

# **Intensity and Wind Radius Identification of Typhoon Mujigae (2015) before landfall**

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**Xiaotu LEI<sup>1</sup>, Bingke ZHAO<sup>1</sup>, Wai Kin WONG<sup>2</sup>**

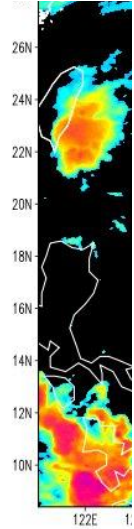
**<sup>1</sup>Shanghai Typhoon Institute, China Meteorological Administration**

**<sup>2</sup> Hong Kong Observatory, Kowloon, Hong Kong, China**

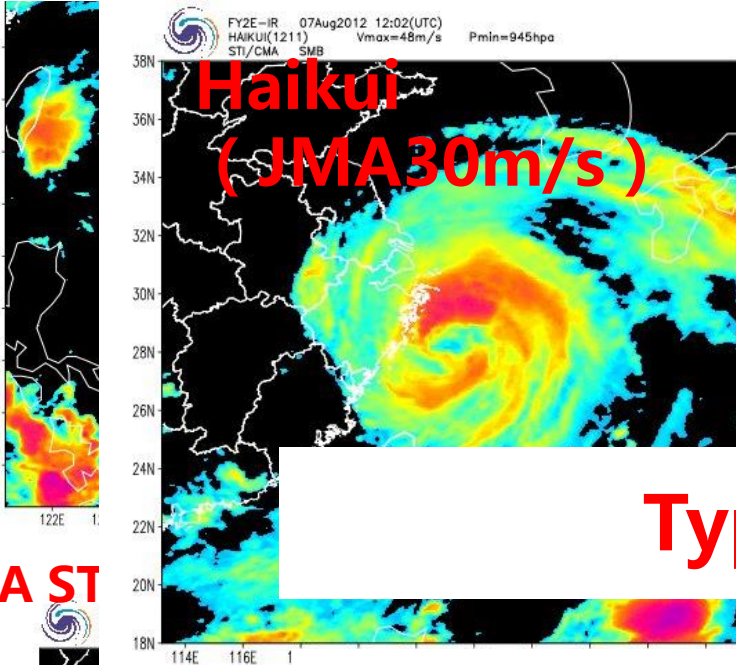
**Shanghai, SEPT 8 2017**

# Offshore Typhoon Identification Dilemma(OTID)

( >42m/s)

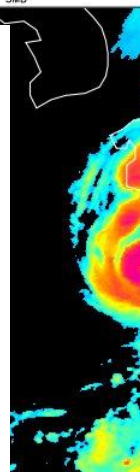


JMA ST

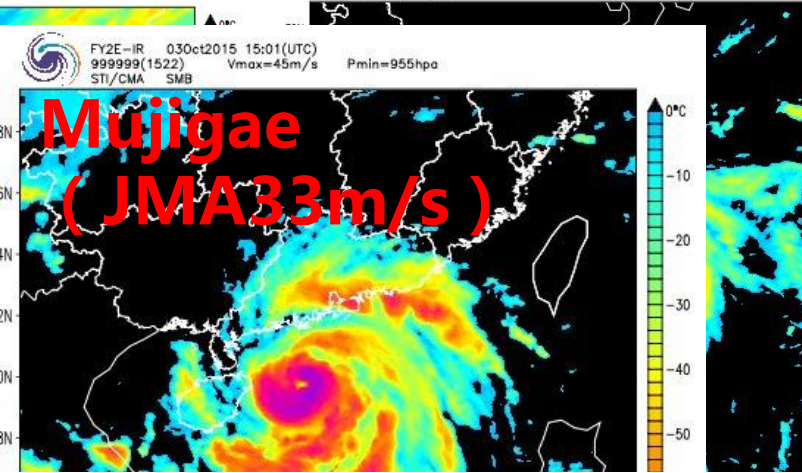


Haikui  
(JMA 30m/s)

FY2E-IR 19Sep2011 18:01(UTC)  
STI/CMA SMB Vmax=40m/s Pmin=955hpa



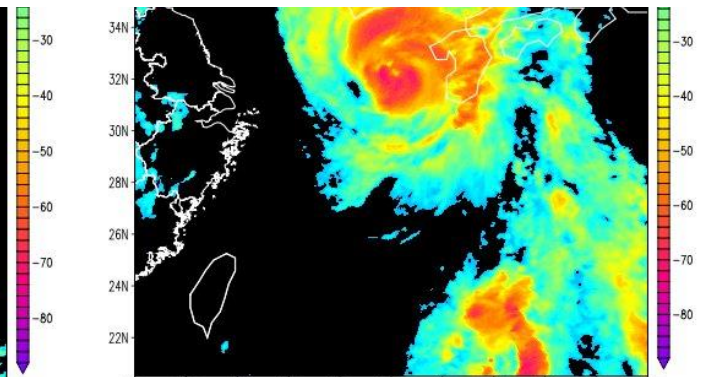
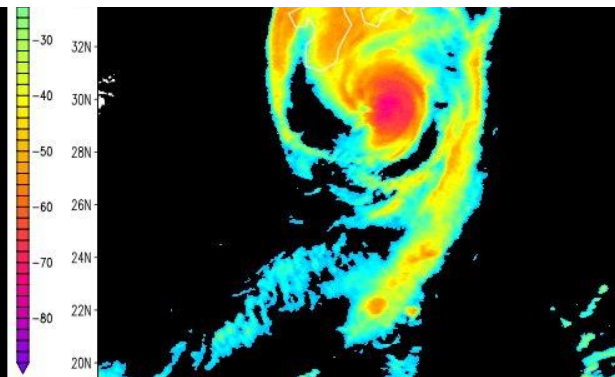
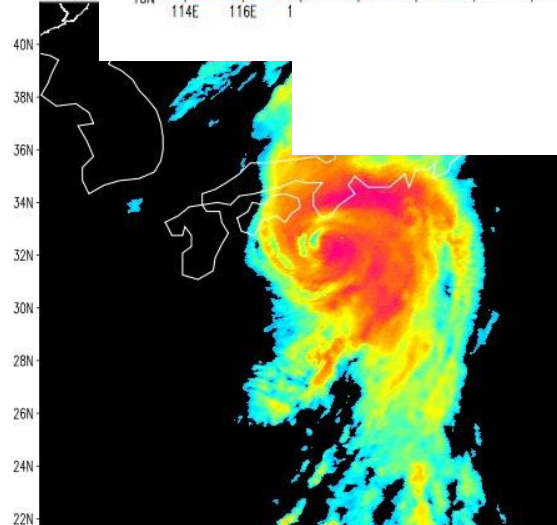
FY2E-IR 17Sep2010 12:01(UTC)  
STI/CMA SMB Vmax=45m/s Pmin=950hpa



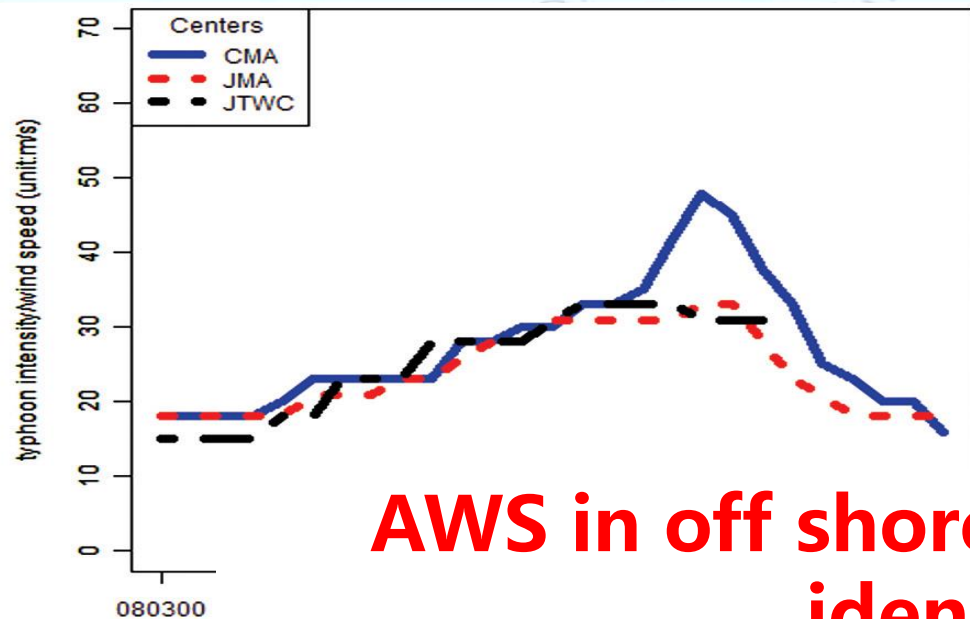
Mujigae  
(JMA 33m/s)

Typhoon Identification?

Satellite VS Offshore OBS ?



