

NCEP GFS海溫錯置修改對 模式預報之影響

中央氣象局 資訊中心

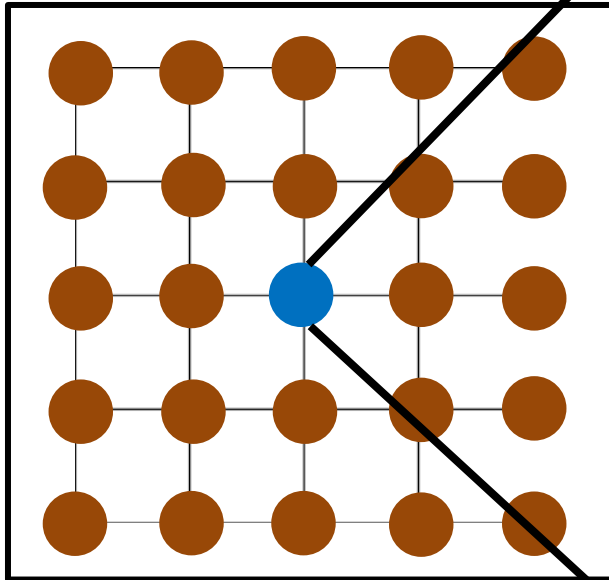
林伯勳、洪景山

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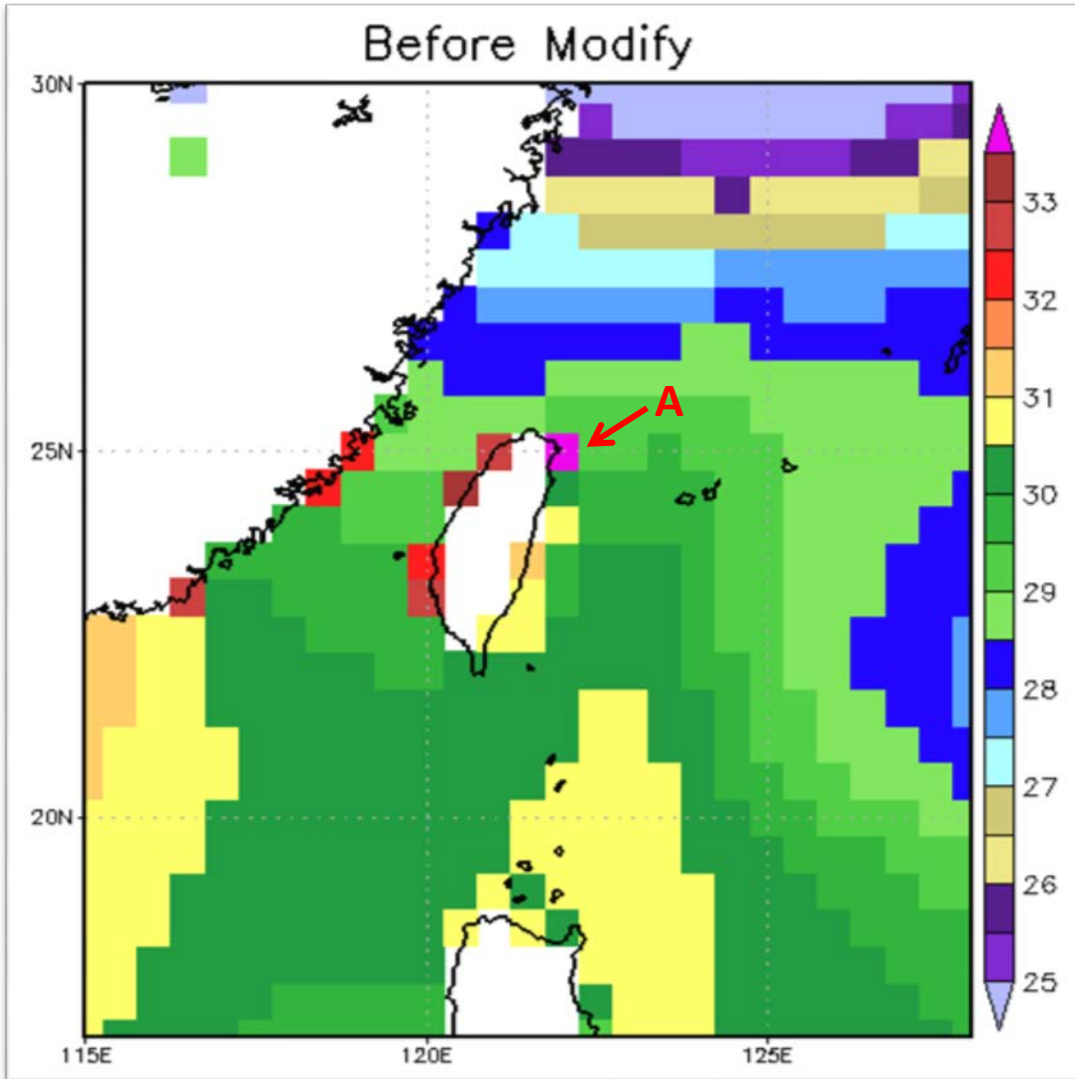
1. 研究目的

