



HYBRID資料同化系統 單點測試結果分析

— (2) 背景誤差權重因子之測試

陳美心 江琇瑛 馮欽賜 李志昕 洪景山
中央氣象局

Hybrid

- **for Background error**
 - **Static BE** :長期大氣平均狀態之靜態背景誤差
 - **Dynamic BE** :系集預報成員之間的流場相關特性之動態背景誤差
- **Hybrid BE** :長期大氣平均狀態與流場相關特性兼具之背景誤差，在描述即時大氣狀態更具有代表性。

背景誤差權重因子 **Je_factor** :
決定**Static BE**與**Dynamic BE**之比例分配

背景誤差權重因子: **Je_factor**

$$\beta_e = \frac{1}{Je_factor}$$

$$\beta_b + \beta_e = 1$$

Je_factor	Static BE (β_b)	Dynamic BE (β_e)
1001	~100%	~0%
4	75%	25%
2	50%	50%
1.333	25%	75%
1	0%	100%

實驗設定

Alpha_corr_scale (localization)

200

375

750

1500

Je_factor

β_b

β_e

1001

~1.0

~0.0

4

0.75

0.25

2.

0.50

0.50

1.333

0.25

0.75

1

0.0

1.0

討論目的：

了解不同背景誤差權重因子對於Hybrid背景誤差結構之變化。

exp name :

EAKF_H

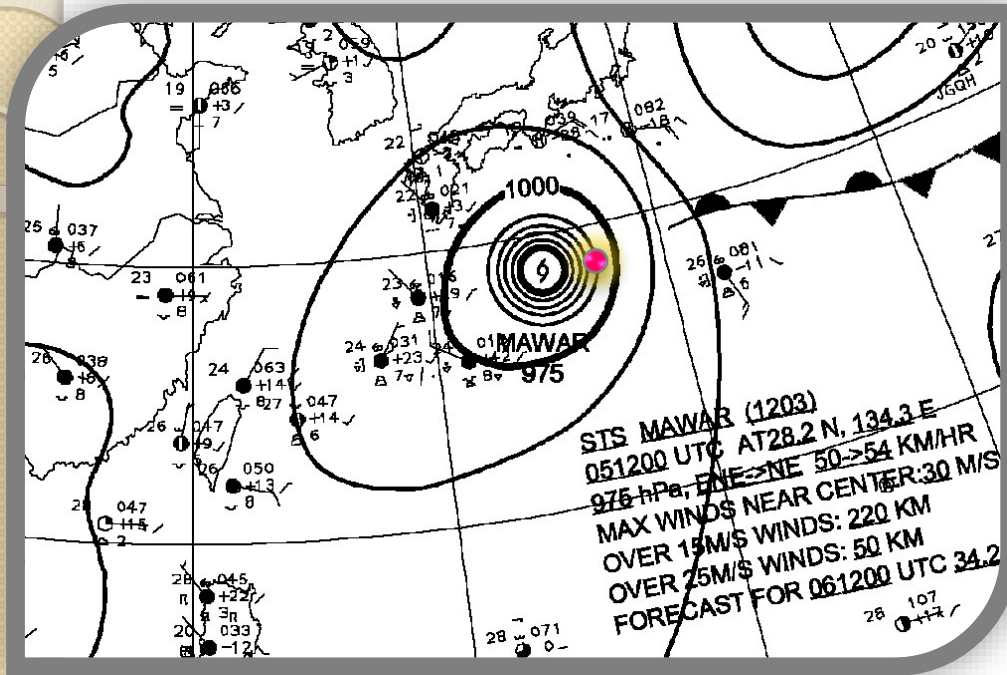
WEPS_H

CWB WRF3DVAR CV5

CWB EAKF (32 members)

CWB WEPS (20 members)

