

Introduction on Typhoon Best Tracks of NTC/KMA

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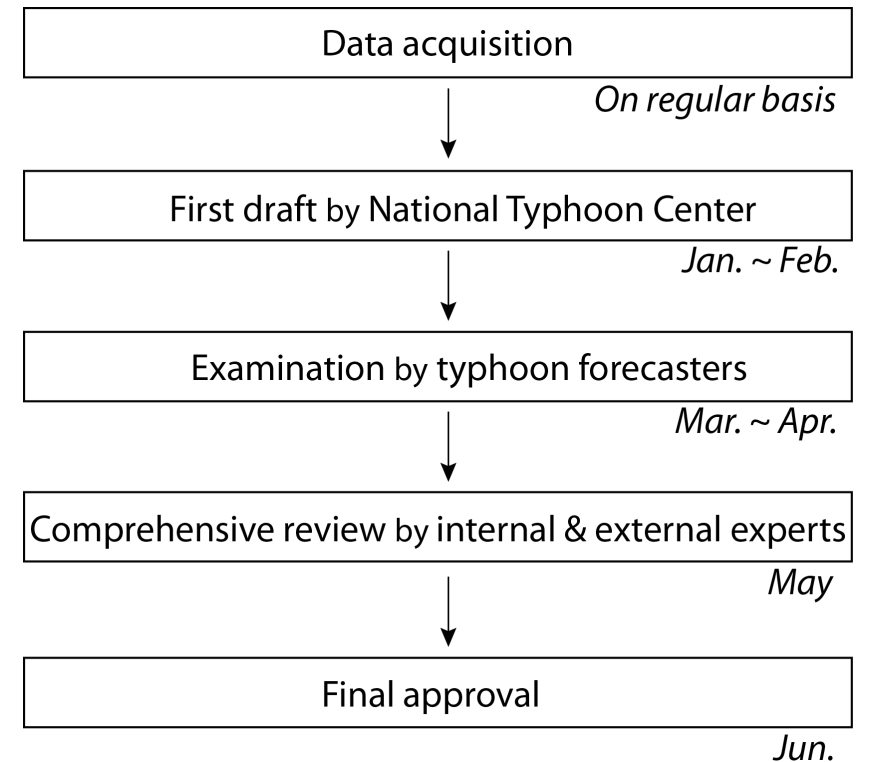
Korea Meteorological Administration (KMA)

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Introduction

- Best track datasets for WNP basin
 - RSMC-Tokyo, JTWC, CMA, HKO
- KMA best track data starts from 2015
- The KMA best track for the previous year's typhoon is released in late June



KMA Best Track

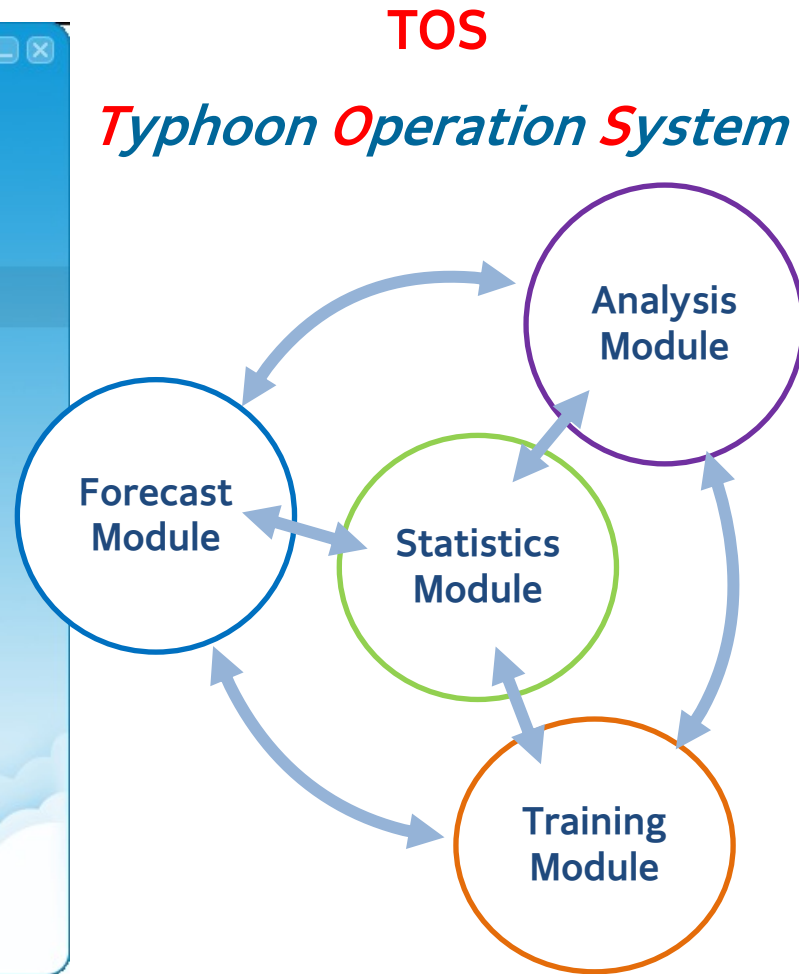
1. KMA Best Track Format

Grade	Date(UTC)				Wind speed		Min. pressure		Radius of 25m/s wind			Name				
	YR	MO	DY	HR	(m/s)	(hPa)			Dir. of the shortest	The shortest	The longest					
TS	2008	2020	08	22	0	122.8	23.4	18	1000	200	120	315.0	-999	-999	-999.9	BAVI
Serial #		Lat.(°E)		Lon(°N)		Center Position		The longest		The shortest		Dir. of the shortest		Radius of 15m/s wind		

