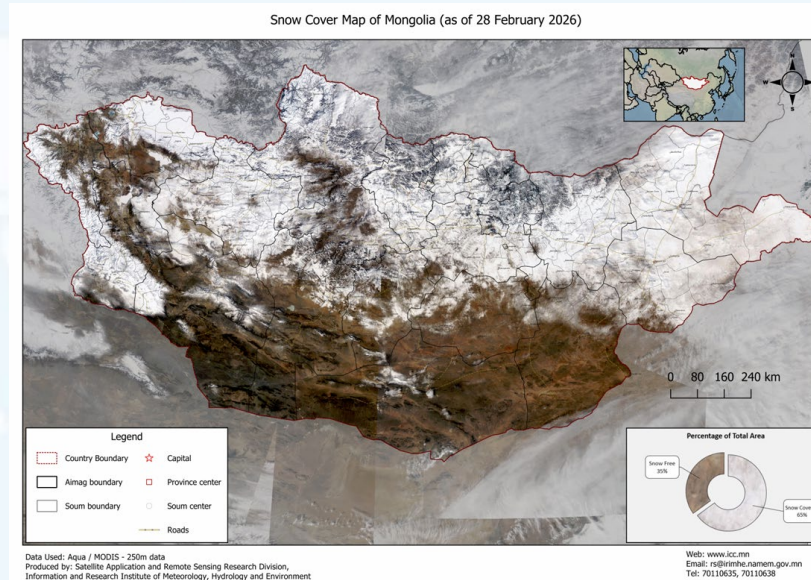




Snowstorm



Satellite imagery as of 14:00 on 21 February 2026, speeds up to 27 m/s



DREF Operation

Mongolia Snow Storm



Dornod province, Khalkgol soum, 24 February 2026, after snowstorm (Photo: MRCS)

A snowstorm event began on 21 February 2026 and affected several provinces of Mongolia, particularly in eastern, northern, and western areas. The storm brought sustained winds of up to 31 m/s, heavy snowfall, blowing and drifting snow, and extreme cold plunging to -48°C . These conditions resulted in blocked roads and mountain passes, widespread transportation disruptions, and life-threatening exposure risks. By 24 February, 56 people had been injured. In addition, confirmed livestock losses directly attributed to the storm exceeded 4,900 head.