單點測試設定



- 單點測試觀測資料：
Temperature
innov (O-B) = 1 K ,
obs_err = 1 K

- 時間 : 12060512 瑪娃颱風
- 單點測試位置 : 137.143 E , 28.2 N
860mb , 520mb, 250mb

◦ 單點測試結果分析

- 分析增量 = 分析場-背景場

Lev= \sim 860mb

β_e

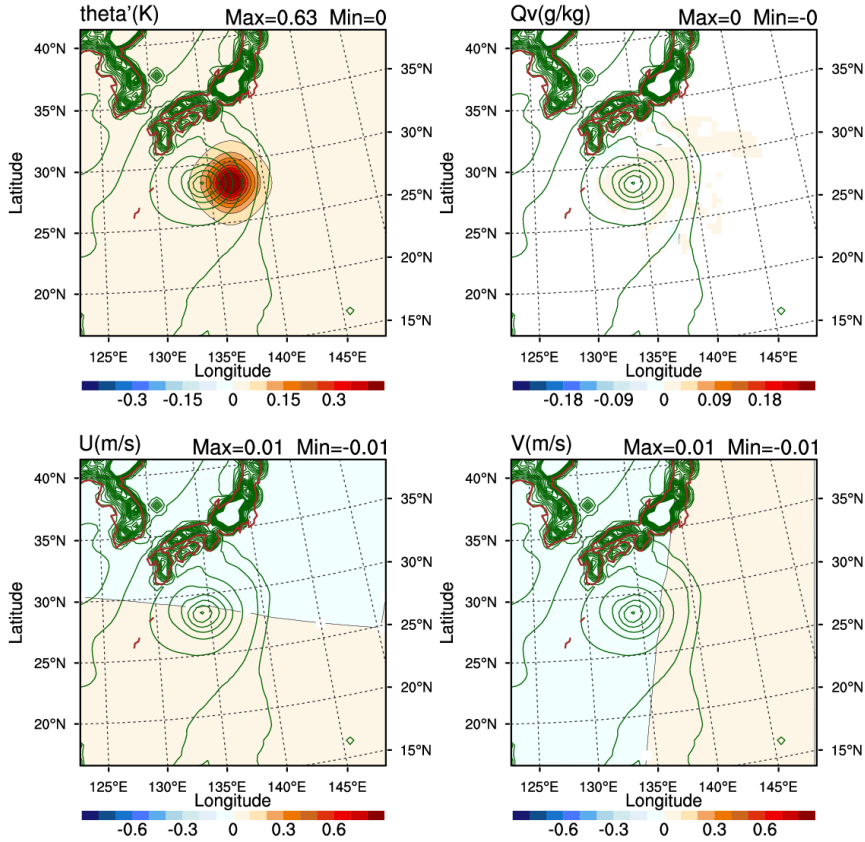
~ 0.0

EAKF_H

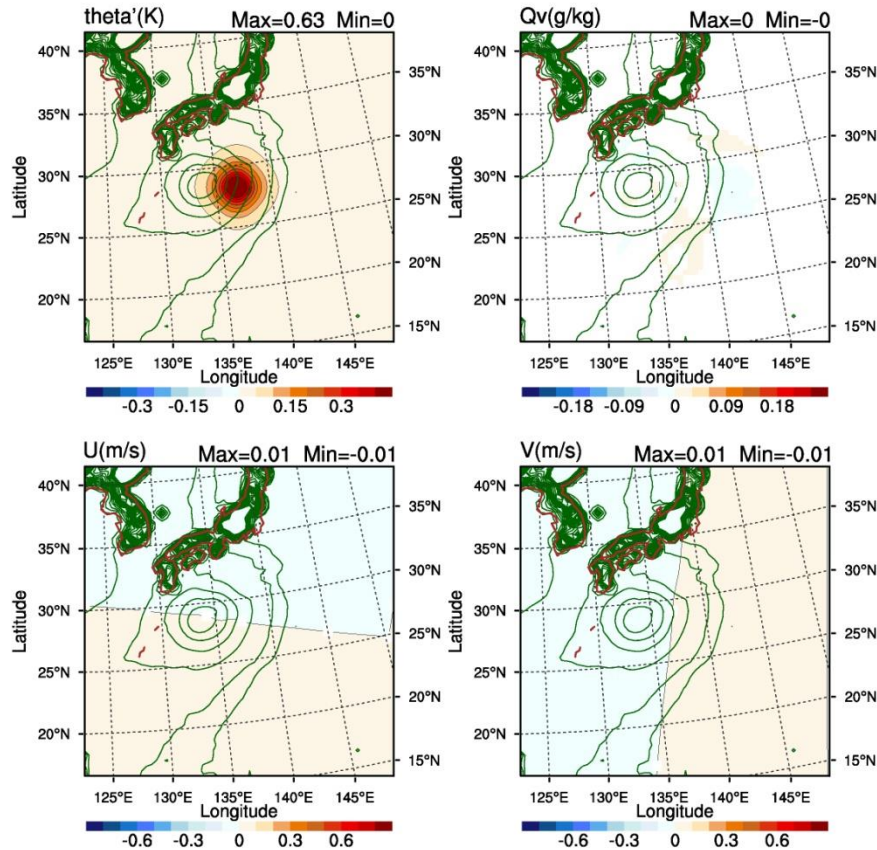
WEPS_H

Note: 兩者之FG不同，EAKF_H颱風結構較強

Analysis Increments form Single Obs. T at sigma Lev=11, Lat=28.2001, Lon=137.143



