Overview of Summer Climate over South Korea 2022

HWANG Hoseong, KIM Miju, KIM Jeongsik

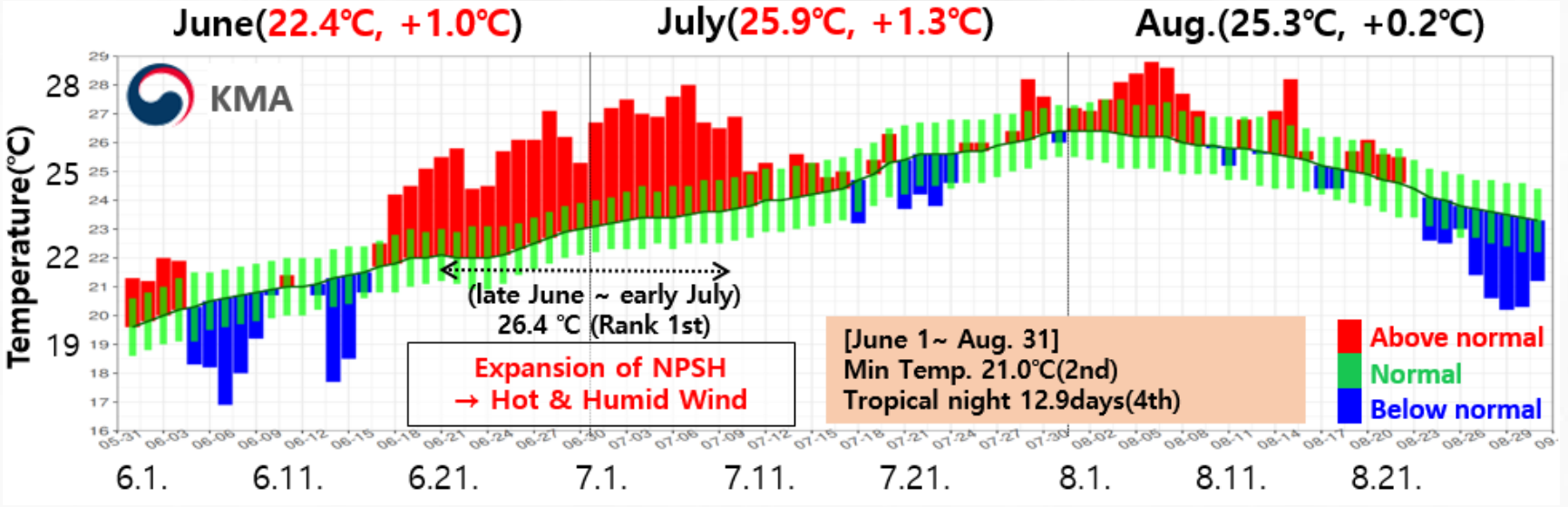
Climate Change Monitoring Division, KMA

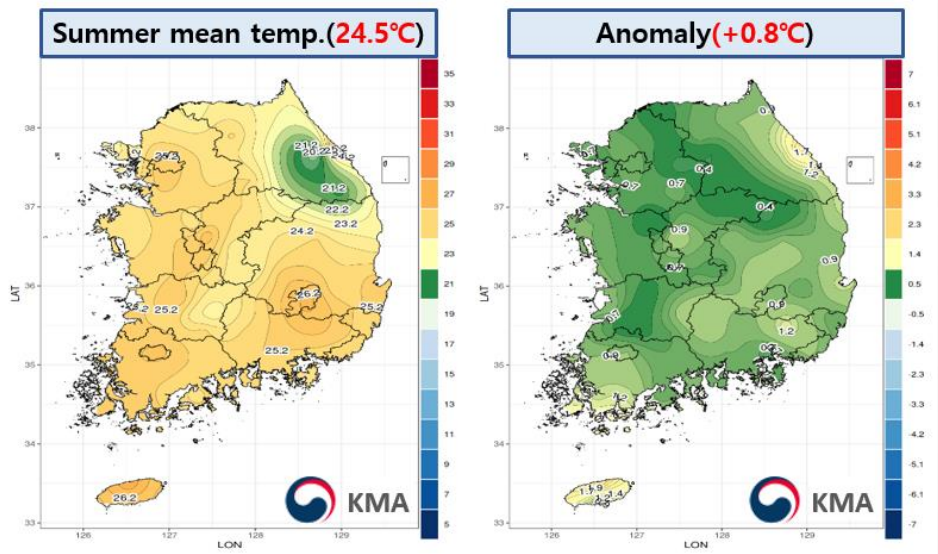
KMA

Contents

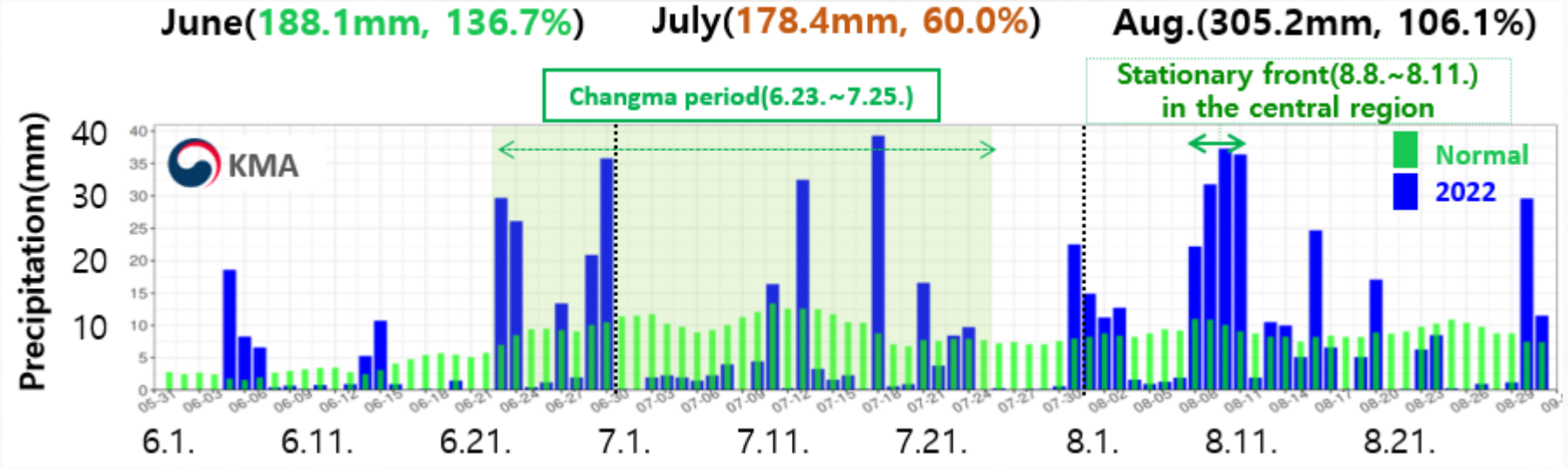
1 2022 Summer Temperature & Precipitation