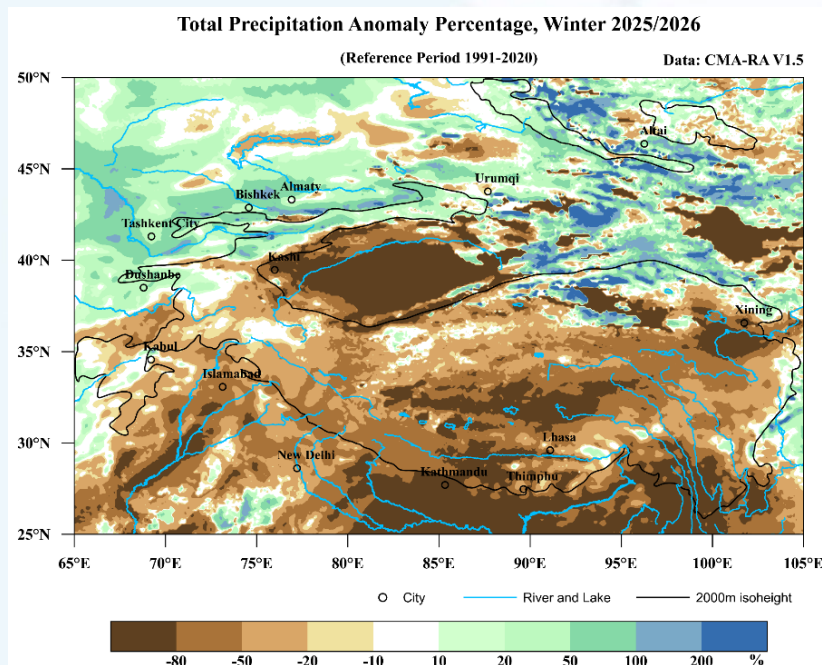




Drought

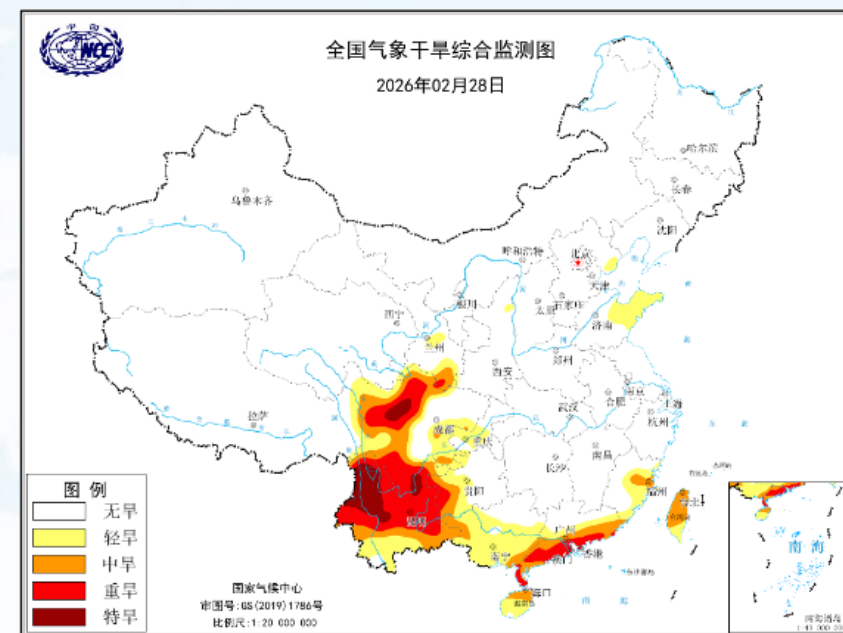


India



December 2025–February 2026 was exceptionally dry **across India**, with seasonal rainfall remaining well below normal.

