

109年天氣分析與預報研討會

10/15

極短期多來源定量降水預報 客觀融合策略評估

A2-37

1 多采科技有限公司 Manysplendid Infotech, Ltd.

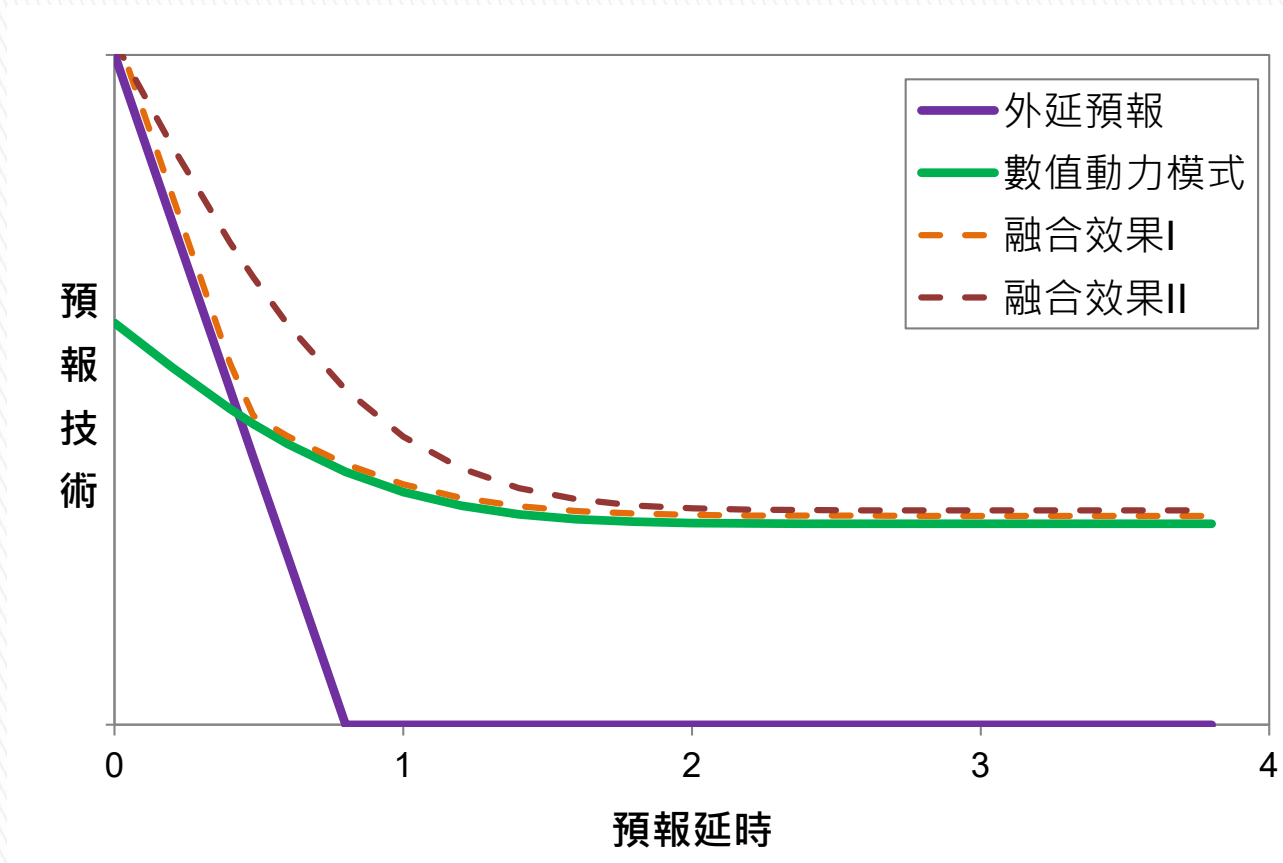
2 中央氣象局氣象預報中心 Weather Forecast Center, CWB

