



T1909 LEKIMA

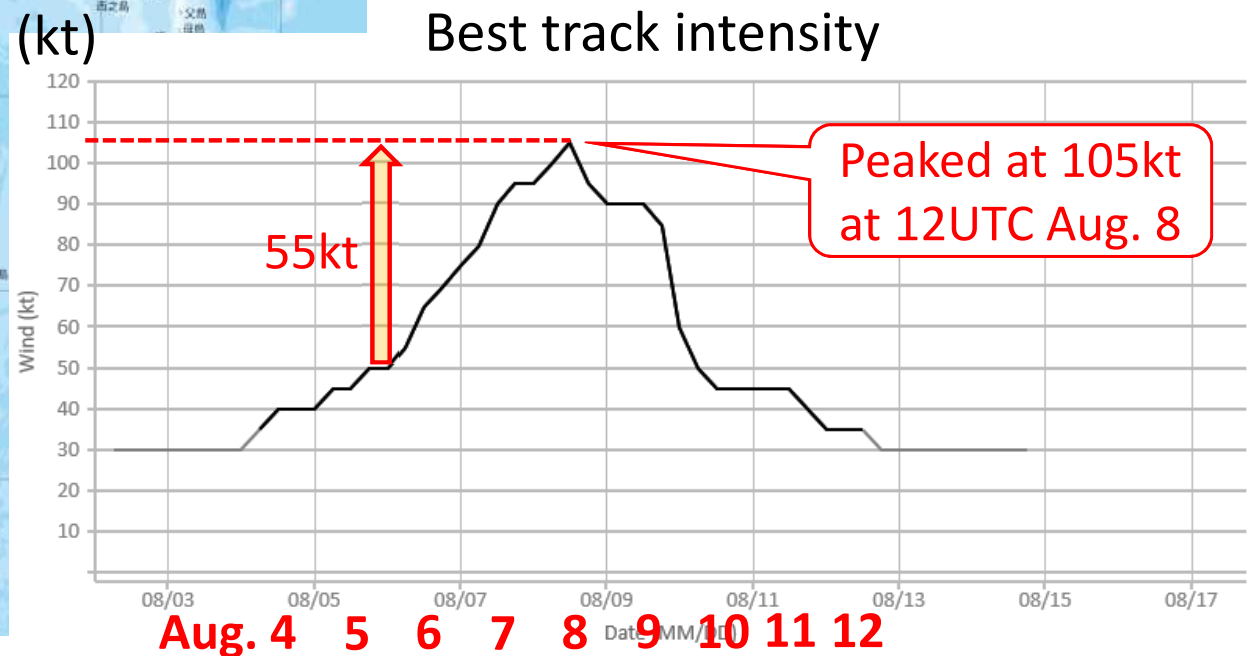
RSMC Tokyo – Typhoon Center
And
Meteorological Research Institute, JMA



Track & Intensity of LEKIMA



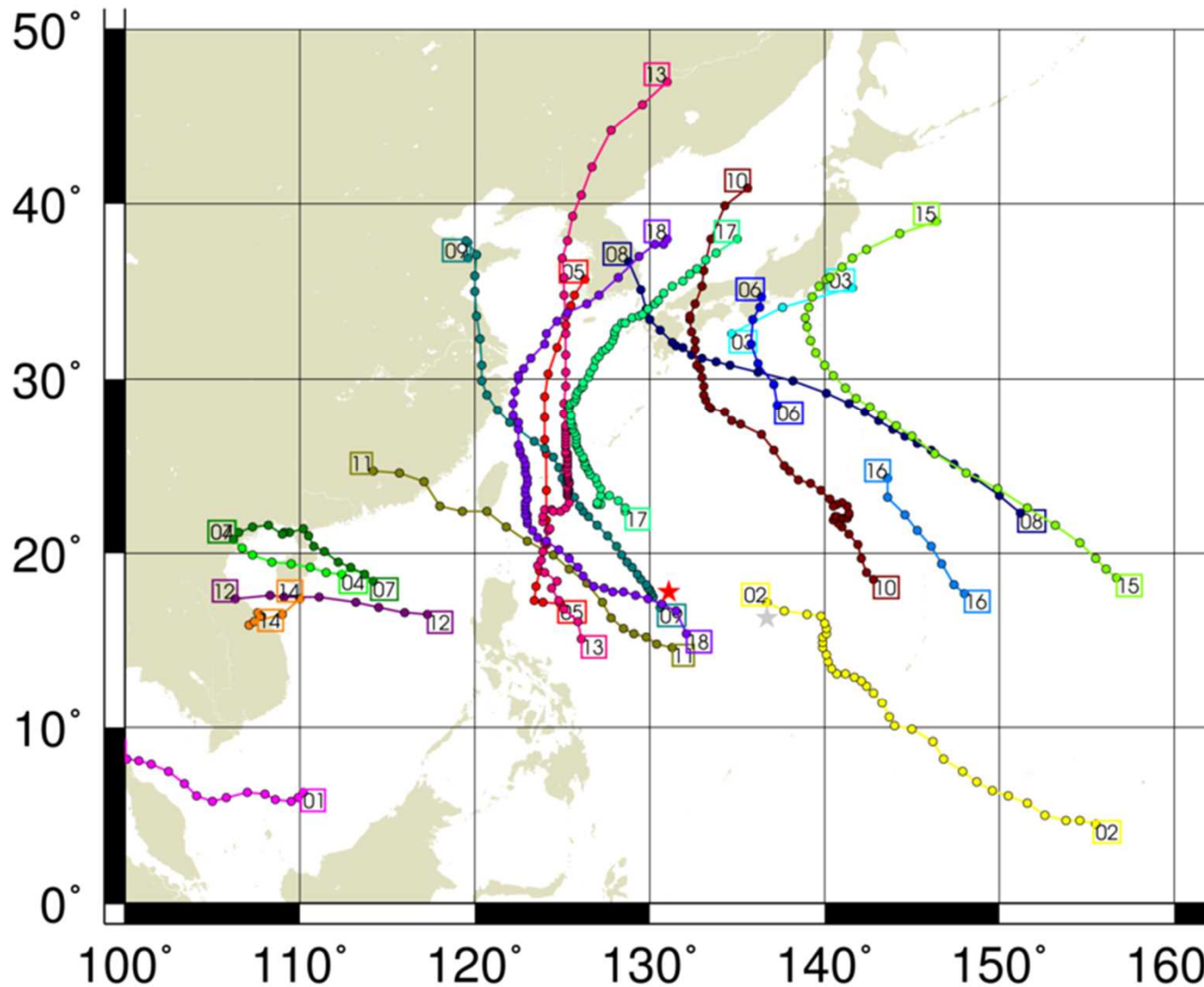
- LEKIMA formed as a TS to the east of Luzon and continued on a northwestward track.
- Intensified by 55kt within 60 hours starting at 00UTC Aug. 6
- Peaked at 105kt at 12UTC Aug. 8
- Most intensified in 2019, tying with T1902 WUTIP



Track & Intensity of LEKIMA

LEKIMA is one of two TCs that have reached 100kt intensity in 2019.