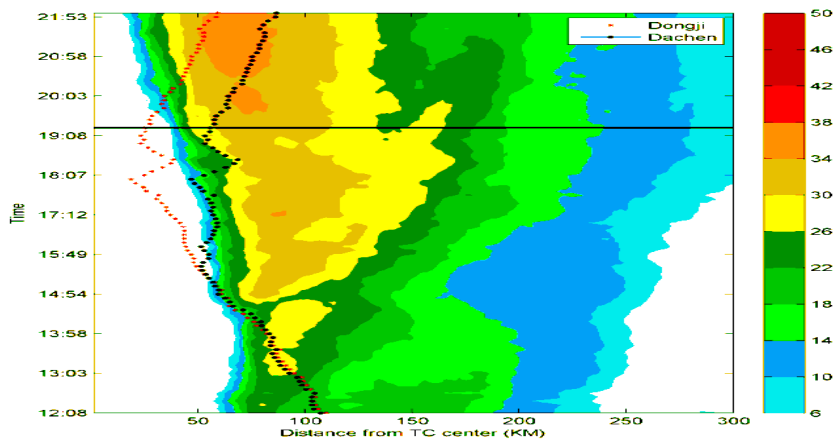
# Offshore Typhoon Haikui(1211) Identification



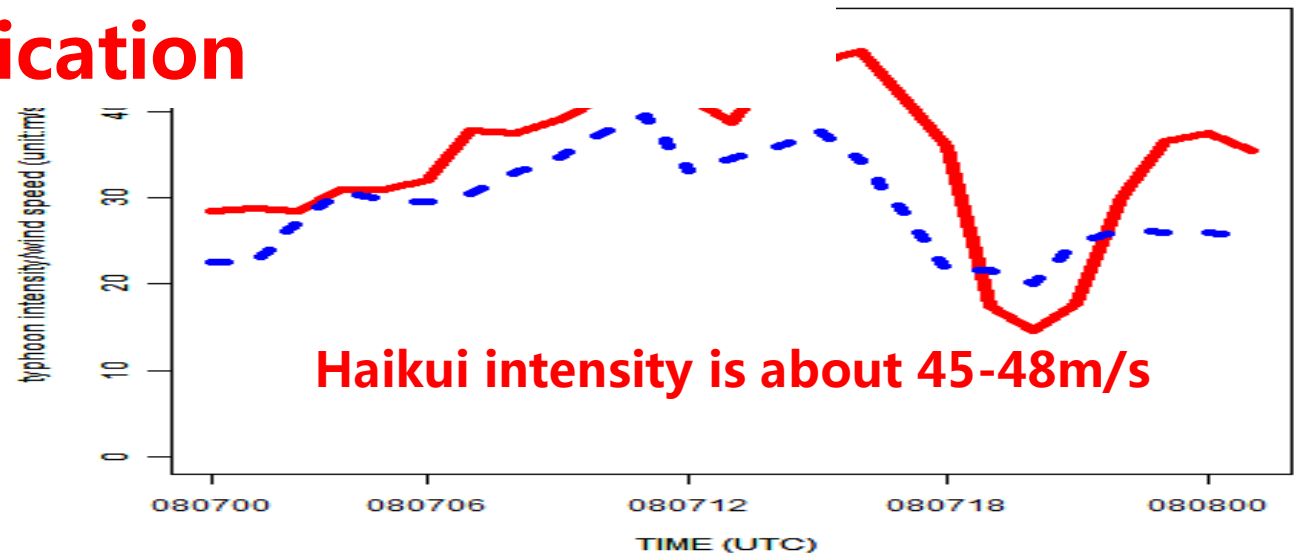
Ningbo 300 m Tower Transition Coefficient between different Height

高层	低层	32 M	89 M	212 M	298 M
32 M		1	/	/	/
89 M		0.955	1	/	/
212 M		0.885	0.982	1	/
298 M		0.870	0.970	0.976	1