劉承昕¹ 馮智勇¹ 葉世瑄² 黃椿喜²



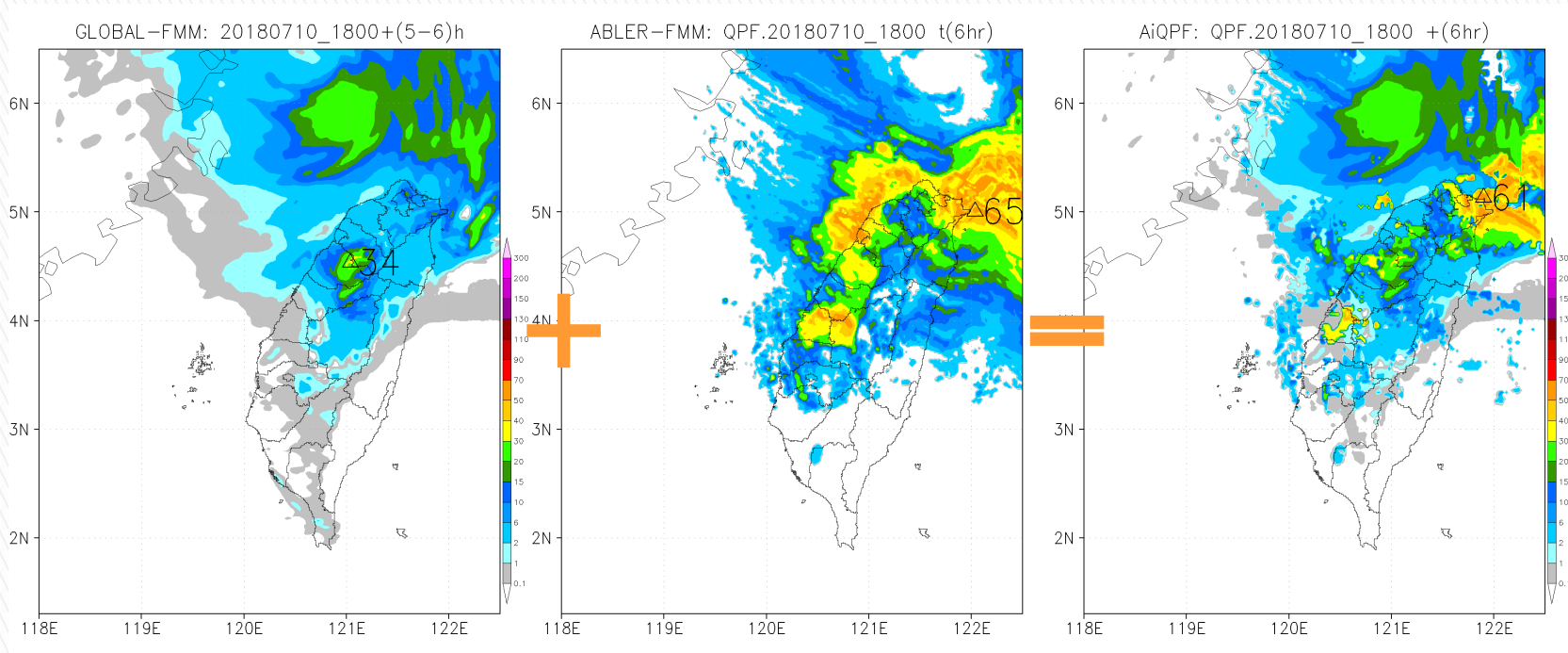
預報融合

預報融合



預報融合

- 定量降水預報
- 客觀產製→自動化定時產製
- 逐網格計算權重融合



融合機制

- 依據預報的不確定性計算權重
- 2018成果:

$$w_{m_i} = \frac{1 / MAE_{m_i}}{\sum_{i=1}^M (1 / MAE_{m_i})}$$

MAE : 絕對平均誤差
m : 來源預報
i : 來源預報編號
M : 來源預報總數

作業化實作設計

作業化實作設計

- 各預報MAE統計方式：
 - ▶ 動態計算最近6小時MAE (Dyn)
 - ▶ 靜態長期統計(2018全年)MAE (Fix)
 - ▶ 人為設計權重對照組
 - ▶ 零雨量場對造組
- 逐網格計算MAE、權重融合
- 預報校正
 - ▶ 原始預報直接融合
 - ▶ 原始預報經FMM校正後進行融合

實驗預報來源

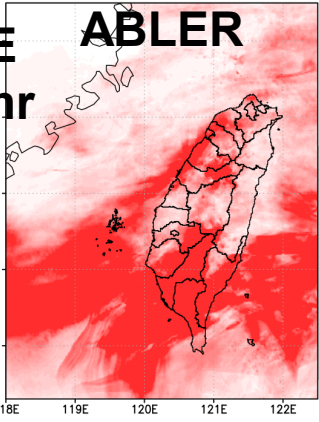
- 校驗時間：
 - ▶ 2019/06/02 00:00—2019/07/01 00:00 UTC
- 校驗指標：
 - ▶ MAE (絕對平均誤差)