TYPHOON TRACKS FOR 2019 (AS OF



TC name	Lifetime Maximum intensity (kt)
(1)PABUK	45
(2)WUTIP	105
(3)SEPAT	40
(4)MUN	35
(5)DANAS	45
(6)NARI	35
(7)WIPHA	45
(8)FRANCISCO	70
(9)LEKIMA	105
(10)KROSA	75
(11)BAILU	50
(12)PODUL	40
(13) LINGLING	90
(14)KAJIKI	35
(15)FAXAI	85
(16)PEIPAH	35
(17)TAPAH	65
(18)MITAG	75

HIMAWARI-8 IR images

East China Sea

Okinawa

Taiwan

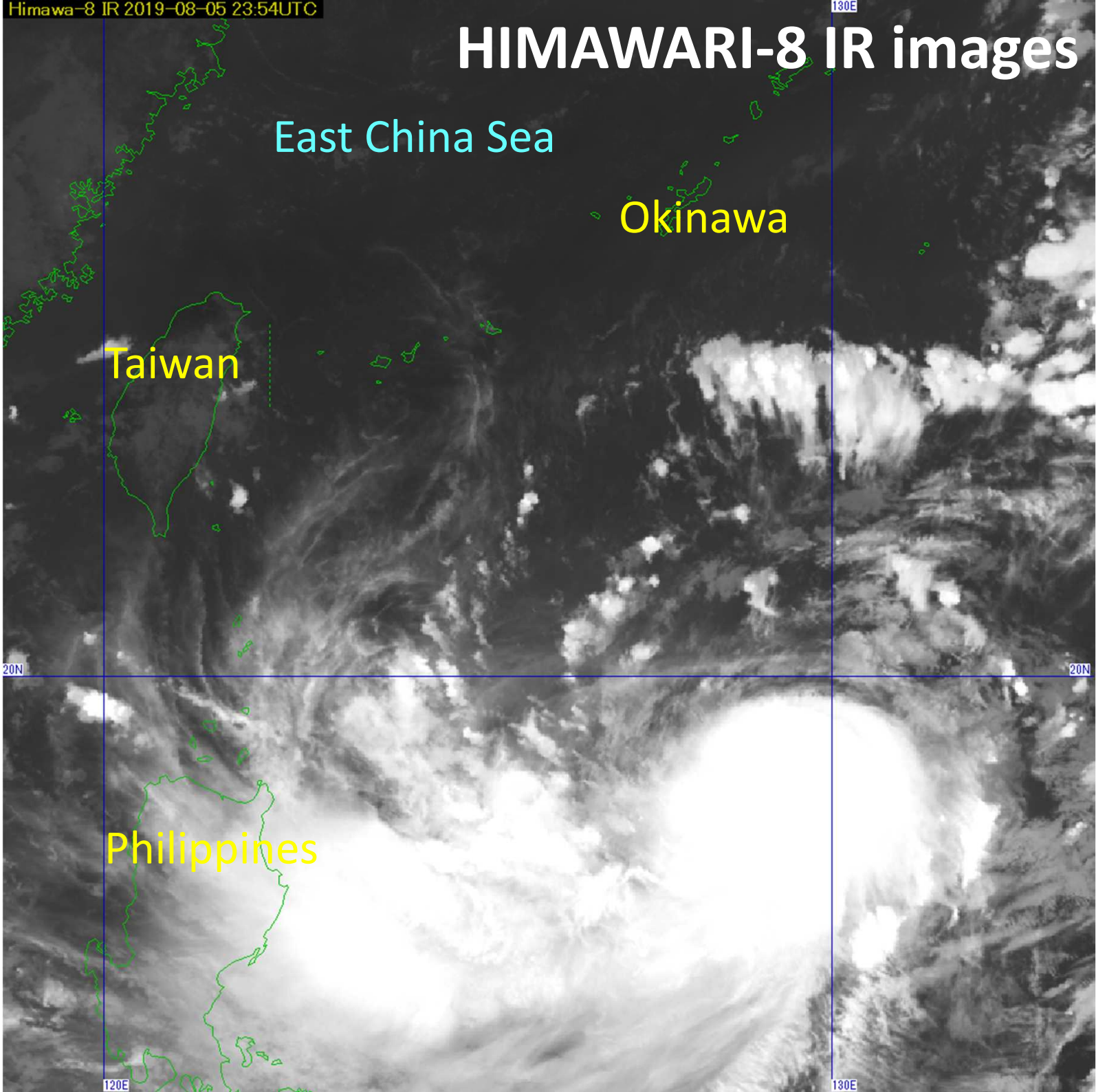
Philippines

20N

20N

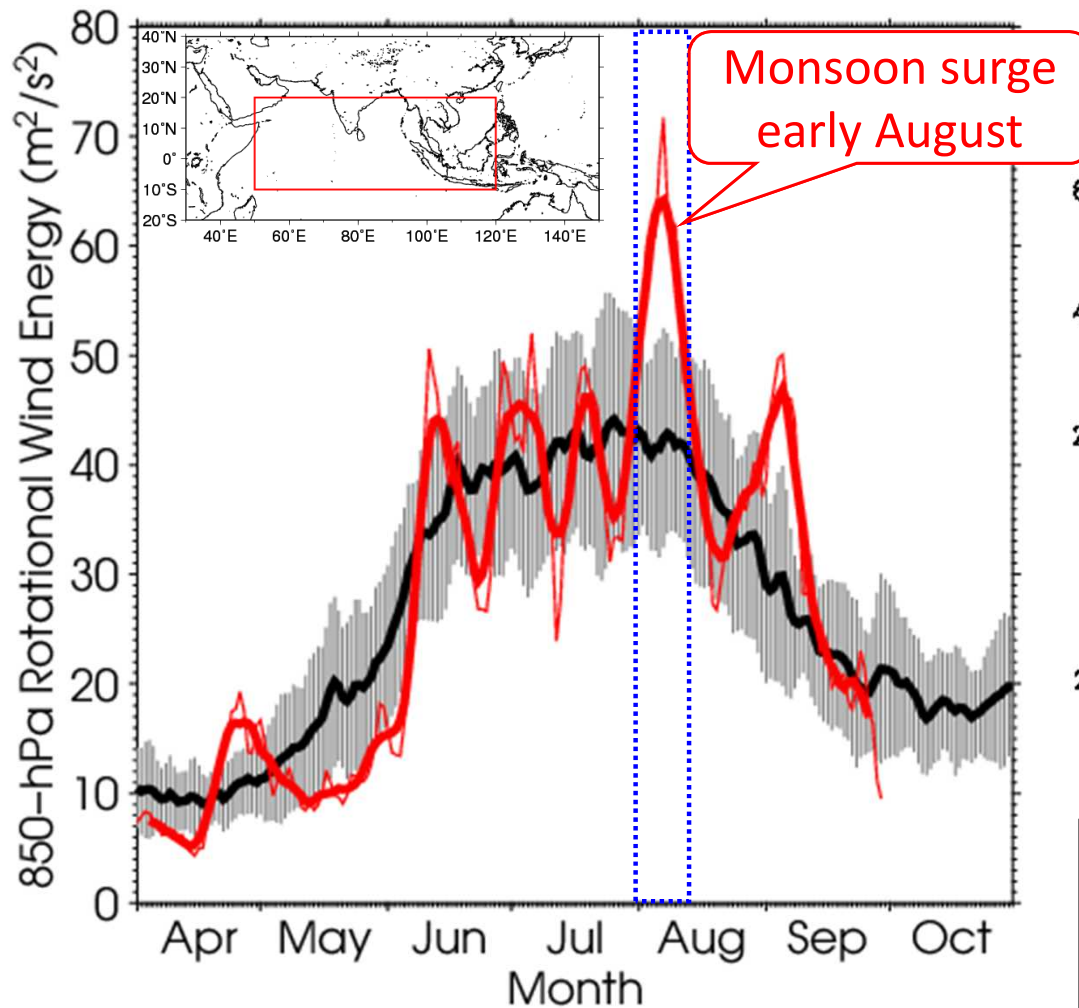
120E

130E



Genesis of LEKIMA and S.W. monsoon activity

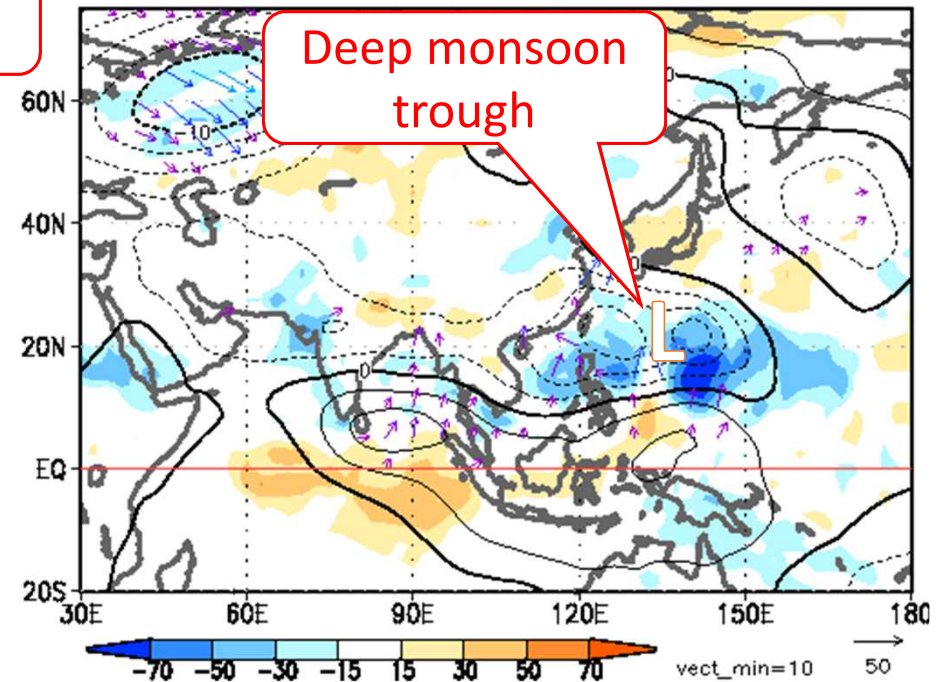
Southwest Asian monsoon activity index



Kinetic energy of rotational component of wind vectors at 850hPa averaged over the Asia monsoon region (red box in the inset figure)