Analysis Increments form Single Obs. T at sigma Lev=11, Lat=28.2001, Lon=137.143



Lev= \sim 860mb

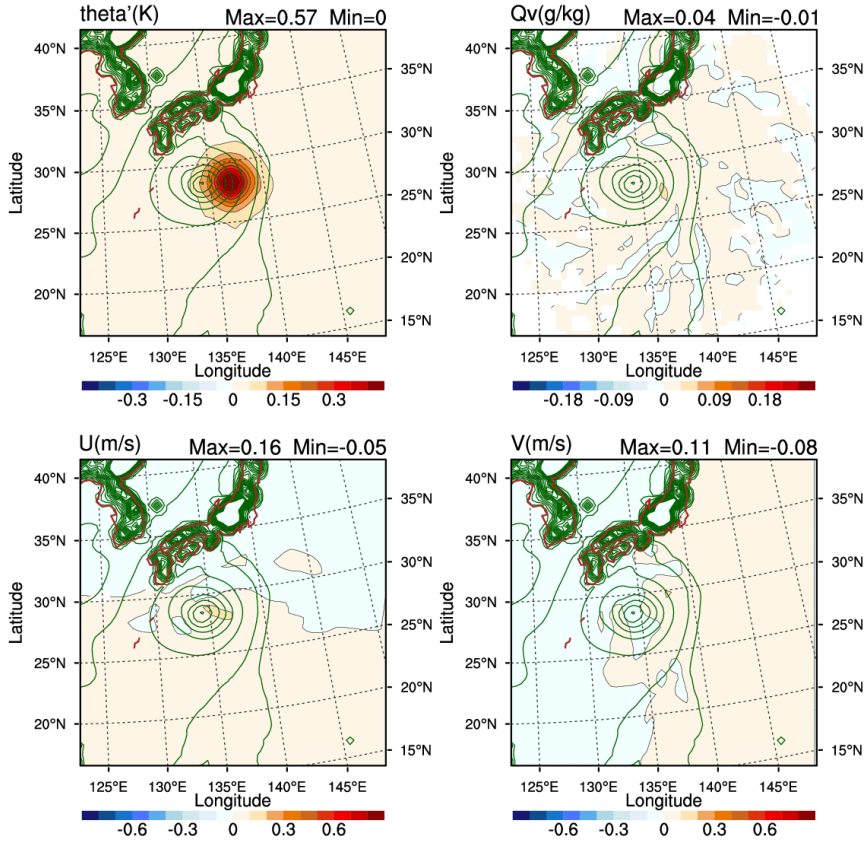
β_e

0.25

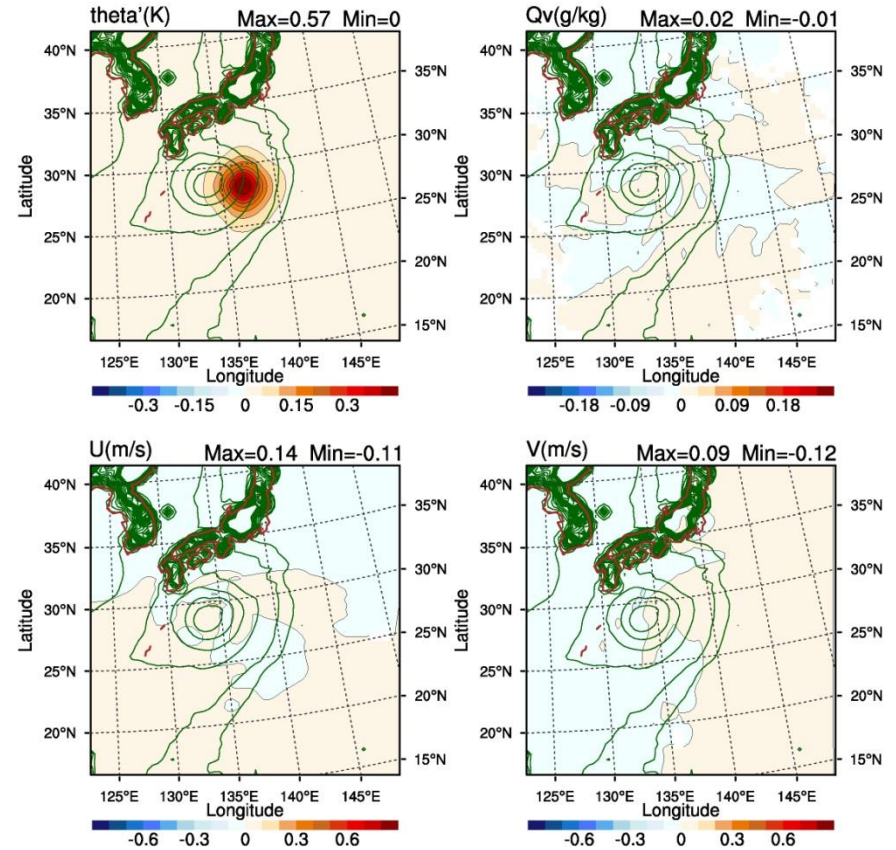
EAKF_H

WEPS_H

Analysis Increments form Single Obs. T at sigma Lev=11, Lat=28.2001, Lon=137.143



Analysis Increments form Single Obs. T at sigma Lev=11, Lat=28.2001, Lon=137.143



Lev= \sim 860mb

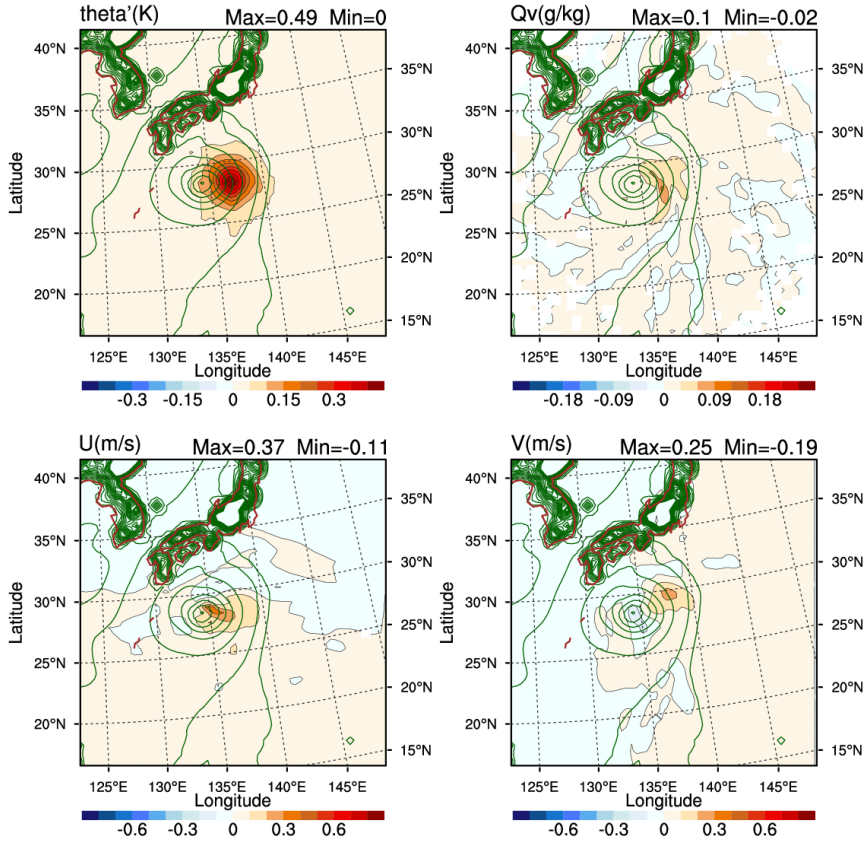