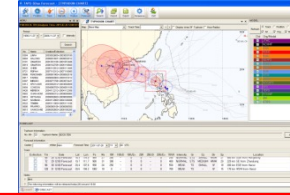
- Center position
- Central pressure
- Maximum wind speed(10 minute averages)*
 - **Until 2017**, the wind speed for extratropical cyclones was recorded as **-9**
- Radius of 15m/s wind
- Radius of 25m/s wind

KMA Best Track

2. Typhoon Operating System

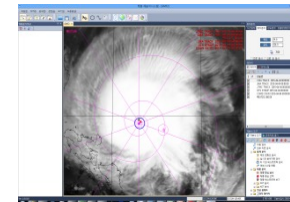


Forecast Module



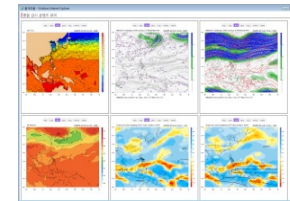
Advanced version of TAPS

Analysis Module



Real-time TC analysis system
extend the functionalities
of the reanalysis system
for operational use

Statistics Module



Visualization of observation
data

Training Module



Mirrored operation system
for training skills

KMA Best Track

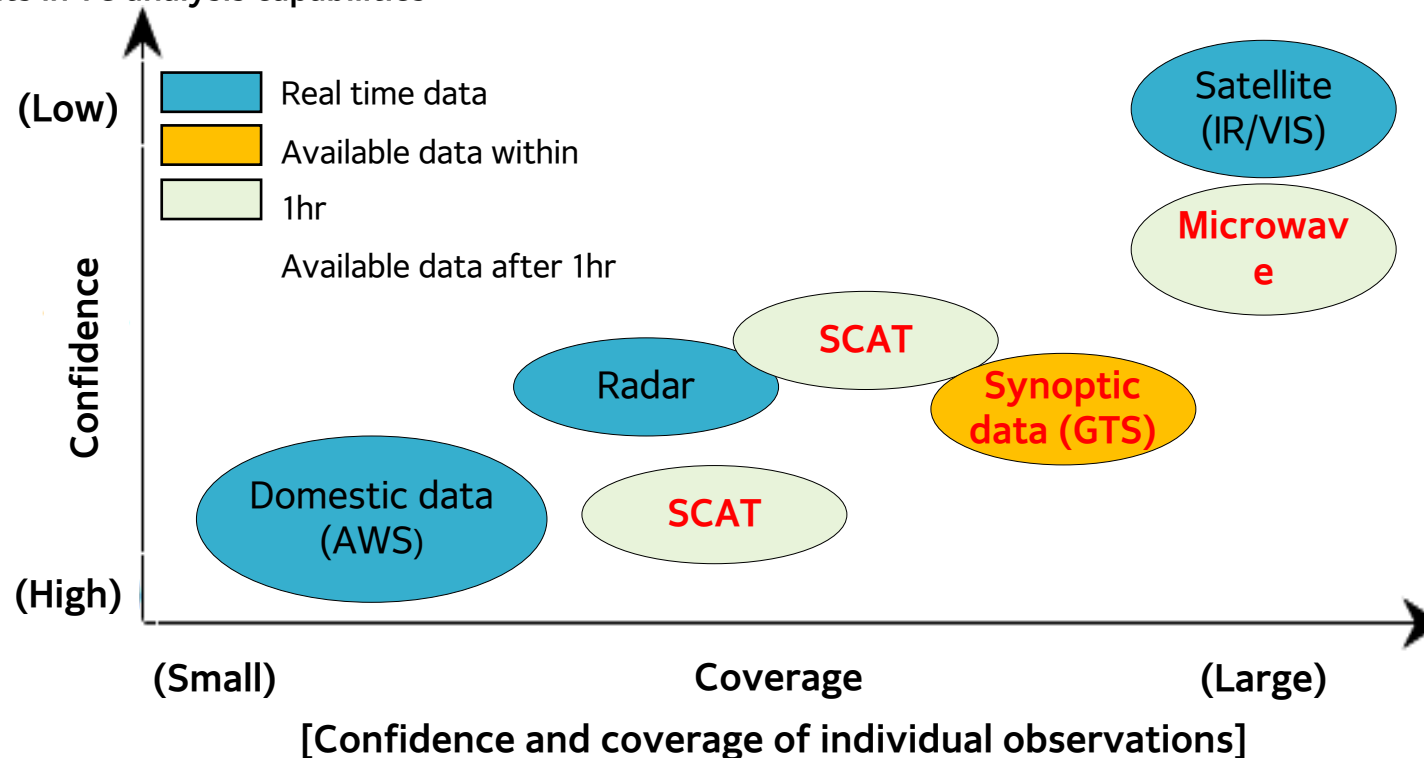
2. Typhoon Operating System

Tool for expressing the uncertainty in the TC center with available data

High technology & high level analysis

- Development of an observation network, including GK2A, radar, weather ships, and improvements in TC analysis capabilities