Stream function anomalies at 850hPa & OLR anomalies for early August

01Aug.2019 – 10Aug.2019

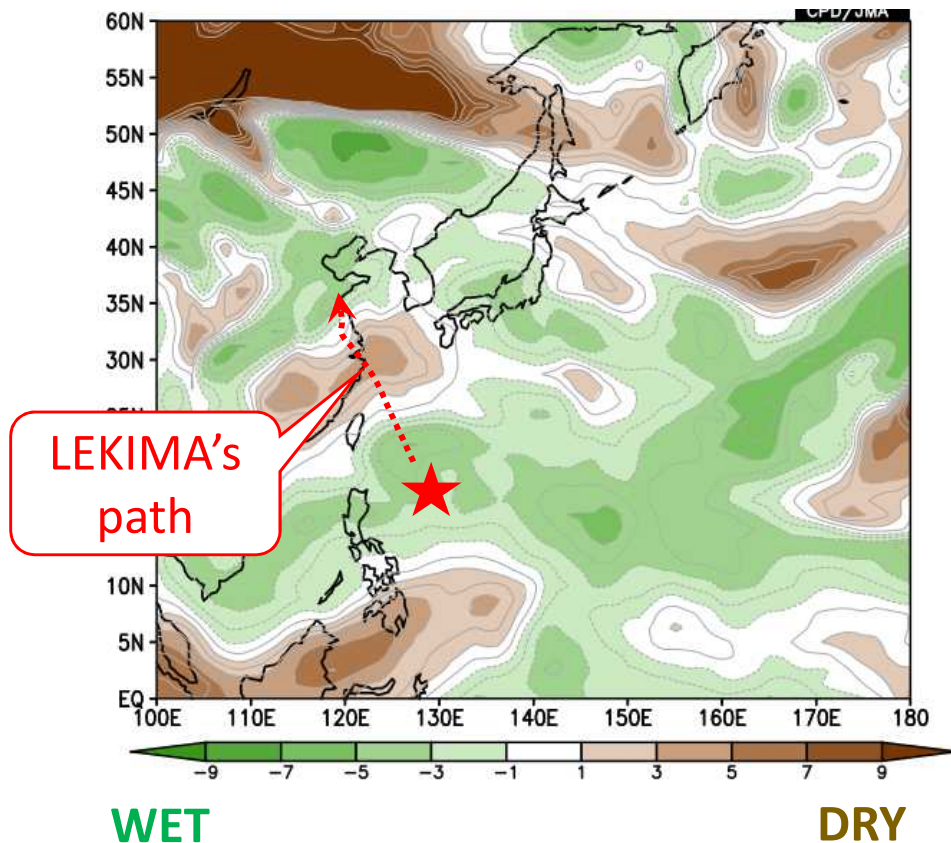


- Genesis of LEKIMA was associated with enhanced SW monsoon and a deep monsoon trough

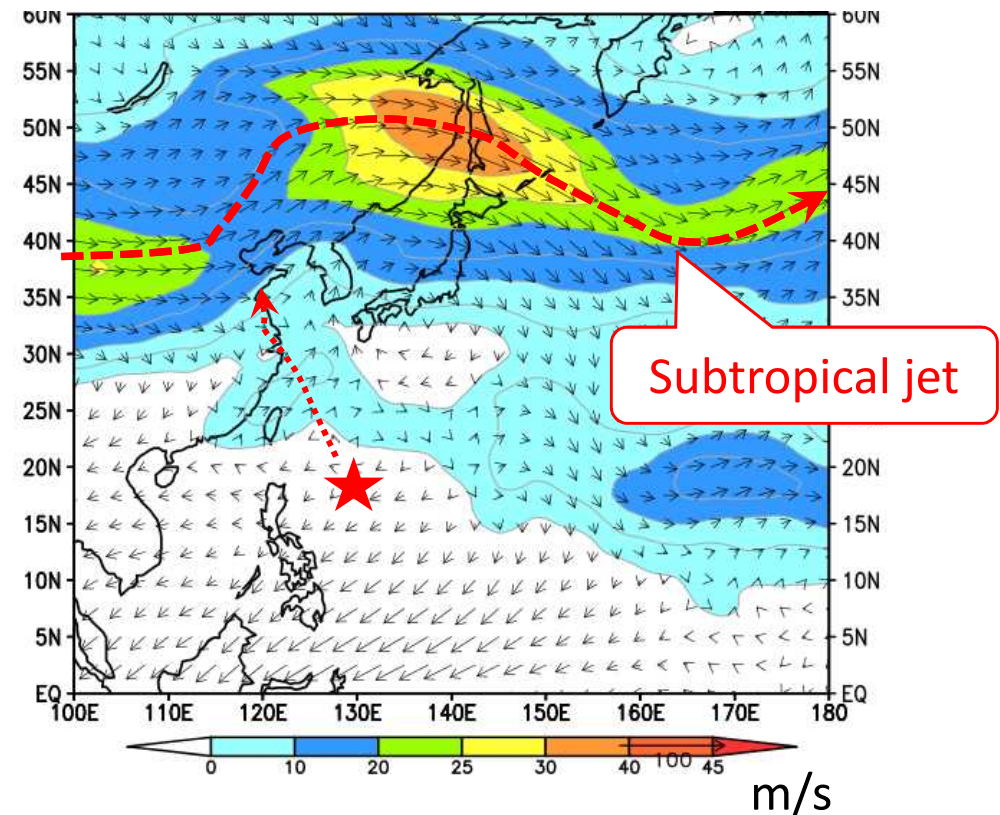
Atmospheric conditions

- Mid-level atmosphere was wetter than normal over much of the western Pacific
- In early August, the subtropical jet stream flowed in the distant north and vertical wind shear was weak around LEKIMA
- These atmospheric conditions were favorable for LEKIMA's intensification

Dew-point depression (T-Td) anomalies at 600hPa averaged for 4 to 8 Aug.



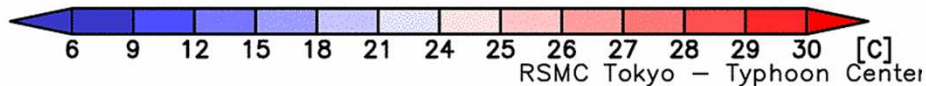
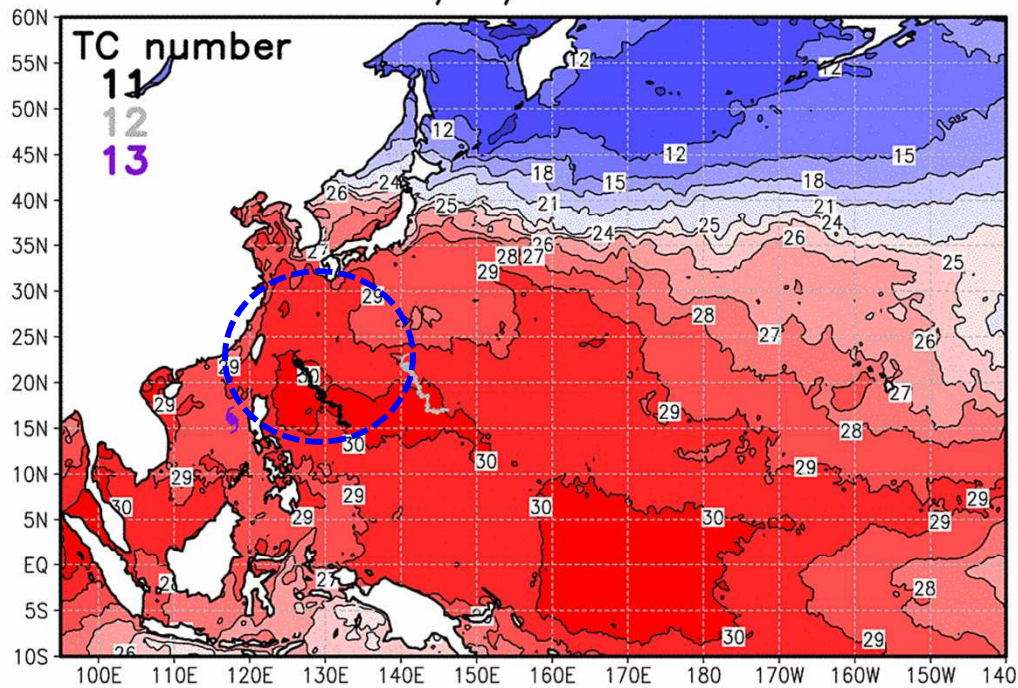
Wind vector and zonal wind speed at 200hPa averaged for 4 to 8 Aug.