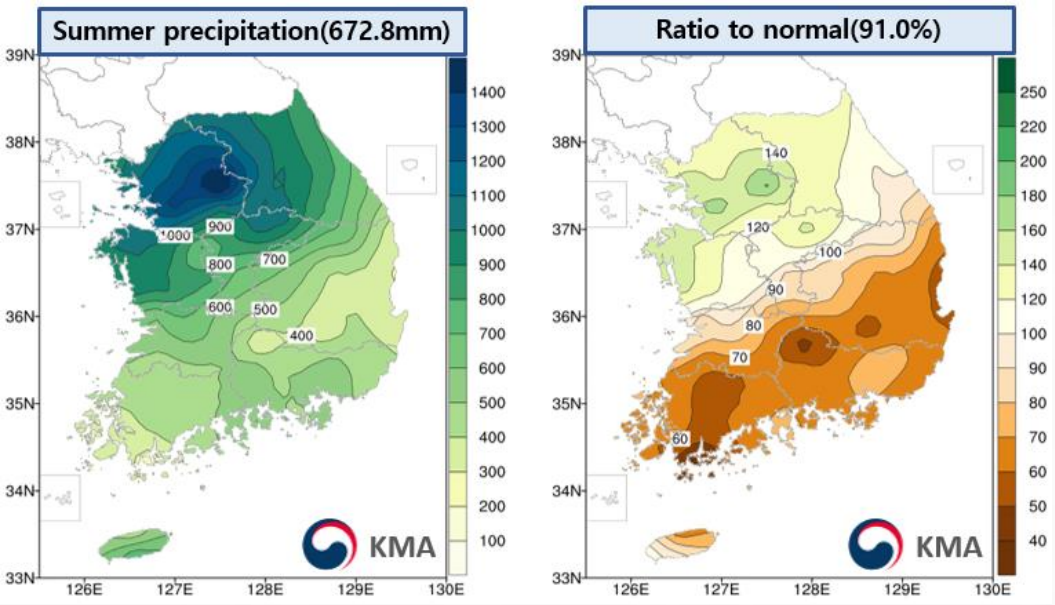
Temperature





Precipitation

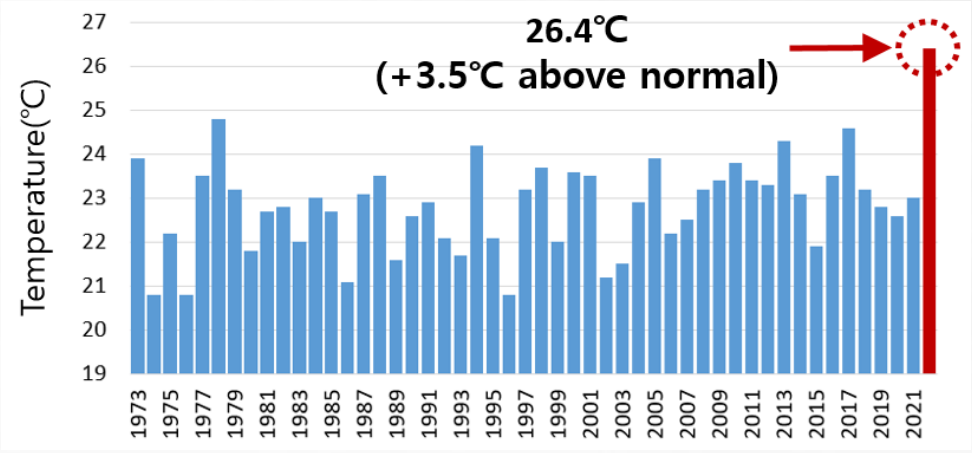




2 Main Characteristics of Temperature

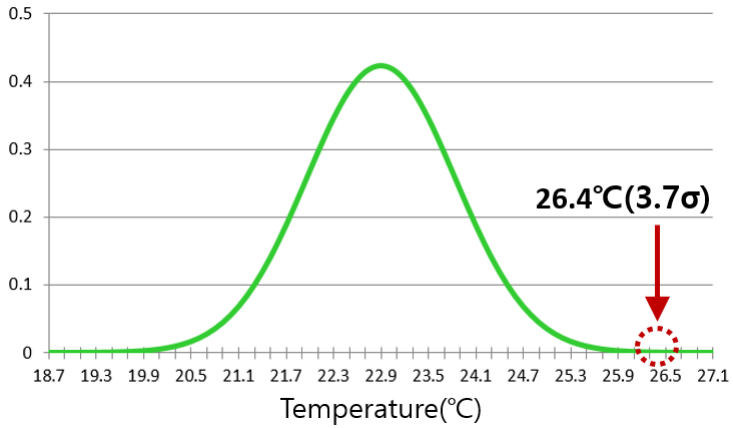
High Temp. in Early Summer

Annual trend (avg. temp. Jun. 21 – Jul. 10)

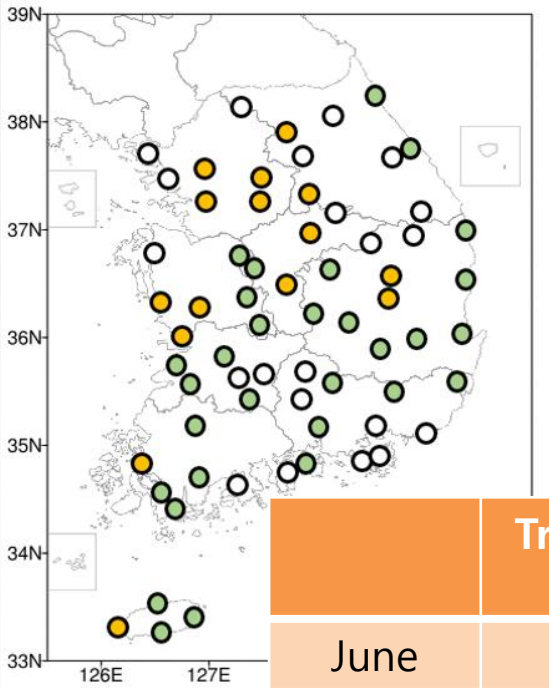


