

Overview of Summer Climate over South Korea in 2023



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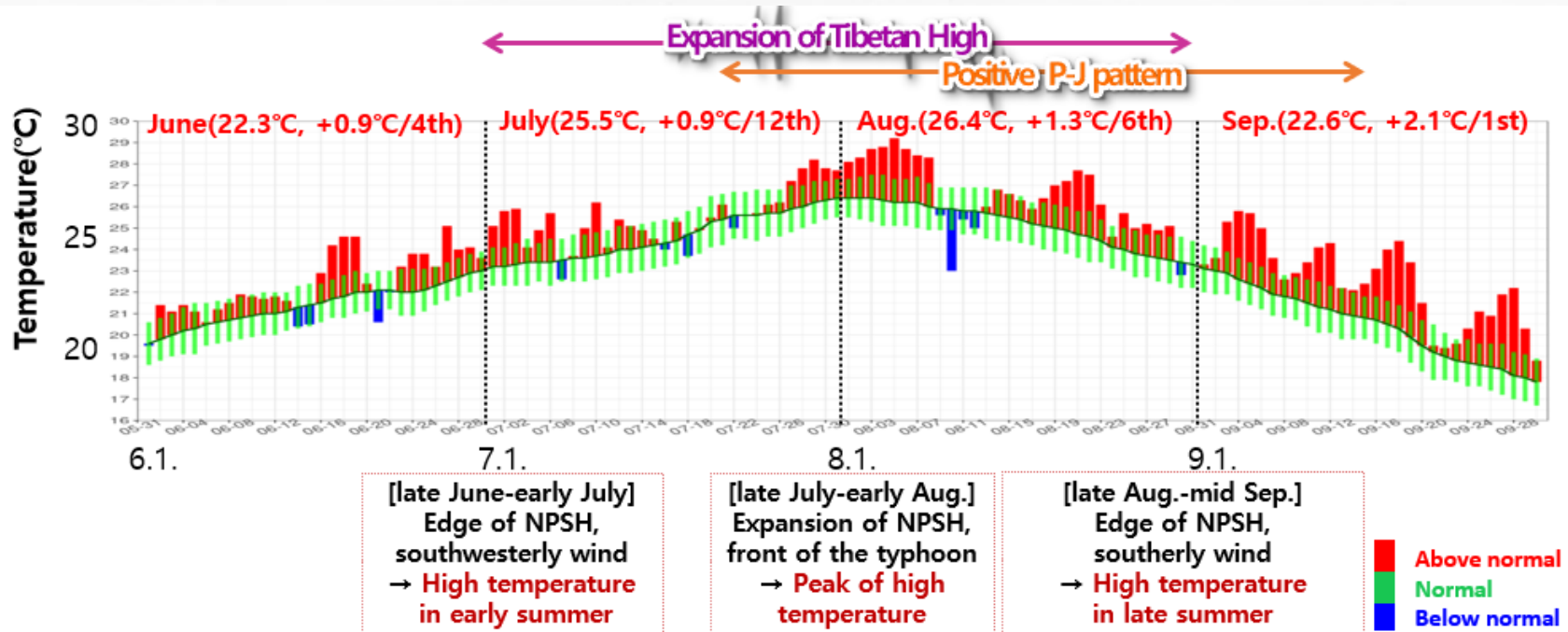
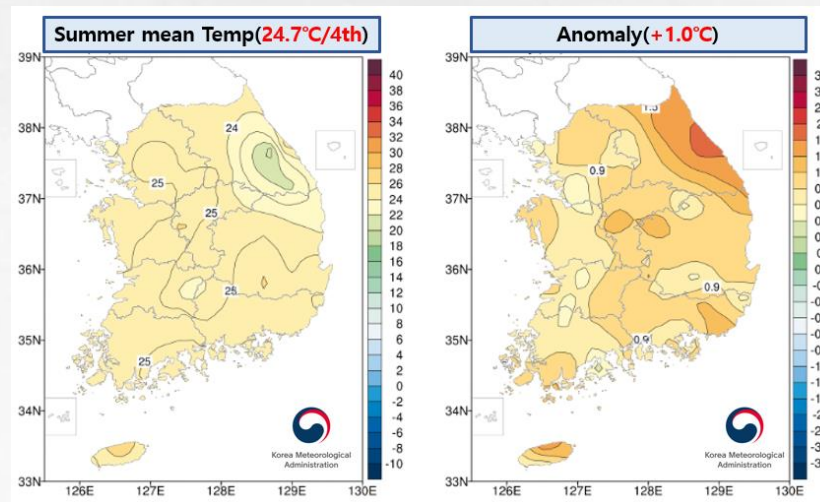
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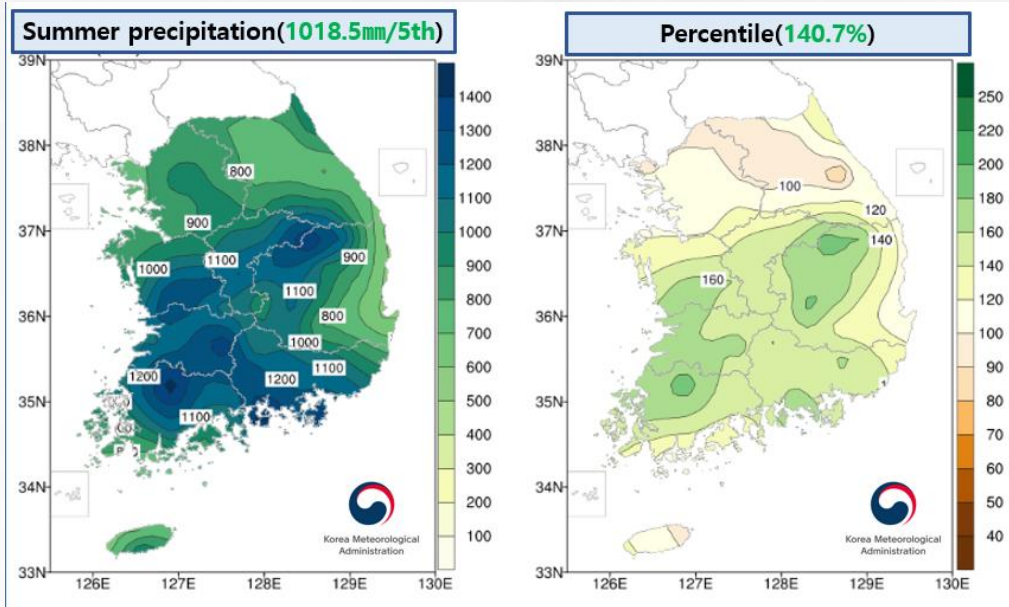
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2023 Summer Temperature & Precipitation

