Post-analysis of summer climate over South Korea 2021

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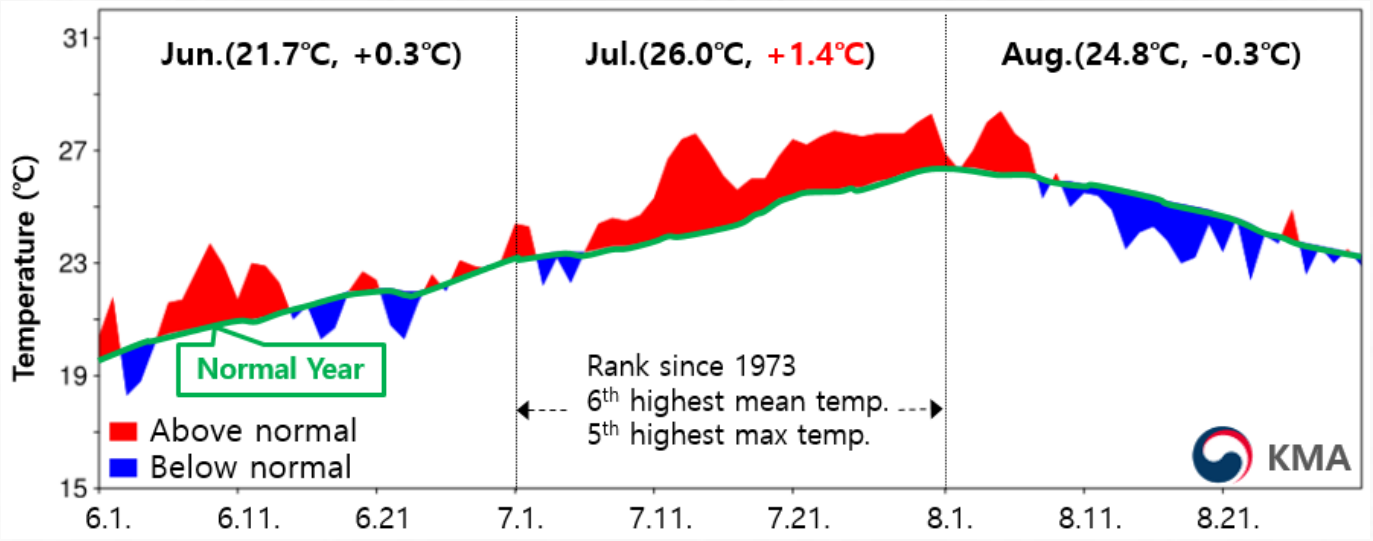
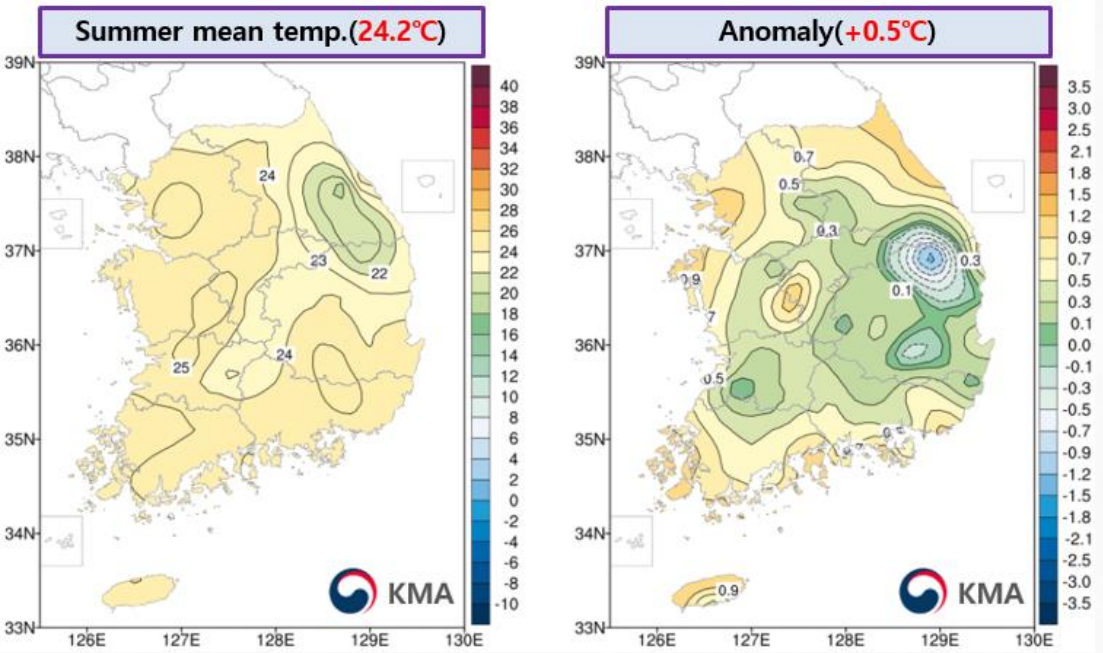
KMA

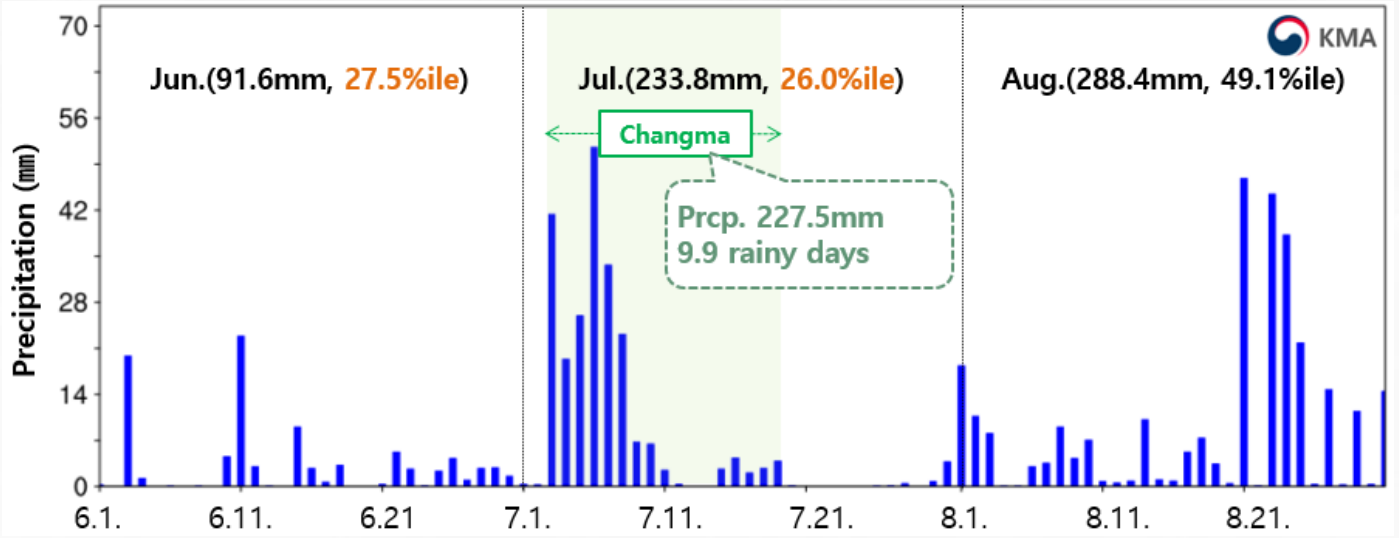
1 Temperature & Precipitation this summer