▶ 1st highest temperature since 1973

PDF (avg. temp. Jun.21 – Jul.10)



Occurrence of tropical nights in June since observations began

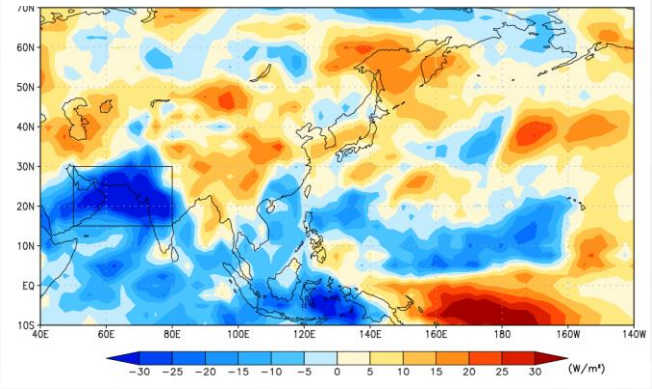


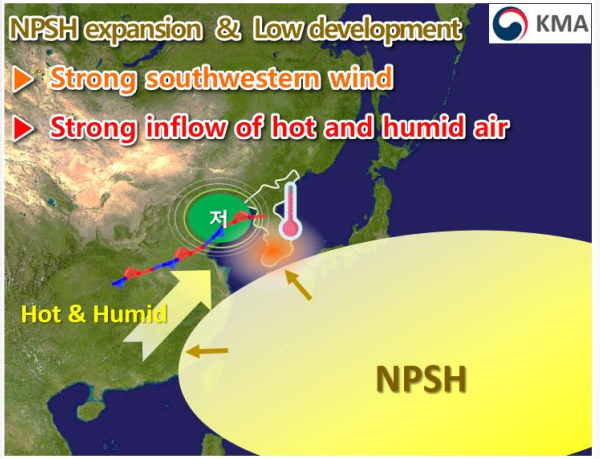
	Tropical night days (rank)
June	1.2 (1th)
Summer	12.9 (4th)