China

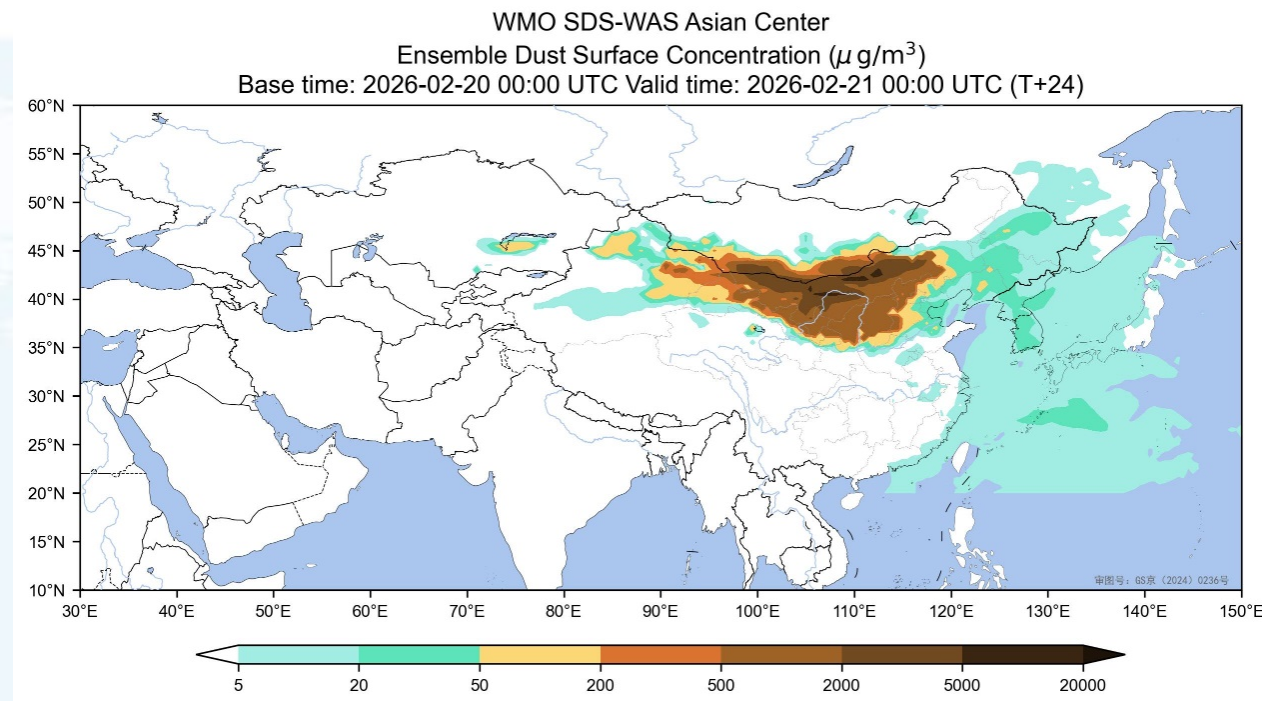
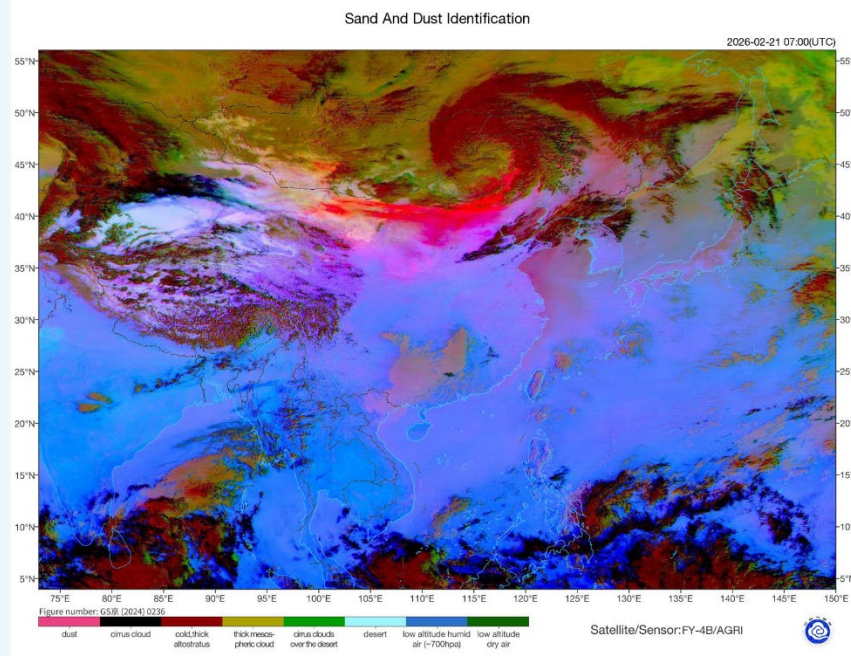


In February 2026, moderate to severe meteorological drought occurred over **the western part of Southwest China**, with exceptional severe drought observed in northwestern Yunnan Province and adjacent areas.





Sand-dust storms



Six sand-dust weather events affected **Mongolia and northwestern China** during winter 2025/2026, three of which reached sandstorm intensity (17–19 January, 20–23 February and 24–26 February). Northern China experienced one sand-dust event in March, five in April and two in May; the most severe episode in spring, occurring from April 17 to 20, reached sandstorm intensity.

During April 2026, severe dust storms struck parts of Rajasthan and Uttar Pradesh in **India**, tragically causing 4 human fatalities.





Heavy rainfall

Afghanistan



Residents cleaning their homes and backyards after recent floods in Abdul Rahman village, Pul-e-Khumri, Baghlan Province, Afghanistan. Photo: FAO/Hashim Azizi

Between 26 March and 6 April, heavy rainfall and flash floods struck all eight regions of Afghanistan. As of 13 April, 161 fatalities had been reported, with eight people still missing, 230 injured and more than 74,200 people affected.