β_e

0.50

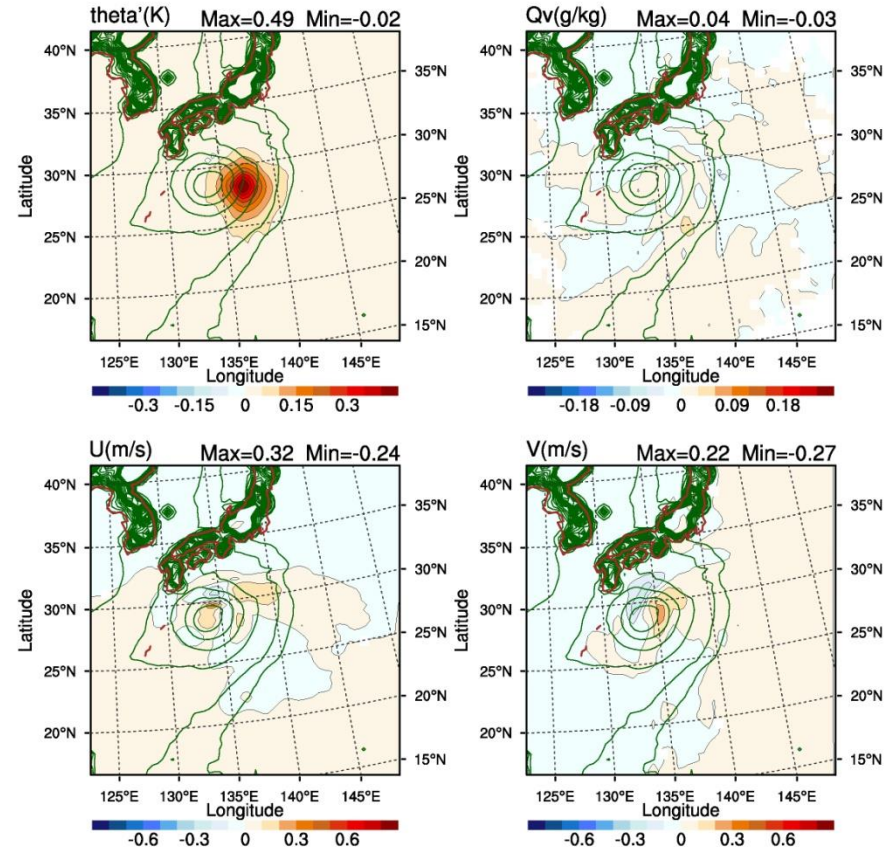
EAKF_H

WEPS_H

Analysis Increments form Single Obs. T at sigma Lev=11, Lat=28.2001, Lon=137.143



Analysis Increments form Single Obs. T at sigma Lev=11, Lat=28.2001, Lon=137.143



Lev= \sim 860mb

β_e

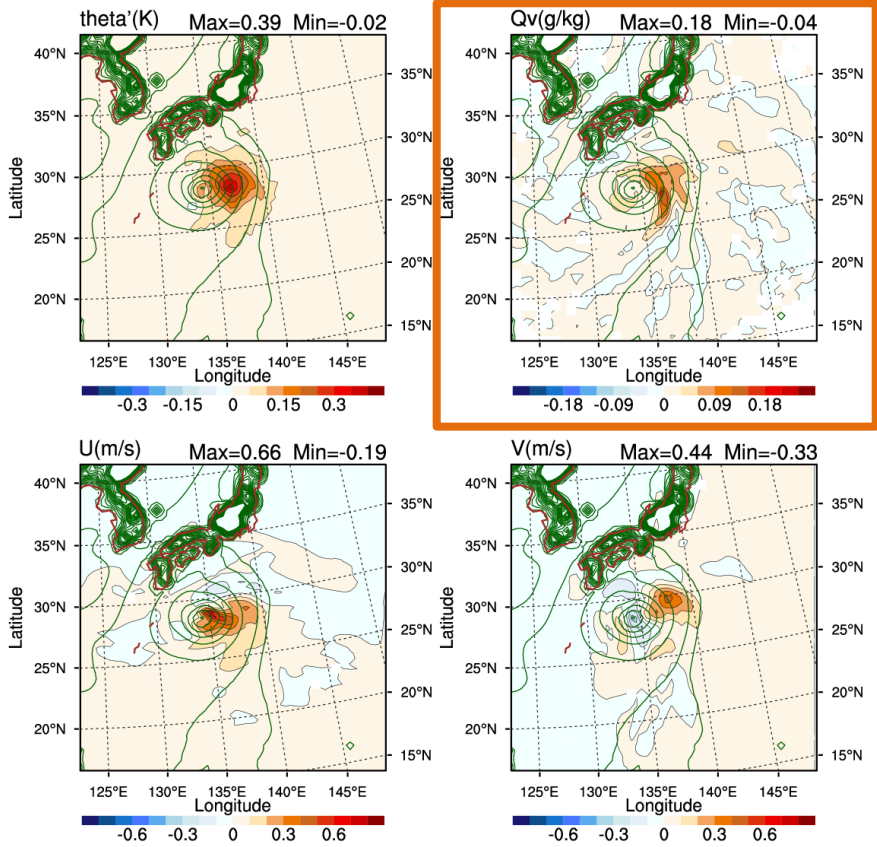
0.75

EAKF_H水氣較豐沛

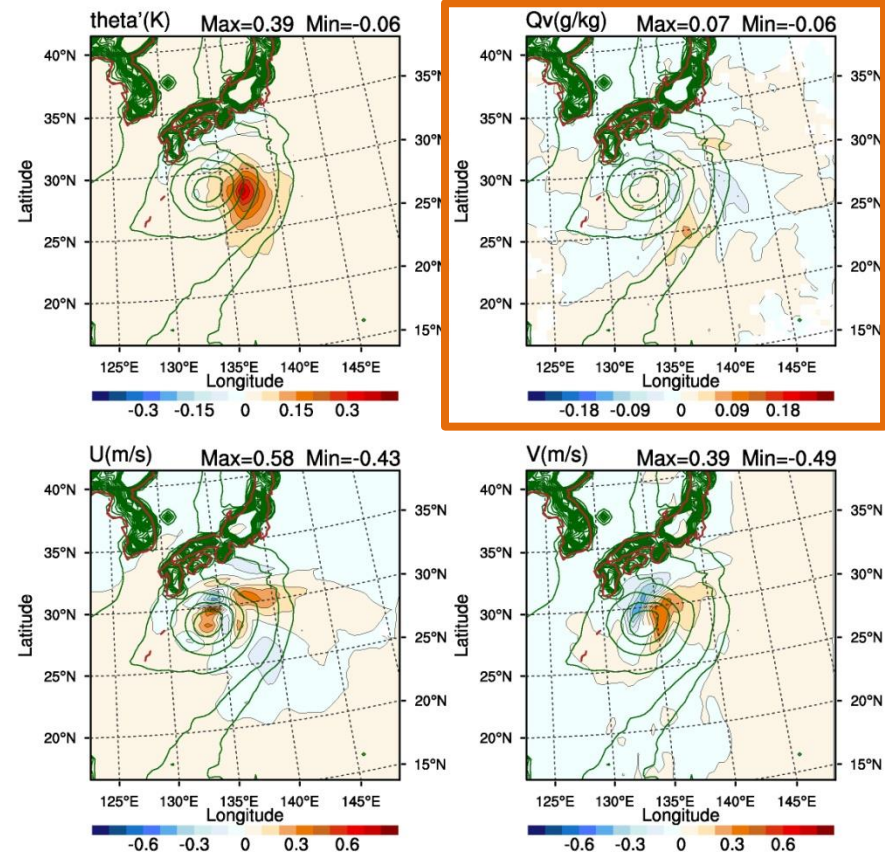
EAKF_H

WEPS_H