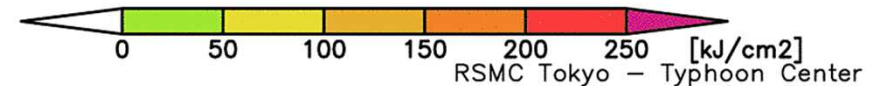
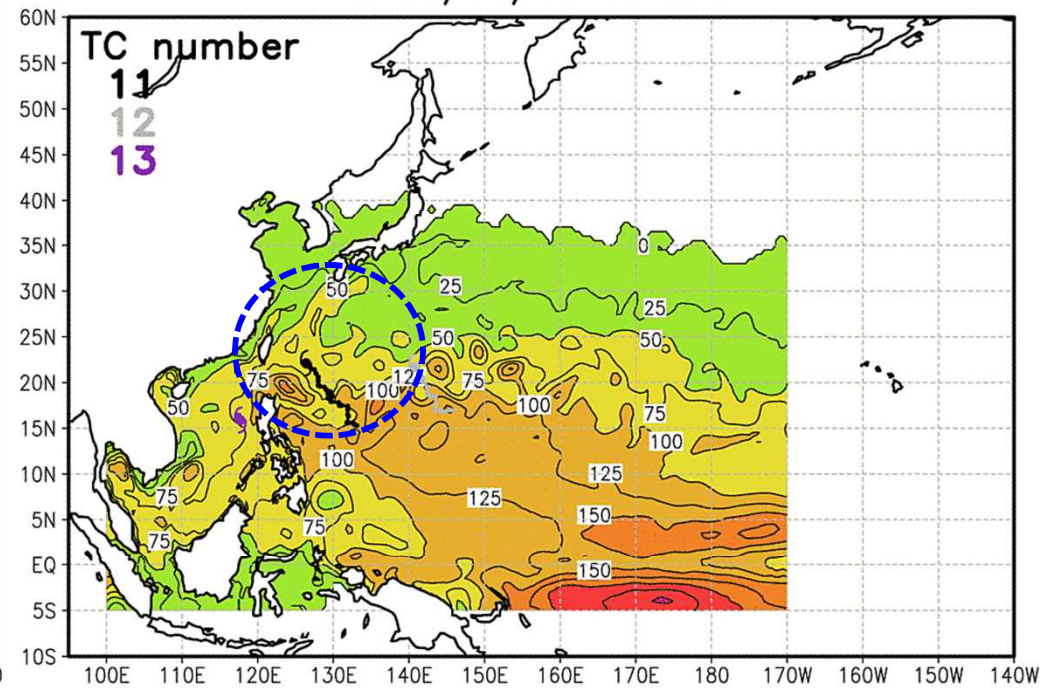
Ocean conditions

- Ocean conditions were moderately favorable with SSTs at 29-30°C and TCHP above 50 along the LEKIMA's track