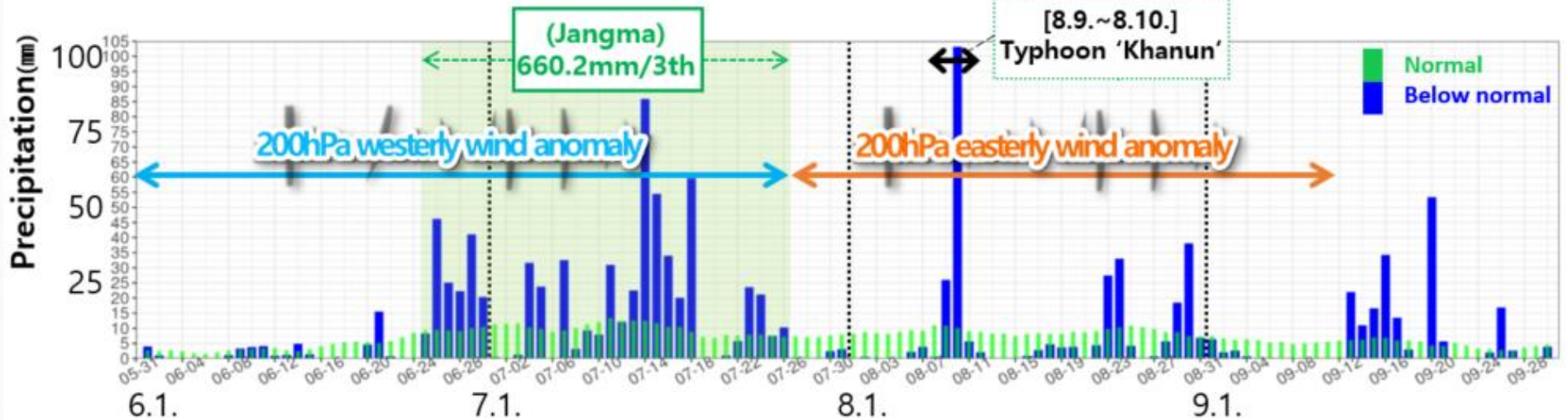
Temperature



Precipitation



June(208.9mm, 142.5%/11th) July(506.4mm, 172.6%/2nd) Aug.(299.6mm, 107.0%/21th) Sep.(198.7mm, 129.6%/20th)

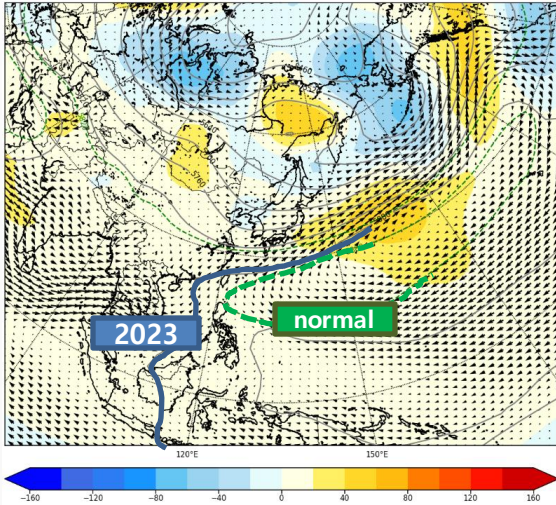


The change with altitude and wind around South Korea

500hPa GPH anomaly & 850hPa wind anomaly

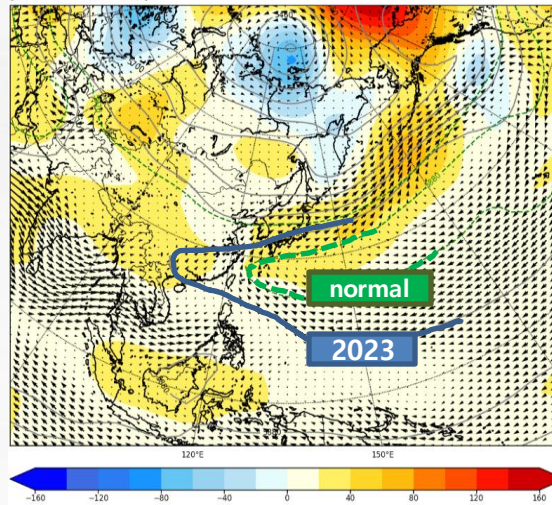
June

500hPa GPH Mean anomaly & 850hPa Wind Mean by NCEP R1 with norm(1991-2020)
[2023.06.01-2023.06.30]



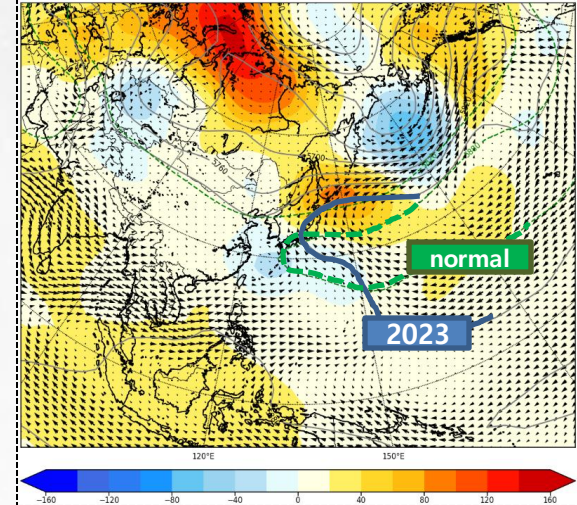
July

500hPa GPH Mean anomaly & 850hPa Wind Mean by NCEP R1 with norm(1991-2020)
[2023.07.01-2023.07.31]



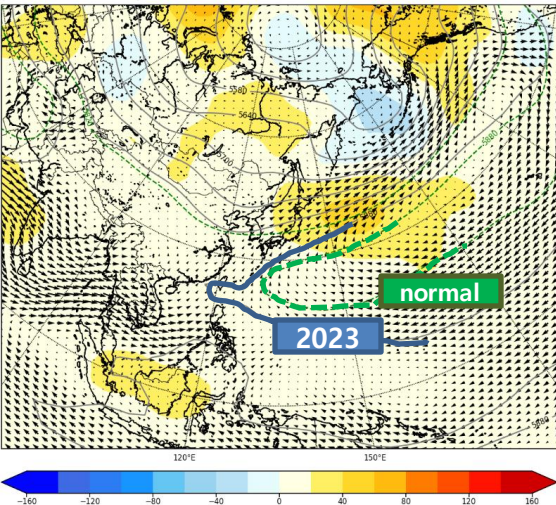
August

500hPa GPH Mean anomaly & 850hPa Wind Mean by NCEP R1 with norm(1991-2020)
[2023.08.01-2023.08.31]