- The first time in June since observations began.
- None in June since observations began.
- More than once in June since observations began

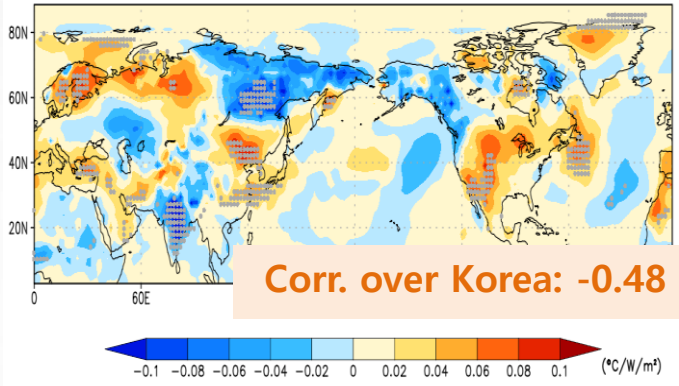
High Temp. in Early Summer

OLR anomaly (Jun. 16 – Jul. 15, 2022)

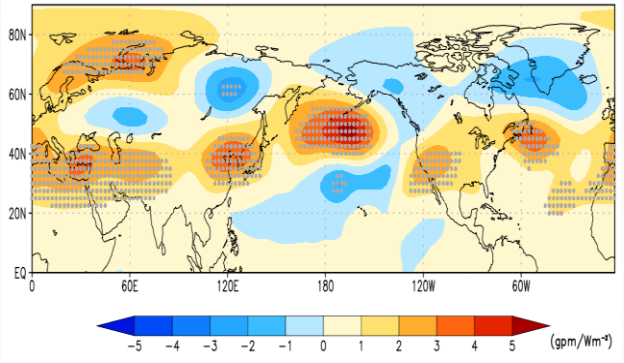




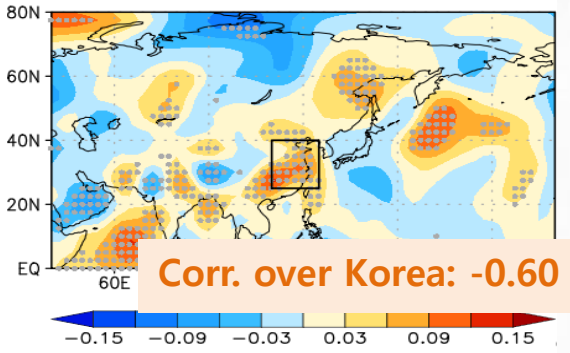
Regr. of Indo Convection and T2m (6.16.~7.15.)



Regr. of Indo Convection and H200 (6.16.~7.15.)



Regr. of Indo Convection and V850 (6.16.~7.15.)



* Source: Prof. Min(POSTECH)

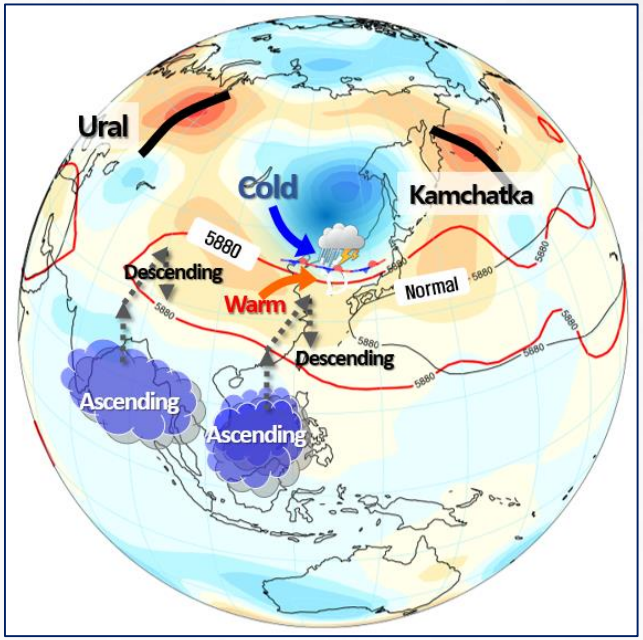
Strong convection in northwest India

- East Asian temperatures rise; Siberian temperatures fall
- Anticyclone anomaly over Korea (CGT-like pattern)
- South-wind enhancement in southwest from Korea

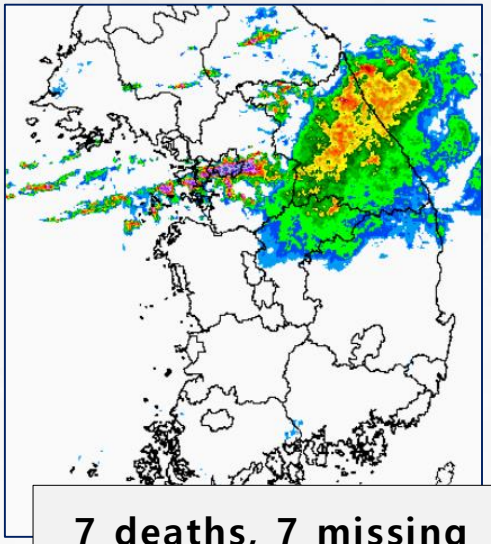
3 Main Characteristics of Precipitation

Heavy Rainfall Even After Changma

Schematic diagram (Aug. 8-11, 2022)