Pakistan

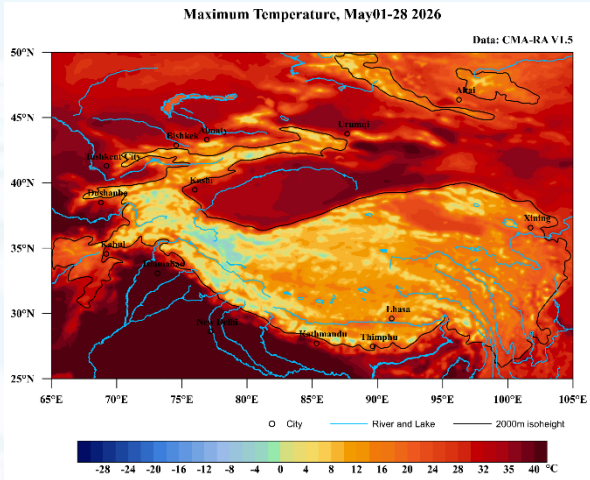
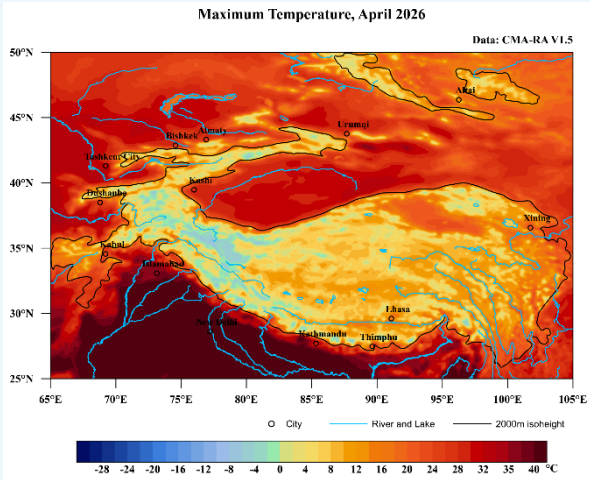


From 25 March to 5 April, heavy rainfall in the Khyber Pakhtunkhwa Province of northwestern Pakistan caused at least 45 deaths, 105 injuries, and damaged 442 houses.





Extreme high temperatures



Observed maximum temperatures in April and May were above 40°C over the majority of the southern and southwestern TPR.

India Faces Severe Heatwave in Late April–Early May 2026: IMD Issues Alerts for North & Central India

SA News — Save It
Last Updated: May 2, 2026 10:36 Am

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Heatwaves stroke India in April and May. On 28 April, maximum temperatures reached 46°C in many parts of India. New Delhi set a new April high-temperature record. In May, large areas across northern India were hit by heatwaves. The maximum temperature in New Delhi exceeded 45°C, and the overnight temperature also hit a 14-year record high. Banda in Uttar Pradesh recorded a peak temperature as high as 48°C. Soaring power demand reached an all-time high, triggering power outages in many regions and severely disrupting people's daily lives.

Quick Reference

Date of Event **22 May 2026**

Hottest City **Balangir, Odisha (48°C)**

Data Source **AQI.in**

IMD Heatwave Threshold **40°C + 4°C above normal**

Power Record **256.11 GW (all-time high) (25 Apr)**

Heatwave Disaster Status **NOT classified (DM Act, 2005)**

97/100

India's Share of Hottest Cities

48°C

Peak Temp (Balangir, Odisha)

270+ GW

Peak Power Demand (22 May)

4.5%

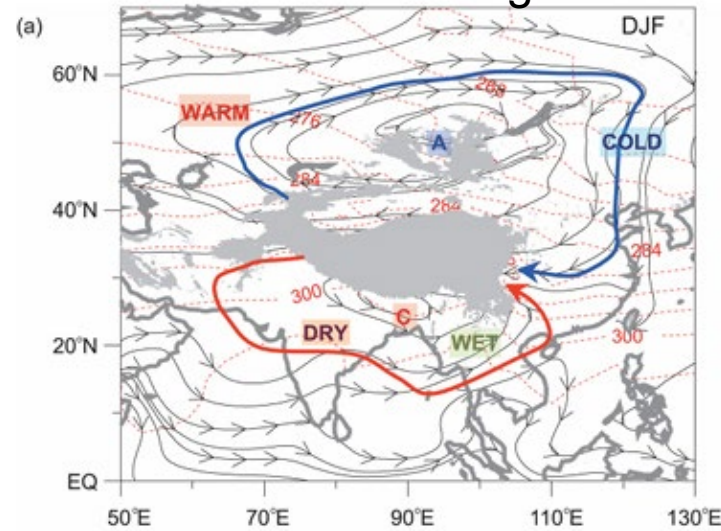
Max GDP Loss Risk by 2030



Climatic background and implications of HIEs

Winter(DJF)

mechanical forcing



During winter, the dominant effect of the Tibet Plateau lies in its dynamic blocking as a huge terrain. The southwestern areas are dry and warm with frequent droughts, while the northeastern areas are dry and cold and vulnerable to cold surges.