Sea Surface Temperature:
2019/08/07 18 UTC

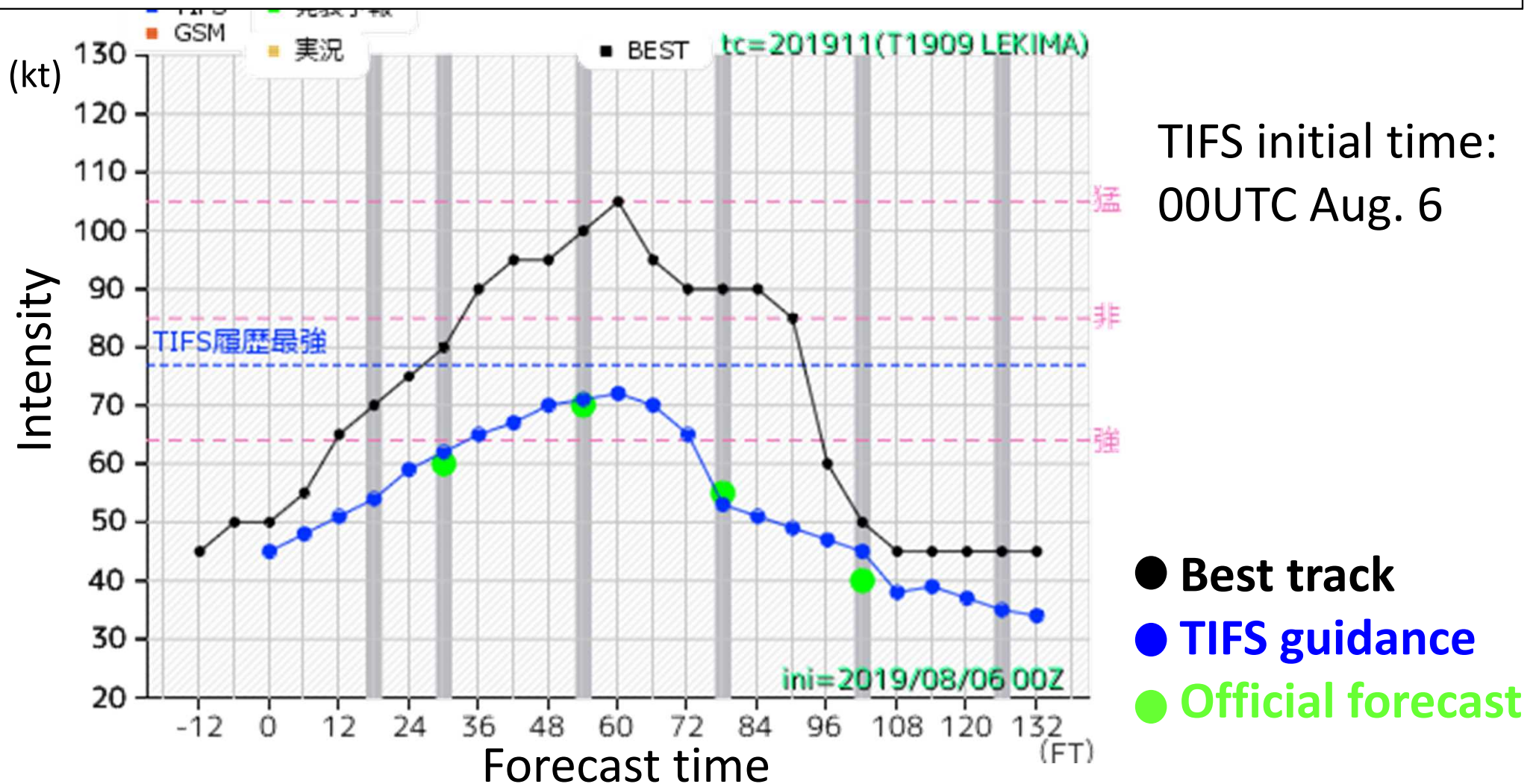


Tropical Cyclone Heat Potential:
2019/08/07 18 UTC



TIFS (intensity forecast guidance) results

- JMA forecasters primarily depend on Typhoon Intensity Forecast Scheme based on SHIPS (TIFS) for forecast guidance
- TIFS struggles with forecasting quick intensity changes, because it is a linear multiple regression statistical model.