NCEP GFS、WRF海陸格點



NCEP	WRF
海點	海點
陸點	陸點
海點	陸點
陸點	海點

NCEP GFS 海溫問題



NCEP GFS初始場的部分格點海、陸點配置失當。例如A點，NCEP GFS定義它為海點，但其溫度卻是陸溫，若是WRF也定義該點為海點，WRF就會直接使用該點的溫度當海溫，就會造成誤把陸溫當海溫情況。

海、陸點配置失當會造成模式預報在海岸附近的海溫異常現象，進而嚴重影響近海的局部環流和降水預報。

Initial time : 14071006

WRF 模式海溫初始場

5 km

4 km

3 km

Sea Surface Temperature

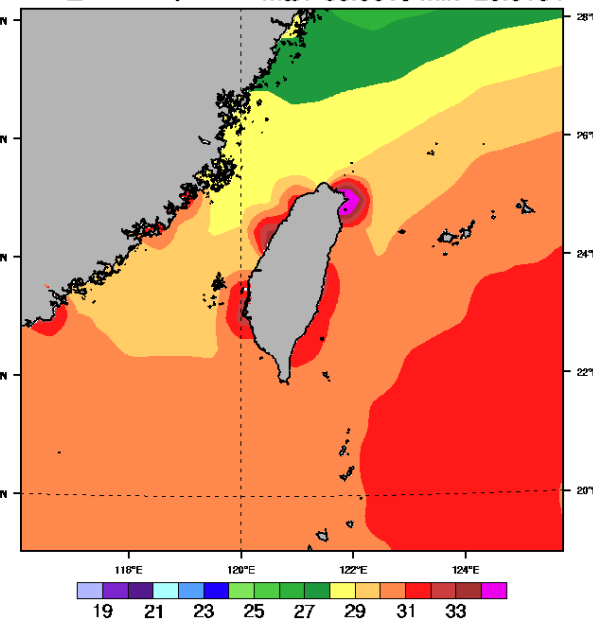
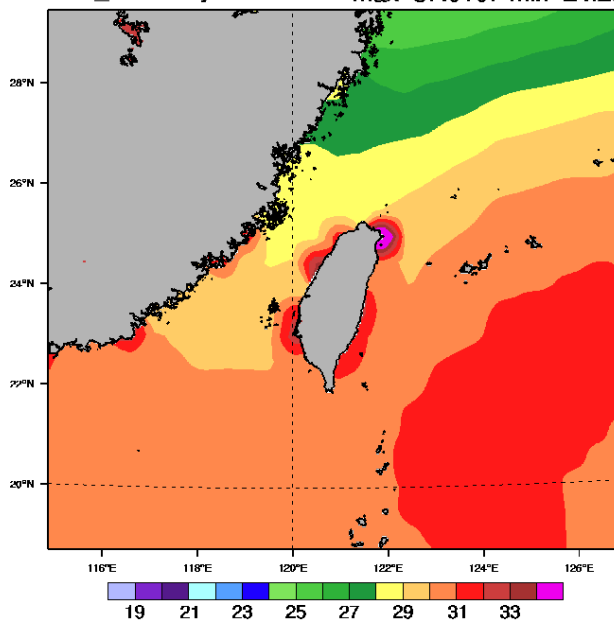
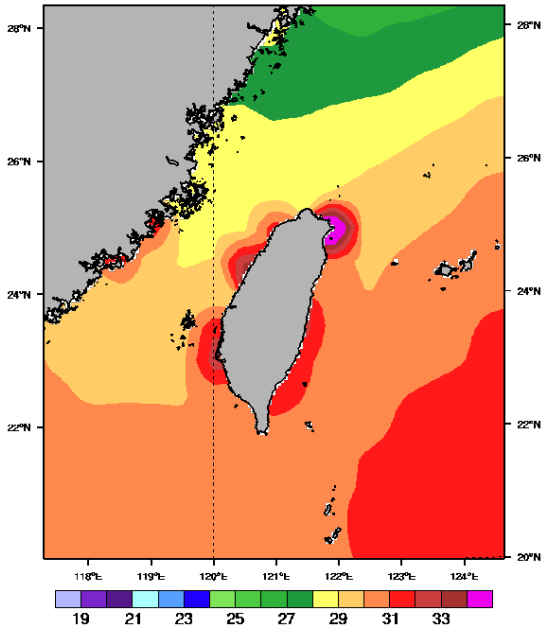
Sea Surface Temperature