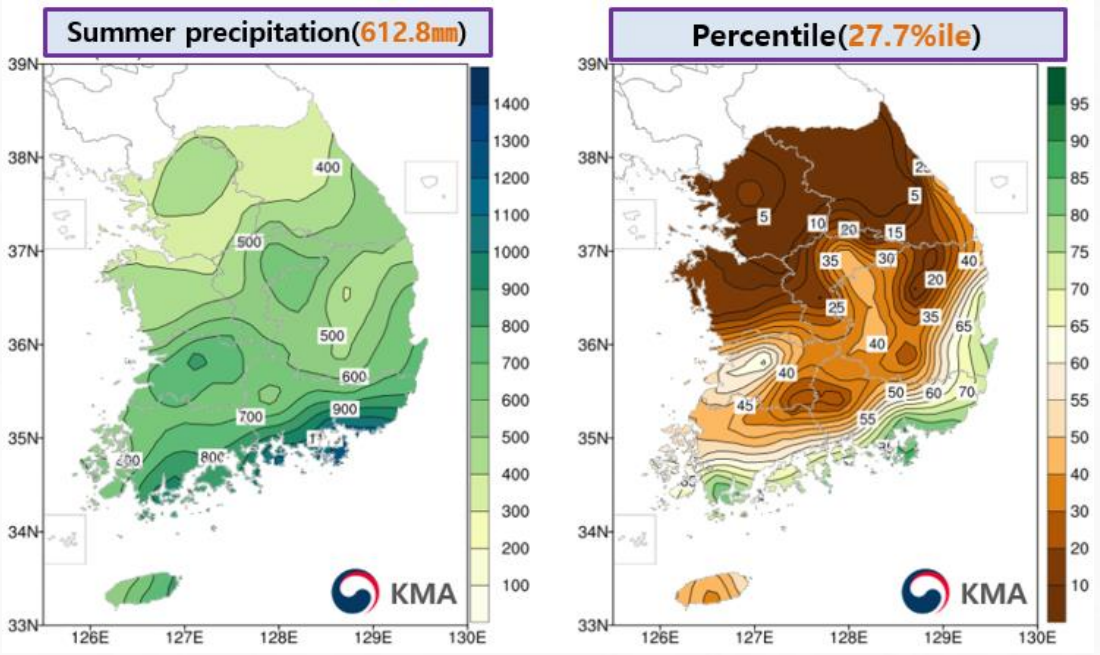
Temperature





Precipitation





2 Main feature this summer

Short duration of Changma

Changma duration (Central part of South Korea)

2021 Normal year

SUN	MON	TUE	WED	THU	FRI	SAT
6/20	21	22	23	24	25	26
6/27	28	29	30	7/1	2	3
7/4	5	6	7	8	9	10
7/11	12	13	14	15	16	17
7/18	19	20	21	22	23	24
7/25	26	27	28	29	30	31

31.5days (Normal)

17days (2021)