**AWS in off shore island is valid in TY identification**



Radar OBS

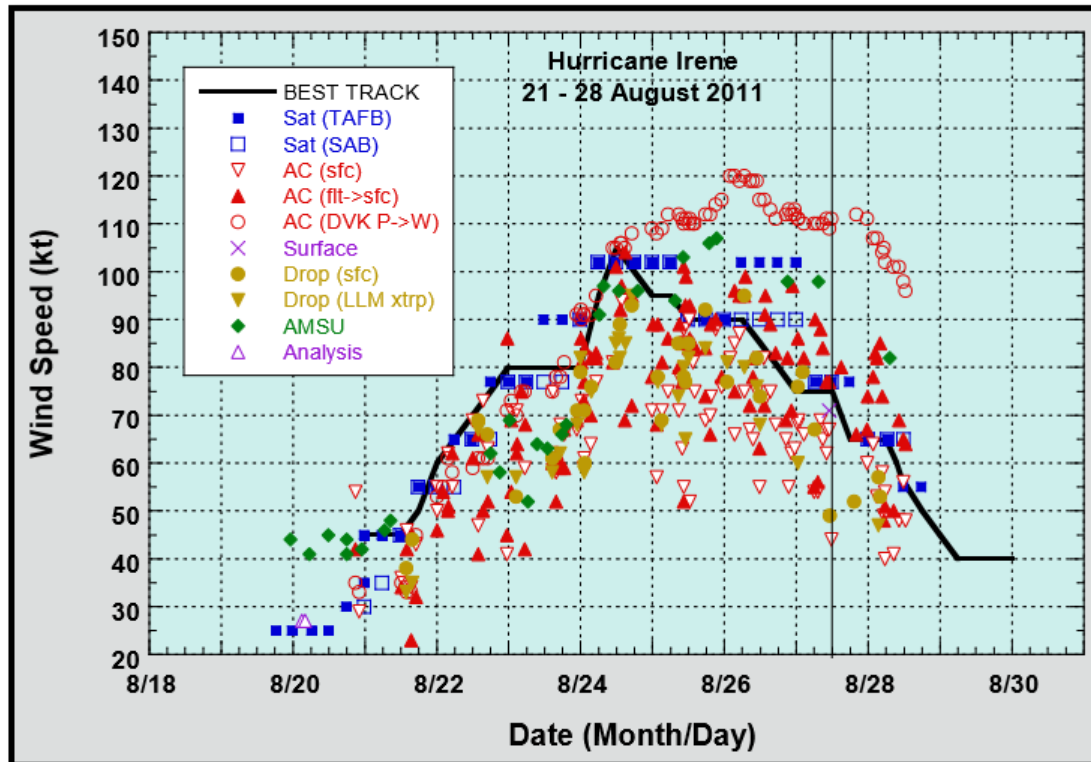


**Haikui intensity is about 45-48m/s**

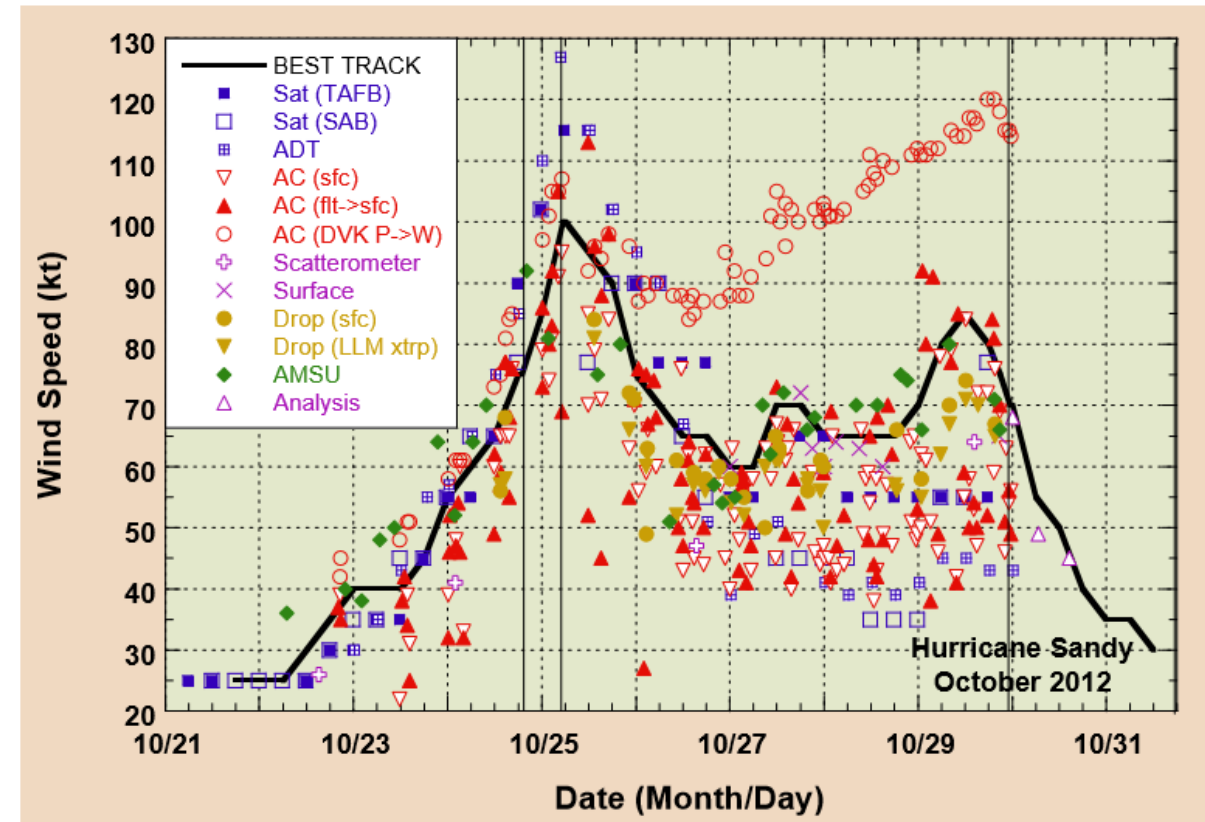
Tang and Wu , 2013 , TCRR



# Hurricane Intensity and Observation

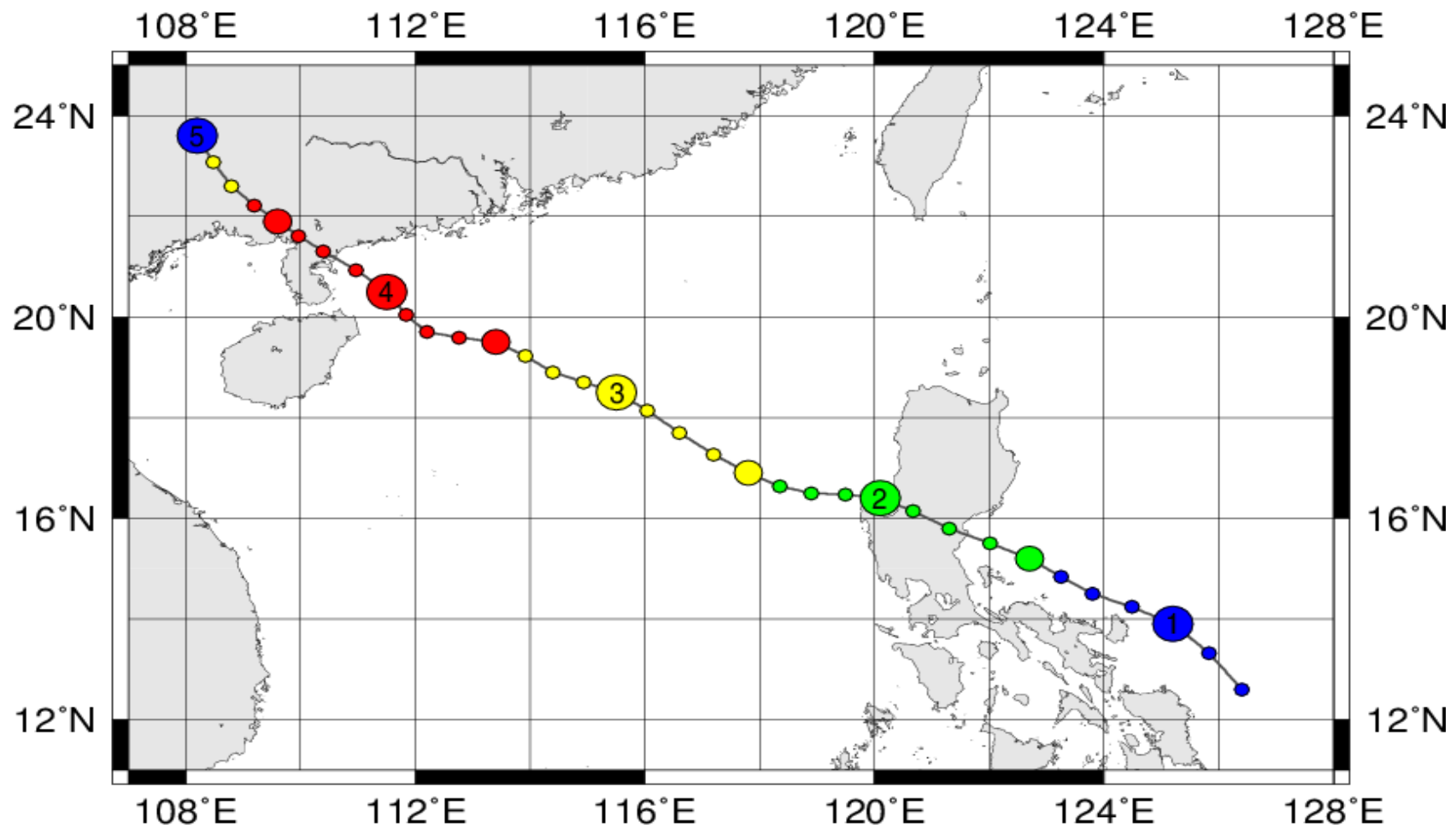


2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Irene. 2



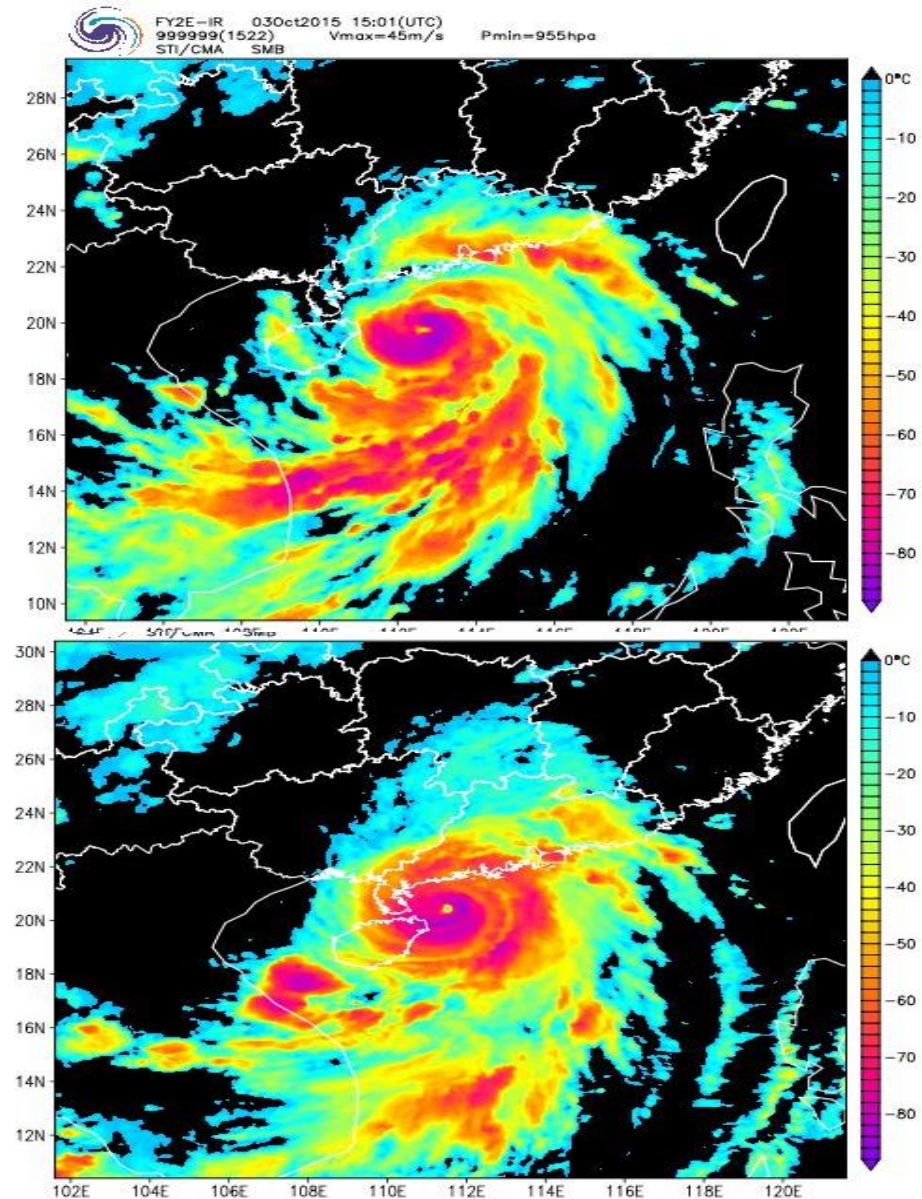
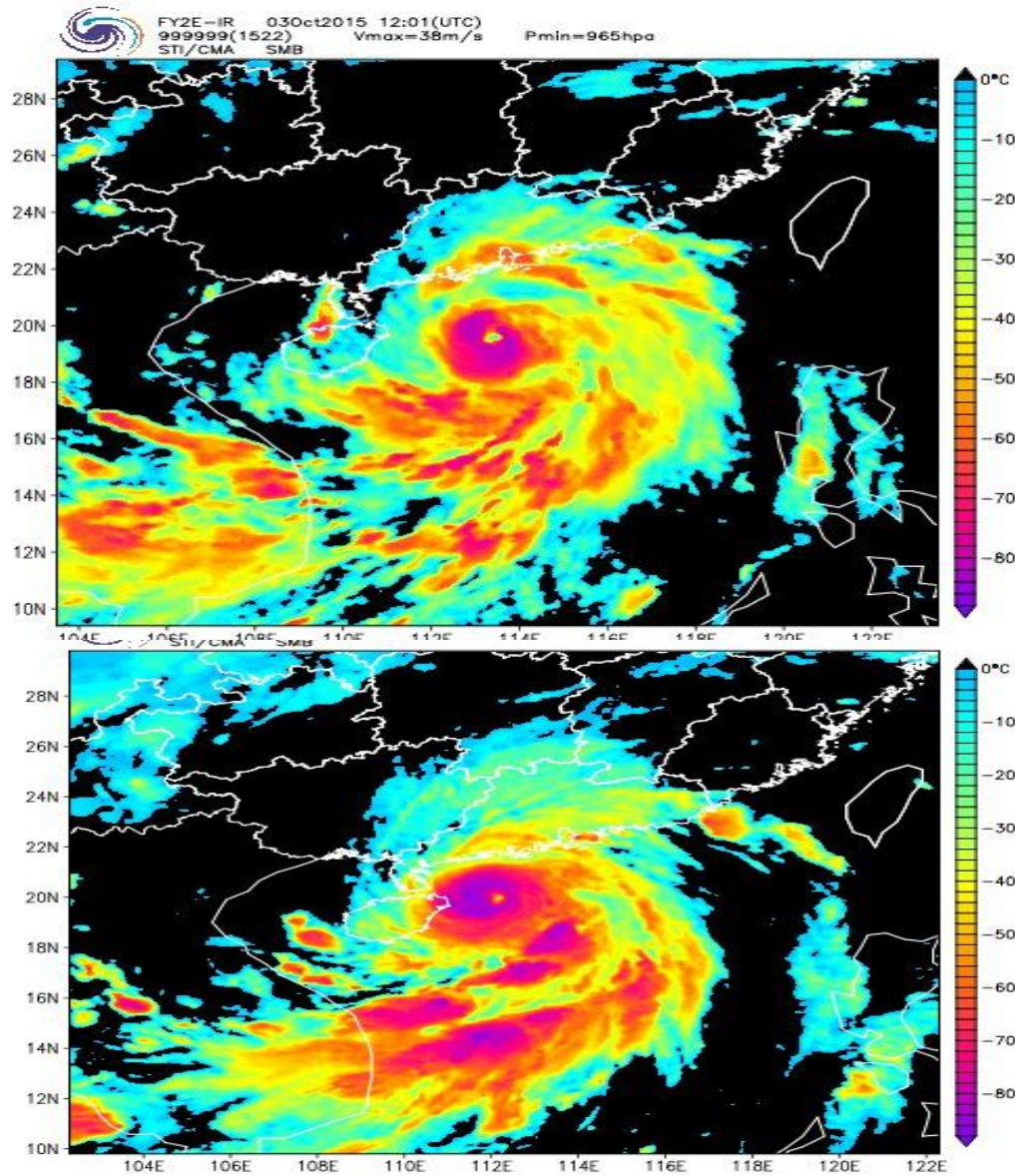
▲ FLIGHT DATA ---> Surface Observation  
○ Dvorak --> Satellite Observation