Sea Surface Temperature

SST_NoModify max=36.9246 min=26.4974

SST_NoModify max=37.0107 min=24.25

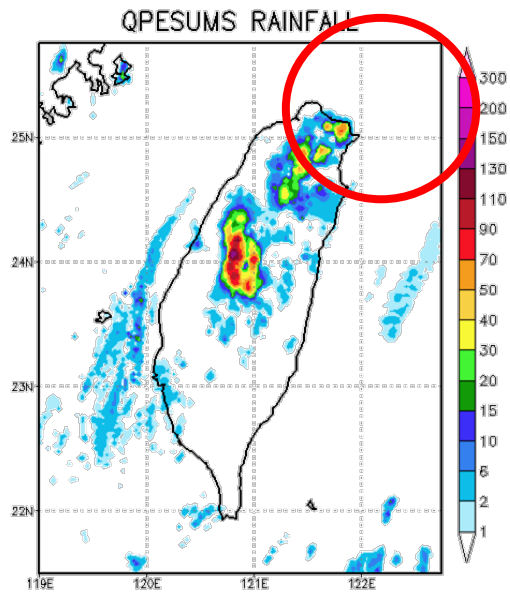
SST_NoModify max=36.8619 min=26.6164



Initial time : 14071006

Fcst : 00~48 hr

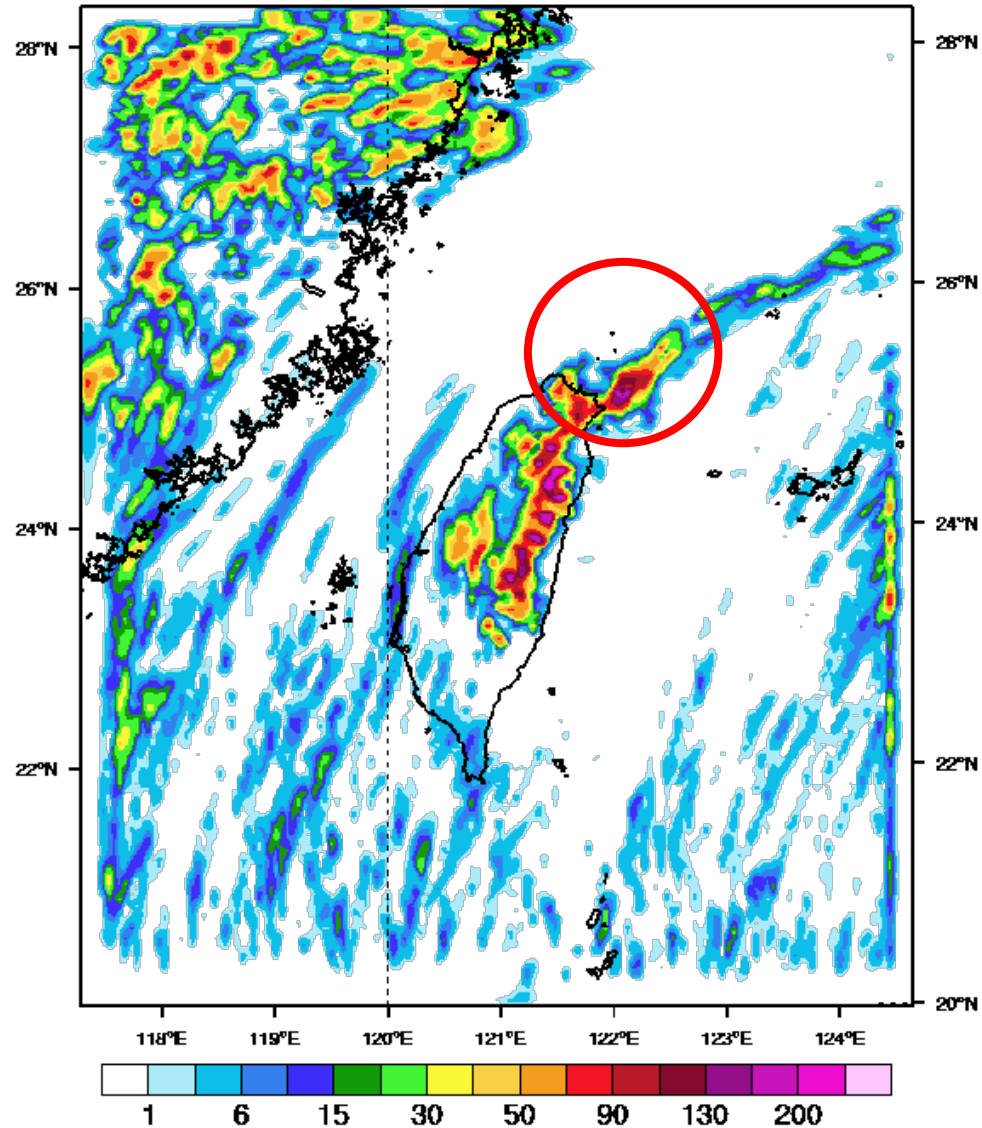
Var : RAINNC



RAINNC

SST_NoModify

Fcst = 48



2. 海溫分析場修正方法介紹

NCEP GFS海溫修正方法

- 針對NCEP GFS海溫分析場做處理，因此可以免除區域模式解析度不同所帶來的麻煩。
- 要解決這個問題，我們必須對NCEP GFS沿岸海溫異常的格點進行修正。
- 以下以示意圖介紹此修正方法。

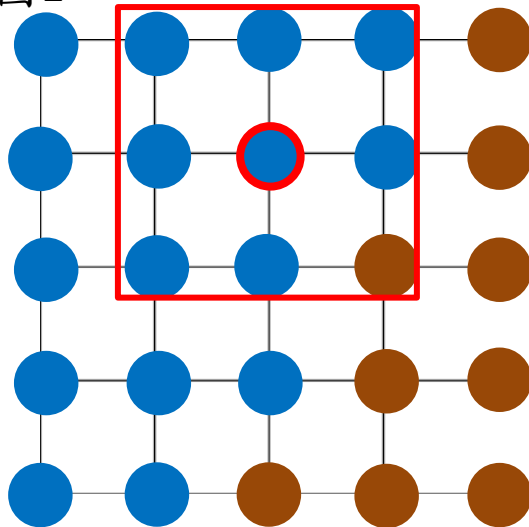
NCEP GFS海溫修正方法

- 海點
- 陸點
- ✘ special value

Step 1 :