June-August

500hPa GPH Mean anomaly & 850hPa Wind Mean by NCEP R1 with norm(1991-2020)
[2023.06.01-2023.08.31]



▶ June-August 5880gpm line slightly expanded than normal

- June, July, August, All positive altitude anomaly in the east of Korea
- June-July, Southwesterly wind → High temperature & Heavy rainfall
- August, Positive P-J pattern & Southeasterly wind → High temperature

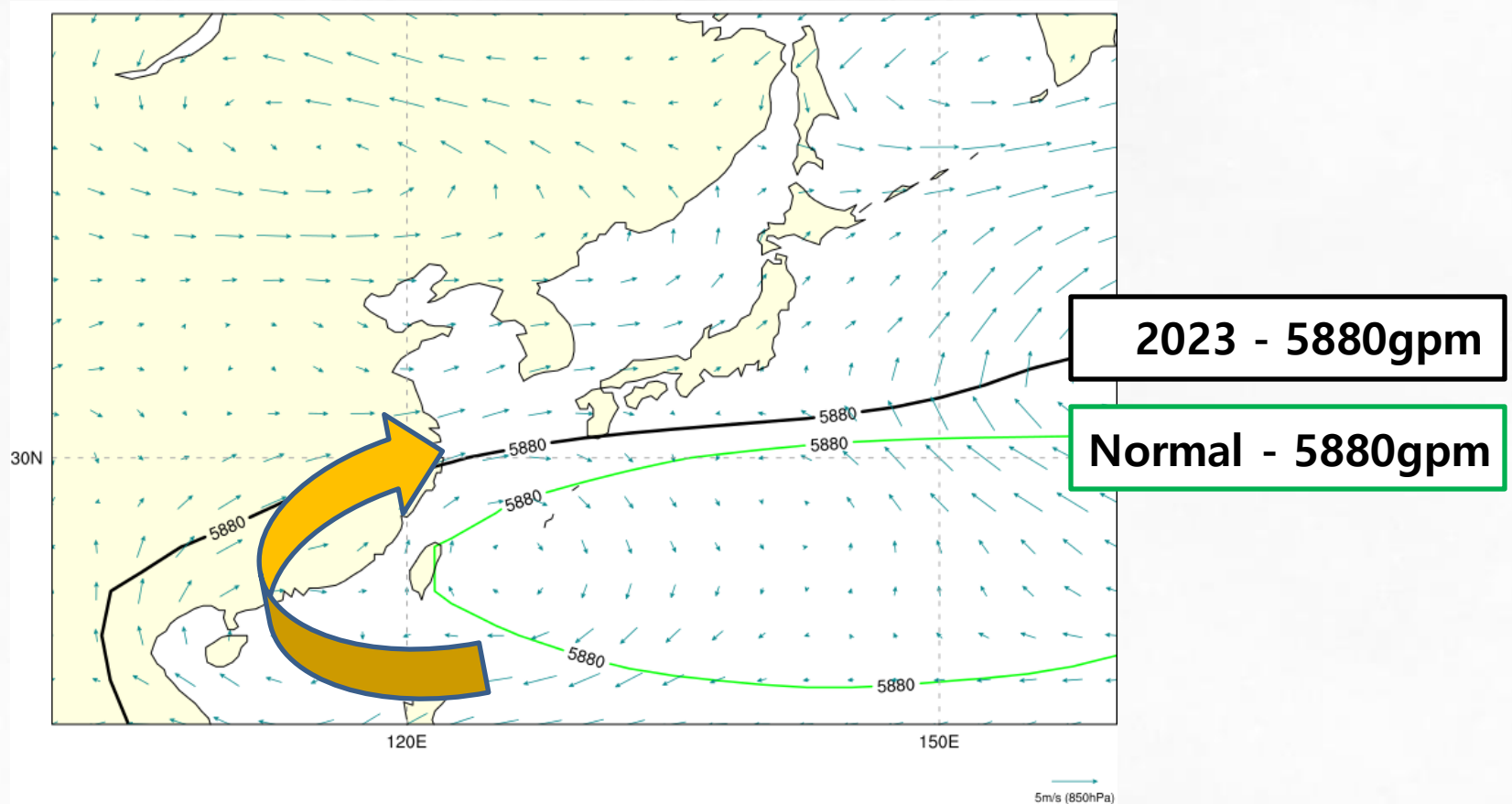


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Main Characteristics of Temperature

Temperature characteristics by period

5880gpm line & 850hPa wind anomaly (2023.6.21.~7.10.)



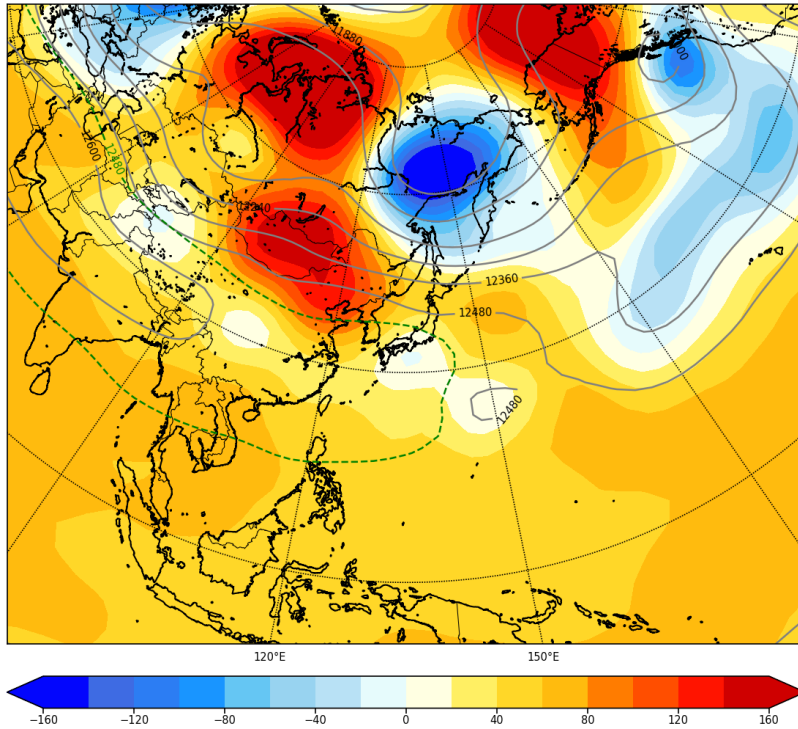
- ▶ (late June-early July)
Edge of NPSH - Inflow of hot and humid wind