# Typhoon Mujigae(1522)



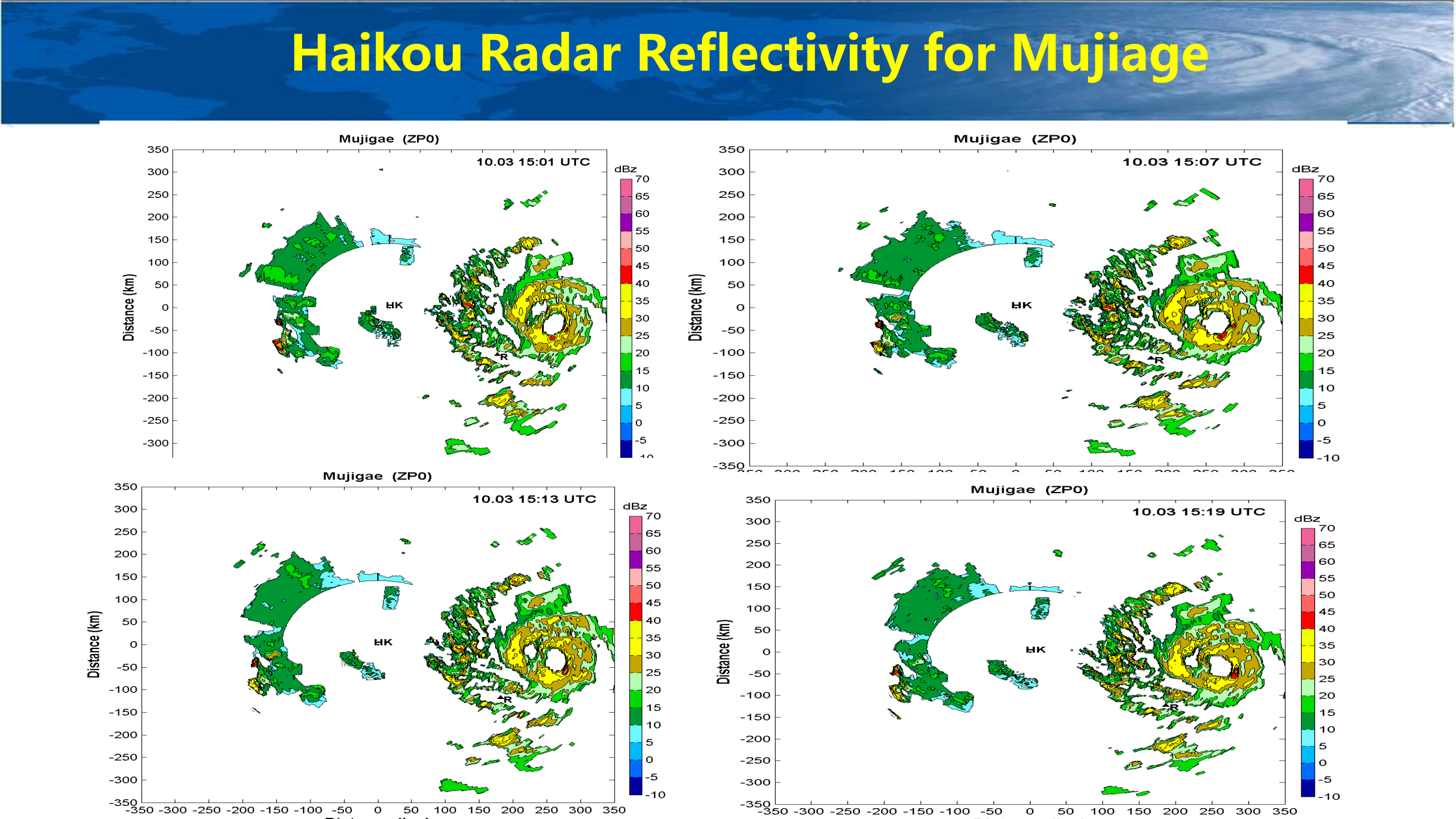


# Landfalling Typhoon Mujigae(1522) by FY2





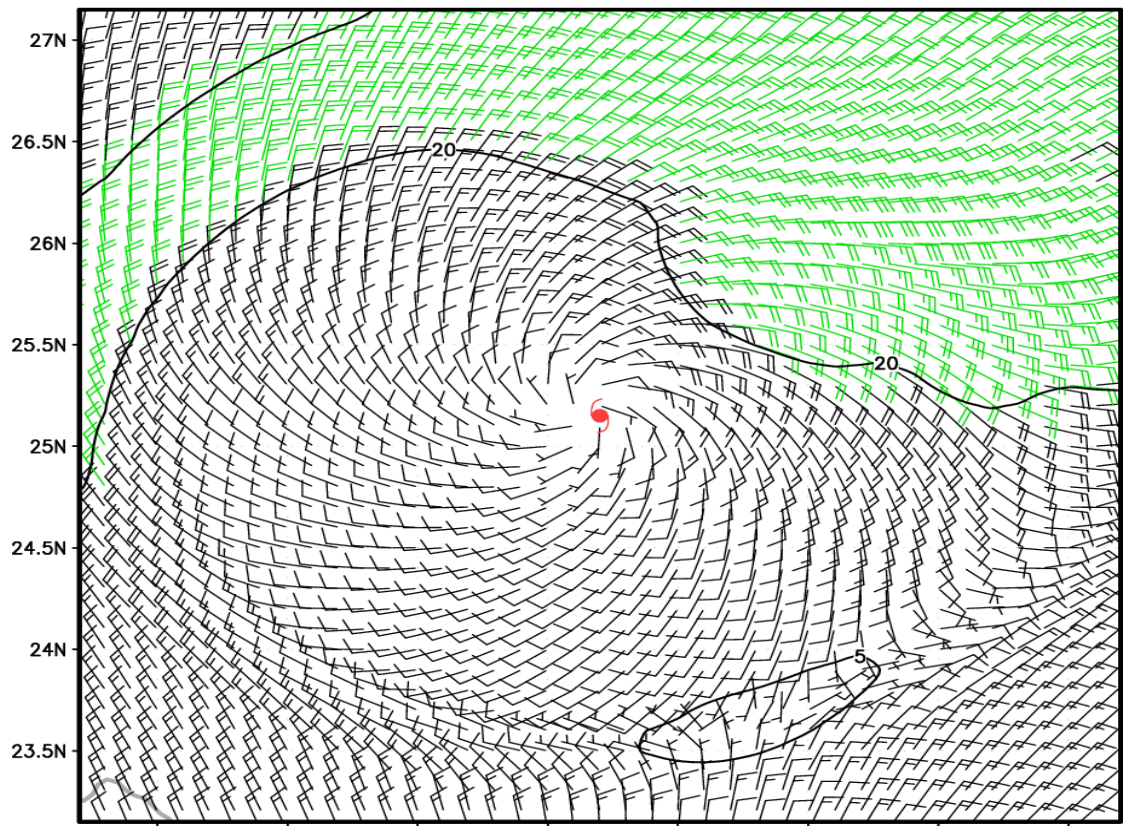
# Haikou Radar Reflectivity for Mujiage





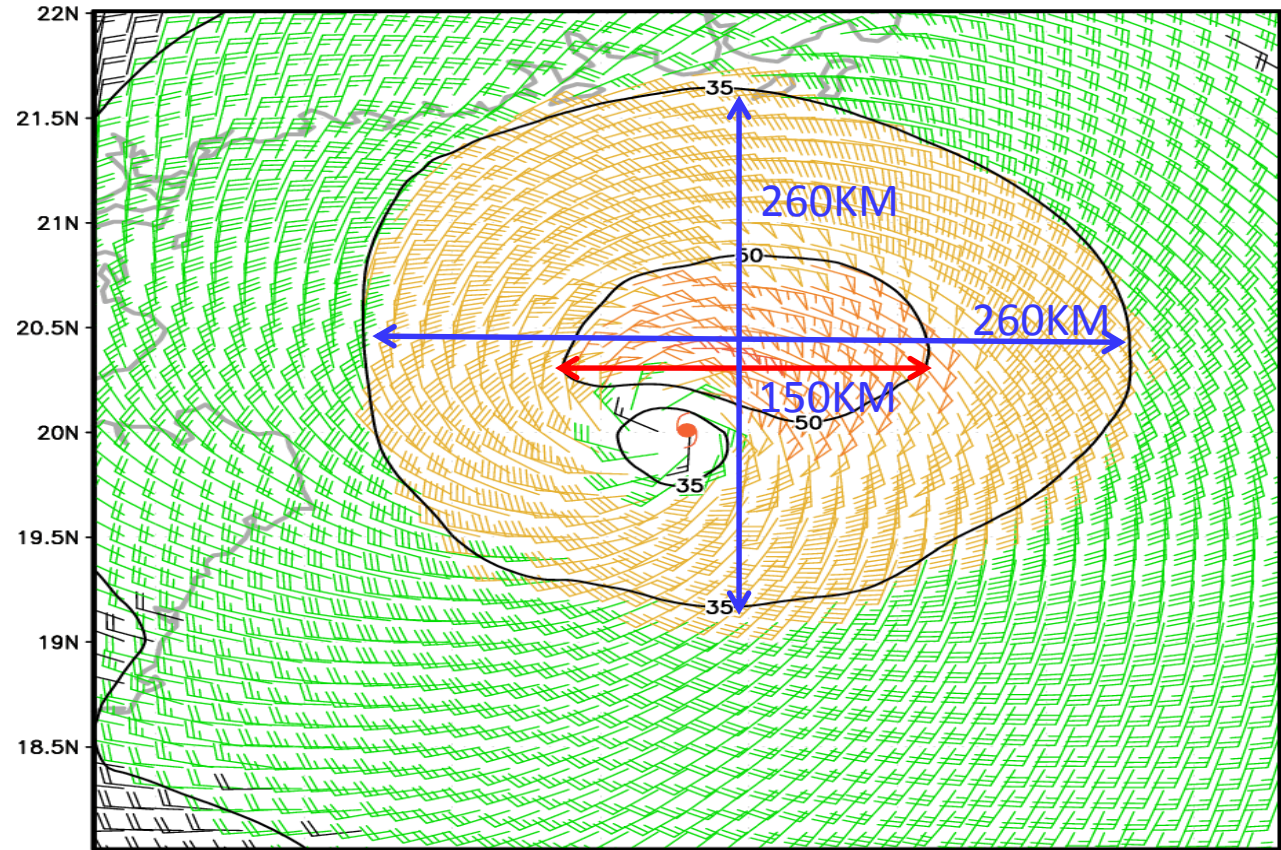
# ASCAT WIND for Mujiage

WP2215 MUJIGAE 2015 5 Oct 12UTC



QUA	NE	SE	SW	NW	VMAX	Input for IR Winds =	28
R34	0	0	0	0	VMAX =	30 kt	MSLP = 1000.4 hPa
R50	0	0	0	0	RMW =	166 nmi	BEARING = 50 degrees
R64	0	0	0	0			