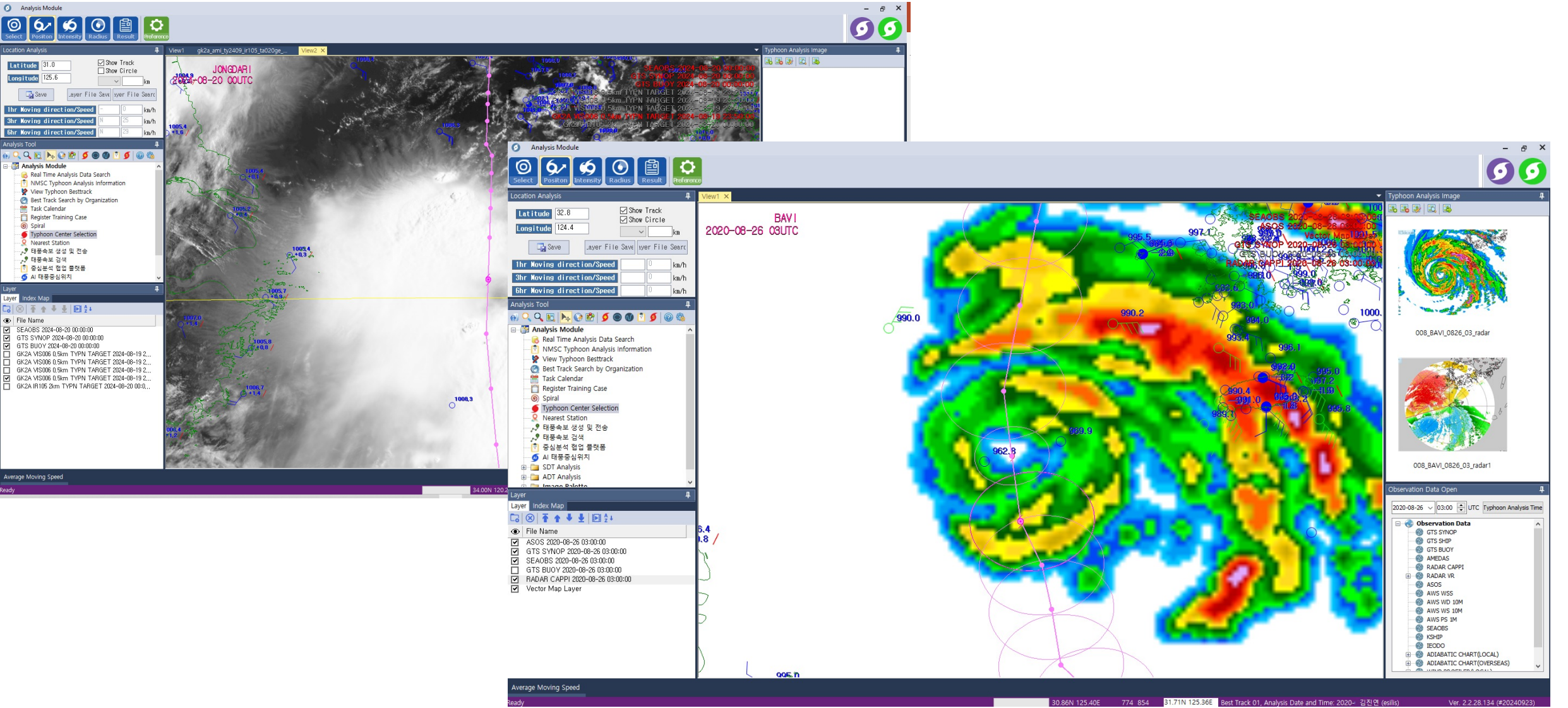
Real time & reanalysis



KMA Best Track

1.9 cm

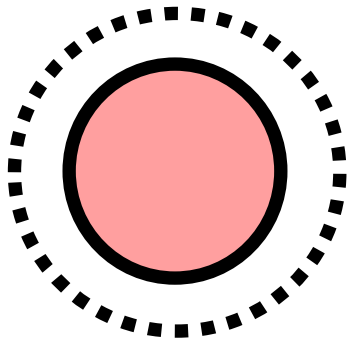
2. Typhoon Operating System



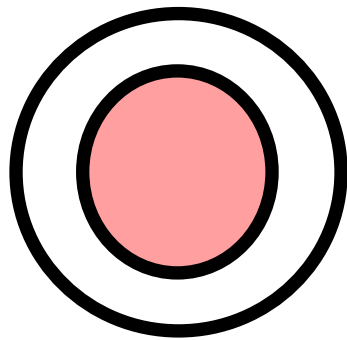
KMA Best Track

3. Potential Interval(PI)

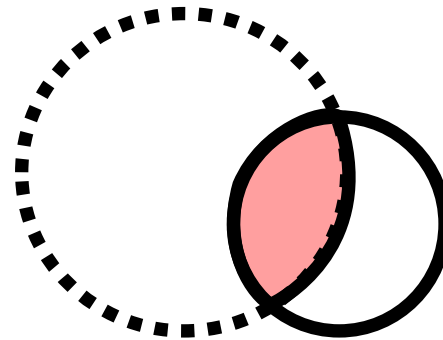
- Overlaying the potential intervals of Data A (solid line), Data B (dashed line), and Data C (long dashed line). The shaded area indicates the optimal **potential interval (PI)**
- The reliability of the data is in the order of $A > B > C$