Temperature characteristics by period

After Jangma - Early August

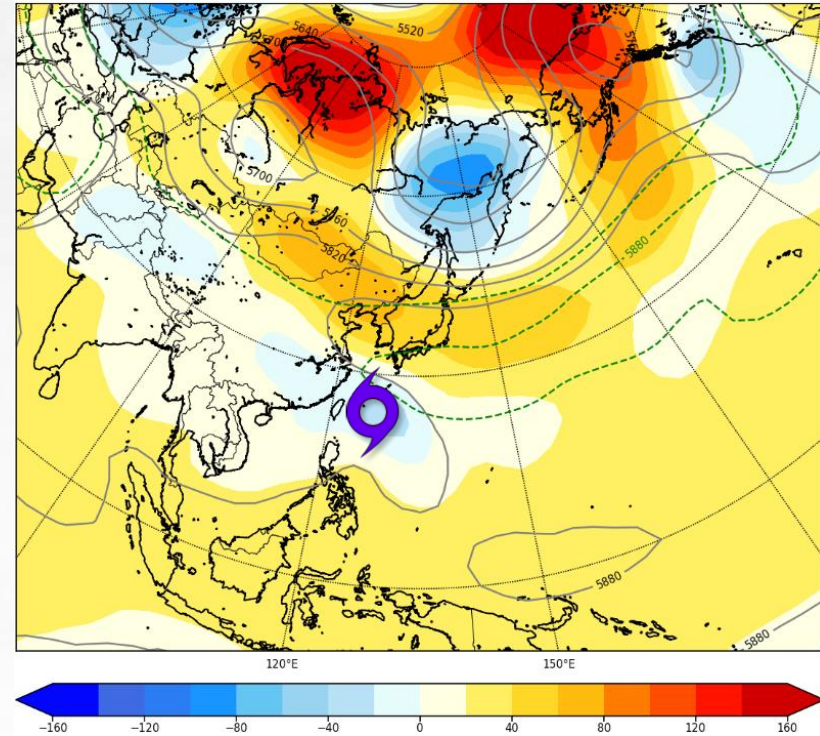
200hPa GPH anomaly

200hPa GPH Mean anomaly by NCEP R1 with norm(1991~2020)
[2023.07.27~2023.08.02]



500hPa GPH anomaly

500hPa GPH Mean anomaly by NCEP R1 with norm(1991~2020)
[2023.07.27~2023.08.02]



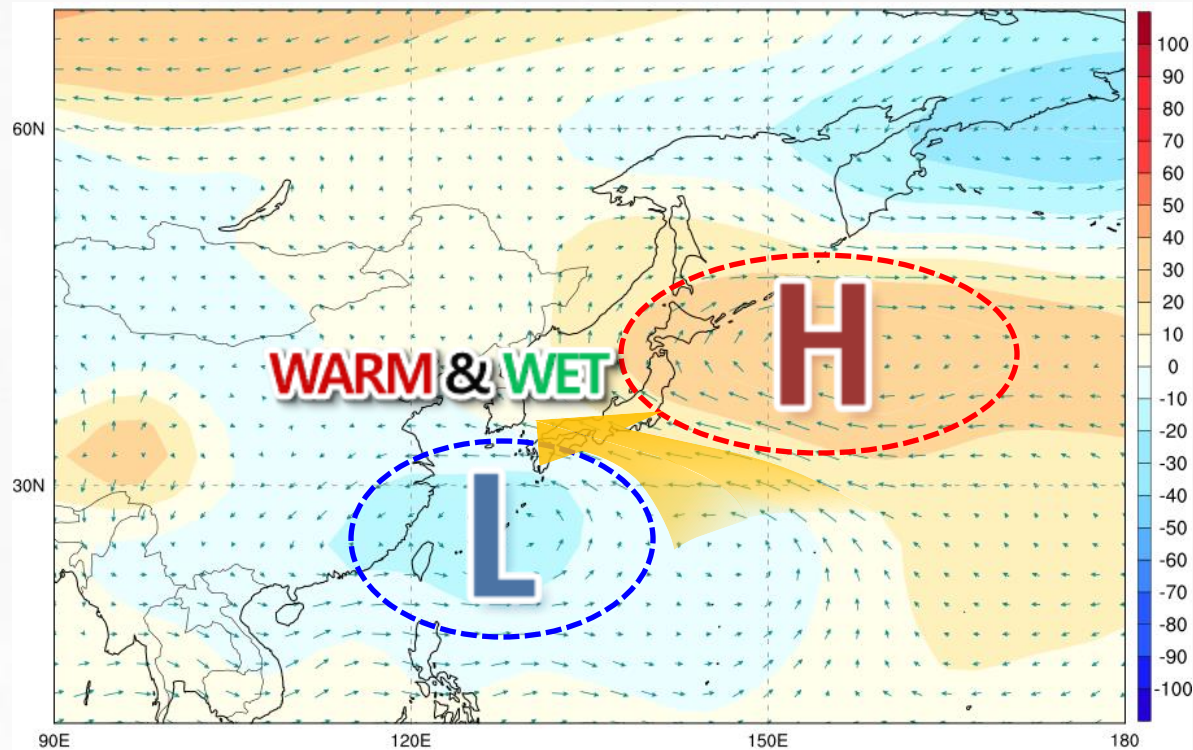
- ▶ NPSH expansion & Indirect effects of typhoon, Strengthening Downward Flows
- ▶ Tibetan high expansion



Maximum high temperature with strong insolation

Temperature characteristics by period

2023.7.21.~9.15. 850hPa GPH anomaly & wind anomaly



► Late July - mid September positive P-J pattern
→ Development of Anticyclone

Continuation of high temperature pattern
by inflow of warm and wet air



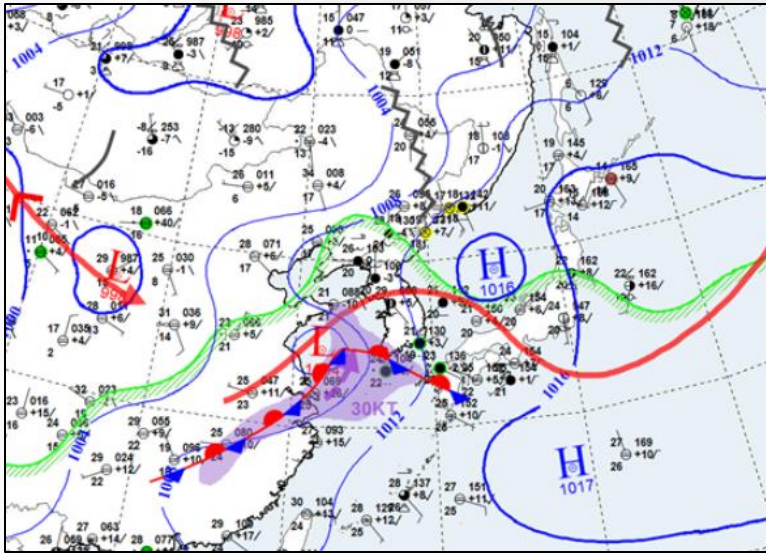
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Main Characteristics of Precipitation