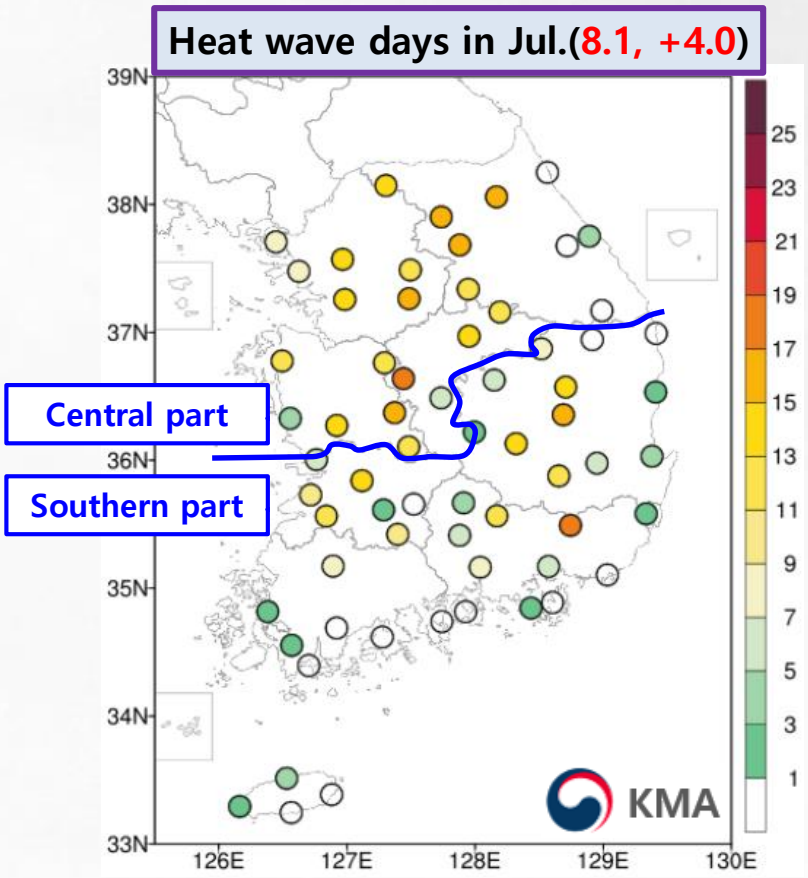
150.9㎜(5th little)
* normal: 378.3㎜

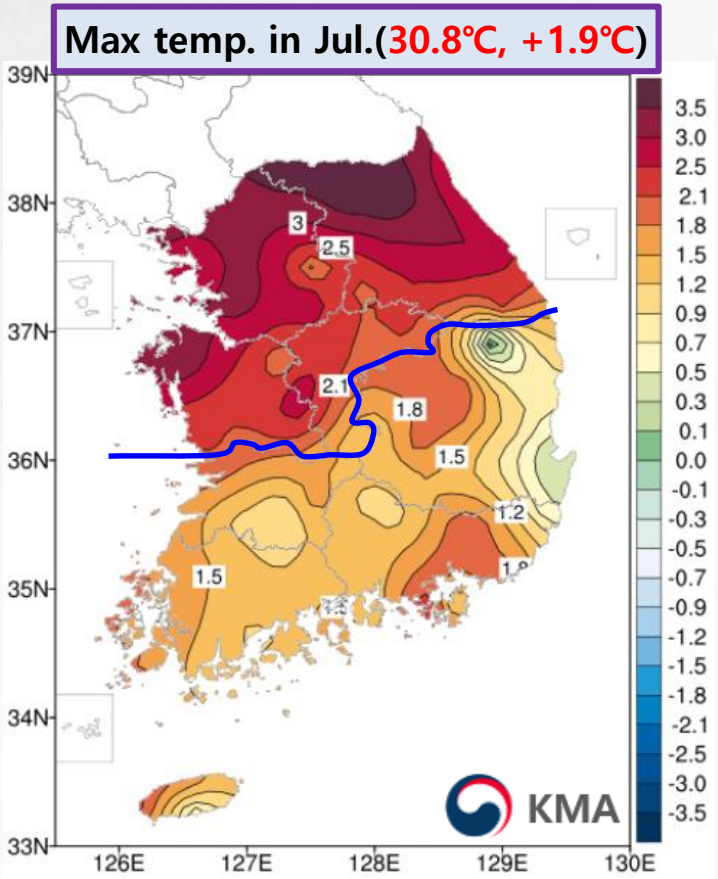
3rd shortest Changma duration(17days) in 2021 since 1973

※ 1st shortest year: 1973. 6. 25.~6.30. (6 days)

※ 2nd shortest year: 2018. 6. 26.~7.11. (16 days)

Heat wave (July)

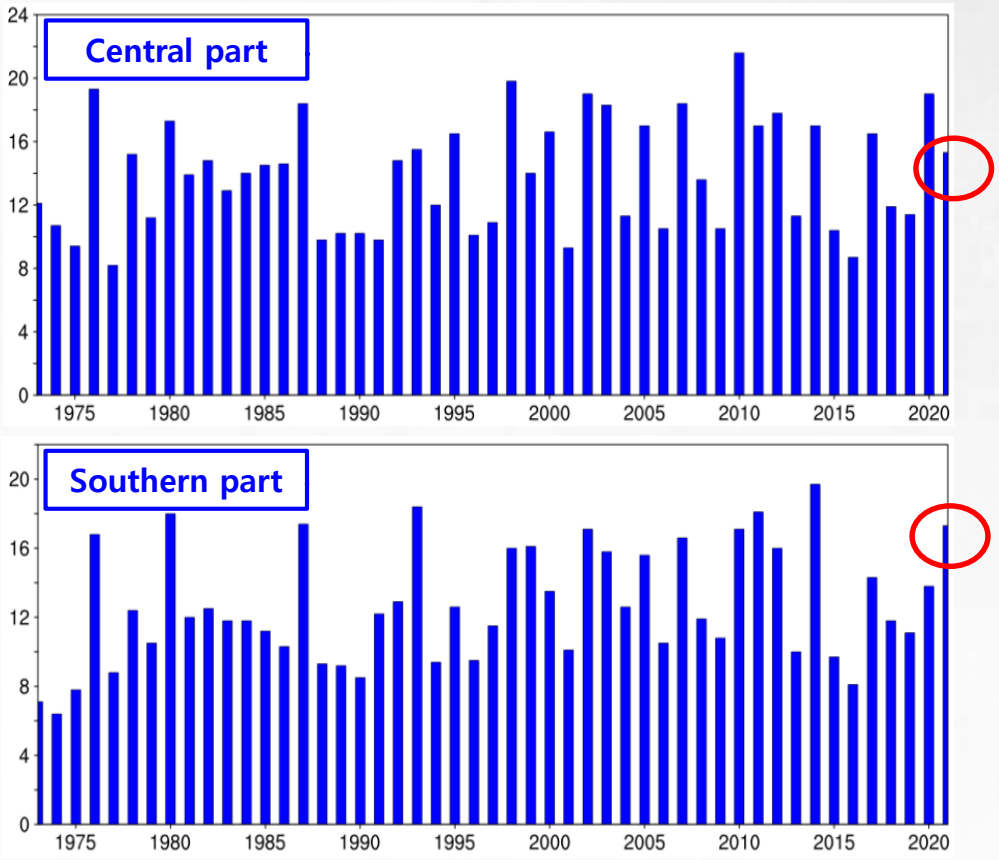




	Heat wave days (rank)	Max temp. (rank)
Central part	**10.9(3rd)**	**31.2℃(2nd)**
Southern part	6.1(17th)	30.5℃(8th)

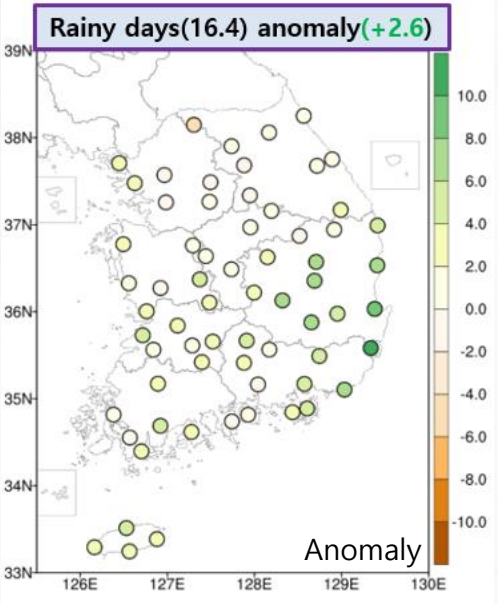
Frequent rain (August)

Rainy days in Aug.