WP2215 MUJIGAE 2015 3 Oct 18UTC



QUA	NE	SE	SW	NW	VMAX	Input for IR Winds =	62
R34	105	80	60	105	VMAX =	68 kt	MSLP = 971.1 hPa
R50	55	50	25	50	RMW =	18 nmi	BEARING = 20 degrees
R64	25	0	0	25			



# Mujigae Intensity(wind) by different centers

Centers					
	CMA	HKO	JMA	JTWC	KMA
Time(UTC)					
031200Z	38	36	33	33	35
031500Z	45	41	33	/	/
031800Z	45	41	37	41	36
032100Z	48	44	39	/	/
040000Z	48	44	33	49	40

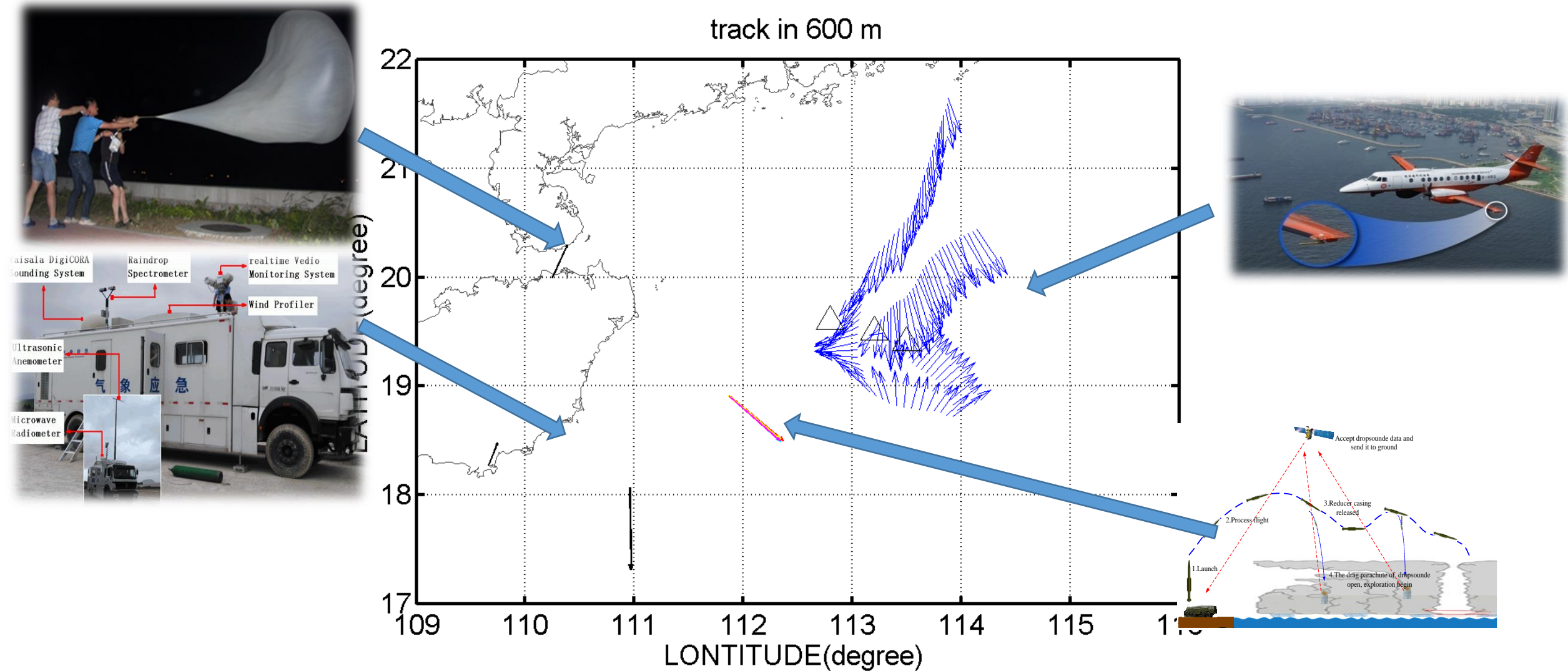
## Mujigae Wind Structure by different centers

Centers	CMA	HKO	JMA	JTWC	KMA
Time(UTC)					
031200Z	260/70	220/110	390/110	160/65	
031500Z	250/80	220/110	390/110		
031800Z	250/80	220/110	390/110	165/110	
032100Z	200/80	220/110	390/110		
040000Z	250/60	280/110	390/110	250/160	