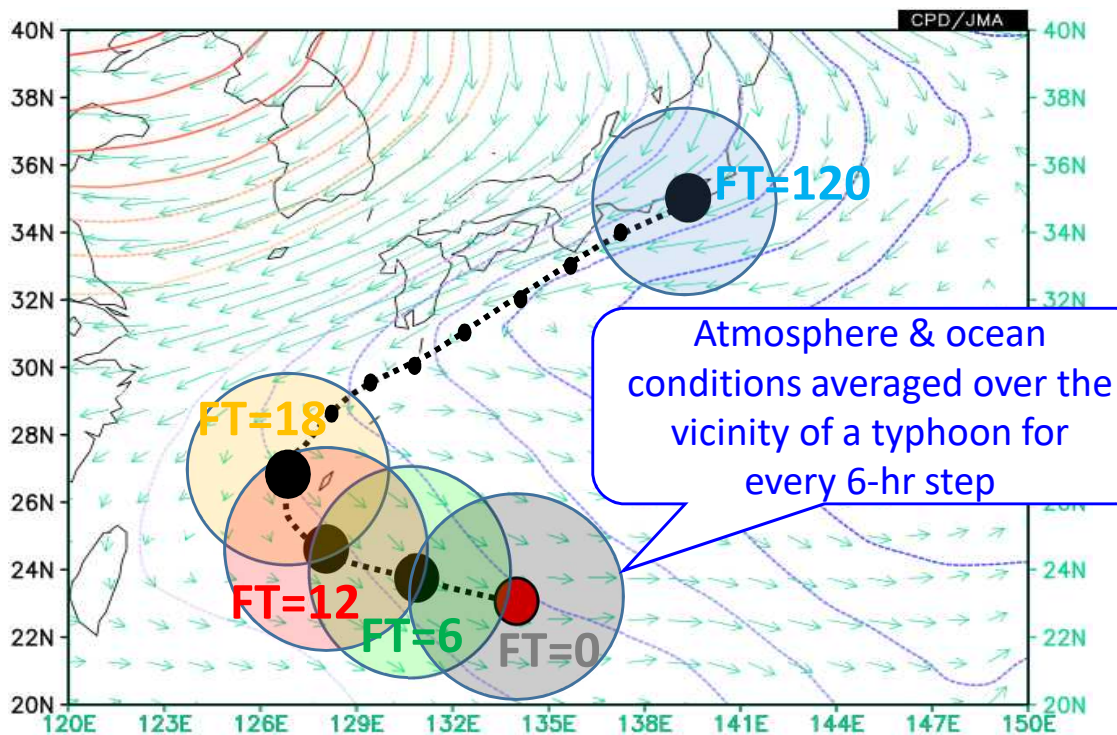


What is TIFS ?

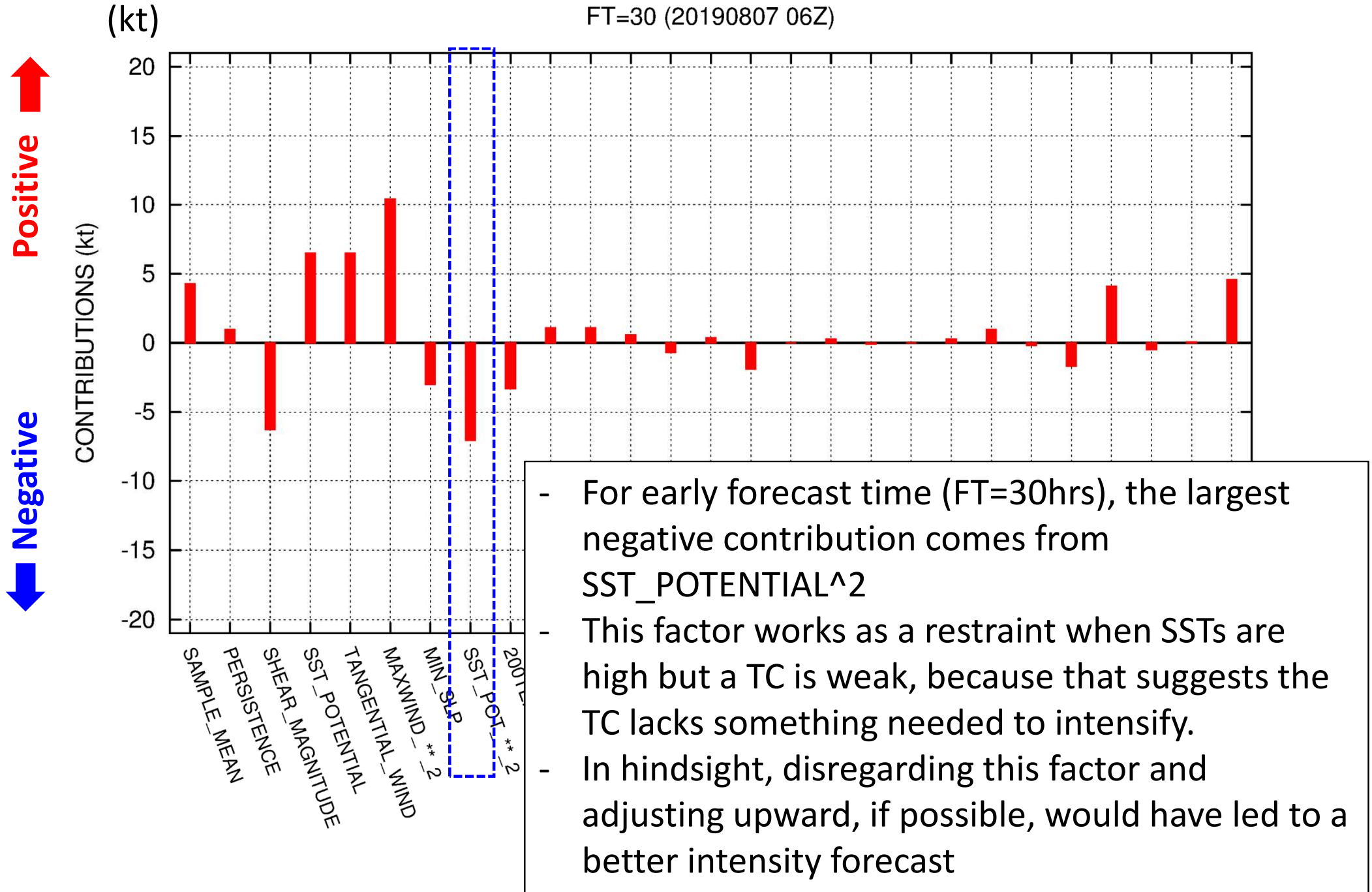
- TIFS predicts intensity changes exploiting statistical relationship btw TC intensity changes and environmental conditions.
- TIFS originates from SHIPS, adapted for the western North Pacific. (Many thanks to Dr. DeMaria)