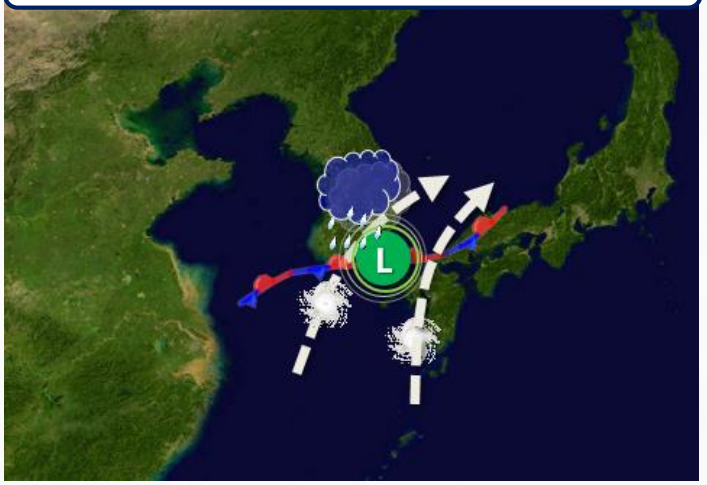


	Rainy days (rank)
Central part	15.3(18th)
Southern part	**17.3(6th)**

Anomaly of rainy days in Aug.



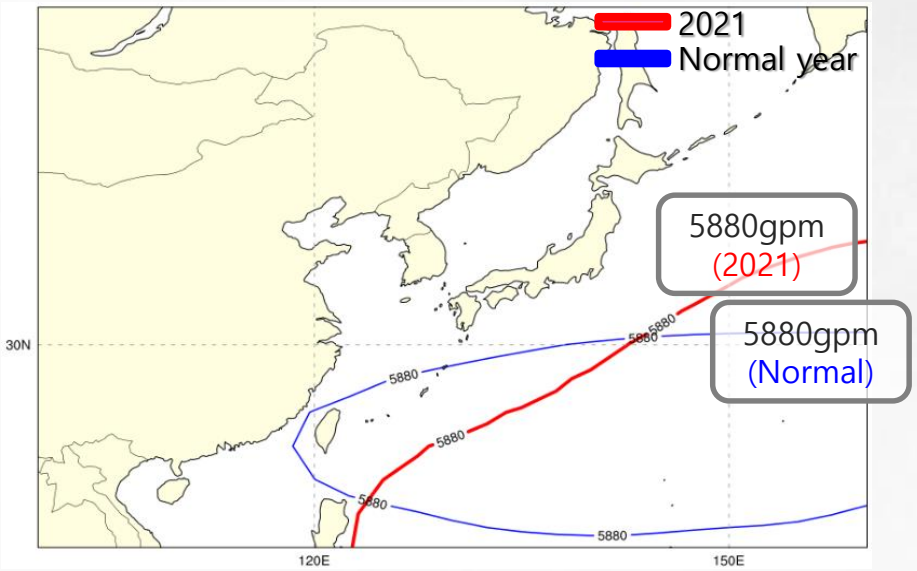
Atmospheric situation in Aug.



3 Cause analysis of the main features

Cause of short Changma

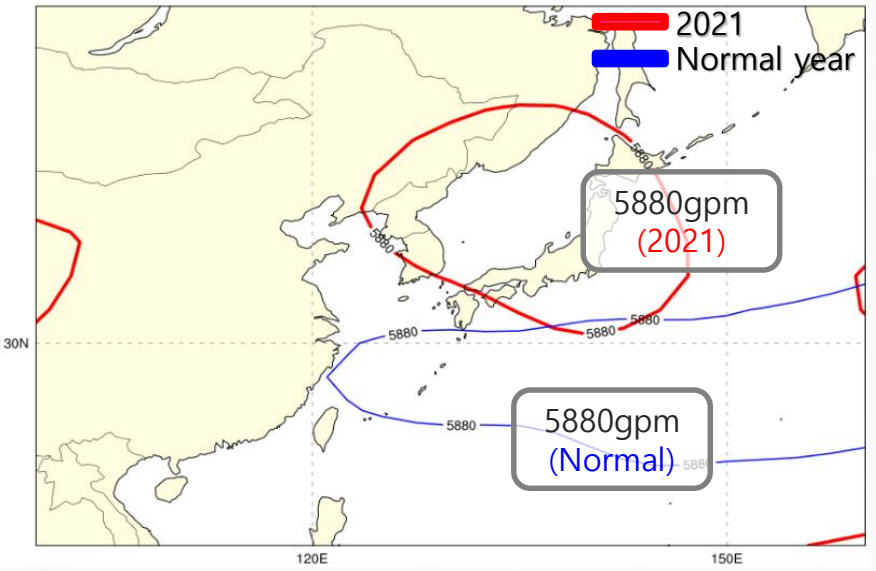
500hPa 5880GPH(6.21.~6.30.)



NPSH, moving northward **Slowly** in June

- Late onset of Changma(7.3.)
- Little rain in Jun.(91.6㎜, 27.5%ile)

500hPa 5880GPH(7.15.~7.24.)