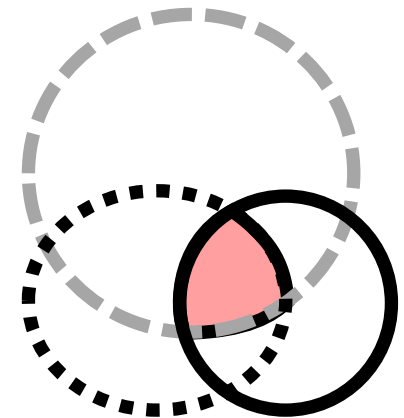
TC eye is clear or
the accuracy of the data is high



PI of B with relatively
low reliability is smaller
than that of A



PIs between A&B are
diverse and the TC eye is
not clear



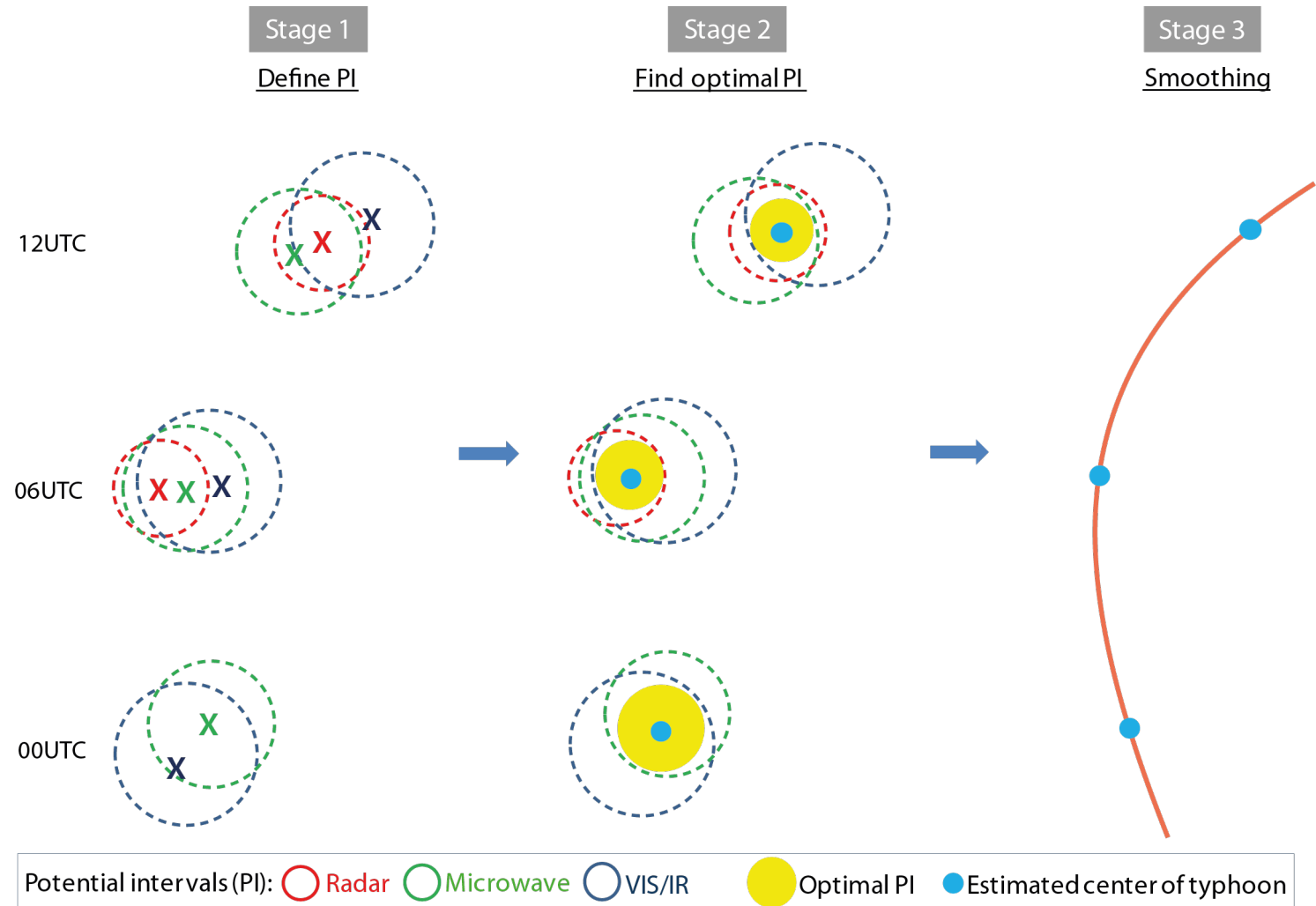
PIs for each data are
diverse and the TC eye is
not clear

 **Potential Interval** : Minimum boundary that TC center may be locate

- Indicator of position analysis accuracy for each data
- Applied to smoothing to find the most natural track within the optimal PI

KMA Best Track

3. Potential Interval(PI)



Tropical Cyclone Monitoring using Drifting Buoys

1. Drifting Buoys

- When a typhoon was expected to impact the Korean Peninsula, the KMA deployed additional drifting buoys to observe atmospheric pressure
- Starting in 2023, this initiative was expanded to deploy drifting buoys across multiple areas, including the East China Sea area and East sea area of the Philippines
- Observation data from these buoys is now made available on the Website (<http://hms.otronix.com:60481/>)