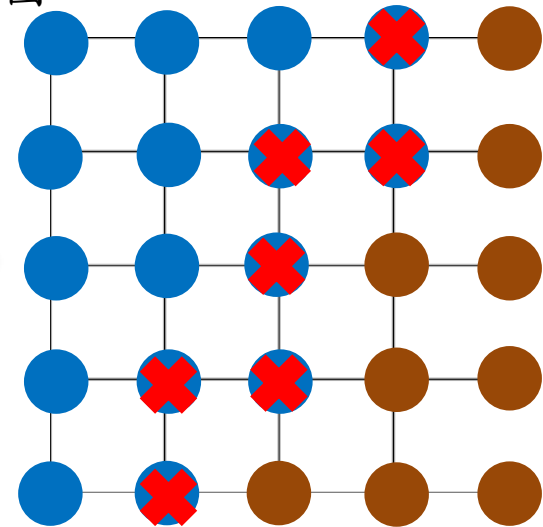
對所有NCEP GFS格點進行判斷，只要與該格點緊鄰的8個格點中有出現1個以上（包含1個）的陸點，則該點的海溫值就改成special value，結果如圖2。

圖1



Step 1

圖2



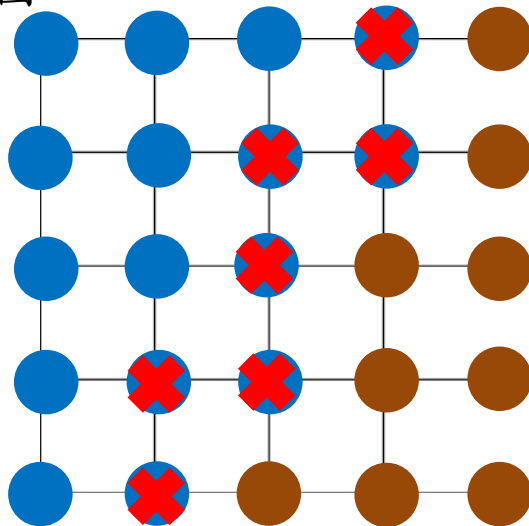
NCEP GFS海溫修正方法

- 海點
- 陸點
- ✘ special value

Step 2 :

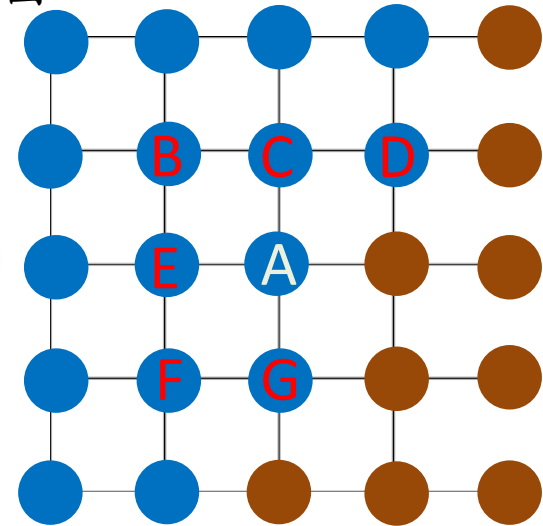
對所有NCEP GFS格點進行判斷，只要該格點的海溫值為special value，就用與該格點緊鄰的8個格點中，landsea index為海點的海溫平均來取代該點的special value。例如圖3中， $A=(B+E)/6$

圖2



Step 2

圖3



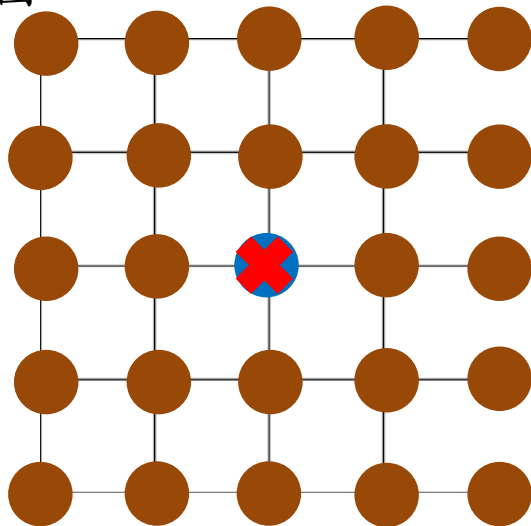
NCEP GFS海溫修正方法

- 海點
- 陸點
- ✘ special value

Step 3 :