Analysis Increments form Single Obs. T at sigma Lev=11, Lat=28.2001, Lon=137.143



Analysis Increments form Single Obs. T at sigma Lev=11, Lat=28.2001, Lon=137.143



Lev= \sim 860mb

β_e

(1)EAKF_H水氣較豐沛

(2)EAKF_H溫度增量集中在颱風的東北方(downstream)
WEPS_H則是在東南方(upstream)

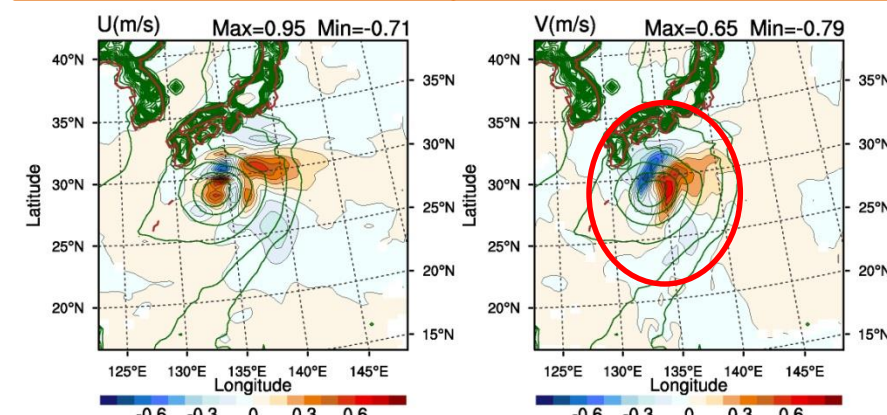
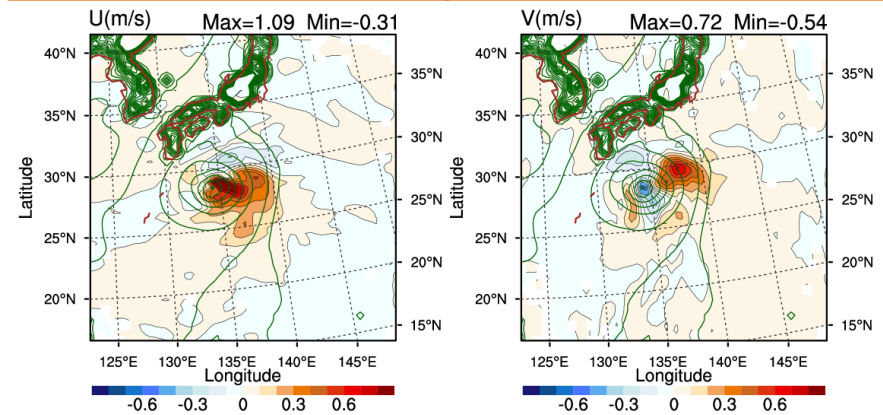
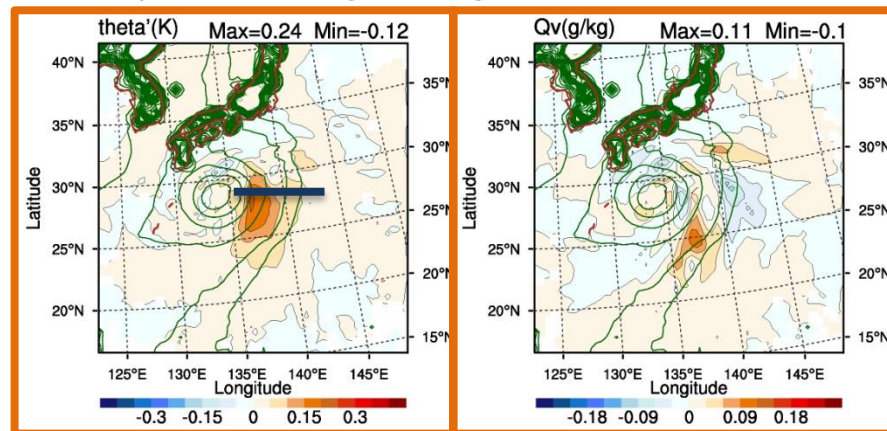
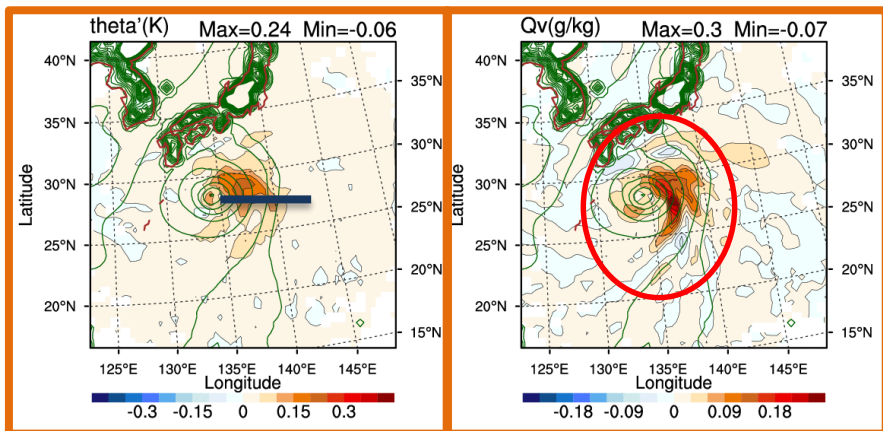
1.00