Explanatory factors for TIFS (not exhaustive)

Variable name	Description
PERSISTENCE	Change in max sustained wind during the last 12 hours
SHEAR	Vertical wind shear between 200 and 850hPa levels
POTENTIAL	Difference between the latest TC intensity and its maximum potential intensity
TANGENTIAL	Tangential wind speed around the TC at 850hPa level
MAXWIND	The latest max sustained wind
TEMP200, TEMP250	Temperature at 200 and 250hPa
MID_RH	Relative humidity in the mid-troposphere
VOR850	Vorticity at 850hPa
DIV200	Divergent at 200hPa
MOTION	Zonal component of translation speed of the TC
OHC	Ocean heat content
IR	Portion of cloud area with infrared irradiance below -30°C

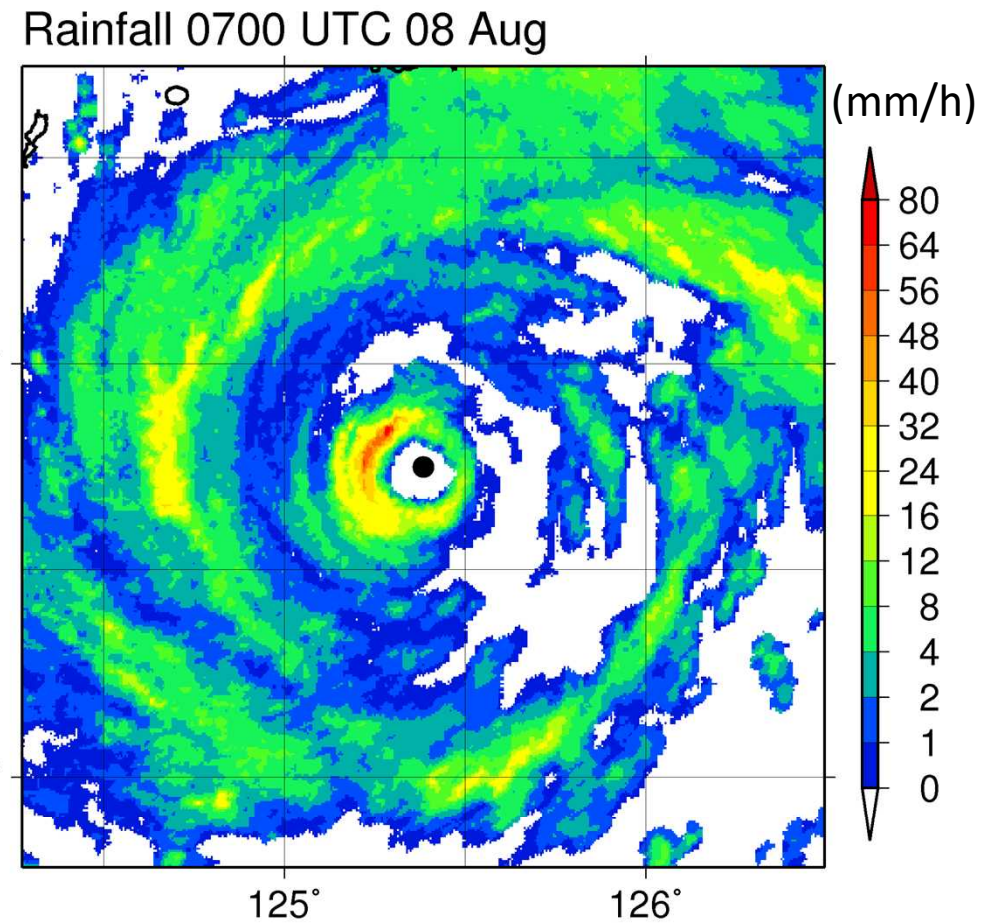
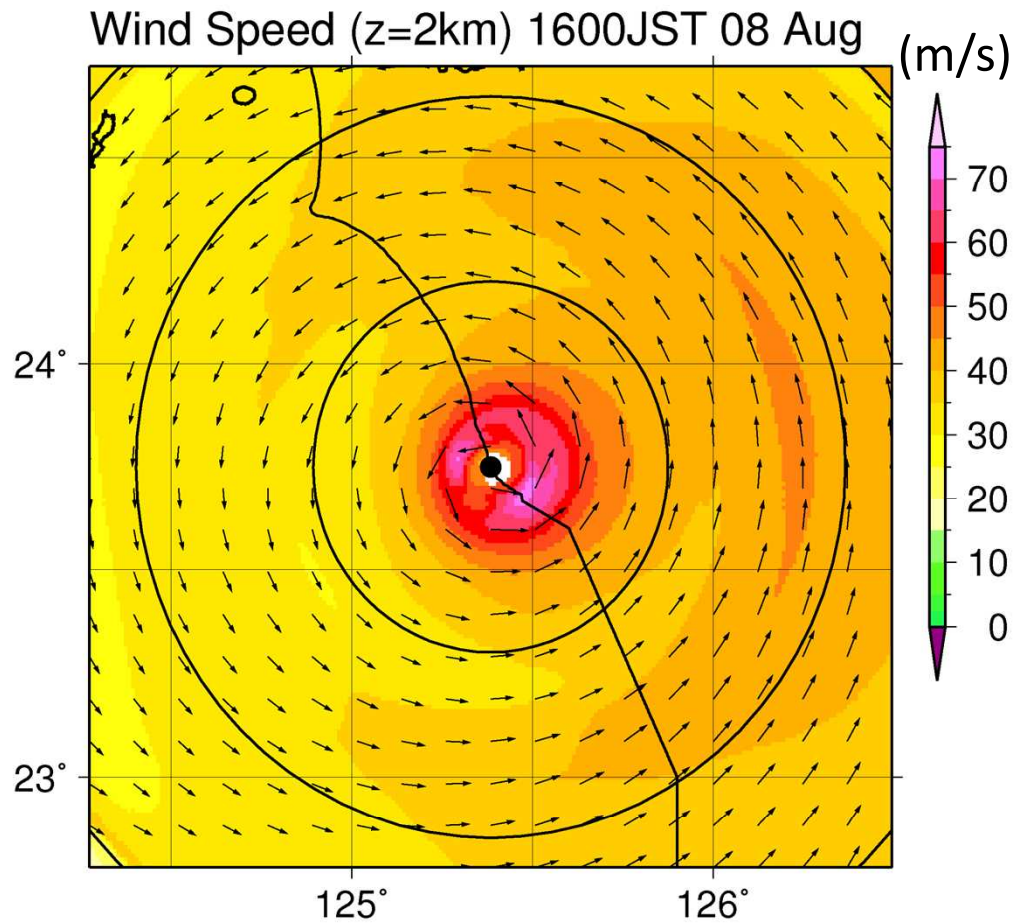