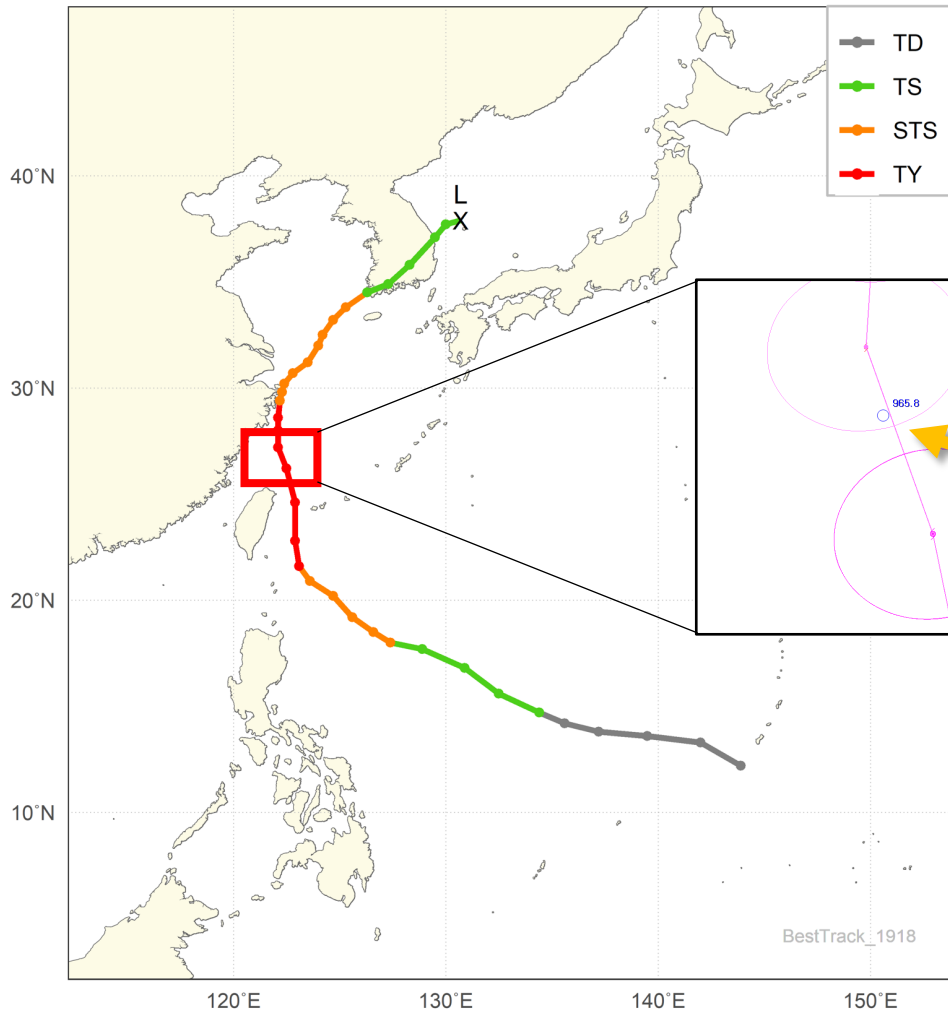
2023



2024

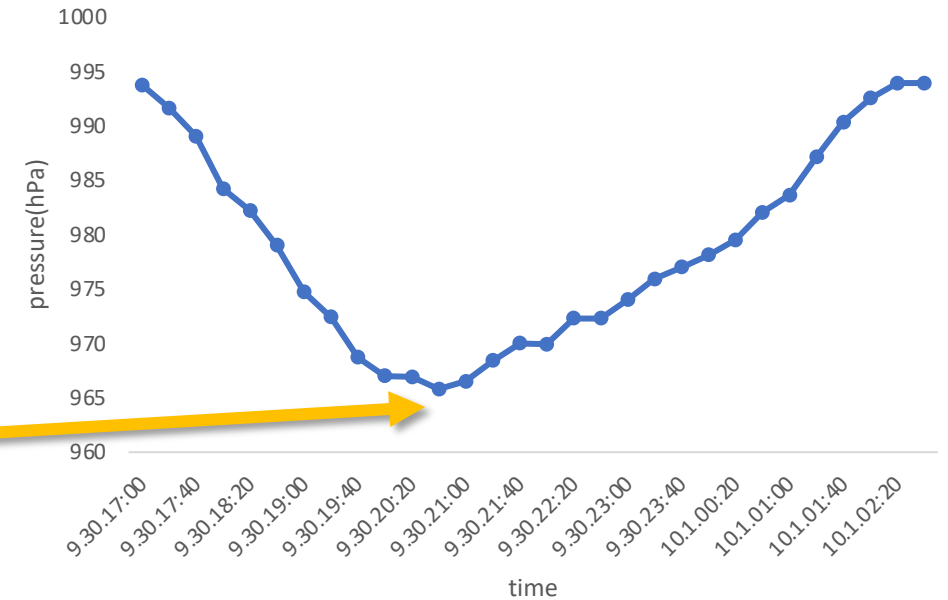
Tropical Cyclone Monitoring using Drifting Buoys