	預報方法	預報時間 (來源)	預報時間 (選用)	解析度
ABLER	雷達外延	0—6 h	1—6 h	0.0125°
iTEEN	系集辨識優選	0—12 h	1—12 h	3km
RWRF	模式雷達同化	0—13 h	1—12 h	3km
WEPS-NewPM	系集平均	0—120 h	1—12 h	3km

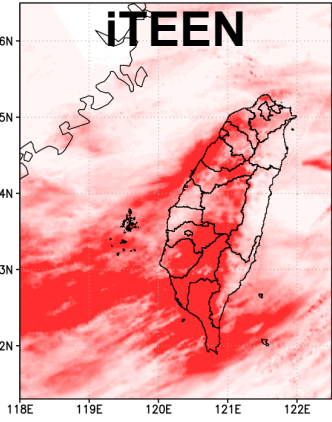
案例評估

MAE
近6hr

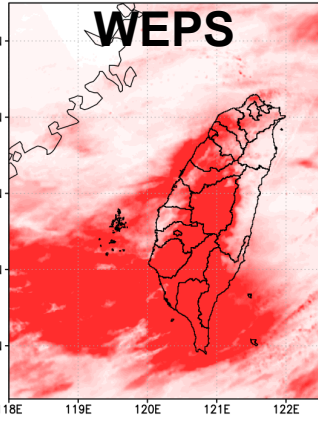
.ABLER.20200522_0700 t(6hr)



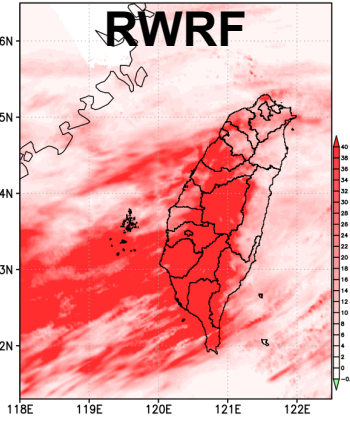
.ITEEN.20200522_0700 t(6hr)



.WEPS.20200522_0700 t(6hr)

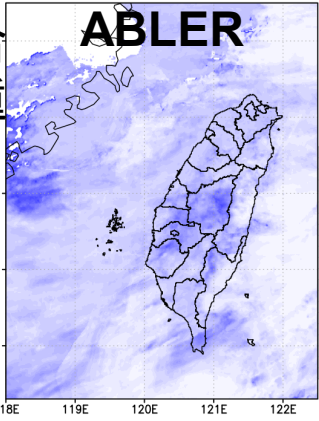


.RWRP-RDA.20200522_0700 t(6hr)

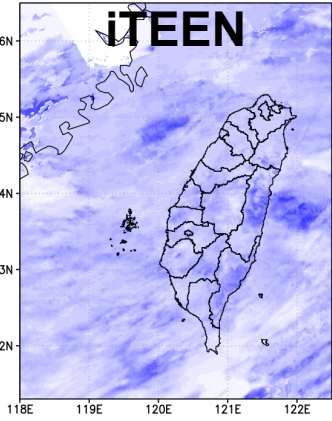


融合
權重

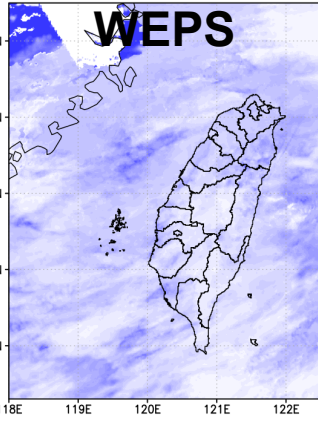
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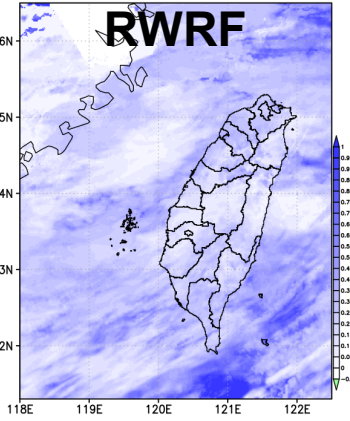
.ITEEN.20200522_0700 t(6hr)