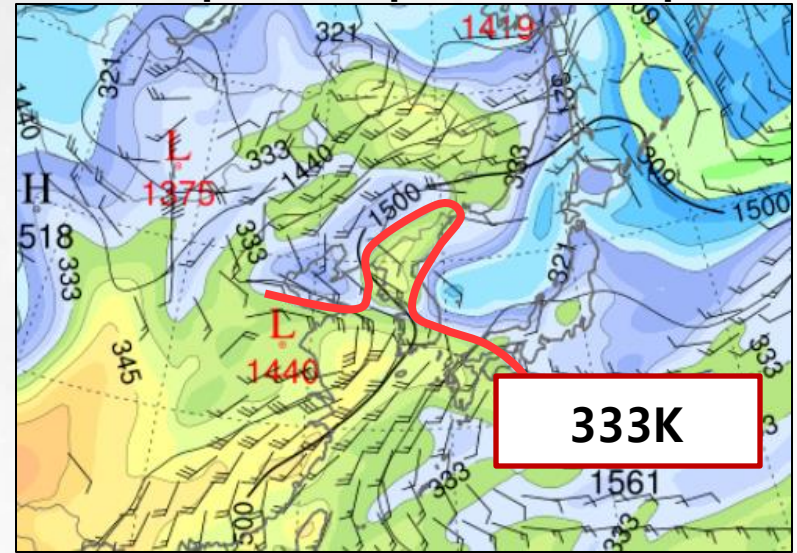
Much rainfall during Jangma

Beginning
of Jangma
2023.6.25.

Surface map

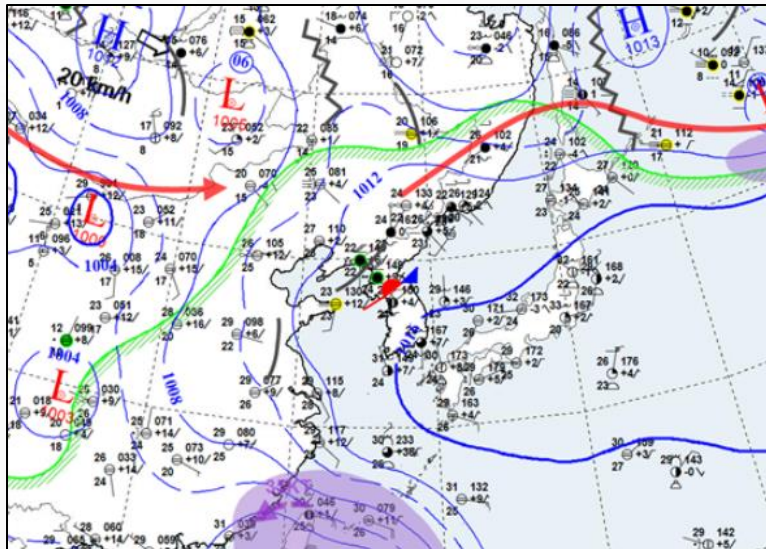


850hPa equivalent potential temperature

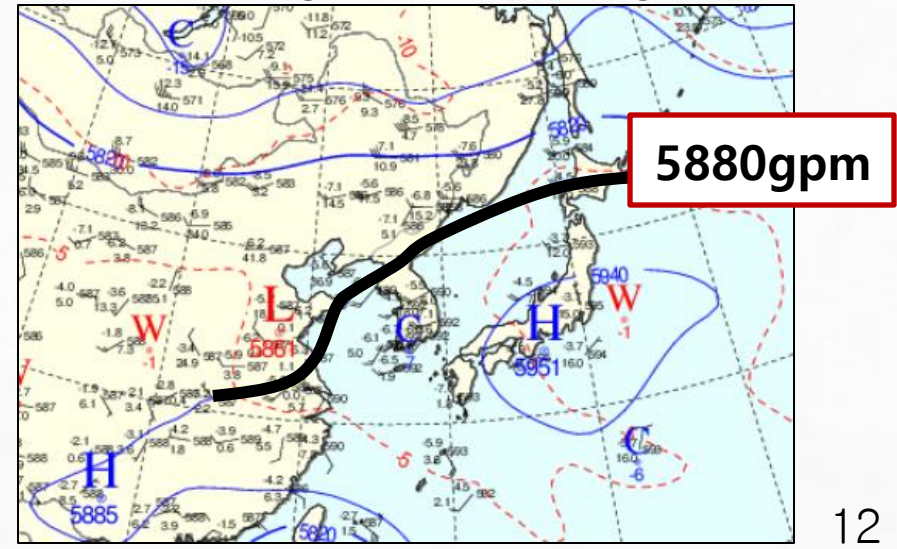


End of
Jangma
2023.7.26.