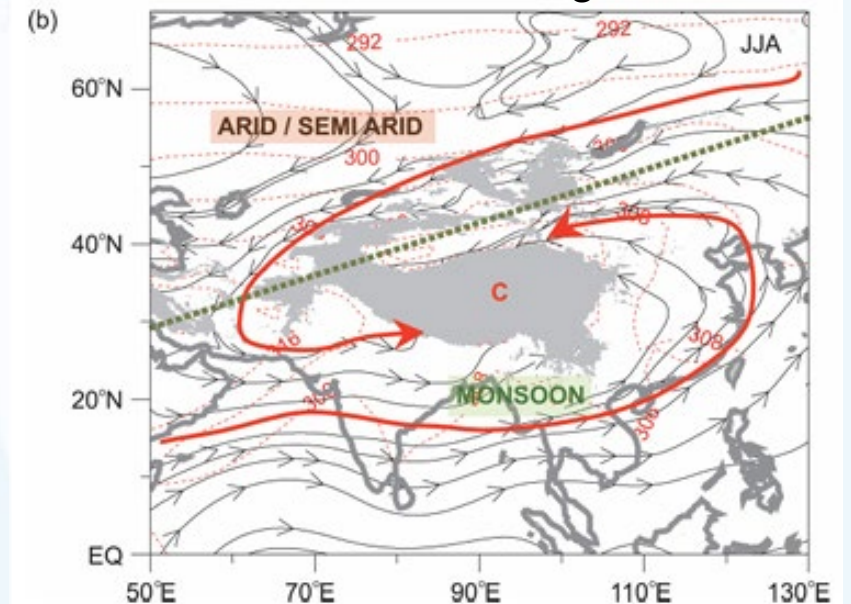
Spring(MAM)



Spring is a transitional season when the thermal effect of the plateau gradually intensifies.

Summer(JJA)

thermal forcing



In summer, the topographic lifting and heating over the plateau is prominent. Its southern and eastern areas are strongly affected by the Asian summer monsoon.

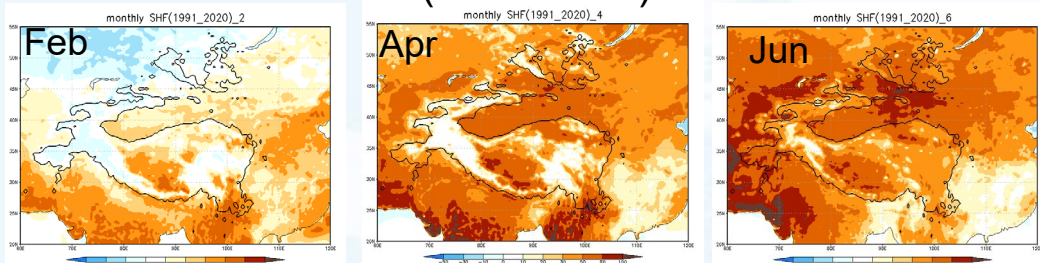
The above HIEs occurred during winter and spring.



Variations of Surface sensible heat flux (SSHF, ERA5) over TPR

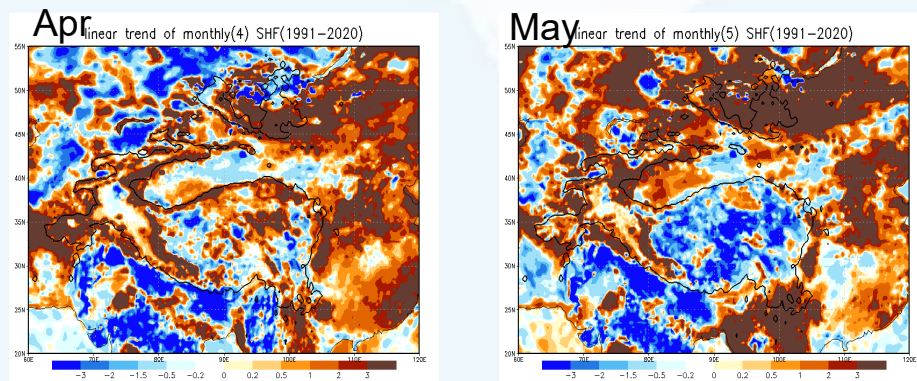


Ave(1991-2020)