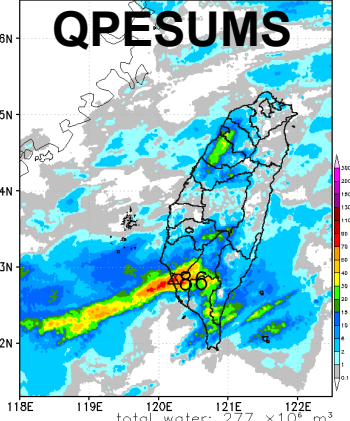
.WEPS.20200522_0700 t(6hr)



.RWRP-RDA.20200522_0700 t(6hr)



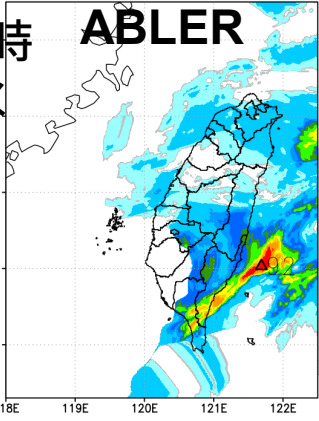
QPESUMS 1h QPE: 20200522_0700



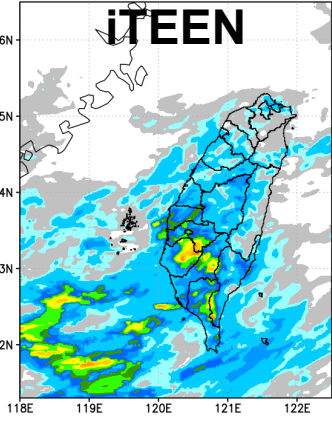
total water: 277 x 10⁶ m³

1小時
降水