2. CASE 1: MITAG(1918)



9.30. 20:40UTC
965.8hPa

Drifting bouy 19006

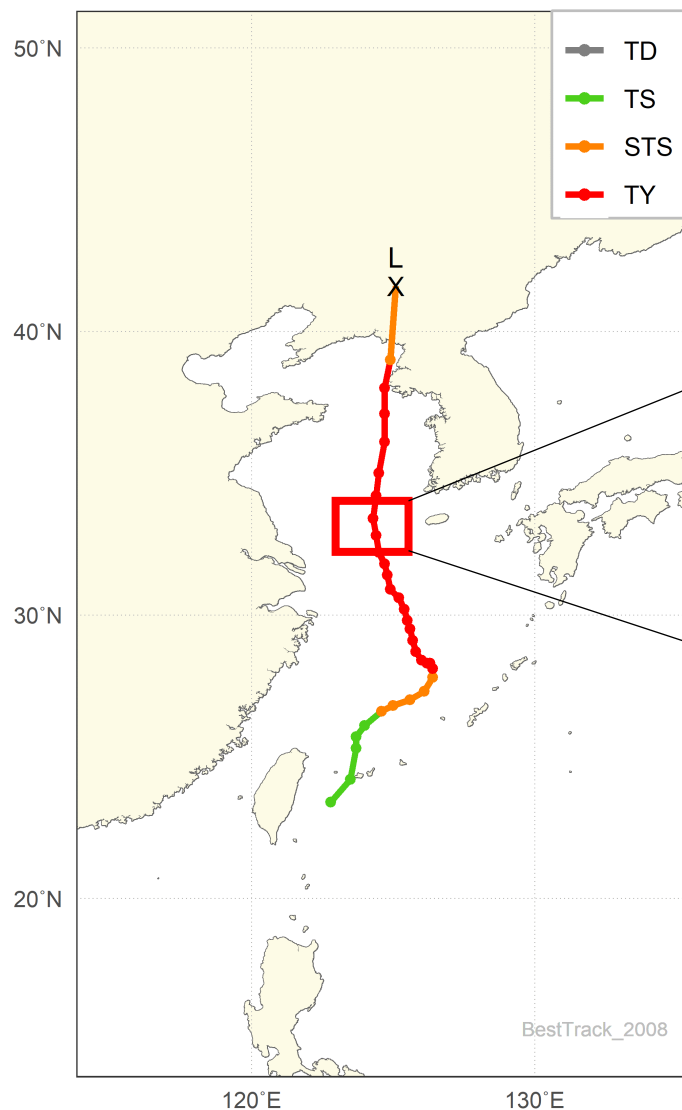


Reanalysis results

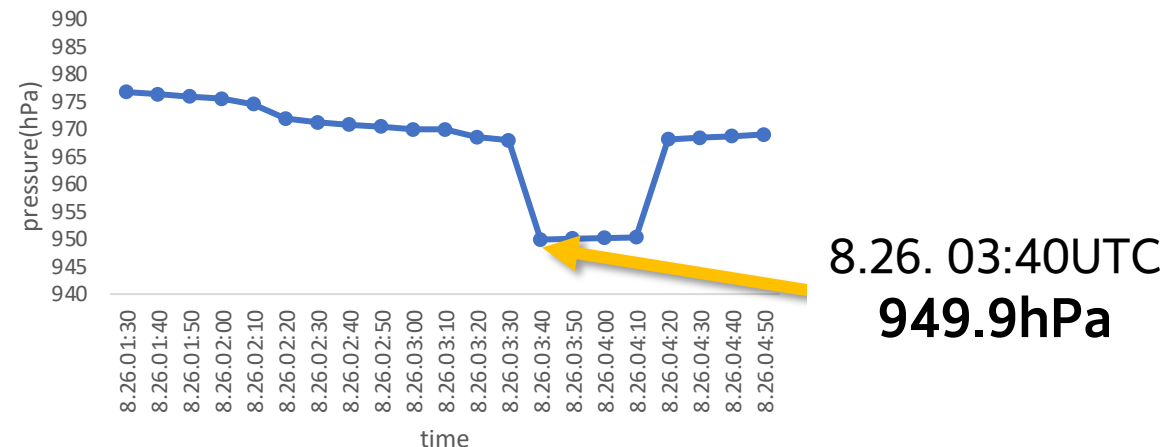
- 9.30. 18UTC : 965hPa, 37m/s => 960hPa, 39m/s
- 10.1. 00UTC : 970hPa, 35m/s => 965hPa, 37m/s

Tropical Cyclone Monitoring using Drifting Buoys

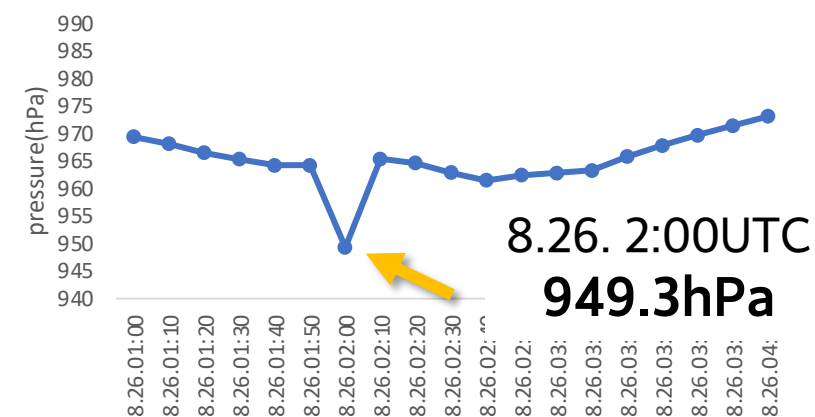
3. CASE 2: BAVI(2008)