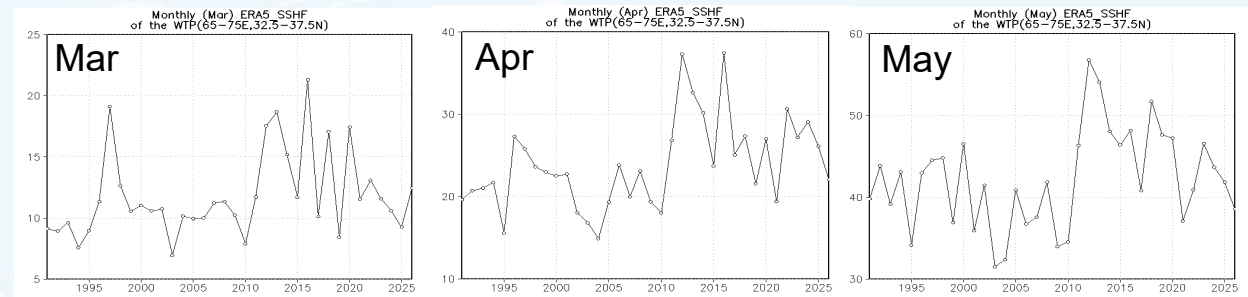


SSHf is greatly enhanced in spring and further intensifies in summer.

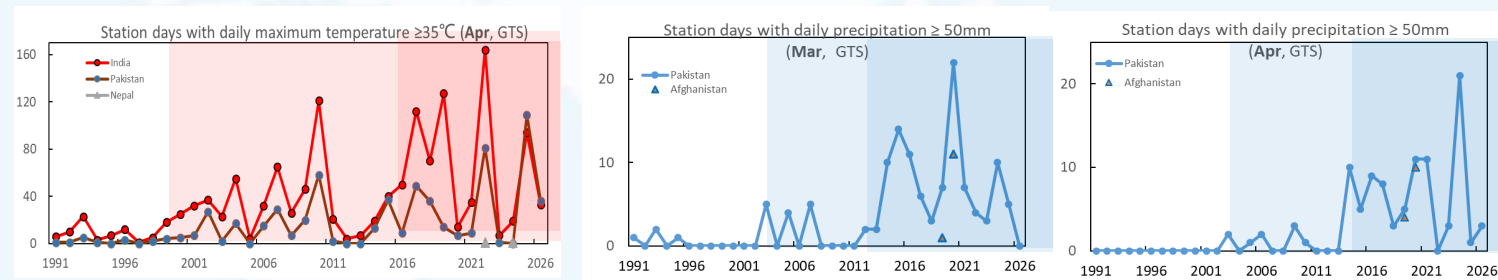
Linear trend of SSHF



Linear analysis reveals rising SSHF across the western TP.



The monthly SSHF time series for the (65-75E, 32.5-37.5N) (WTP) shows a significant increase after 2011 during March, April, and May.



After the 2000s, April high-temperature station days and March–April heavy rainfall station days both rose significantly over the Indian and Pakistani domains of the Third Pole, coinciding with intensified surface sensible heat over the western Tibetan Plateau.