Surface map



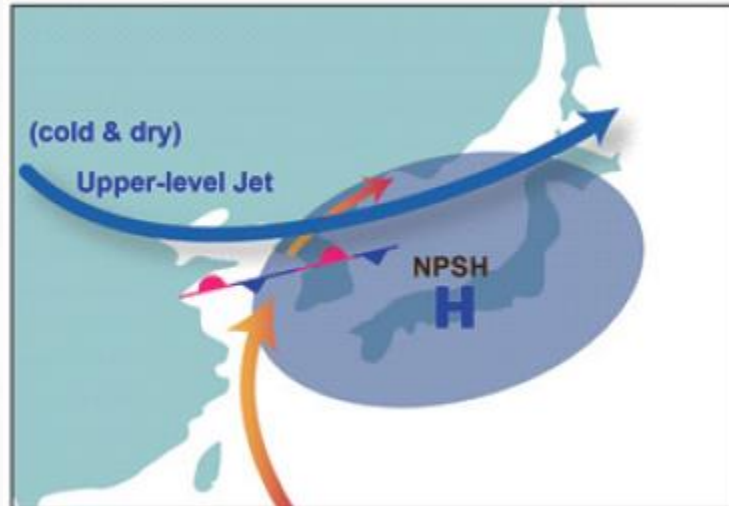
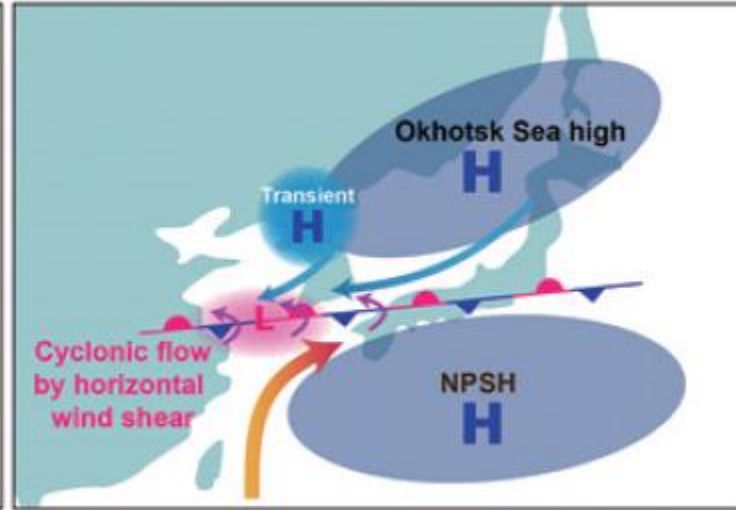
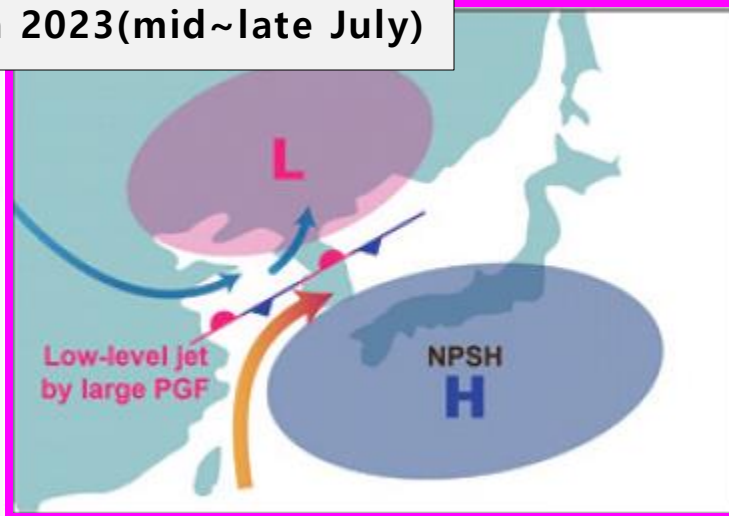
500hPa geopotential height



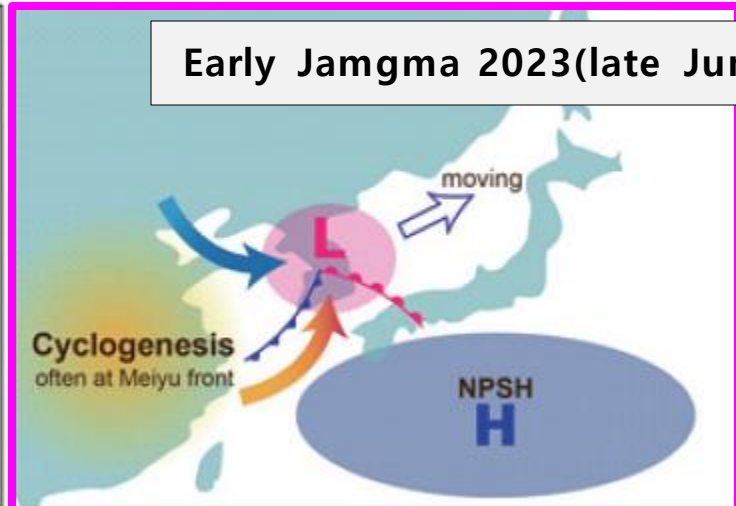
Much rainfall in Jangma 2023

Jangma season barometer pattern of South Korea(Synoptic Scale)

Late Jangma 2023(mid~late July)



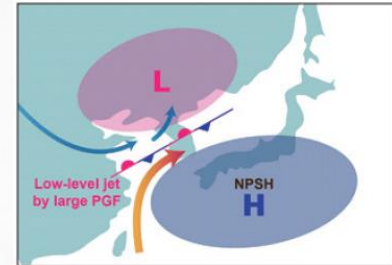
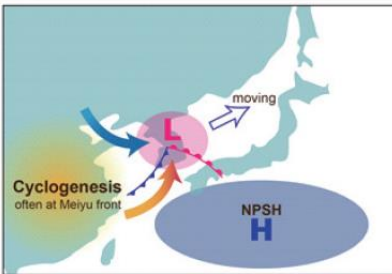
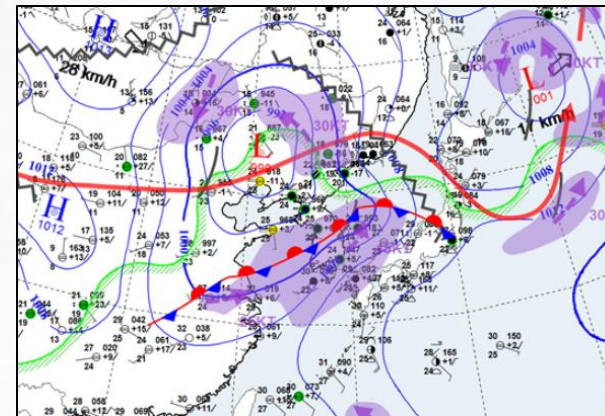
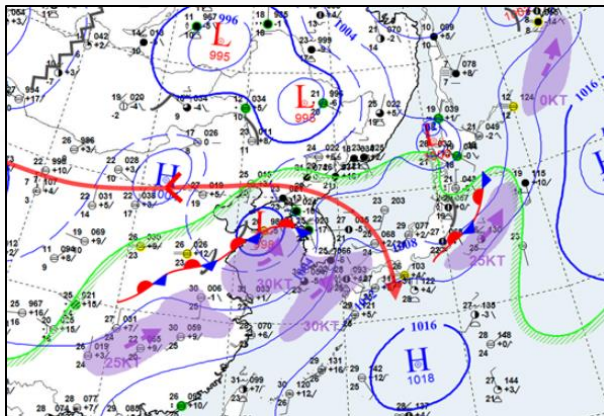
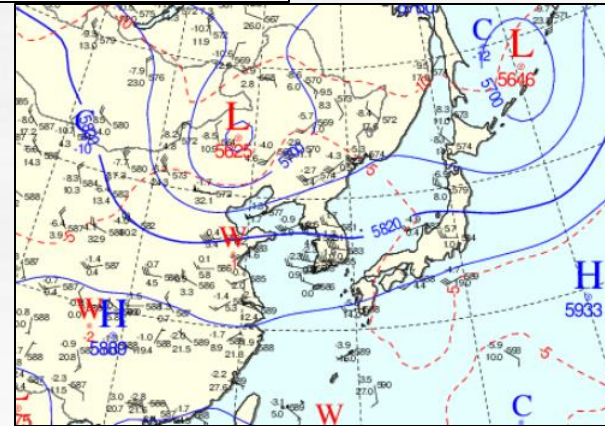
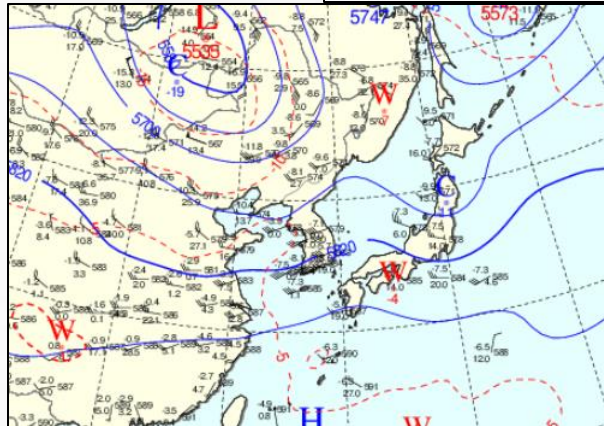
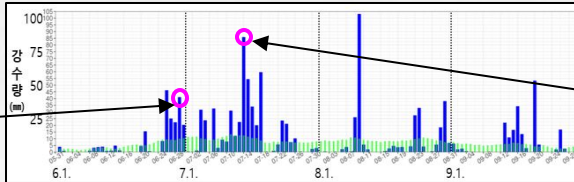
Early Jangma 2023(late June~early July)