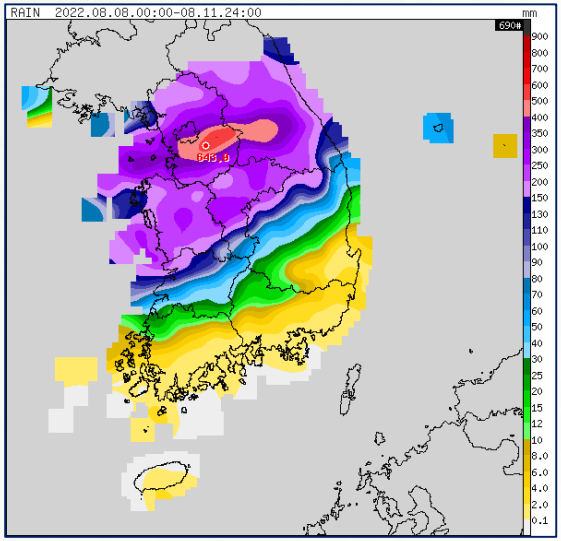


Radar echo (Aug. 8, 2022 at 20:30)



7 deaths, 7 missing

Precipitation (Aug. 8-11, 2022)



Two ridges develop in the Ural Mountains and near Kamchatka
- ▶ Cold dry air inflow

Cold air
vs
Warm air

Strong convection in tropical western Pacific and East Indian Oceans
- ▶ NPSH Develops East-West

Stationary front anchored over the central region

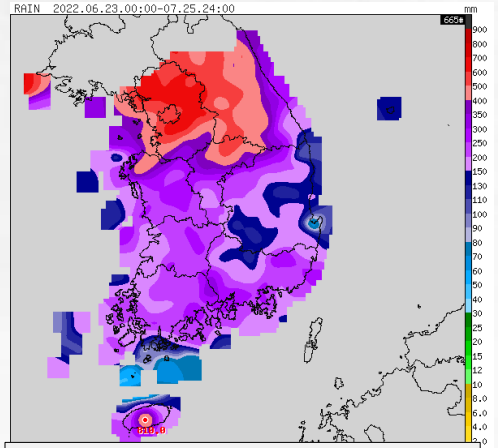
Heavy Rainfall Even After Changma

Precipitation

	Changma	After Changma (~ Aug. 31)
2022	**284.1mm**	**333.5mm**
Normal year	356.7mm	304.5mm

Precipitation distribution

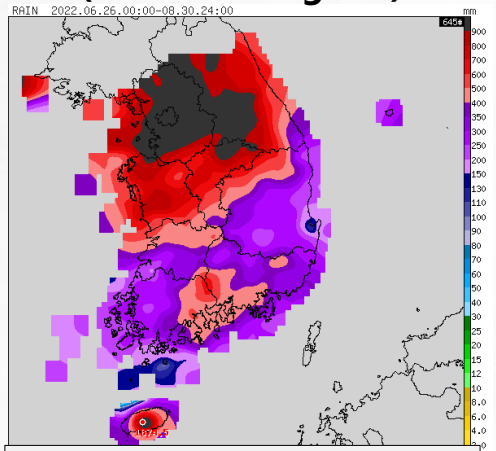
Changma season (Jun. 23 – Jul. 25, 2022)



284.1mm

42.2% of summer precipitation

After Changma (Jul. 26 – Aug. 31)