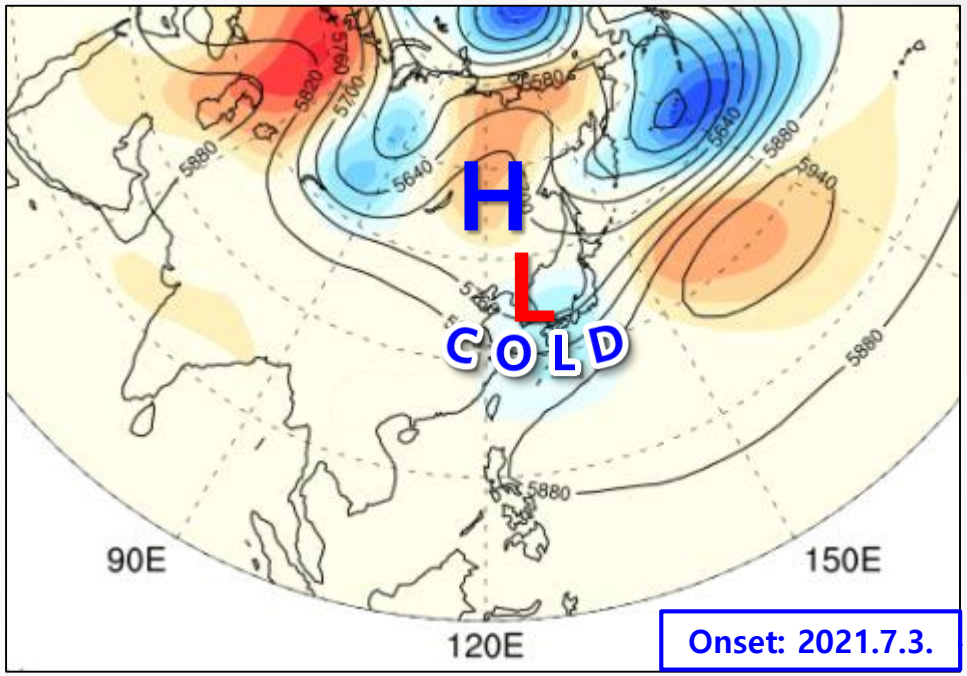


NPSH, moving northward **Rapidly** in July

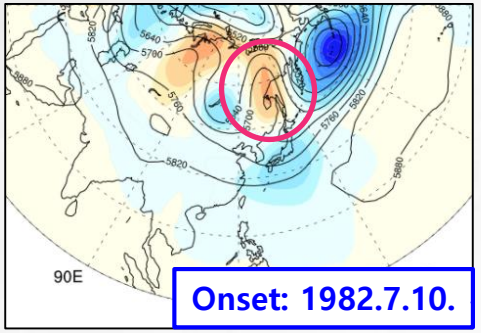
- Early end of Changma(7.19.)
- Little rain in Jul.(233.8㎜, 26.0%ile)
- Heat wave in Jul.(8.1days, +4.0)

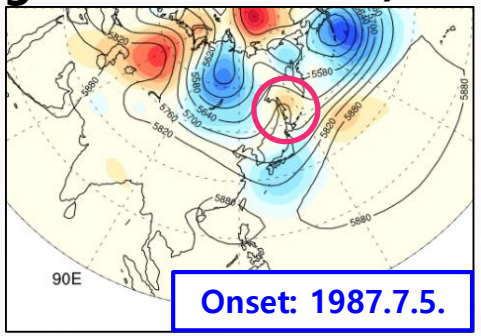
Cause of late expansion of NPSH in June

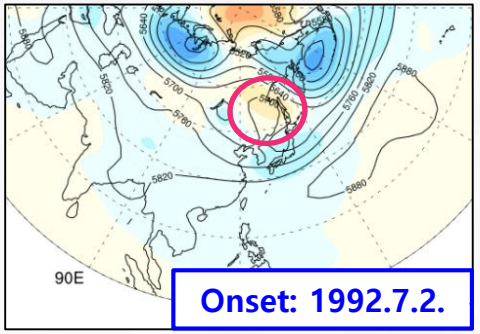
500hPa GPH(2021.6.21.~6.30.)

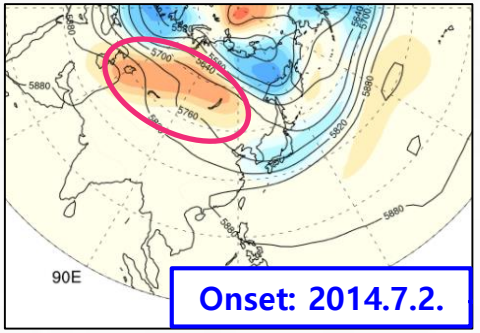


500hPa GPH
(Years when Changma started late)