Much rainfall during Jangma

6.29.

7.14.



► Late June, Cyclone develops in Central China
→ Moving east along the edge of mT

► Mid July, Development of stationary trough
→ Inflow of cold air by edge of mT & collision



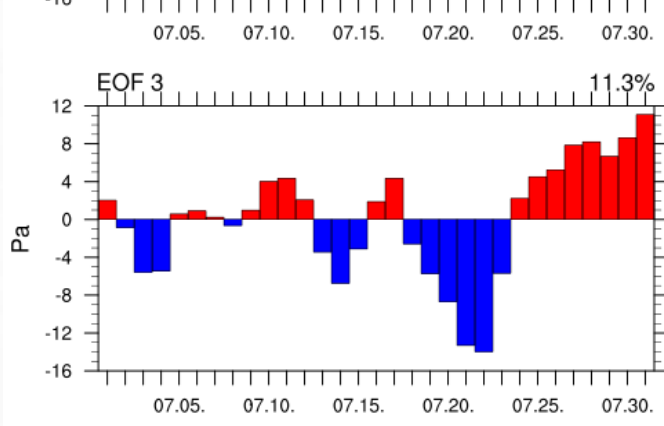
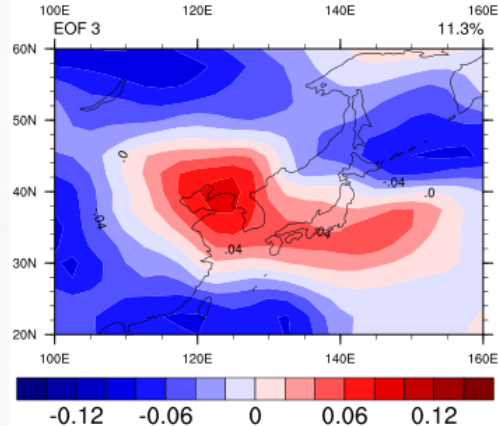
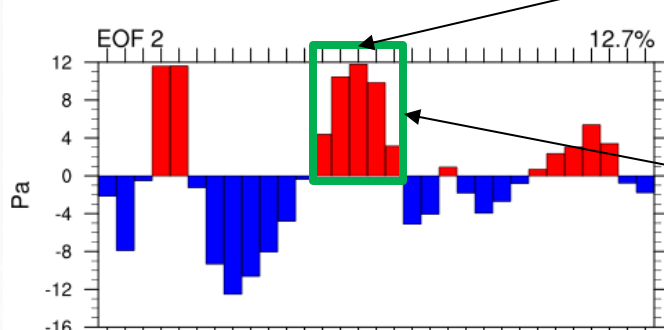
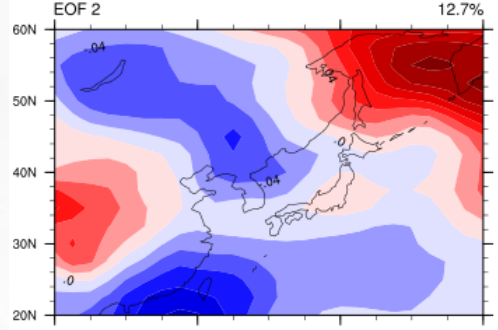
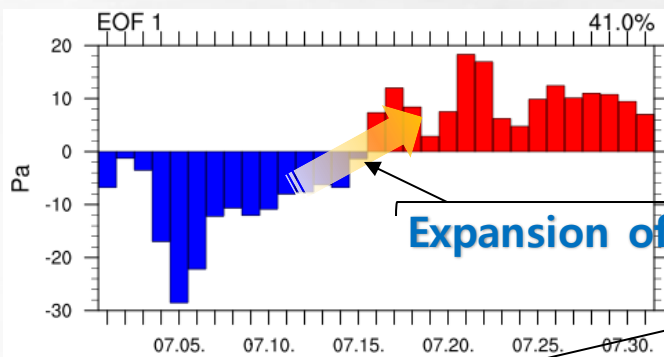
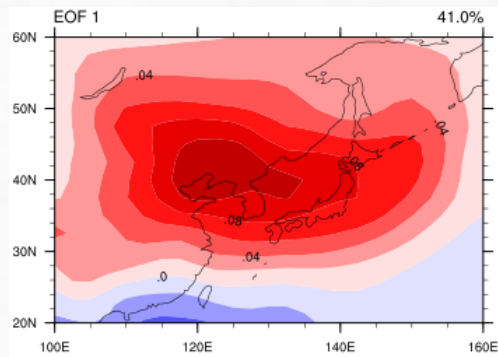
Heavy rain



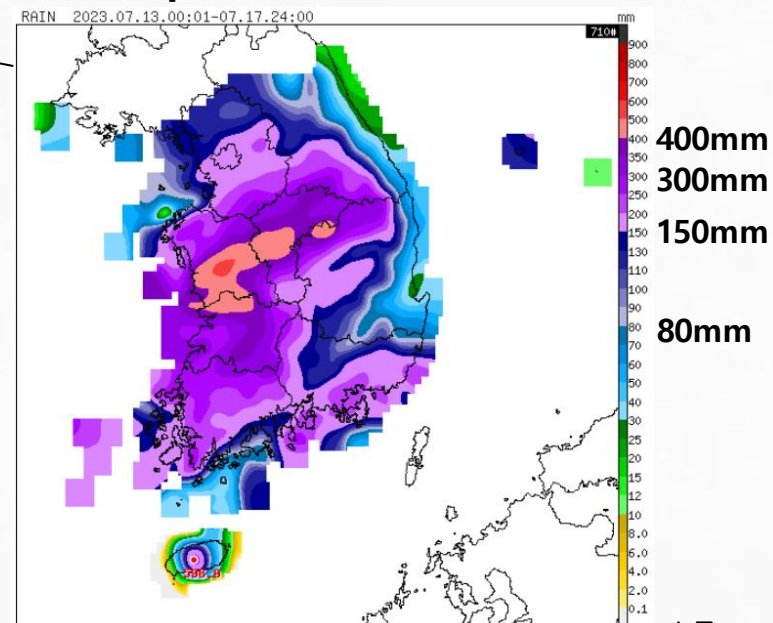
Very heavy rain

Heavy rainfall during Jangma

SLP EOF analysis (2023.7.1~7.31.)