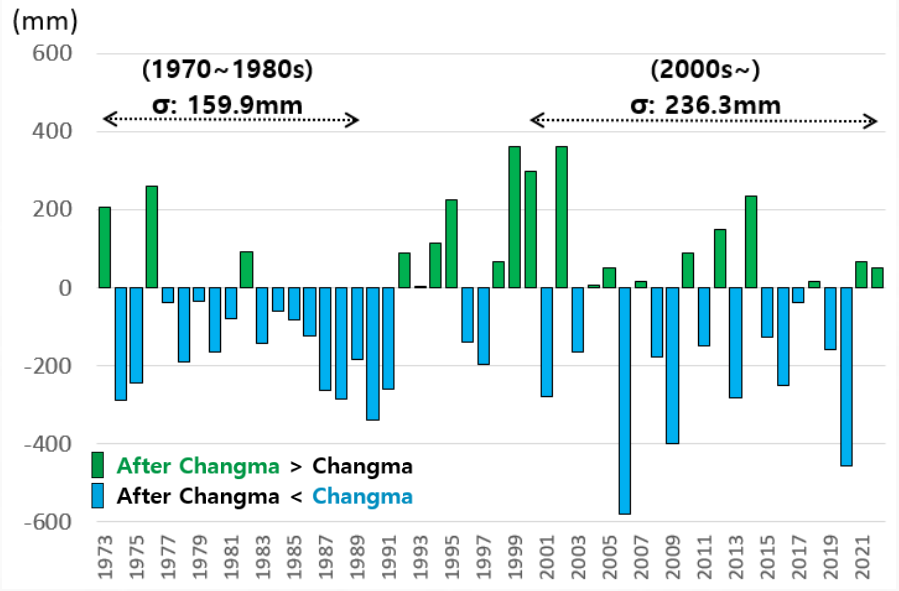


333.5mm

49.8% of summer precipitation

Precipitation difference

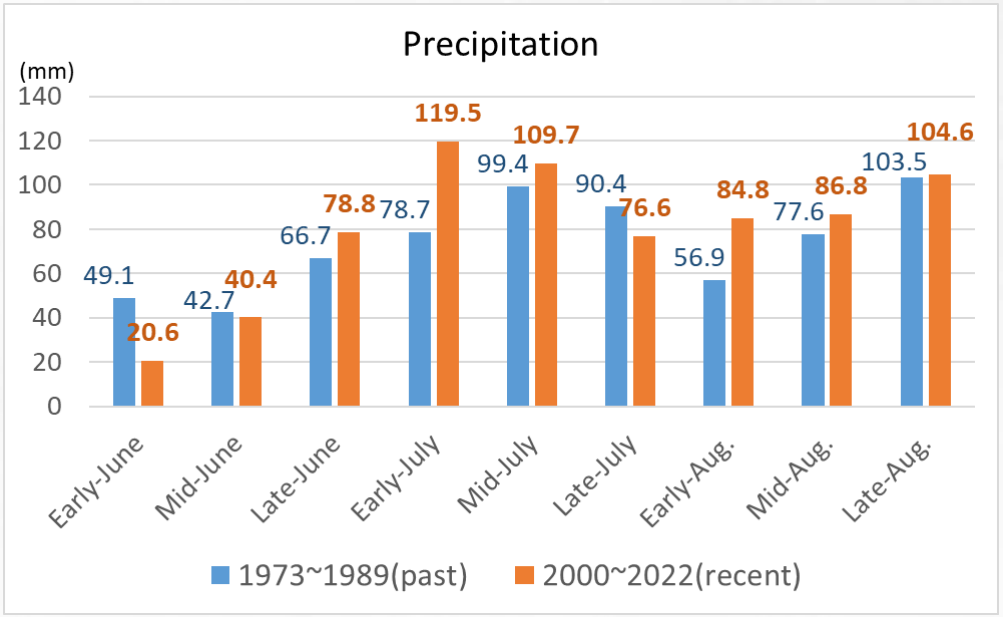
(After Changma – Changma)



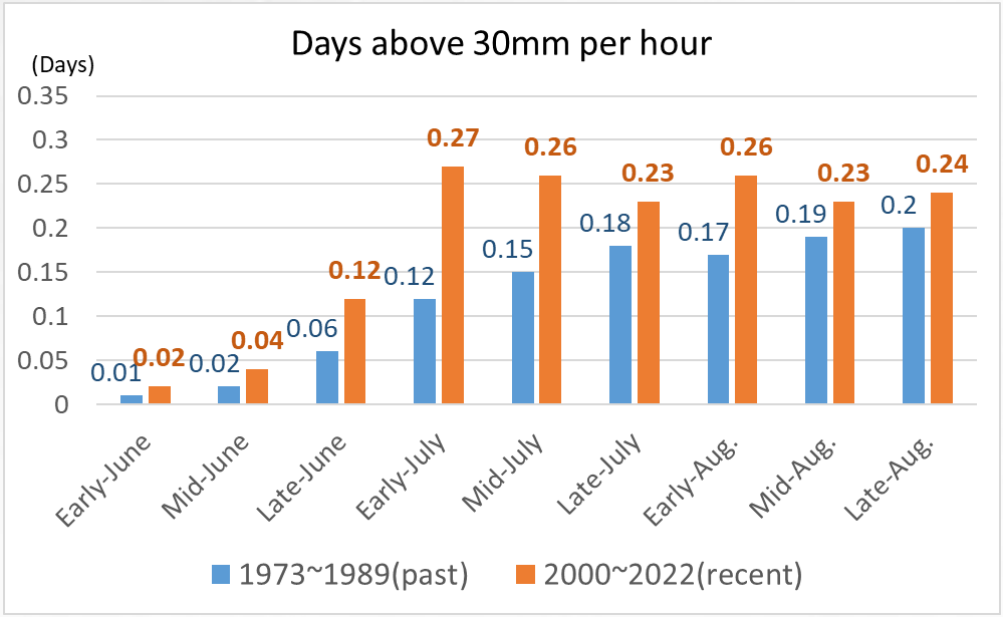
- Since the 1990s, precipitation after Changma tends to increase more than that during Changma.
- The variation of the difference has also increased compared to the past.

Heavy Rainfall Even After Changma

Precipitation by period (Early Jun. - Late Aug.)