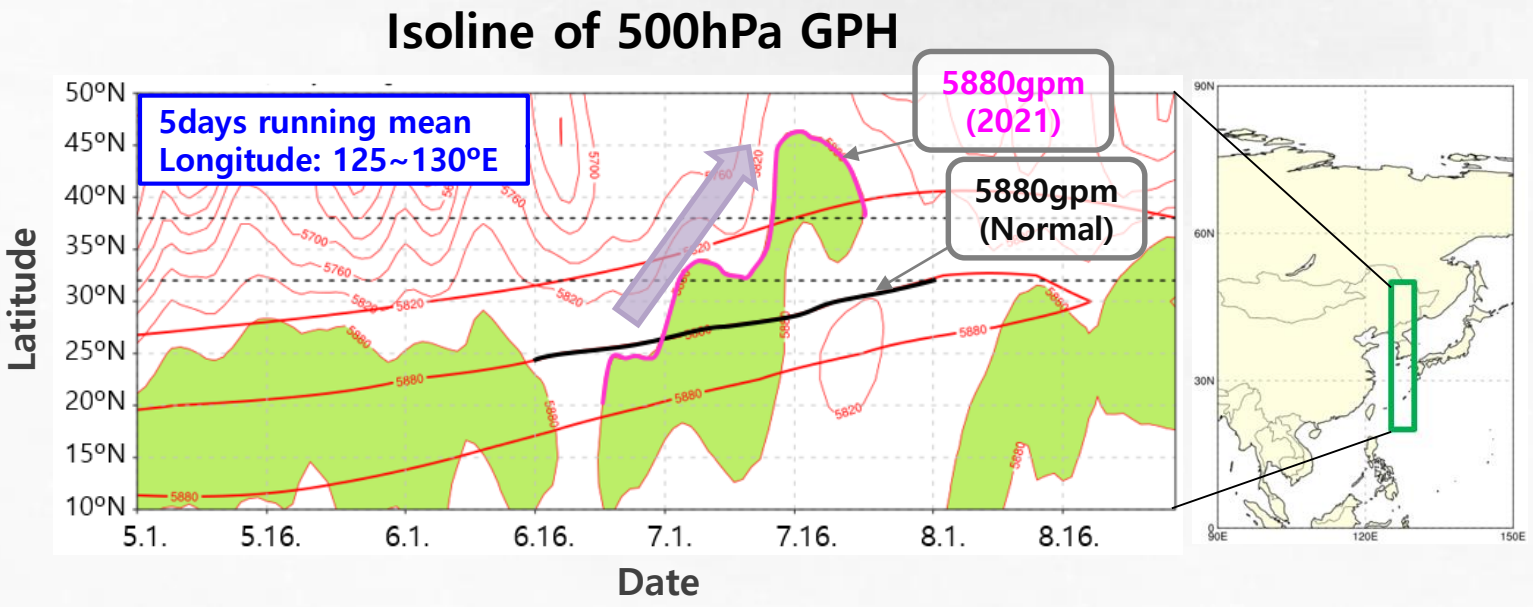


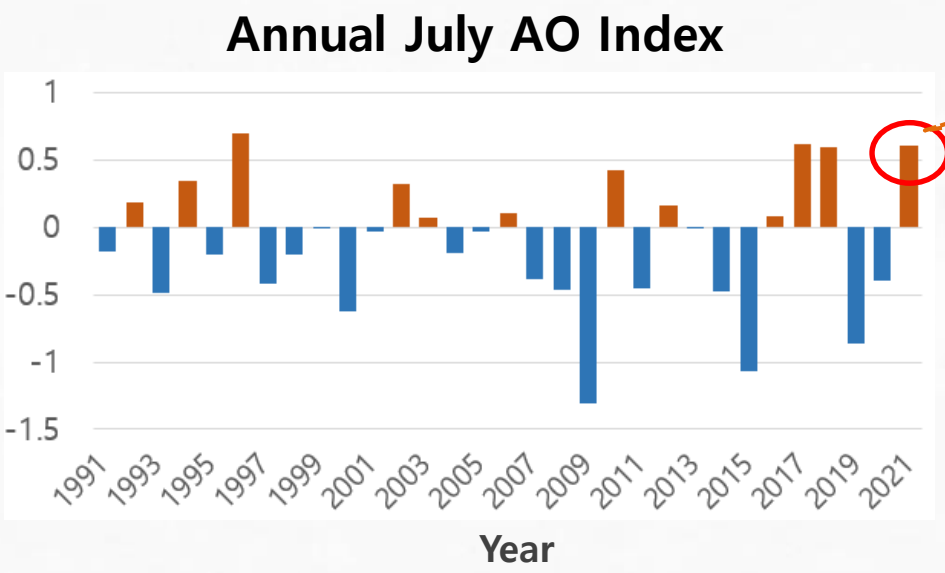




- In late June, blocking or ridge developed from East Siberia to South Korea
- In early July, blocking or ridge retreat → Onset of Changma

Cause of rapid expansion of NPSH in July



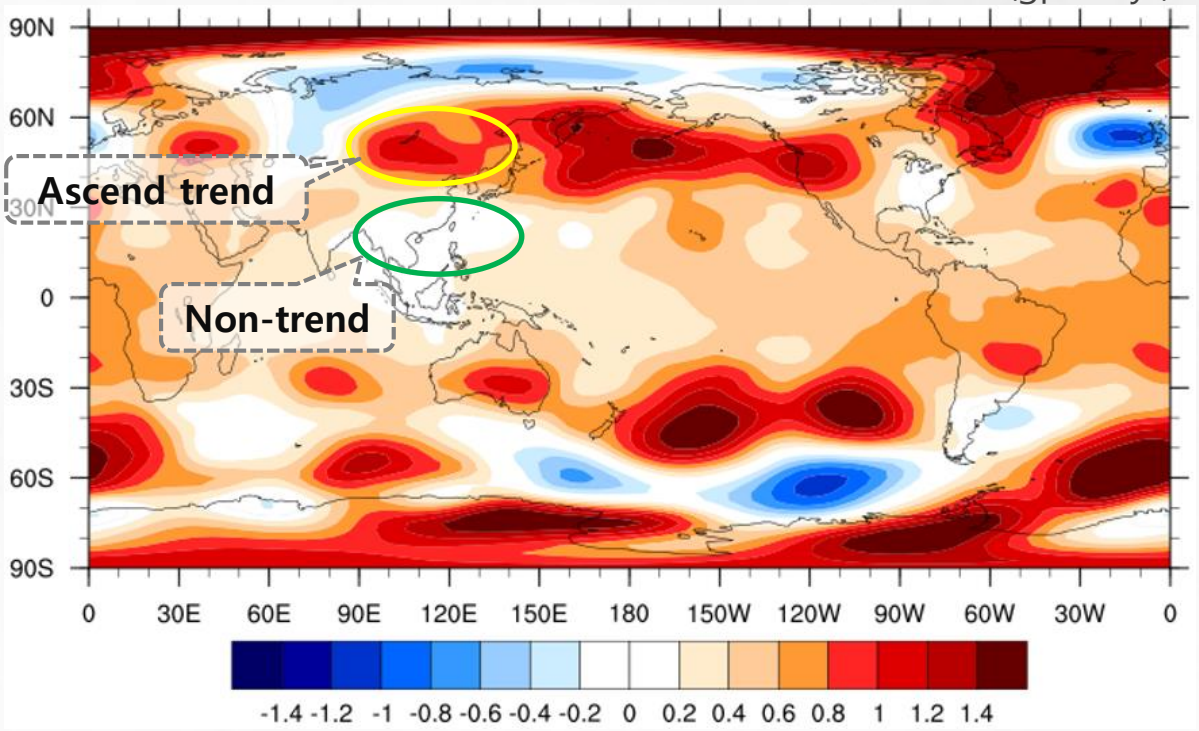


- 3rd highest AO Index, in July
- Northward expansion of Northern Pacific Subtropical High and Tibetan High
- Heat wave over South Korea

Cause of rapid expansion of NPSH in July

Annual July trend of 500hPa GPH(1981~2021)

(gpm/1yr)