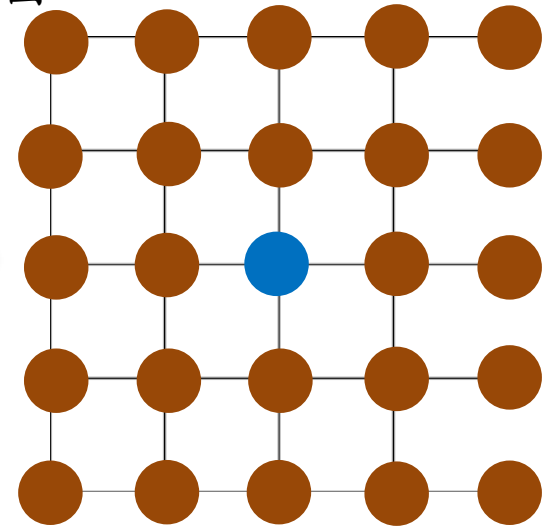
- 經過step 2後，部分special value的格點會因為其周圍全部是陸點（例如內陸湖泊），所以無法進行修正，如圖3，則該點的值就用原來的海溫值取代。
- 海溫修正完成。

圖4



Step 3

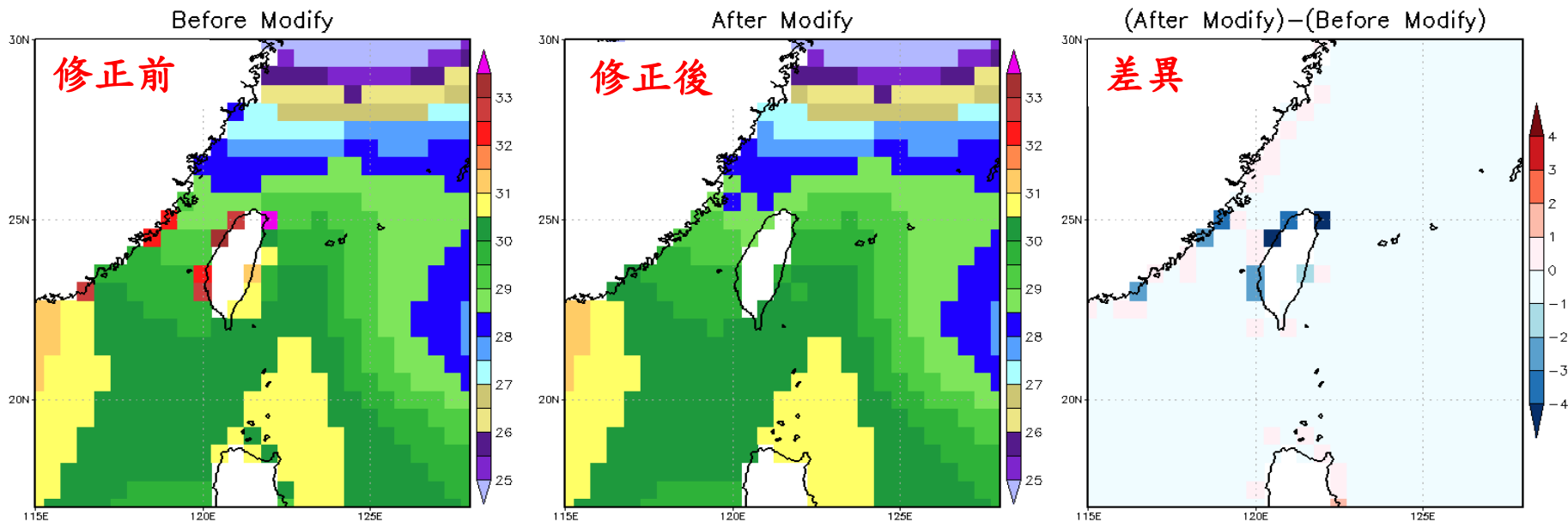
圖4



3. 海溫分析場修正結果

海溫分析場修正前 V.S 修正後

NCEP GFS 0.5°
2014071006 UTC