EAKF_H

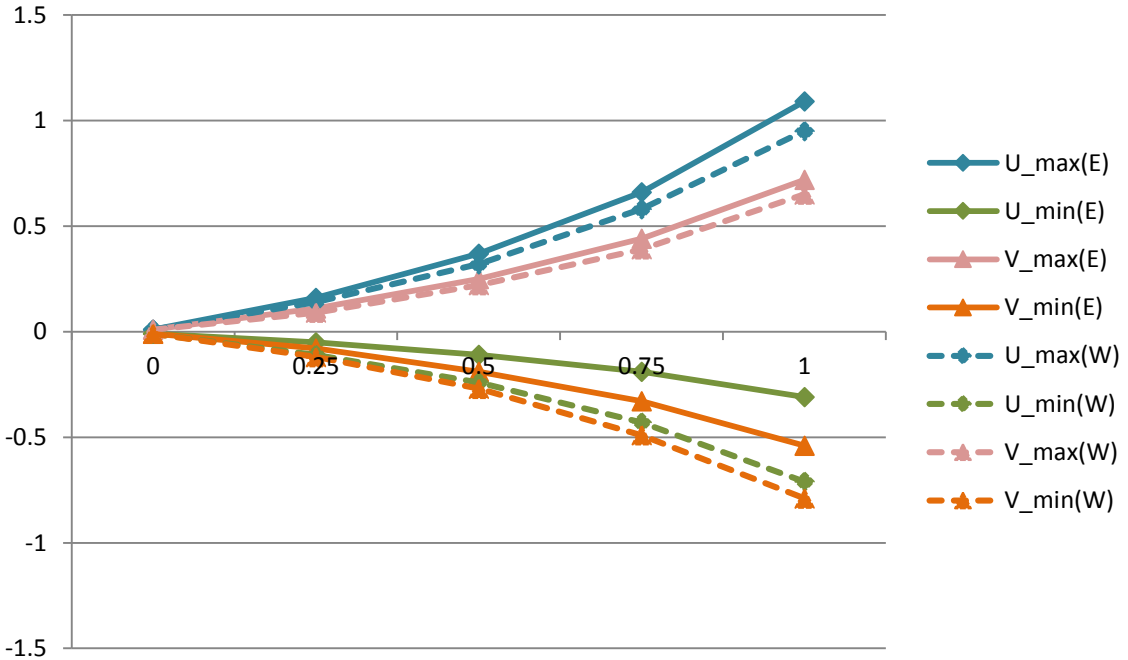
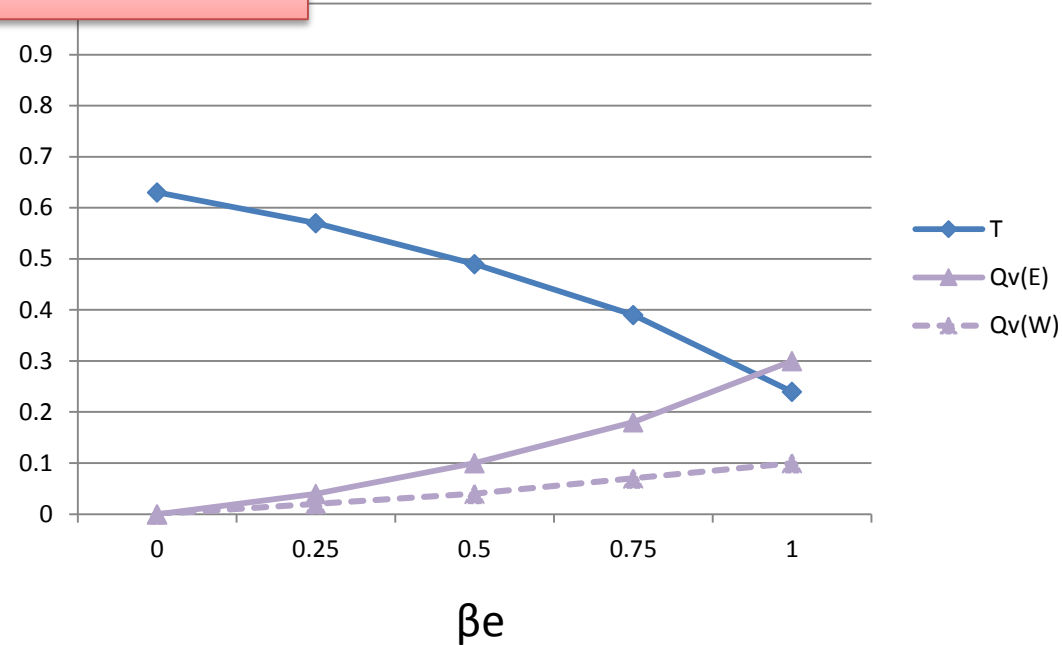
WEPS_H