**Which one is more reliable?**

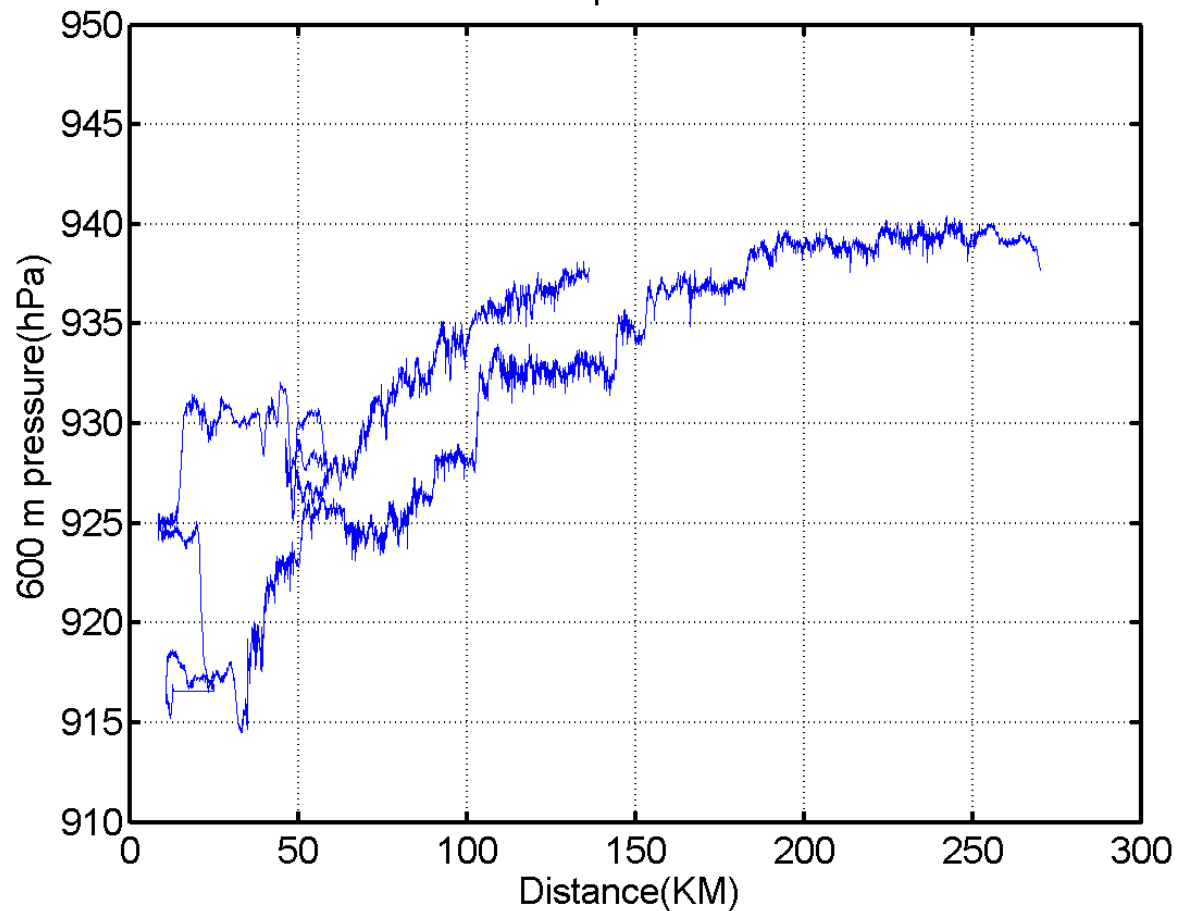


# EXOTICCA(2015)-HKO/STI

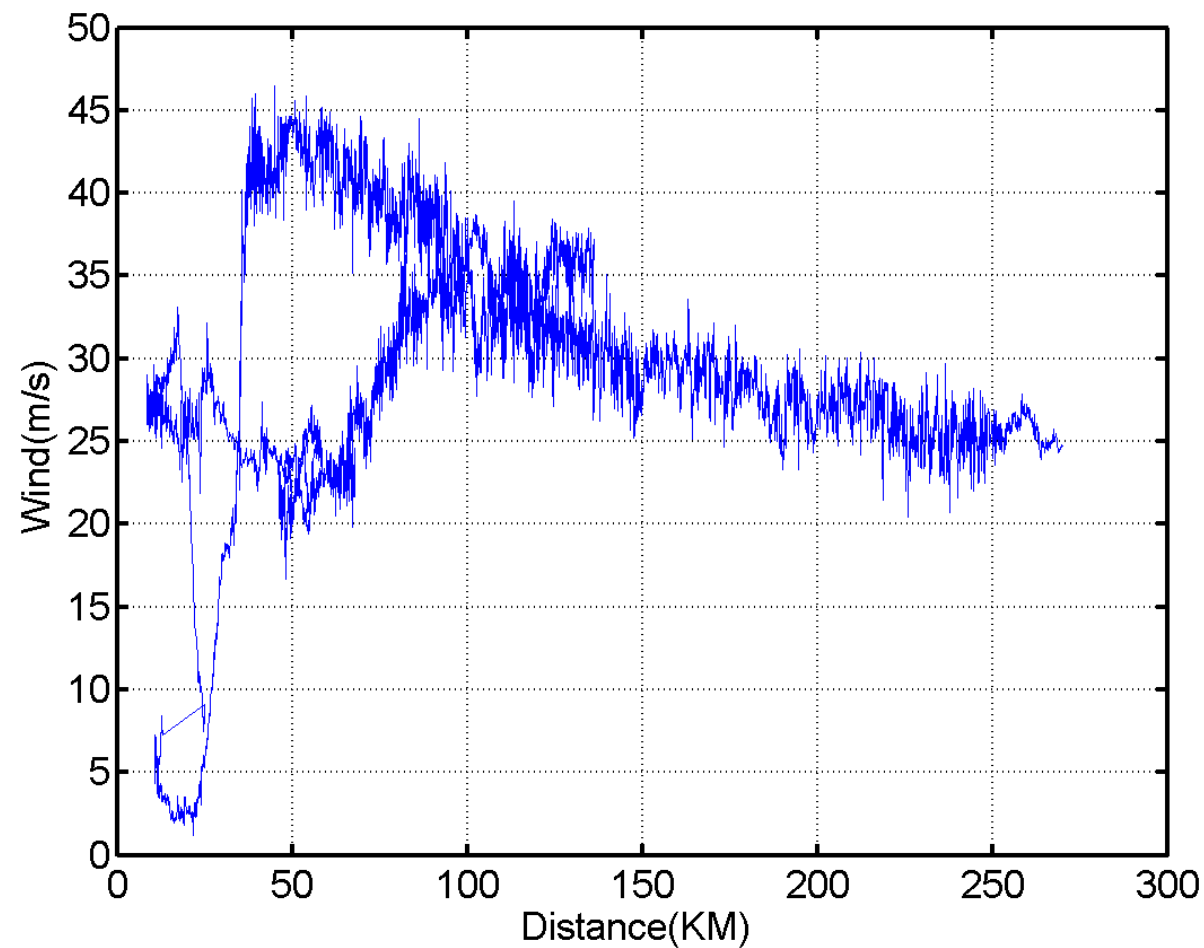


# HKO Flight Wind Observation

Distance vs pressure in 600 m



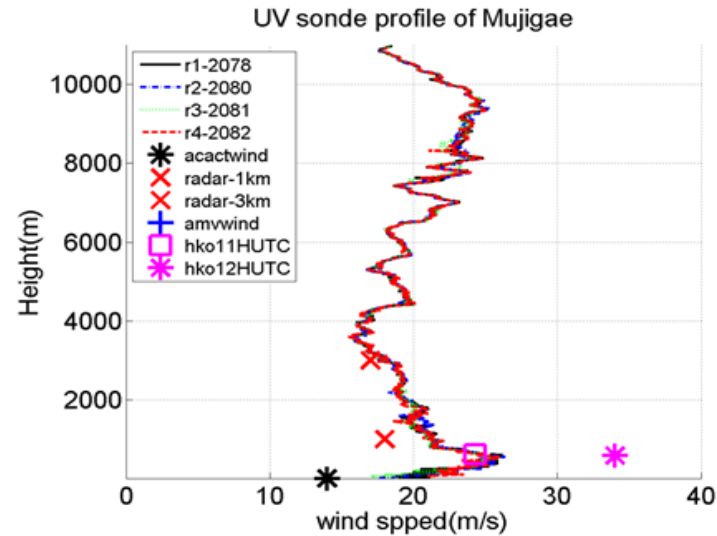
Distance vs UV wind in 600 m



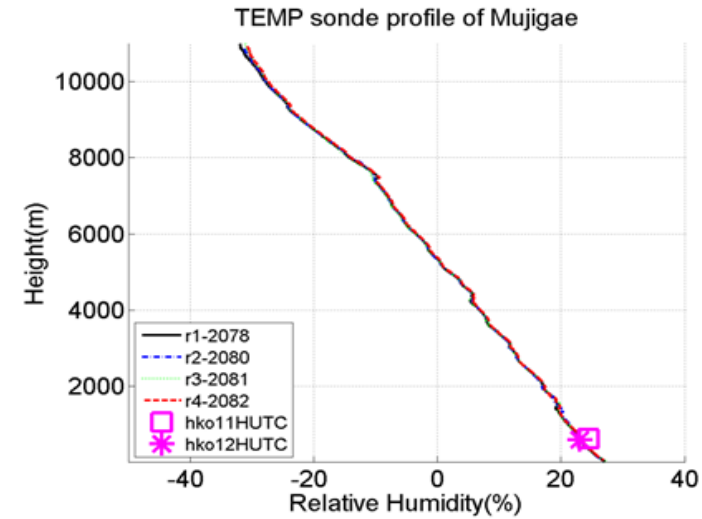