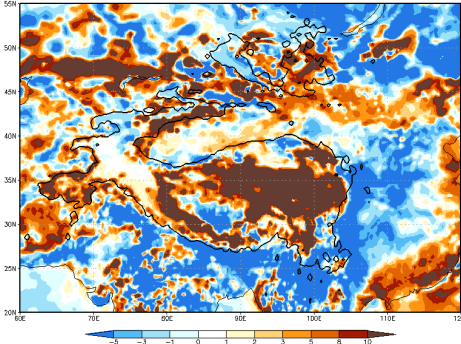


Variations of Surface sensible heat flux (SSHF, ERA5) over TPR

SSHF anomalies

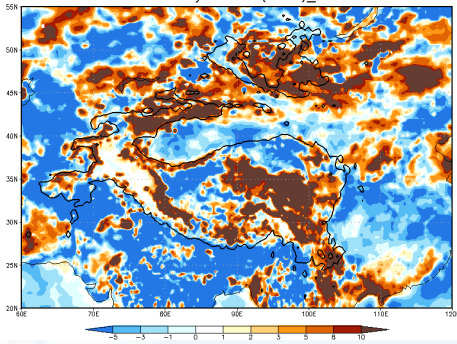
Mar, 2026

monthly SHFano(2026)_3

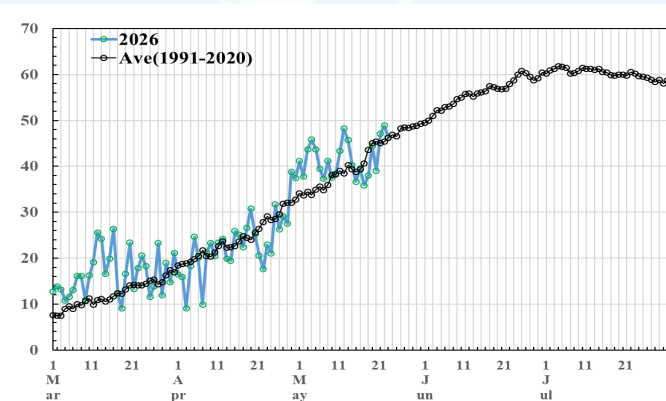


Apr, 2026

monthly SHFano(2026)_4



In March and April 2026, SSHF anomalies were positive in the west, southern fringe and east of the TPRC region.

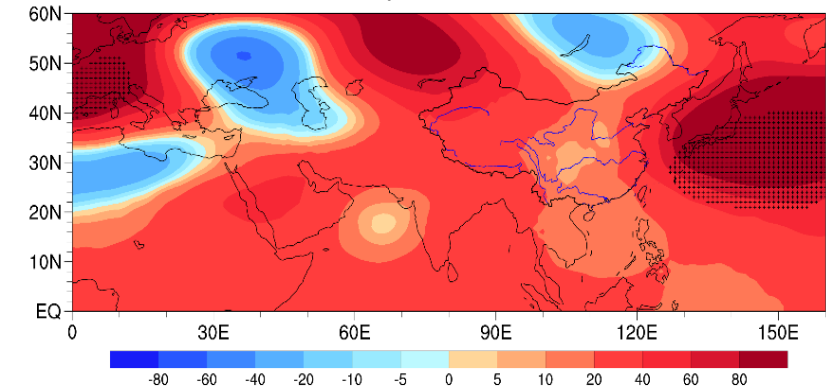


Daily regional SSHF of the western Tibetan Plateau (65-75E, 32.5-37.5N) (WTP) was above-normal in March, late April and May.



200 hPa geopotential height anomalies (Apr 2026)

气候值: 1991-2020年
数据: CRA40
单位: gpm



The increased SSHF over the western Plateau in spring excites upper-tropospheric (200hPa) anticyclonic anomalies via the Tibetan Plateau Sensible Heat Air Pump (TP-SHAP). Accordingly, the South Asian High migrates westward to the northern Arabian Sea and Pakistan and strengthens. The established upper-level divergence and pumping effects create favorable conditions for precipitation and storm systems across the western TPR.

Conclusion and discussion

- Several high-impact climate events affected the region during the DJFMAM(2025/2026). In February, a severe **snowstorm** affected multiple provinces of Mongolia while moderate to severe meteorological **drought** persisted over western Southwest China. During winter and early spring, **sand-dust storms** affected Mongolia, northern China and northern India. From late March to early April, **heavy rainfall** and flooding affected Afghanistan and Pakistan, while India experienced **extreme heat** in late April and continued to May.
- **The HIEs exhibit distinct regional and seasonal characteristics of winter and spring.** In winter, climatologically, the southwestern TP is characterized by arid, warm conditions with recurrent droughts, whereas its northeastern counterpart features dry, cold climates prone to cold surges. While variations in surface sensible heat flux (SSHf) over the TP play a critical role in modulating the surrounding atmospheric circulation and climate anomalies in spring. Intensified SSHf over the western TP may be linked with the occurrence of spring high temperature and rainstorm-flood events.

Thank you



WMO OMM

World Meteorological Organization
Organisation météorologique mondiale

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