Drifting bouy 20009



Drifting bouy 20010

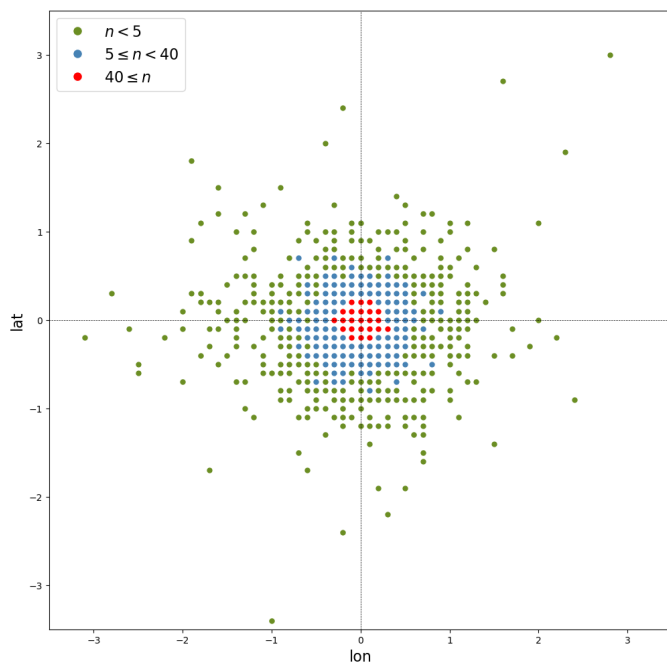


Reanalysis results

- 8.25. 18UTC-21UTC : 950hPa, 43m/s => 945hPa, 45m/s

Summary

1. Comparison of real-time analysis and Best track – Center Position

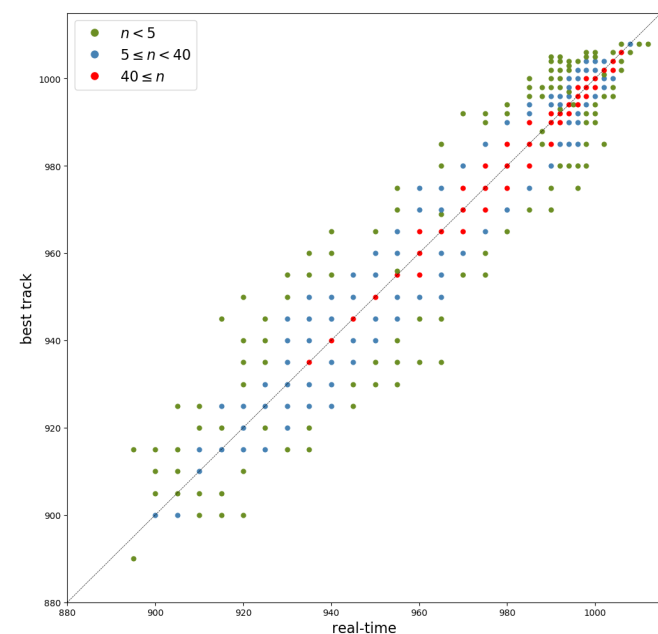


- The stronger the tropical cyclone, the smaller the difference
- Typically, positional differences are larger during the early stages of cyclone development or weakening stage
 - When analyzing a system that is not associated with the cloud system of a developed typhoon
 - When upper-level clouds obscure lower-level circulation