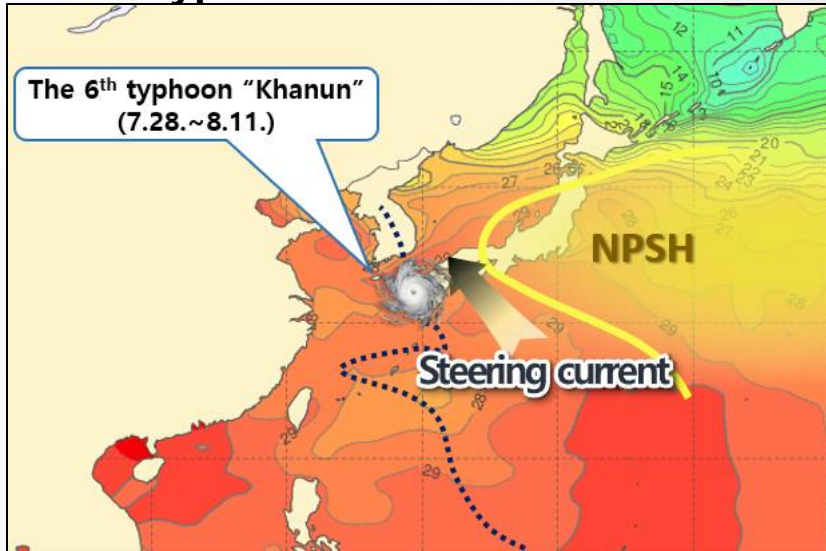


Precipitation(2023.7.13~17.)



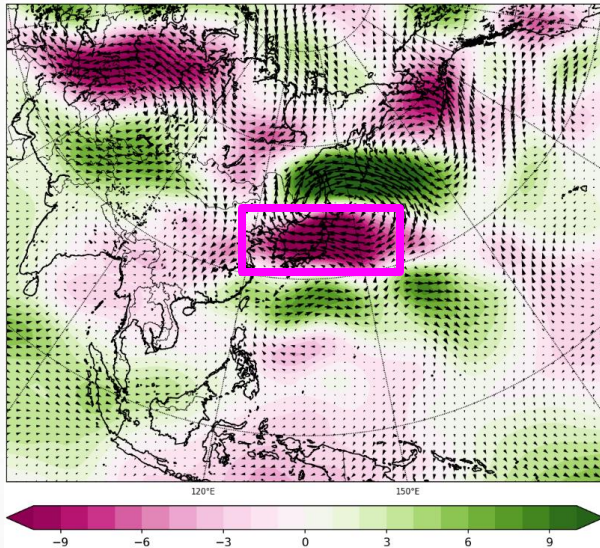
Typhoon

Typhoon "Khanun" & SST

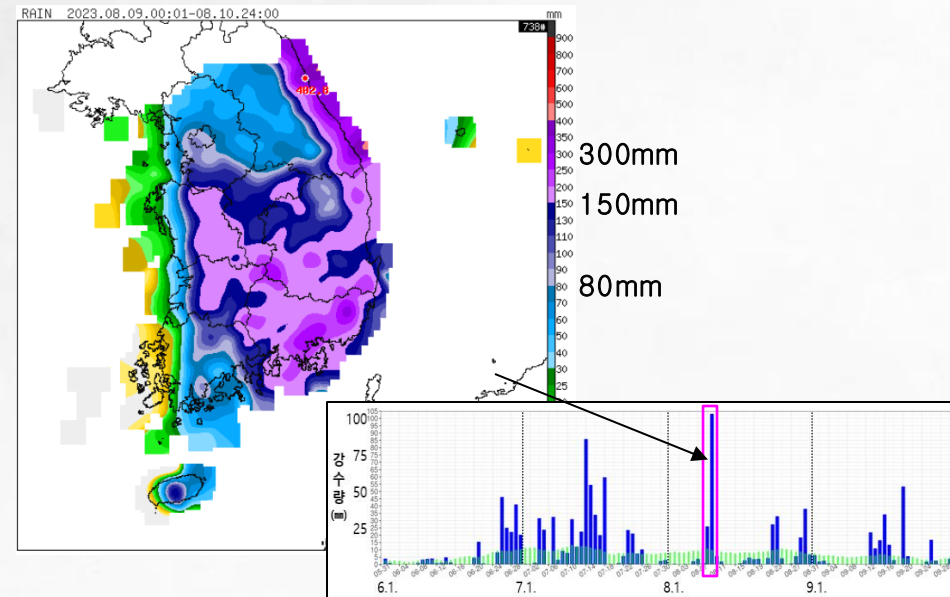


200hPa wind anomaly (Aug. 2023)

200hPa WIND Mean anomaly by NCEP R1 with norm(1991-2020)
[2023.08.01-2023.08.31]



Precipitation(2023.8.9.~8.10.)



Unusual path of the typhoon

- ▶ NPSH developed east of Korea
→ Typhoon moved northwest to Korea without converting

Easterly wind anomaly of upper air

- ▶ 200hPa easterly wind anomaly
→ The conditions were that it wouldn't rain much, the rainfall in August was at the average level due to the typhoon.



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Summary

✓ Summer temp. & precipitation in 2023

- ▶ Summer mean temperature: 24.7°C (+1.0 °C higher than normal)
- ▶ Summer precipitation: 1018.5mm (89.2%ile)

✓ Inflow of hot and humid wind

Development of NPSH in the east of Korea & Positive P-J pattern

- ▶ Inflow of southerly wind



Continuation of high temperature

✓ Strengthen of stationary front & Impact of typhoon in August

(Early Jangma) Activation of cyclone by edge of NPSH

(Mid-late Jangma) Strengthening stationary front between NPSH and cold trough

(Aug.) Typhoon "Khanun" passed through Korean peninsula



Much rainfall

THANK YOU