TIFS by contribution factors



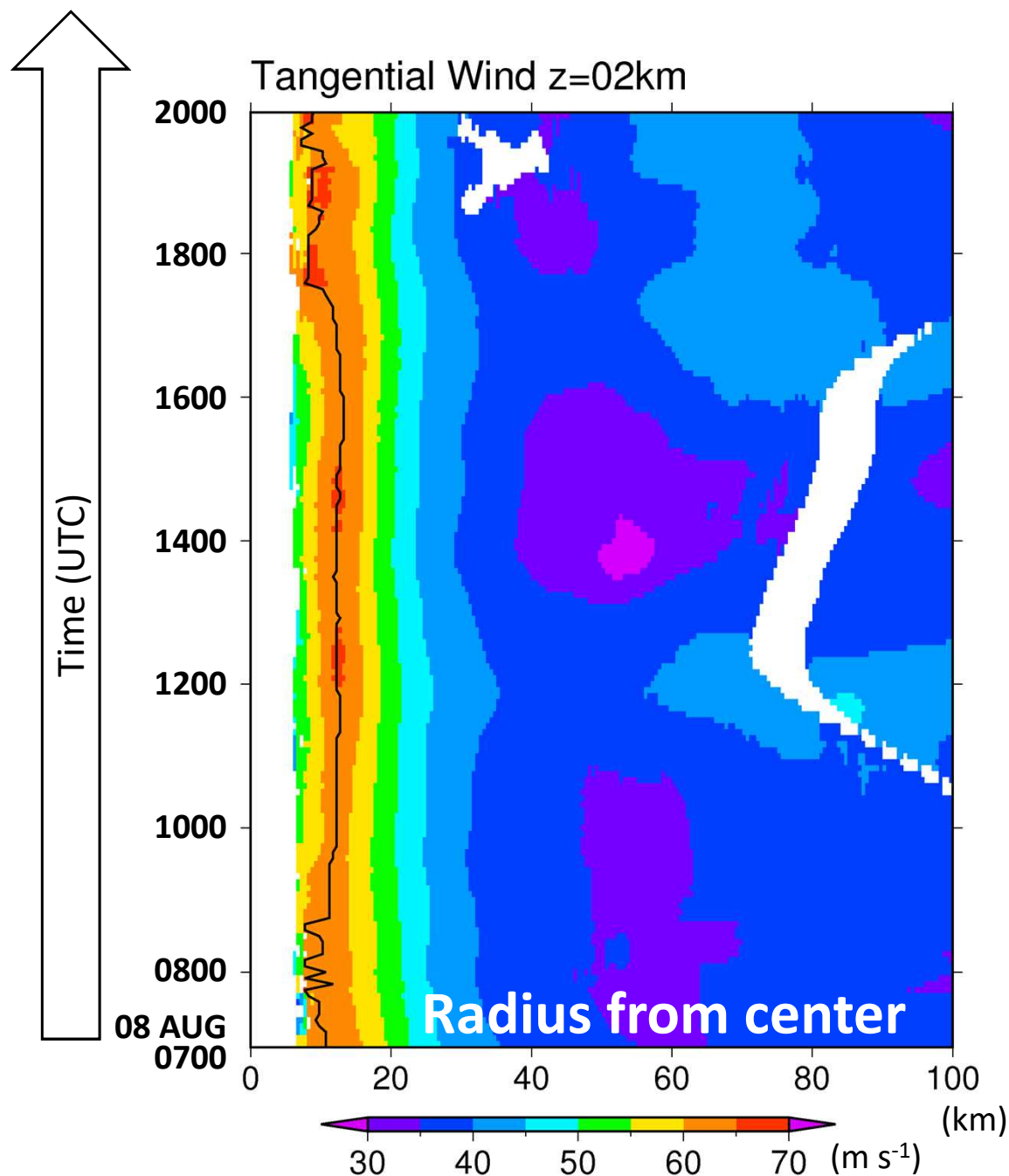
Doppler-Radar derived winds at 2km

- Post analysis using Ishigaki radar data
- During this period, Lekima had strong winds greater than 70 m/s at 2-km altitude and had concentric eyewalls.



Doppler-Radar derived tangential winds at 2km

- The radius of maximum wind is located at about 12km from the center
- The inner eyewall was very compact
- The maximum tangential wind speed reached 65 m/s
- The secondary eyewall developed and contracted between 60 and 90 km from the storm center



Doppler-radar derived maximum sustained winds

- 6-hourly Dvorak analysis gives constant CI numbers of 7.0 through the peak intensity period
- Doppler-radar provides information on intensity with high temporal resolution.