Days above 30mm/hr by period (Early Jun. - Late Aug.)

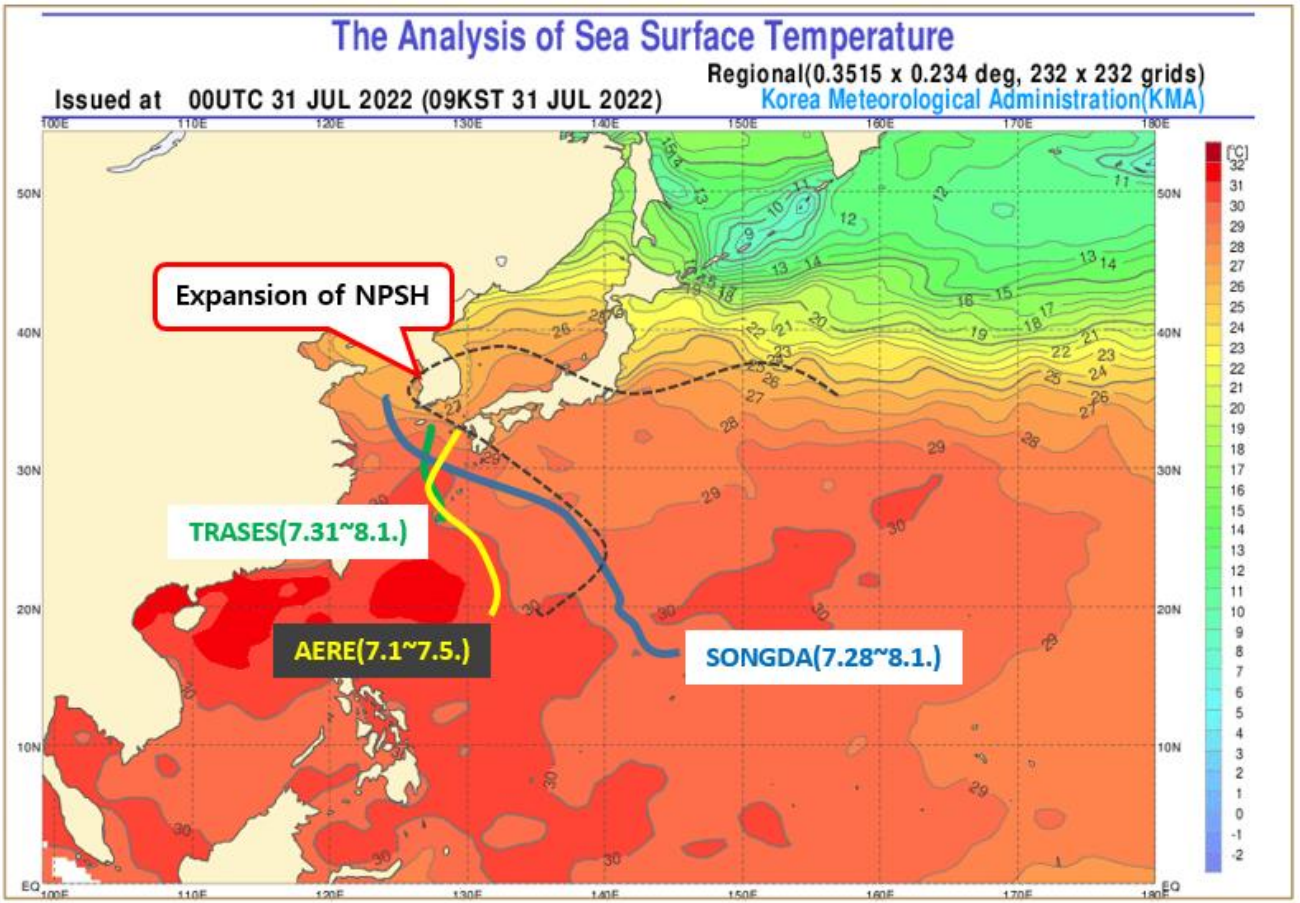


- ▶ Precipitation in early June & early Aug: Obvious increase in recent years
- ▶ No. of days with strong rain from Jul to Aug.: Similar across all periods in recent years

4 Typhoons

Typhoons in Summer (Jun. – Aug.)

Typhoon tracks in summer (Jun.–Aug.)