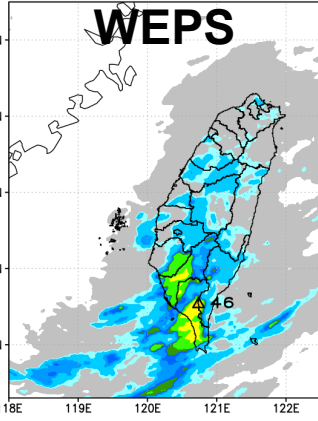
ABLER-QPF-FMM: 20200522_0700+(5-6)h



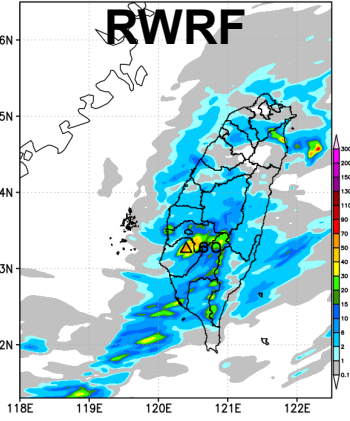
NCtestt-FMM: 20200522_0700+(5-6)h



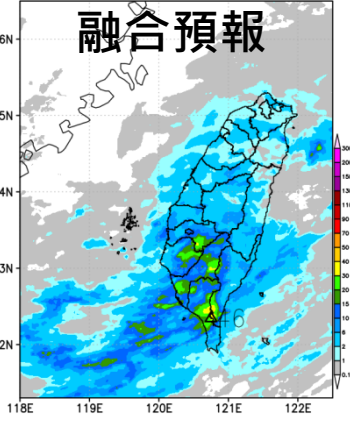
WEPS-NPM-FMM: 20200521_1800+(18-19)h



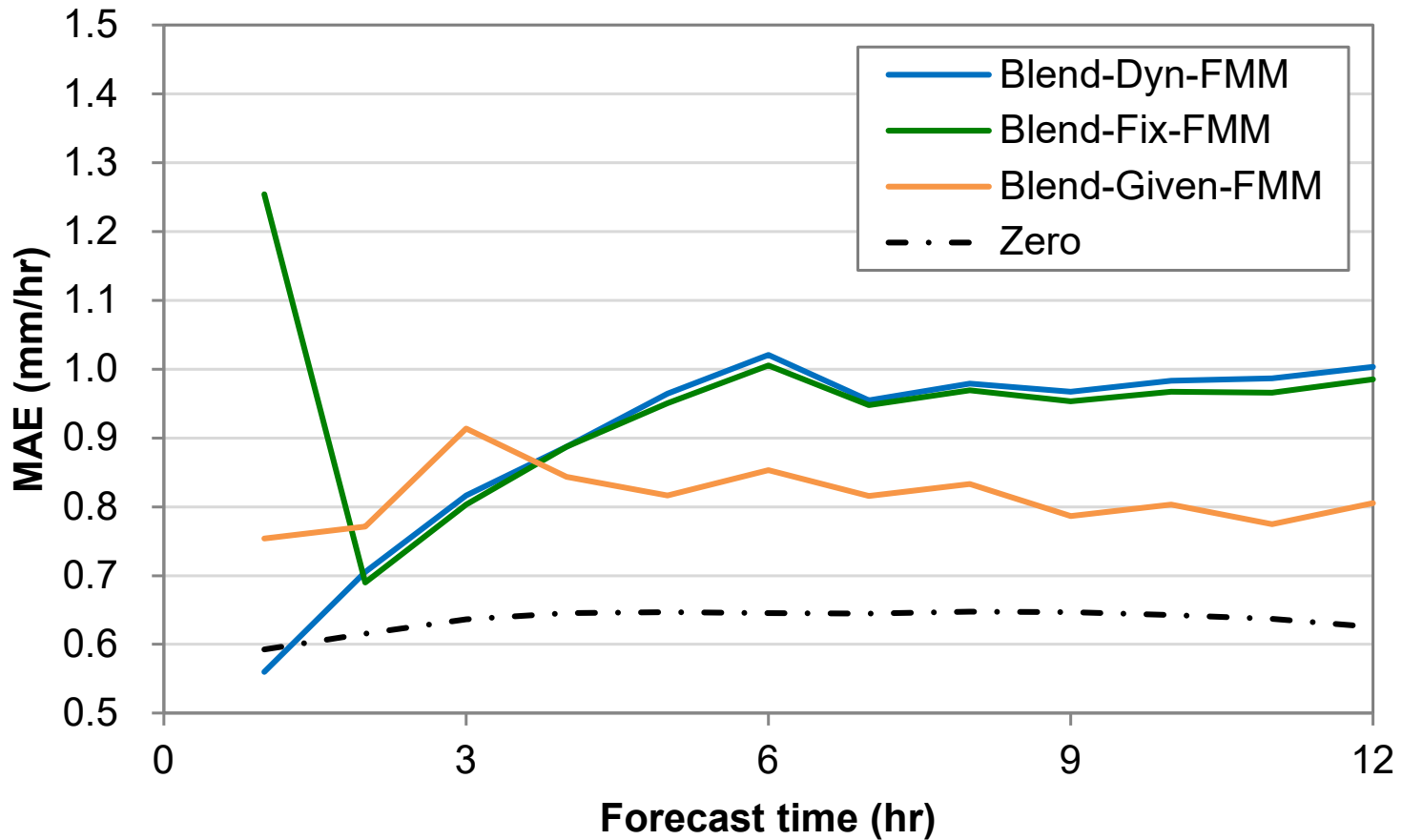