Analysis Increments form Single Obs. T at sigma Lev=11, Lat=28.2001, Lon=137.143

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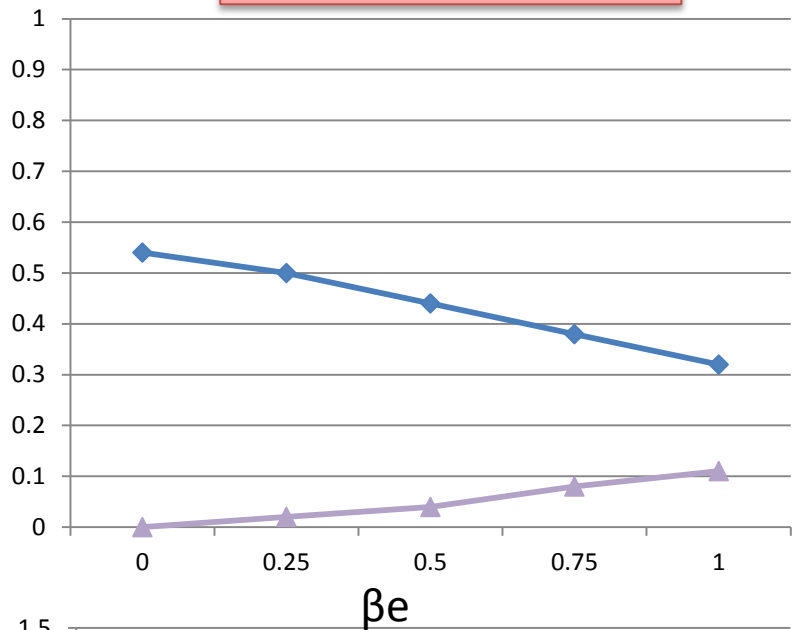
Lev= \sim 860mb



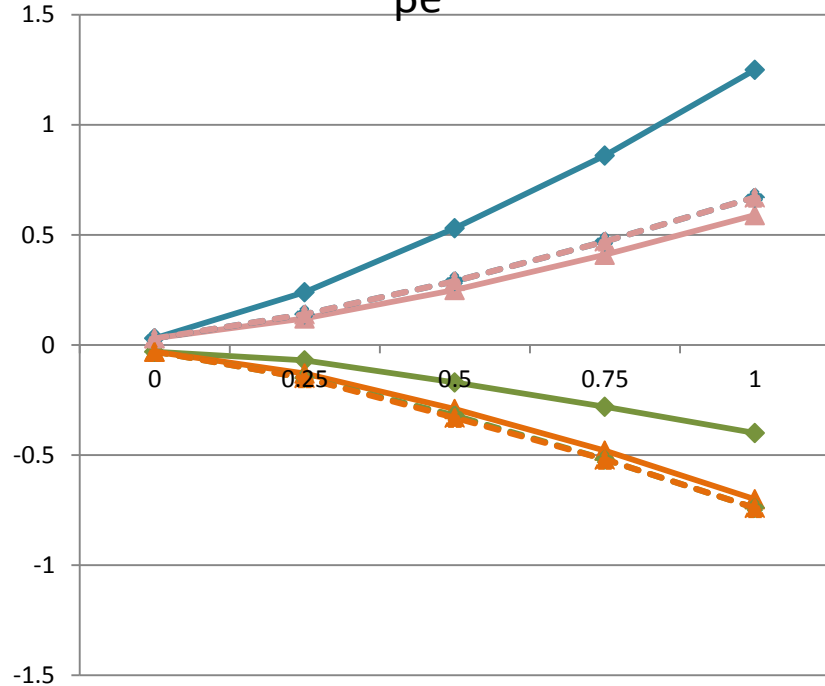
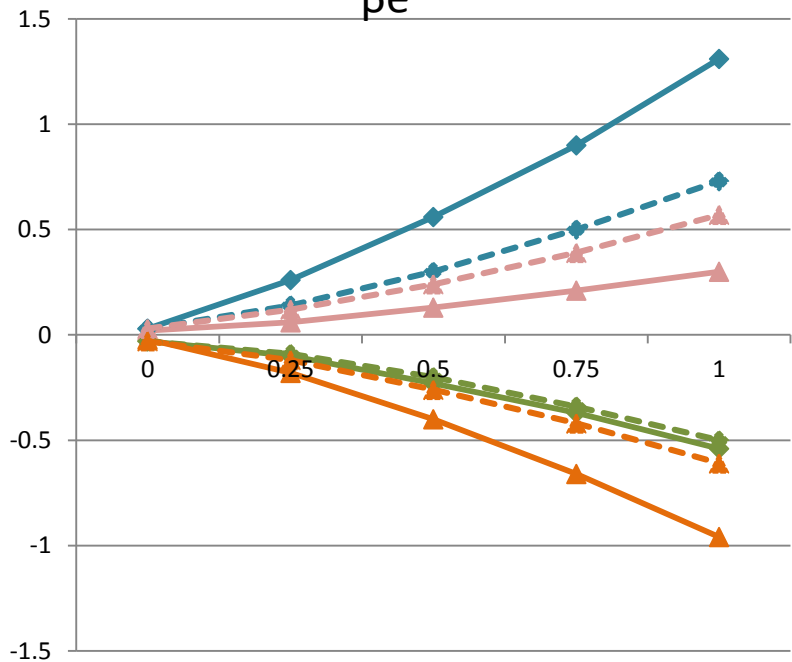
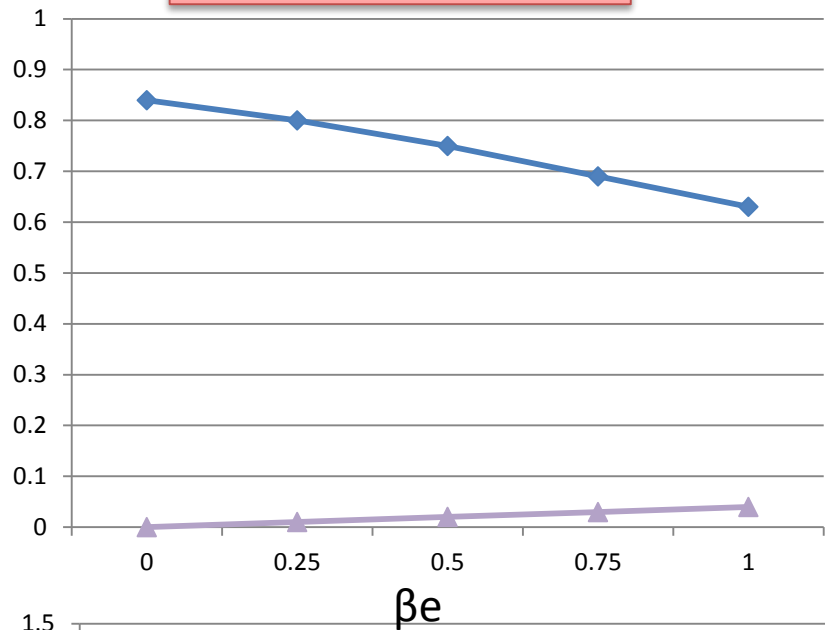
由CV5調整至ensemble BE的過程中，溫度增量逐漸變小，濕度及風場增量逐漸變大變強。