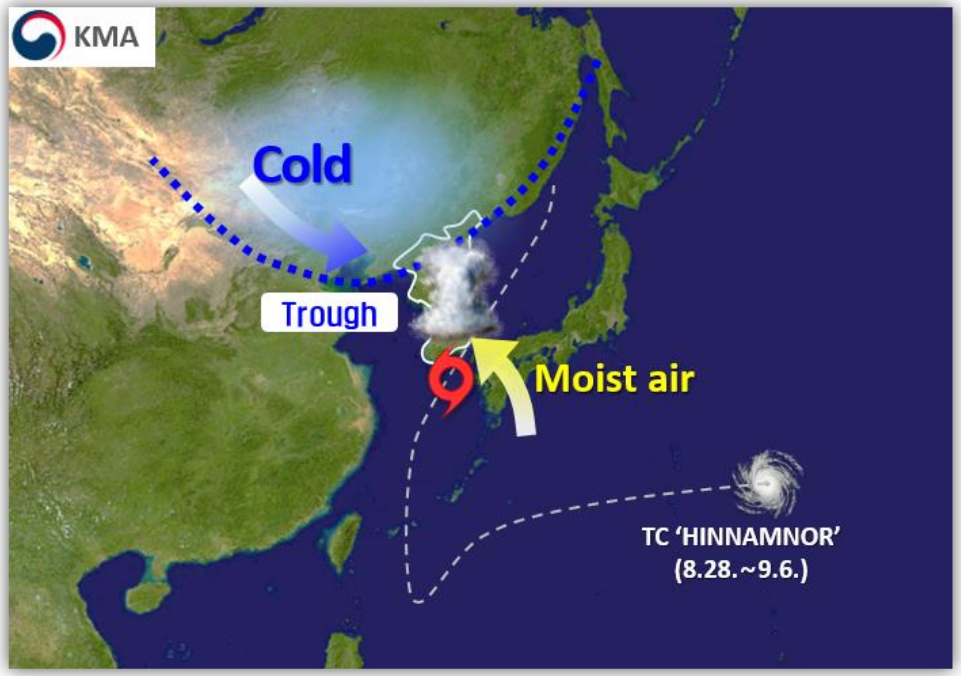


Enhanced NPSH ➡ **All 3 TCs, weakened around Korea**

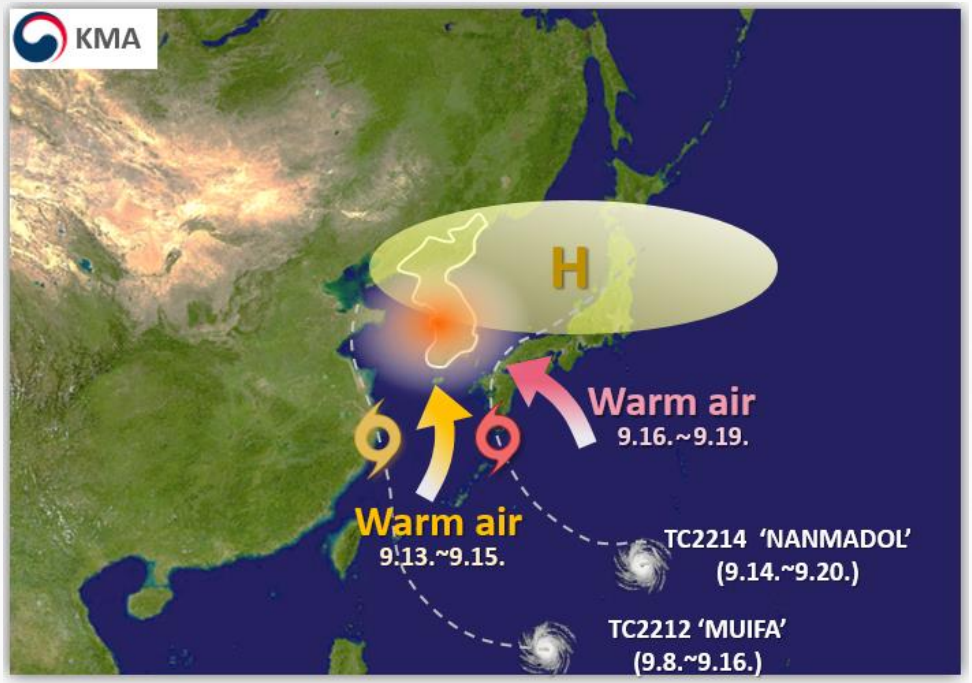
Large amount of water vapor inflow between the typhoons (SONGDA, TRASES) and NPSH ➡ **Heavy rain in Jeju Island and the southern coast**

Heavy Rain (early Sept.), High Temp. (mid-Sept.) by TCs

Schematic diagram for heavy rain (Sept. 6, 2022)



Schematic diagram for high temp. (mid-September 2022)



Convergence of water vapor

& Cold trough

& Orographic effect

▶ Heavy rain

Inflow of warm air

& Development of Anticyclone

▶ High temperature

5 Summary

Summary

Summer temp. & precipitation

- Summer mean temperature: 24.5℃ (+0.8 ℃ above the normal)
- Summer precipitation: 672.8㎜ (91.0%)

High temp. in early summer (Jun. 21 – Jul. 10)

Strong convection in northwest India

- East Asian temperatures rise; Siberian temperatures fall
- Anticyclone anomaly over Korea (CGT-like pattern)
- South-wind enhancement in southwest from Korea

Much rainfall even after Changma (Aug. 8 – 11)

Two ridges develop in the Ural Mountains and near Kamchatka
- Cold dry air inflow

Strong convection in tropical western Pacific and East Indian Oceans
- NPSH Develops East-West

Warm air vs Cold air
- **Heavy rain**

THANK YOU