RDA-FMM: 20200522_0700+(5-6)h



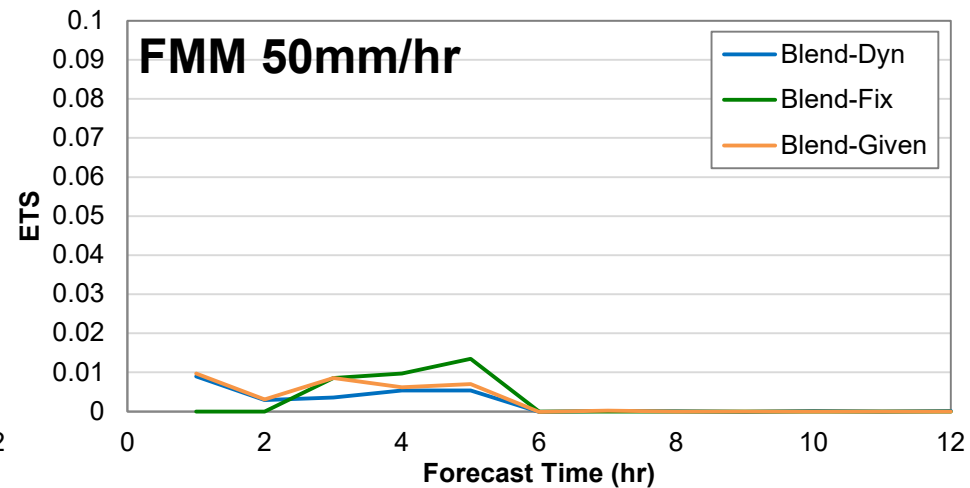
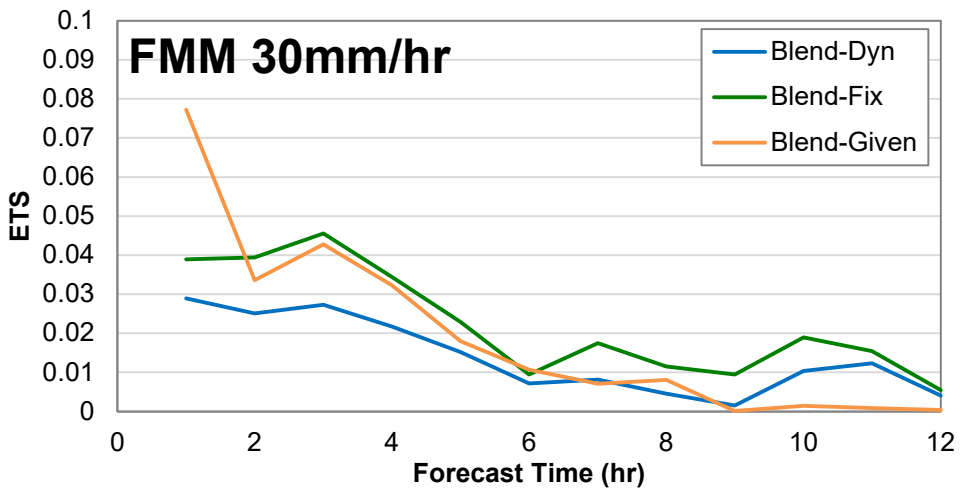
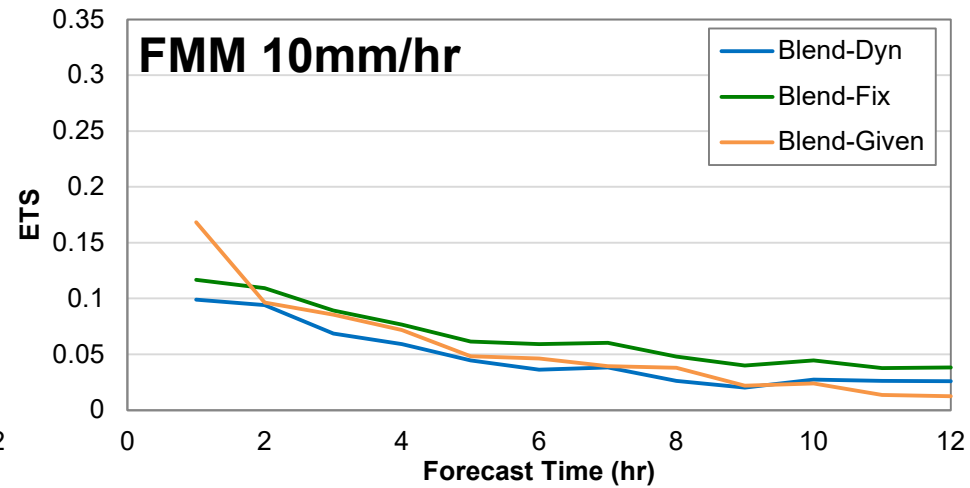
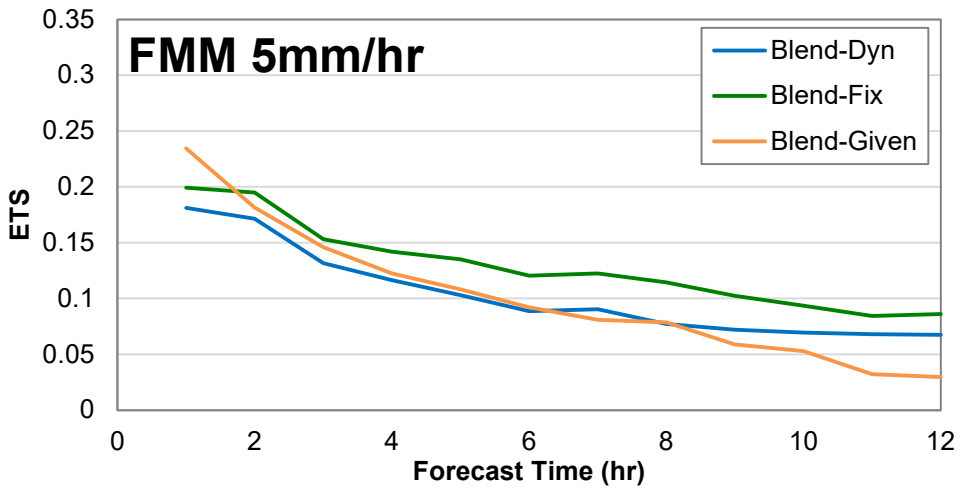
WAIR-4-Fusion-FMM: 20200522_0700+(5-6)h