# EXOTICCA(2015)-STI obs VS Satellite

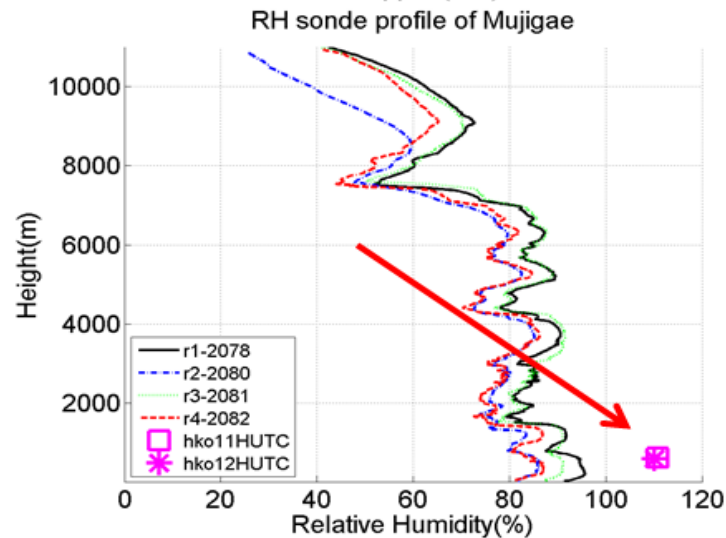
UV WIND



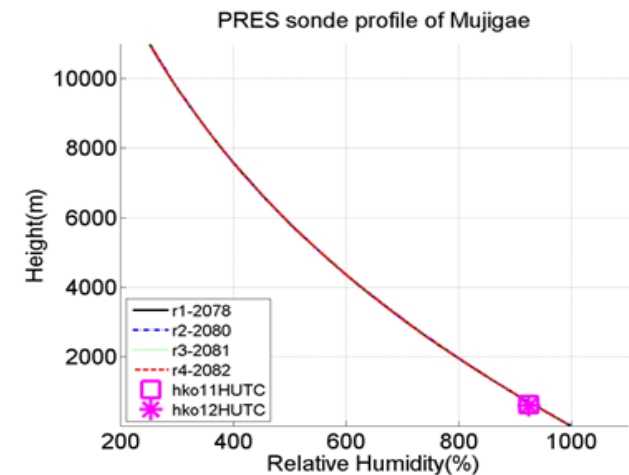
TEMP



RH

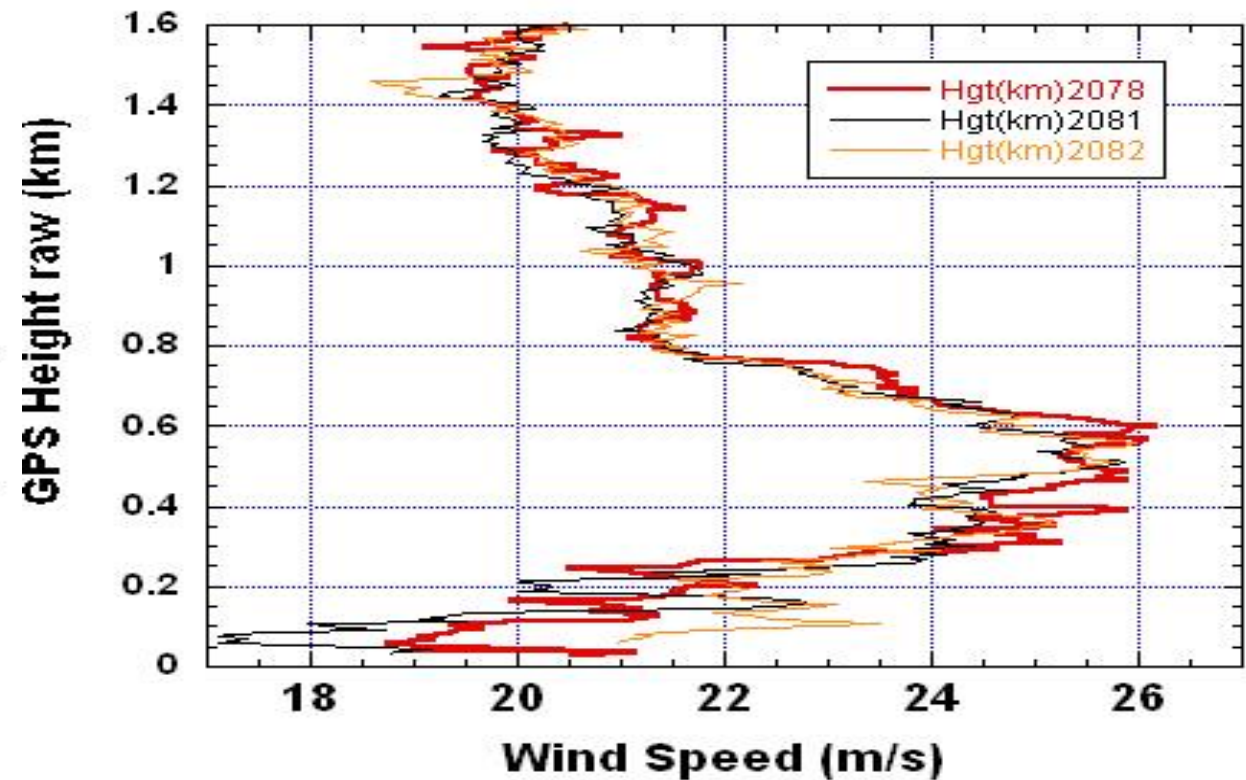
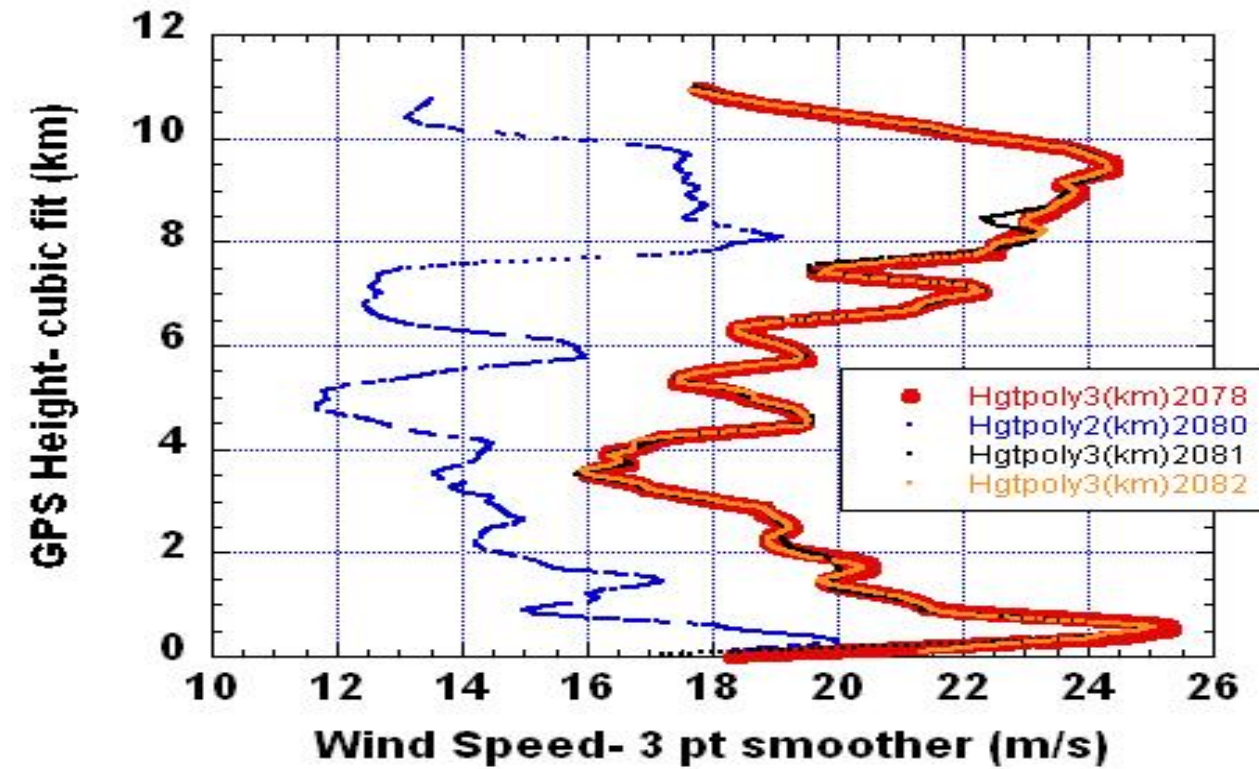


PRES



# Transition between different height in TCBL

2015-10-03 150619-152525 UTC Mujigae

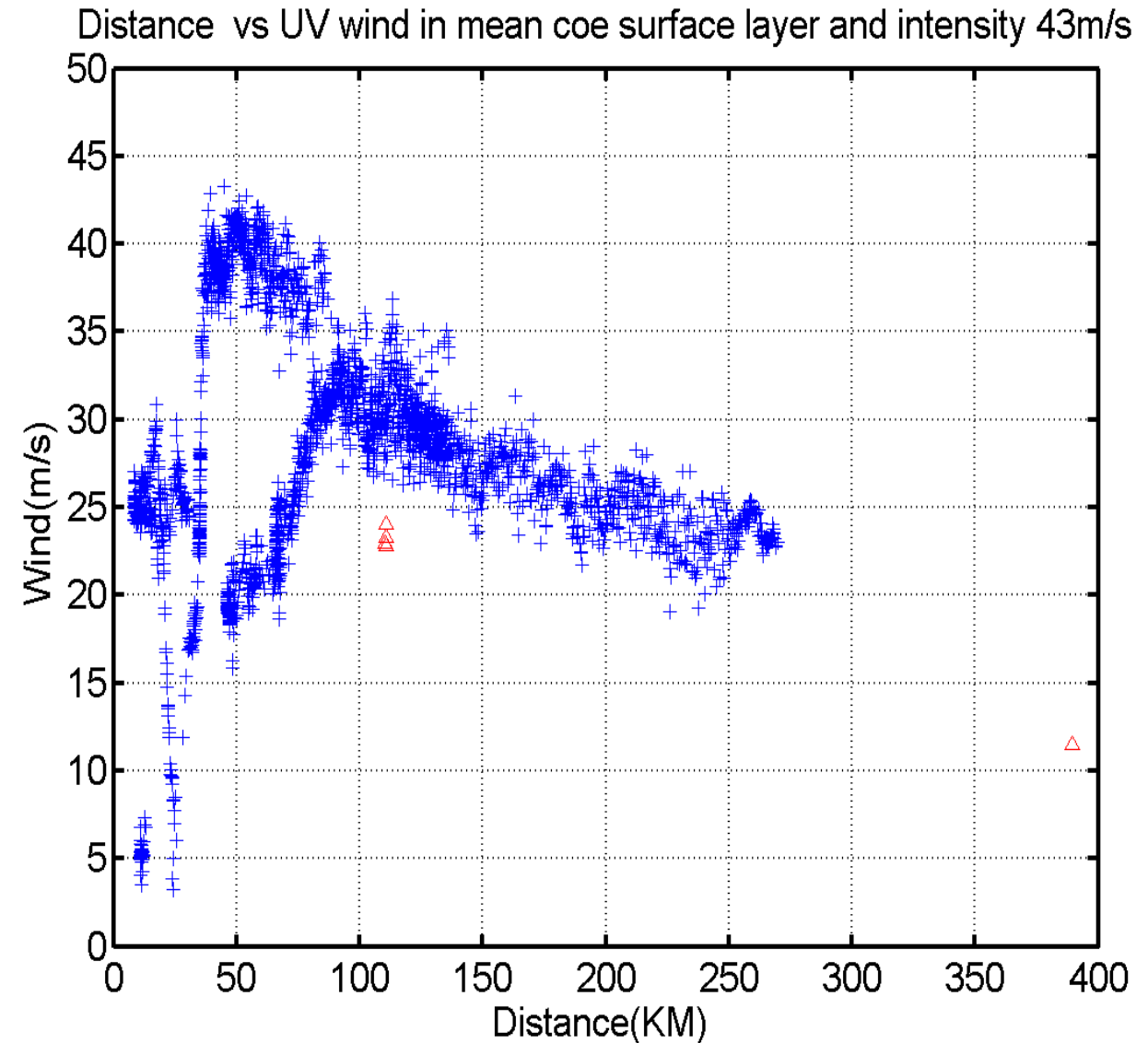
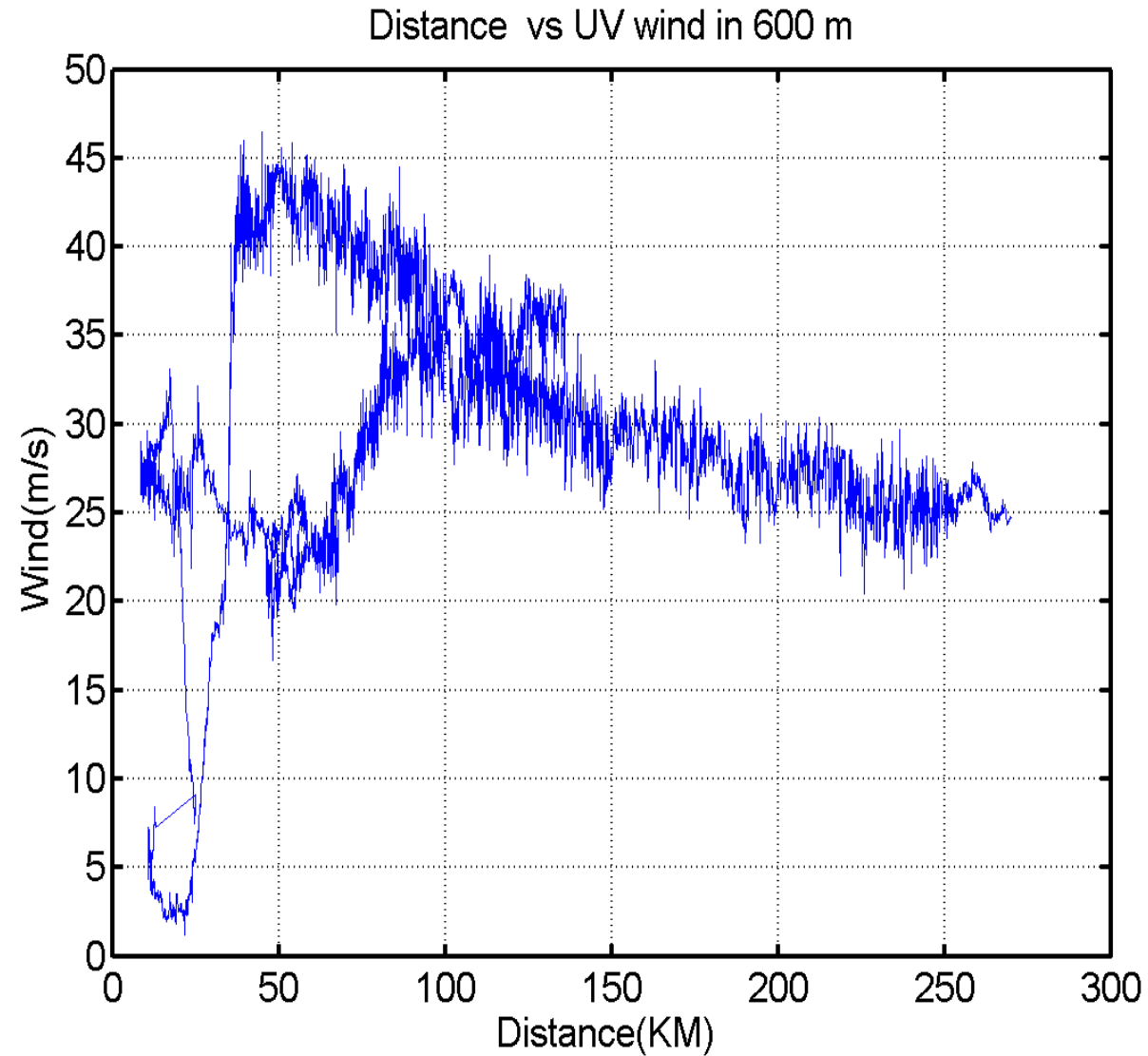