經過修正後，台灣及大陸東南沿海海溫明顯降低。
修正後的海溫分佈看起來較修正前合理。

模式解析度：5 km

Initial time : 14071006

WRF 模式海溫初始場

修正前

修正後

差異

Sea Surface Temperature

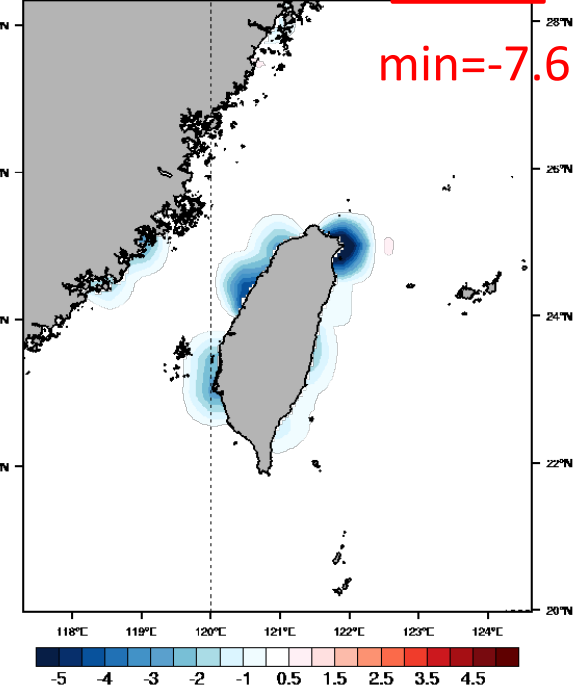
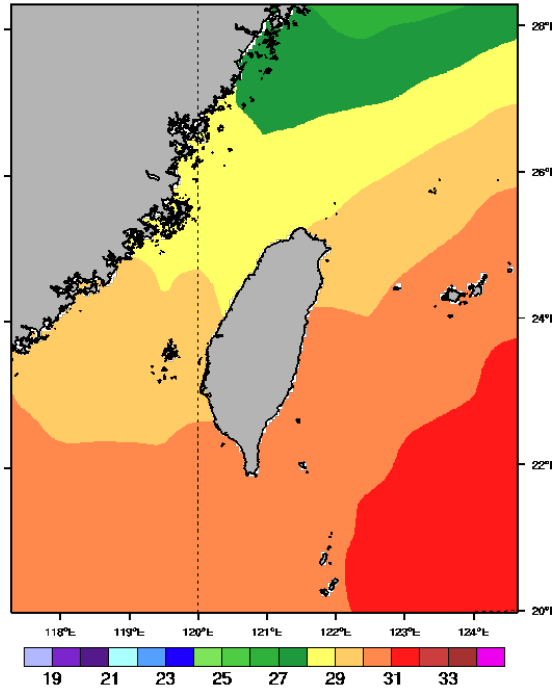
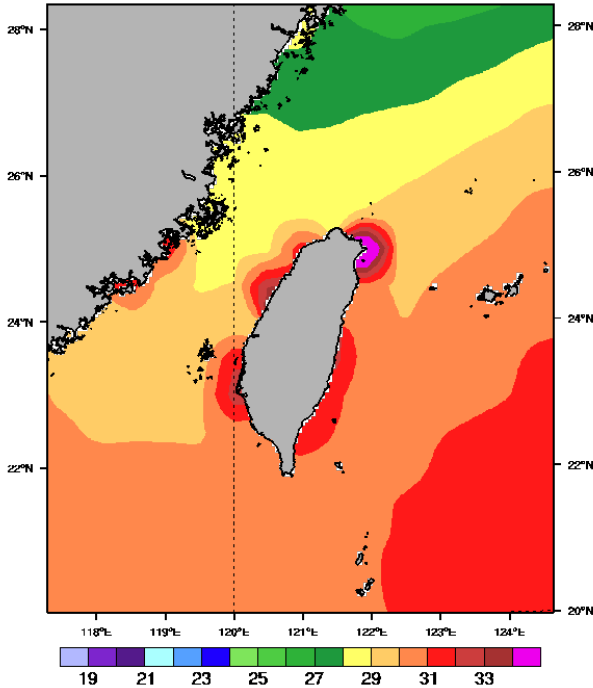
Sea Surface Temperature