案例融合評估—MAE

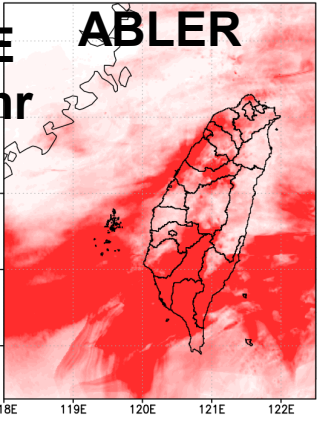


案例融合評估—ETS

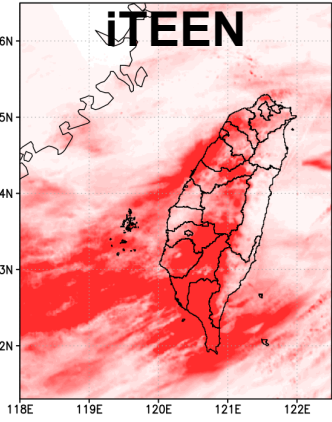


MAE
近6hr

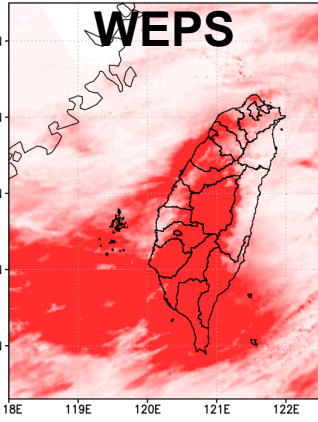
.ABLER.20200522_0700 t(6hr)



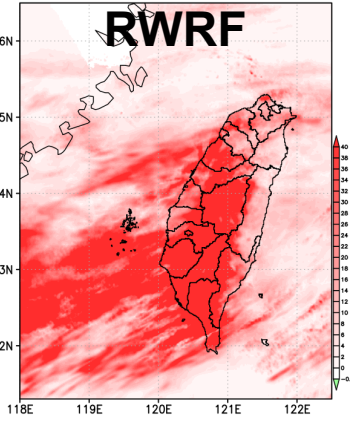
.ITEEN.20200522_0700 t(6hr)



.WEPS.20200522_0700 t(6hr)

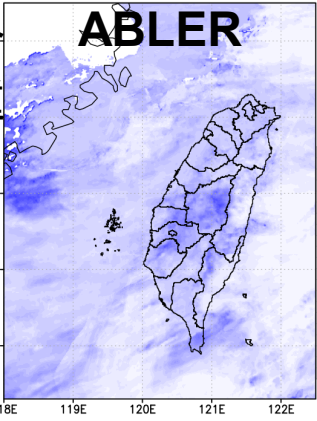


.RWRf-RDA.20200522_0700 t(6hr)

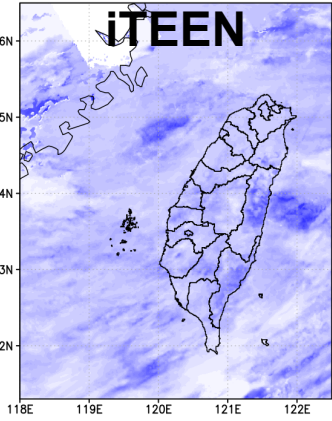


融合
權重

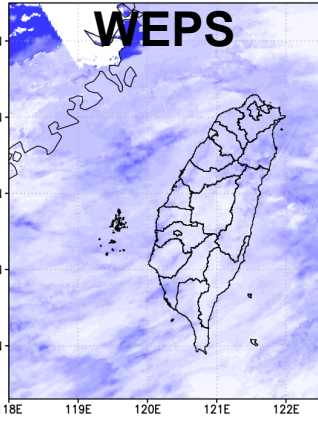
.ABLER.20200522_0700 t(6hr)