加強multi-variable特性，增加變數間的相關性

Lev= \sim 520mb

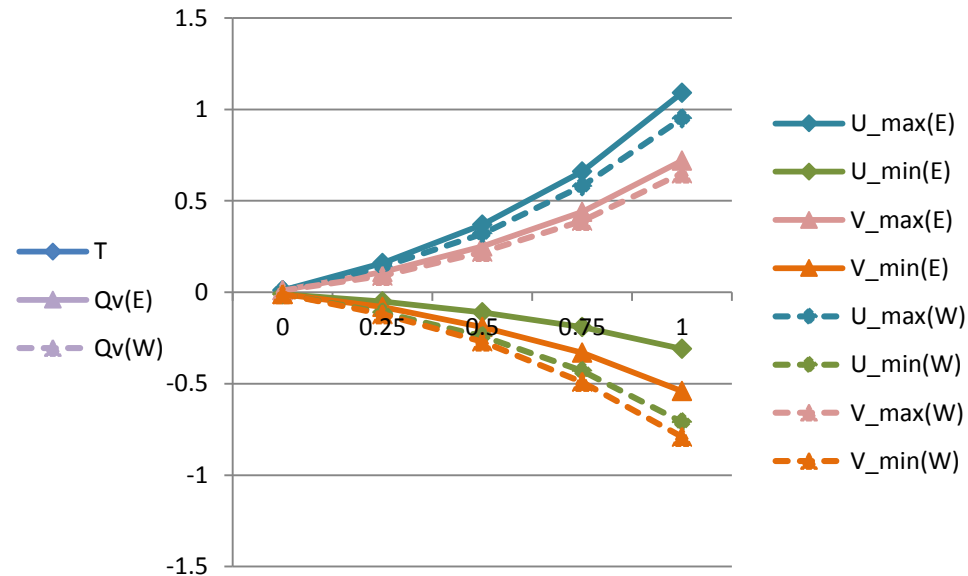
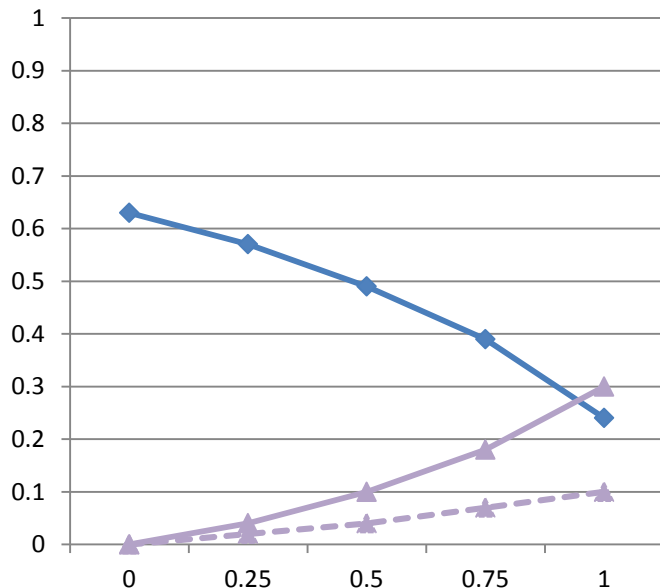


Lev= \sim 250mb



Summary & Discussion

- 增加動態背景誤差比例有效引入流場相關特性，使單點測試之分析增量分布與颱風環流相關，並增加變數間的相關性，使溫度觀測能進一步影響風場及濕度場的改變。
- 如何決定 β_e ? 0.75是否足夠?





THE END

THANK YOU