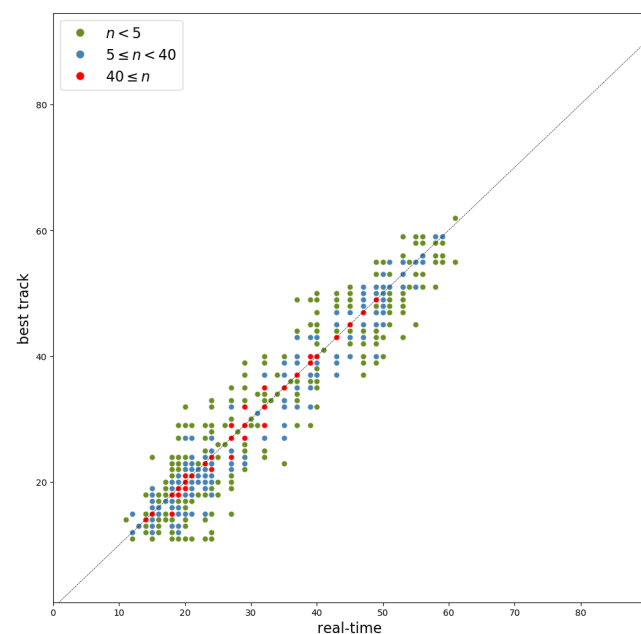
Summary

2. Comparison of real-time analysis and Best track – Pressure & Wind

Pressure



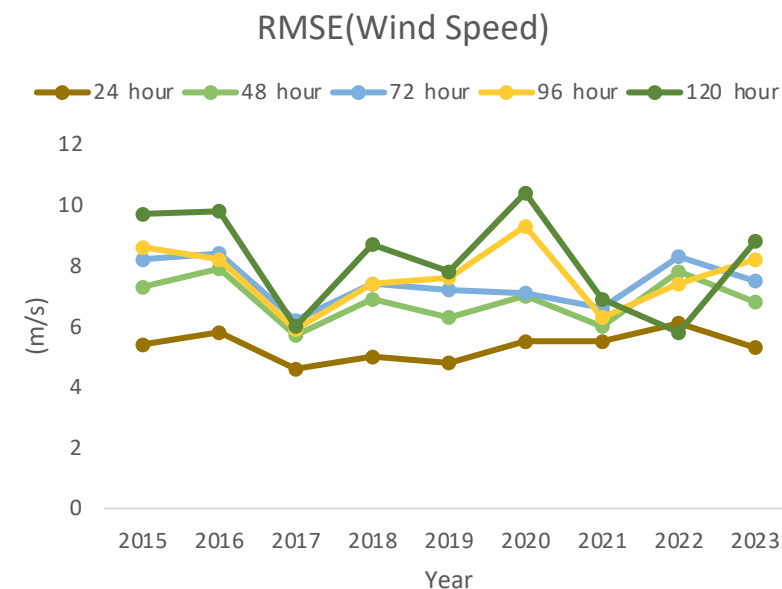
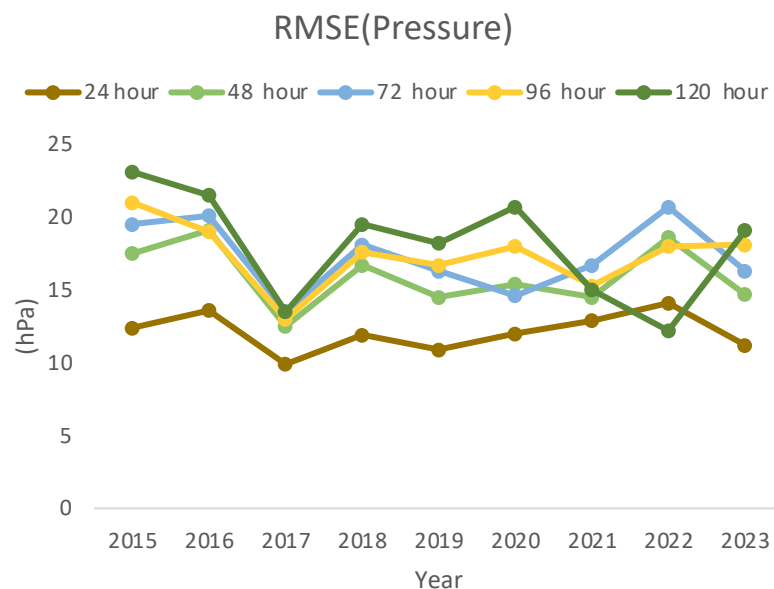
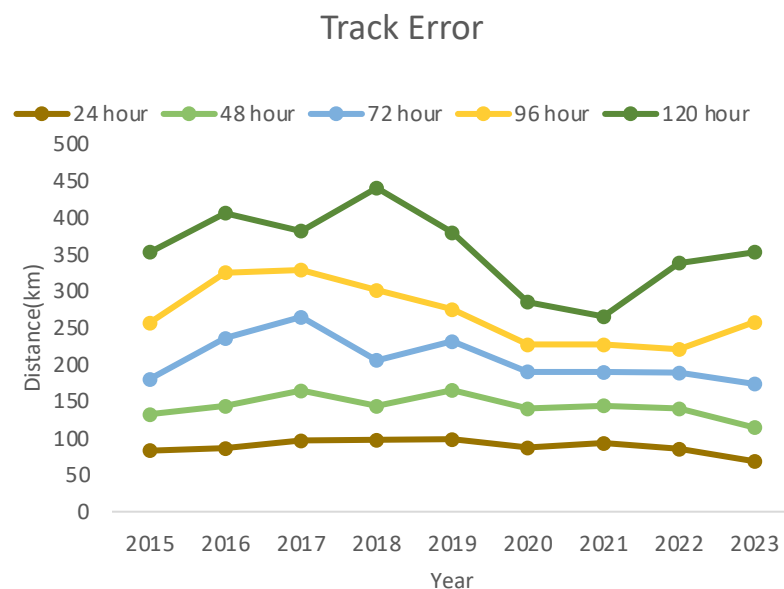
Wind speed



- The stronger the tropical cyclone, the greater the difference in pressure
- Wind speed differences tend to increase with higher intensity (STS, TY), but even TD cases can show significant differences.
- Generally, when there is a large difference in pressure, there is also a significant difference in wind speed
- In rare cases, only the pressure difference or wind speed difference may be significantly large

Summary

3. Verification of Operational Forecast



- Track forecast error
 - The longer the forecast lead time, the larger the error
- Intensity(pressure, wind) forecast error
 - While errors tend to increase with longer lead times, the differences are relatively minor

Summary

4. How to access the data

```
https://apihub.kma.go.kr/api/typ01/url/typ_besttrack.php?year=2023  
&tcid=2301&help=0&authKey=t1FI3nkZSVCRSN55GQlQjQ
```

- **year=\$yyyy** - the desired year of the Best Track data
- **tcid=\$tcid** - the specific number ID of the Tropical Storm
- **help=\$n** - 0: Start and end indicator + variable name
 - 1: 0 + description of variable
 - 2: only value displayed

Thank you for your attention!!