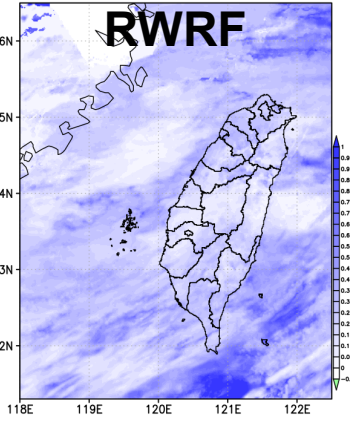
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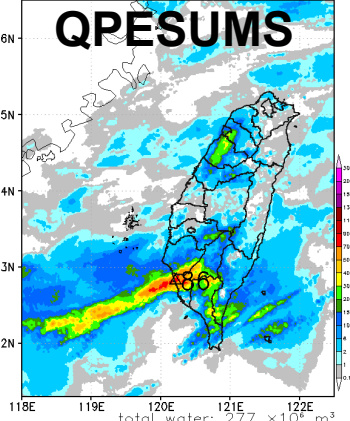
.WEPS.20200522_0700 t(6hr)



.RWRf-RDA.20200522_0700 t(6hr)



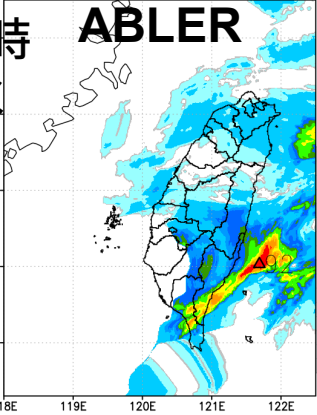
QPESUMS 1h QPE: 20200522_0700



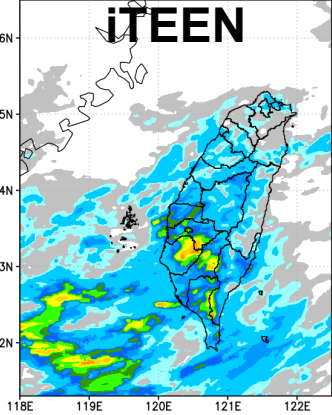
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1小時
降水

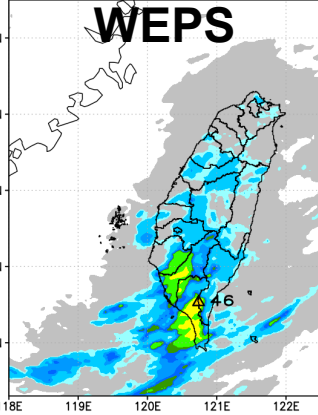
ABLER-QPF-FMM: 20200522_0700+(5-6)h



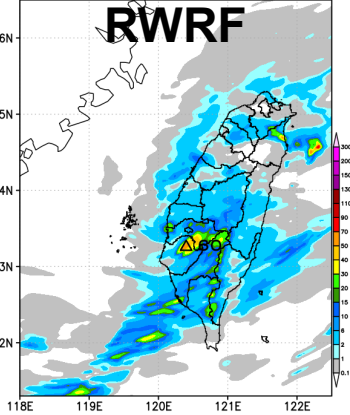
ITEEN-FMM: 20200522_0700+(5-6)h



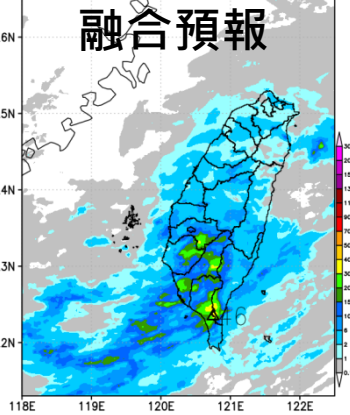
WEPS-NPM-FMM: 20200521_1800+(18-19)h



RDA-FMM: 20200522_0700+(5-6)h



WAIR-4-Fusion-FMM: 20200522_0700+(5-6)h



結論與後續發展方向

- **Given**在第4小時之後優於**Dyn**及**Fix**權重，顯示一次方倒數太過保守，無法區別較佳的預報
- 雨量在一次方倒數權重之下融合出現雨峰強度被平均而低估之現象
- 如何在融合後保留可靠的雨峰強度：校正
- 預報技術指標的選擇會影響融合結果
- 分區統計預報技術，可否得到更穩定的融合權重

簡報結束 敬請指教

極短期多來源定量降水預報客觀融合策略評估
Evaluation of objective blending strategy

多采科技有限公司
中央氣象局氣象預報中心

Manysplendid Infotech, Ltd.

Weather Forecast Center, CWB

劉承昕
馮智勇
葉世瑄
黃椿喜