$$\text{Coe} = V_{\text{suf}} / V_{600}$$

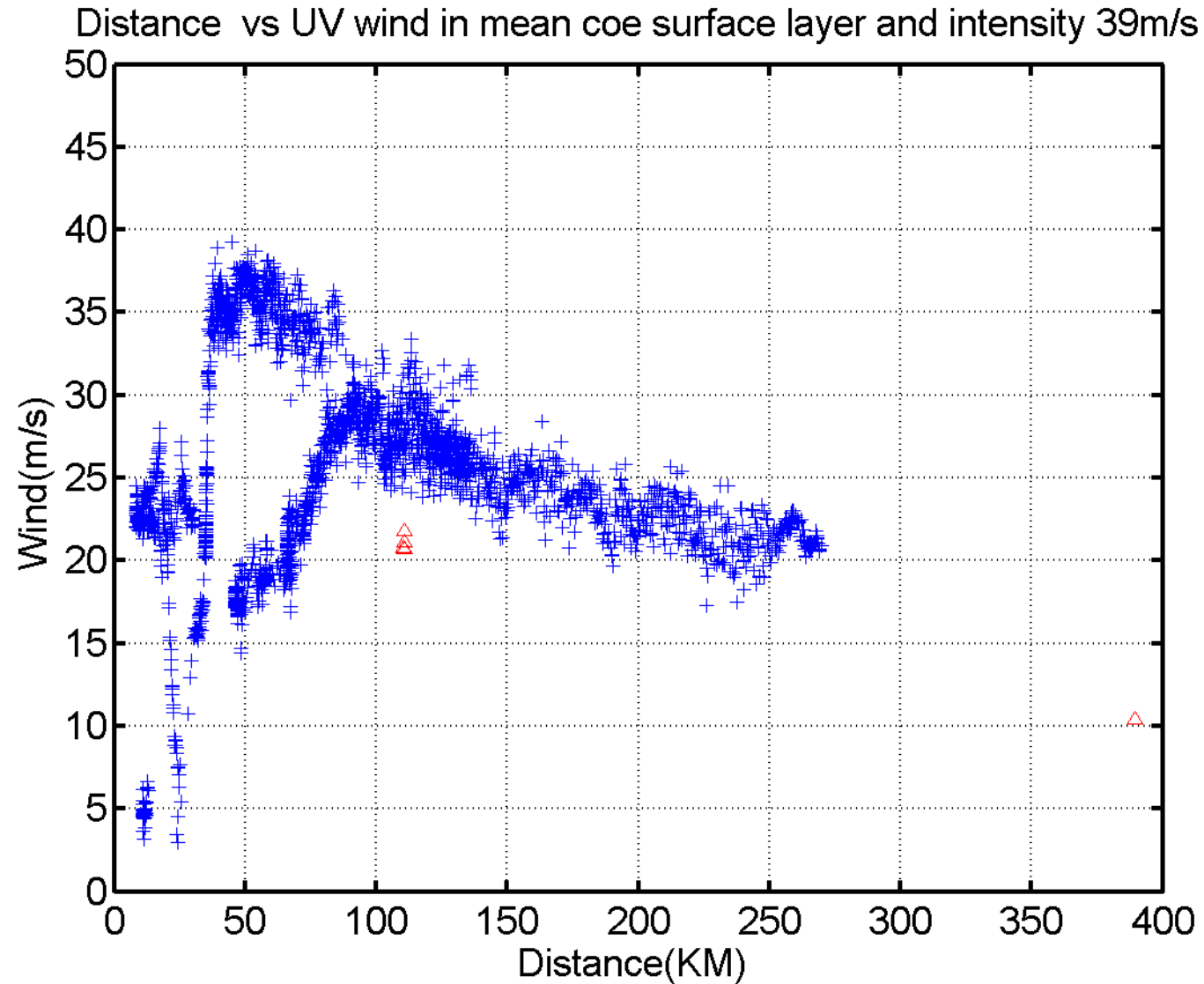
Dropsonde	R2078	R2080	R2081	R2082	mean
Coe	0.8186	0.8455	0.7828	0.9320	0.8447



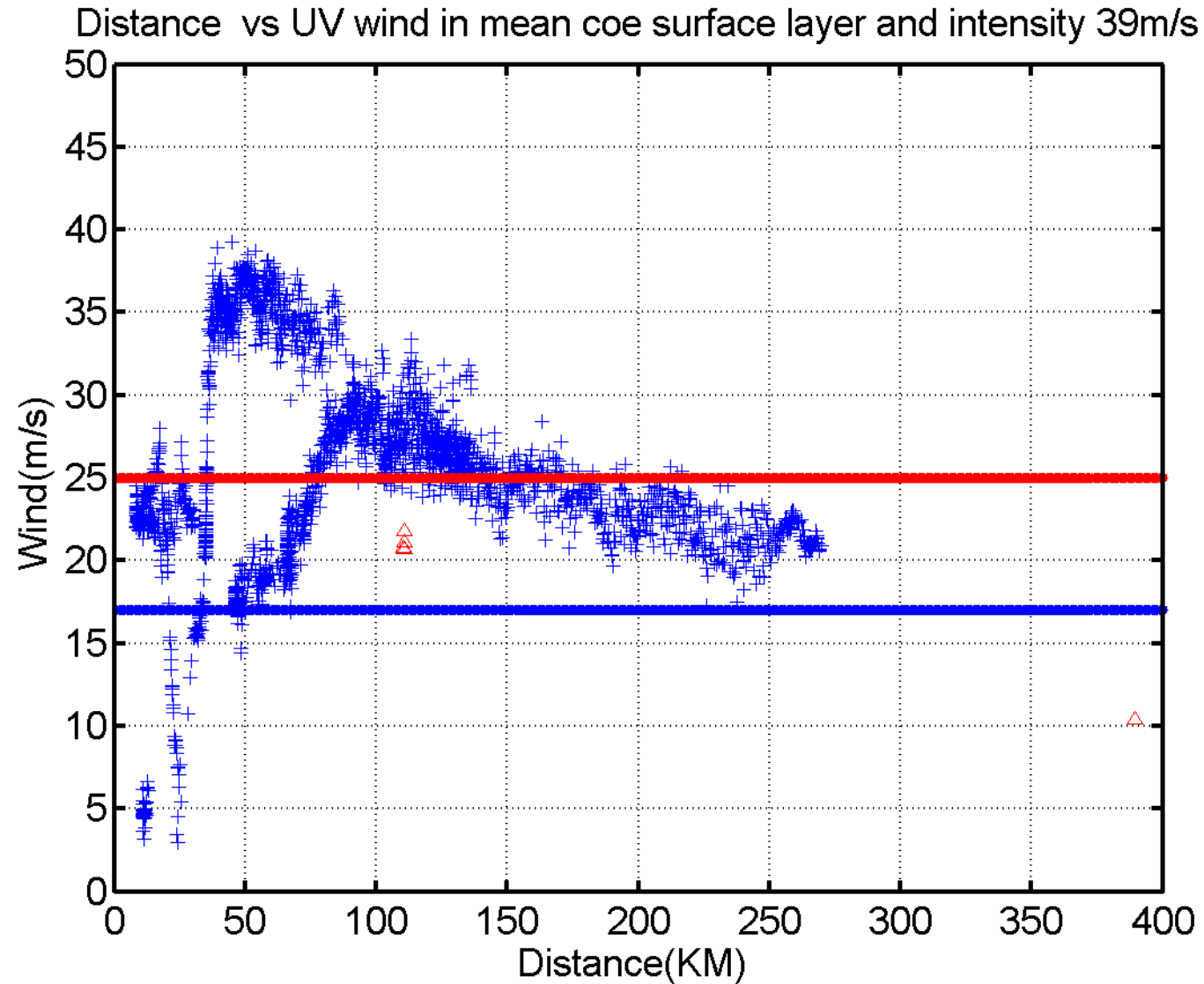
# Maximum Transition to Surface



# Mean Transition to Surface



# Mean Transition to Surface





# Modified Intensity in Our result

Centers						
	CMA	HKO	JMA	JTWC	KMA	WE
Variables						
WIND	38-45	36-41	33-37	33-41	35-36	41
Pressure	965		970		970	
30kt	260	220	390	160		267
50kt	70	110	110	65	/	155

# Summary

➤ **Th How and what can we do from very limited data in  
oper Typhoon Research and Operation?**

➤ **Excess data (like and only data set could be used to  
identify the intensity and wind structure of Typhoon Muiigae in  
the Offshore Typhoon Identification**

➤ **T based on different datasets → OTID**

431, ... 0  
km for 25m/s (50 kt) RMW is about 50 km) based on current

and **Offshore Typhoon Boundary Layer**

➤ **Turbulence Transition**

identify the offshore typhoons



谢谢!