Sea Surface Temperature

SST_NoModify max=36.9246 min=26.4974

SST_Modify max=31.2715 min=26.4896

DIFF max=0.579834 min=-7.61337



模式解析度：4 km

Initial time : 14071006

WRF 模式海溫初始場

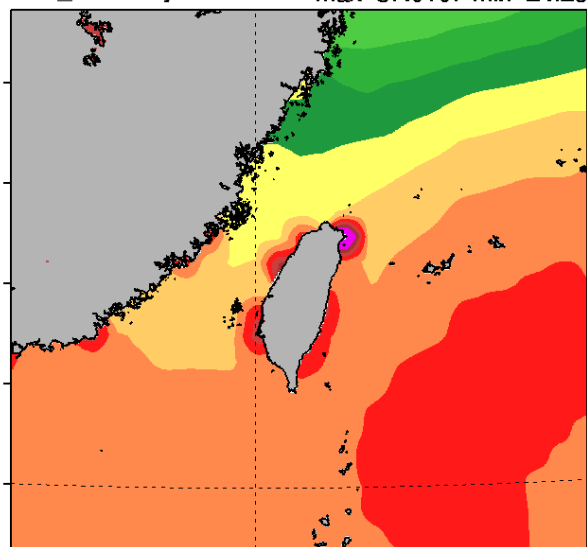
修正前

修正後

差異

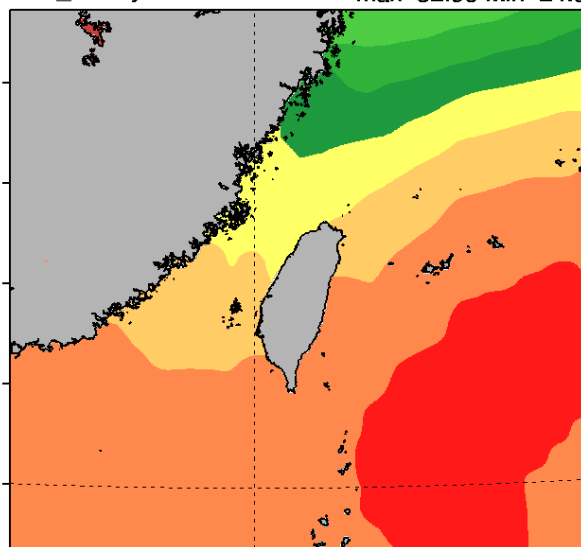
Sea Surface Temperature

SST_NoModify max=37.0107 min=24.25



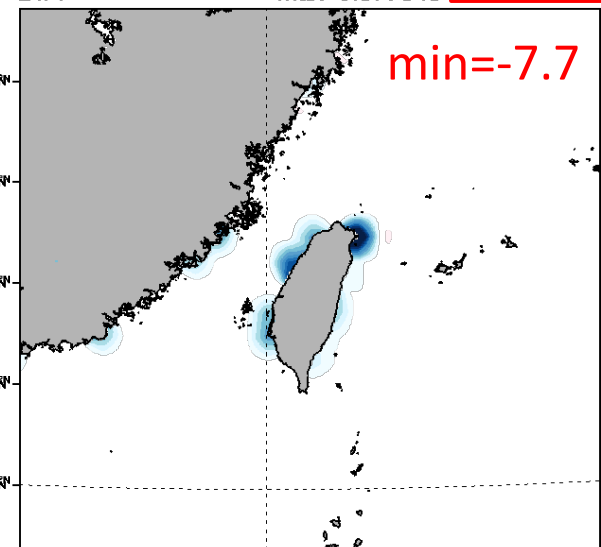
Sea Surface Temperature

SST_Modify max=32.95 min=24.5



Sea Surface Temperature

DIFF max=0.577545 min=-7.68405



19 21 23 25 27 29 31 33

19 21 23 25 27 29 31 33

-5 -4 -3 -2 -1 0.5 1.5 2.5 3.5 4.5

模式解析度：3 km

Initial time : 14071006

WRF 模式海溫初始場

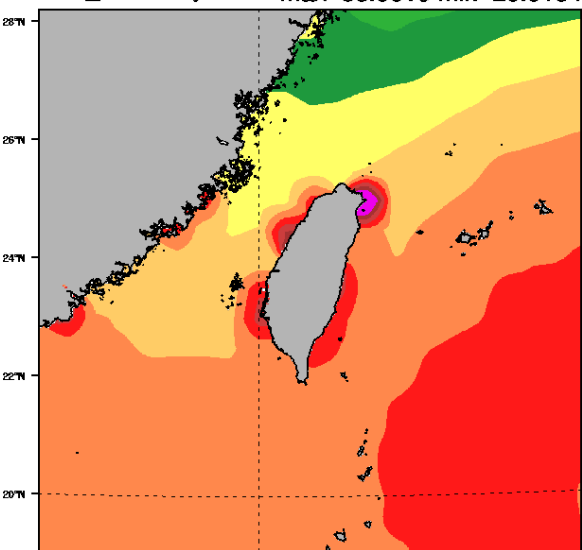
修正前

修正後

差異

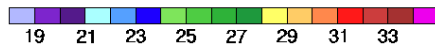
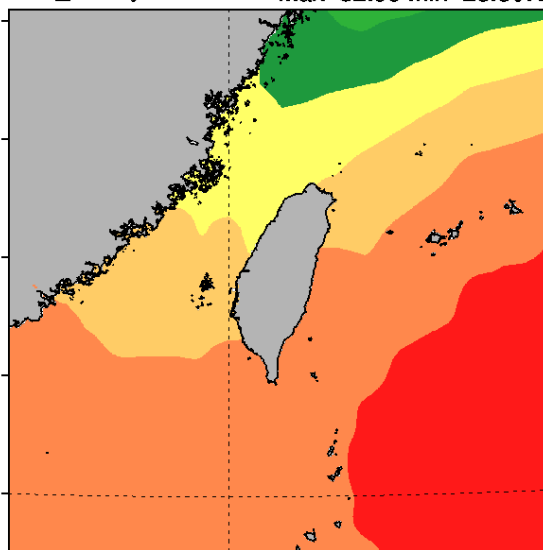
Sea Surface Temperature

SST_NoModify max=36.8619 min=26.6164



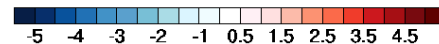
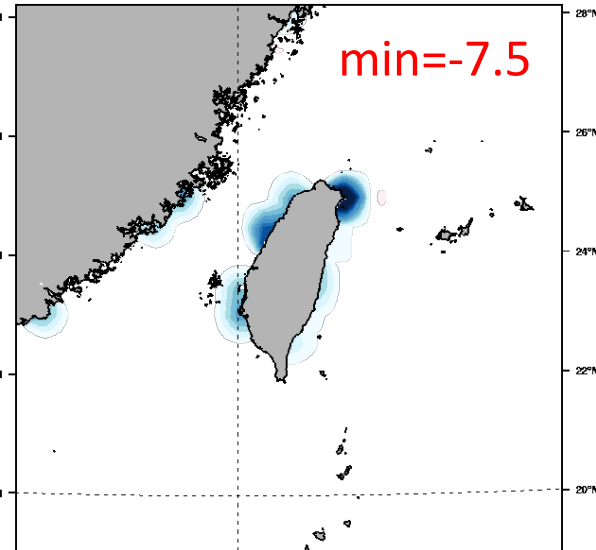
Sea Surface Temperature