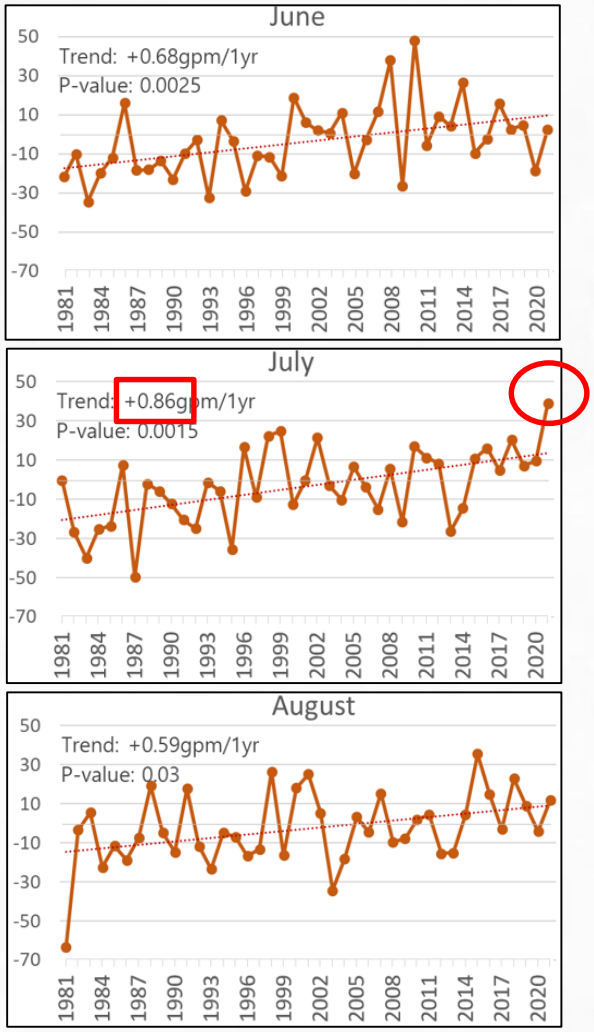


▶ Ascend trend in northern China and Mongolia

	June	July	August
Annual trend of 500hPa GPH(gpm/1yr)	+0.68	**+0.86**	+0.59

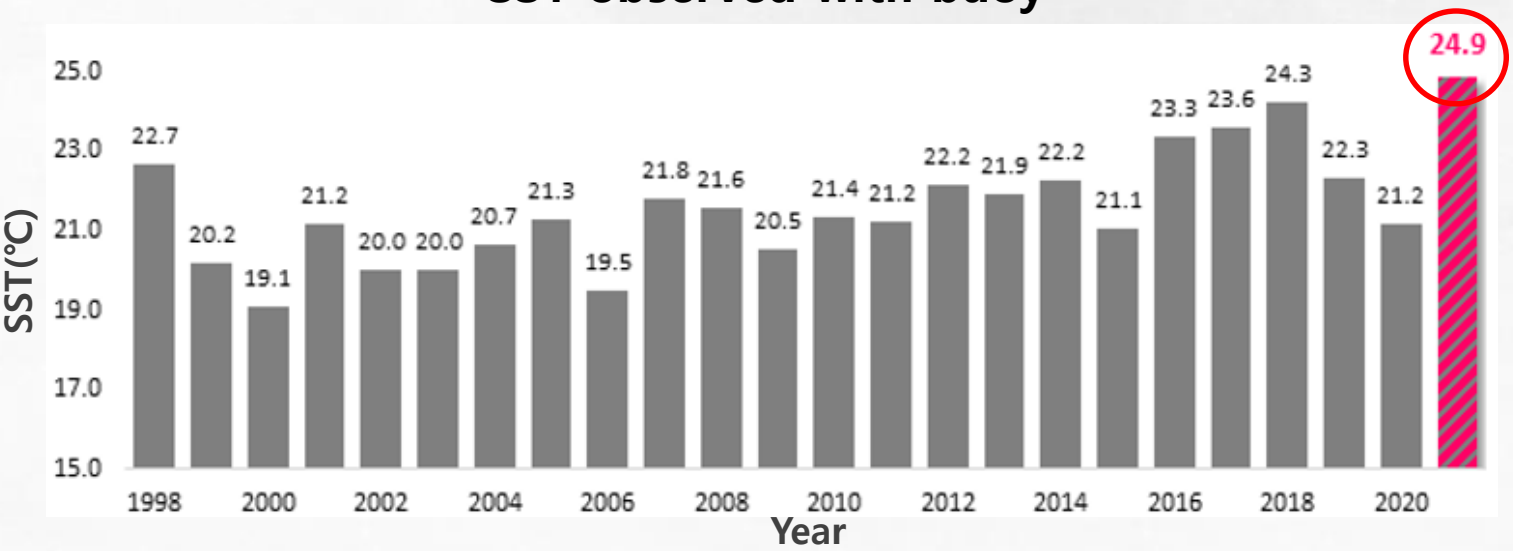
Annual July 500hPa GPH

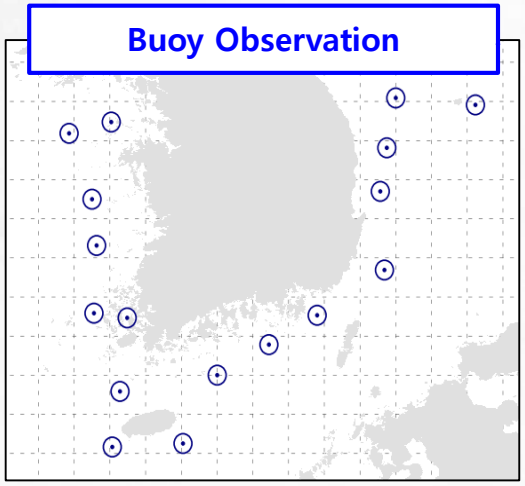
Area: Lat. 40~60°N / Lon. 100~140°E



SST around Korean Peninsula for July

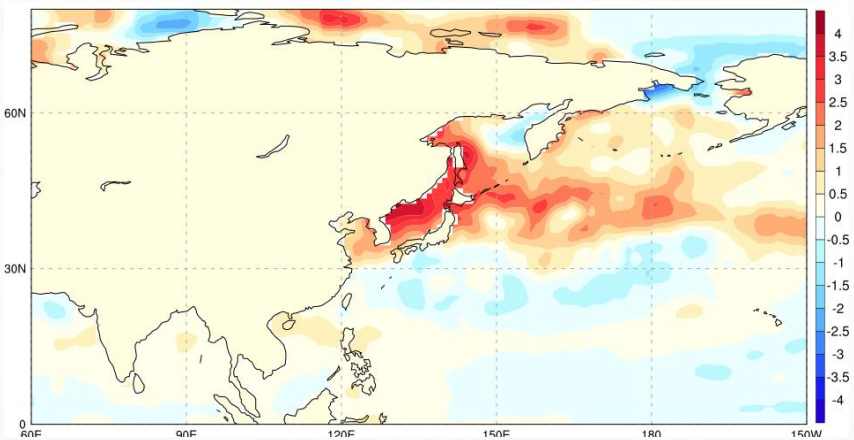
SST observed with buoy





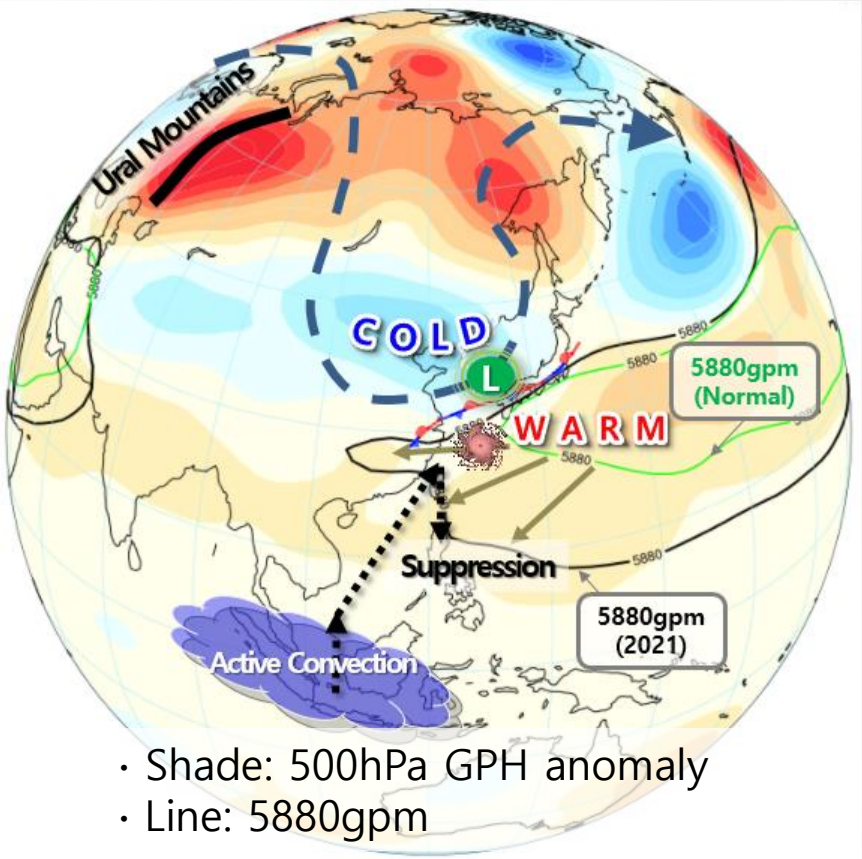
- In July, subtropical high and strong sunlight
- 1st highest SST since 1998

SST anomaly in July, 2021



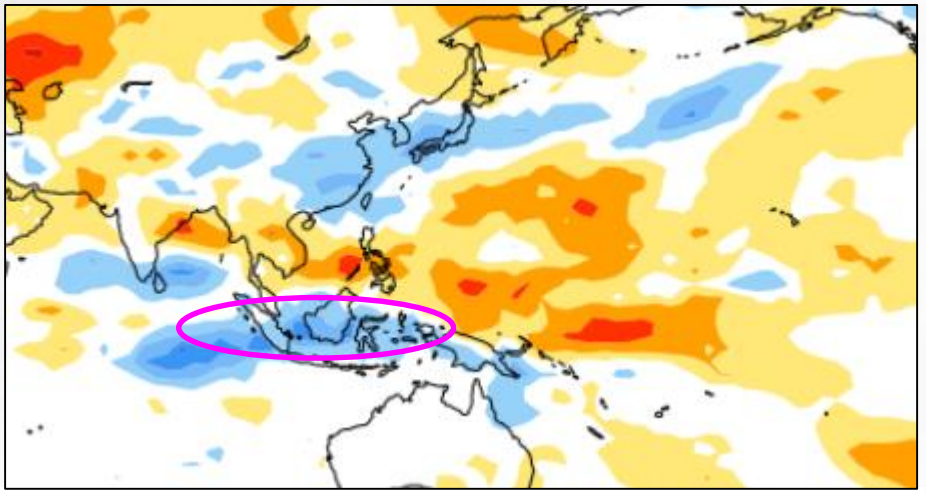
Cause of frequent rain in August

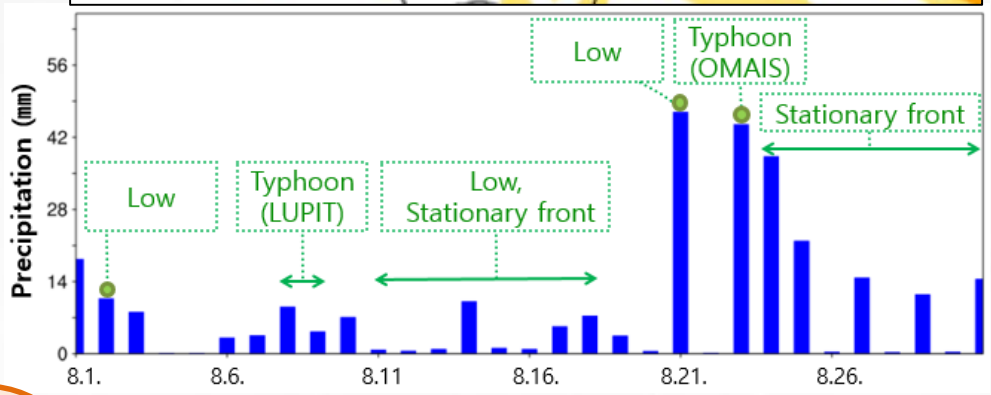
Atmospheric situation in Aug.



- Shade: 500hPa GPH anomaly
- Line: 5880gpm

OLR anomaly in Aug.





(High latitude) Ridge around the Ural Mountains, inducing cold in Korea

(Low latitude) Convection around the Western Pacific, inducing westward expansion of NPSH

- Periodic low, front, typhoon
- Frequent rain and early retreat of heat-wave in Aug.

Summary

Summer temp. & rain

▶ Summer mean temperature: 24.2℃(+0.5 ℃ above the normal)
※ July heat-wave days: 8.1(+4.0 above the normal)

▶ Summer Precipitation: 612.8㎜(27.7%ile)
※ Aug. rainy days: 16.4(+2.6 above the normal)

June~July

(June) Blocking → Slow expansion of NPSH → Late onset of Changma
(July) High AO → Rapid expansion of NPSH → Early end of Changma

▶ Short duration of Changma, Little rain in June~July, Heat wave in July

August

(High latitude) Ridge around the Ural Mountains → Cold air in South Korea
(Low latitude) Convection around the Western Pacific → Westward expansion of NPSH

▶ Periodic influence of low, front, typhoon → Frequent rain in Aug.
→ Early retreat of heat-wave in Aug.

THANK YOU