SST_Modify max=32.95 min=26.6072



Sea Surface Temperature

DIFF max=0.579865 min=-7.53598



4. 個案實驗結果探討

Initial time : 14071006

Var : LH

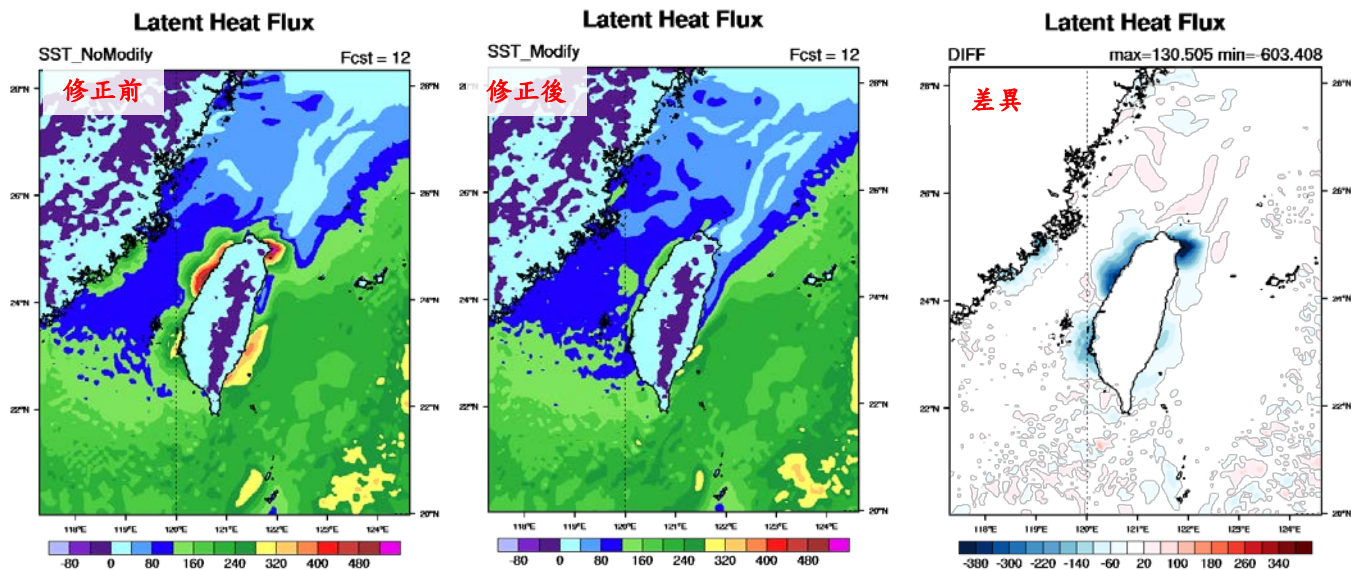
SST_NoModify

SST_Modify

DIFF

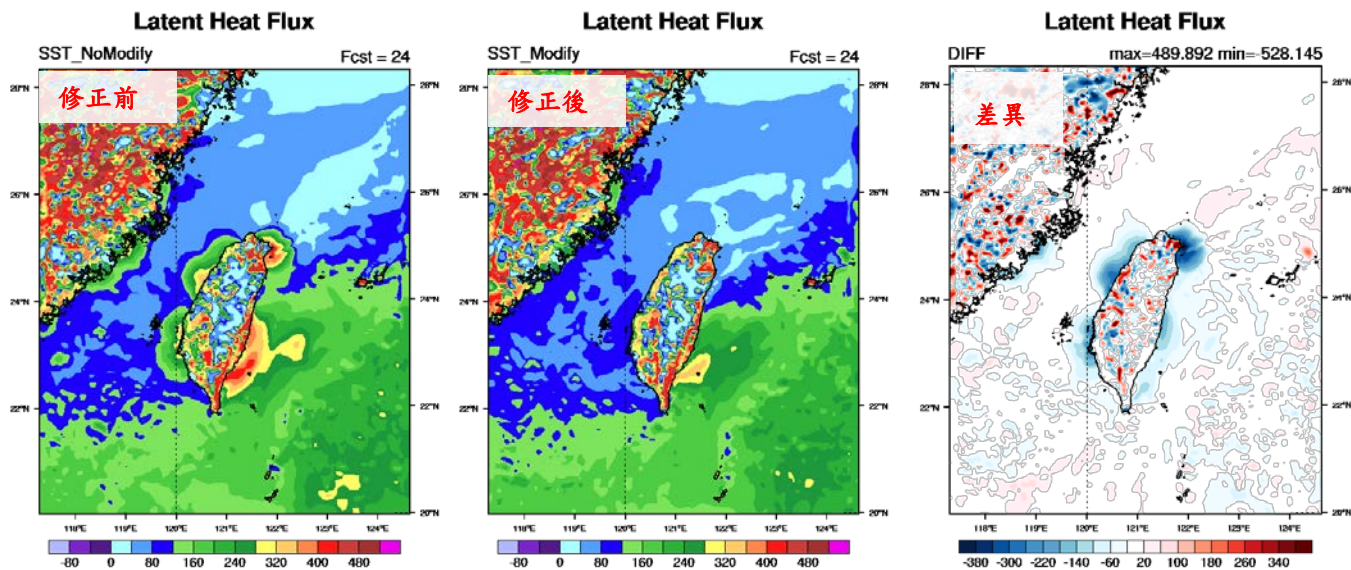
Fcst : 12 hr

Valid time : 14071018



Fcst : 24 hr

Valid time : 14071106



Initial time : 14071006

Var : HFX

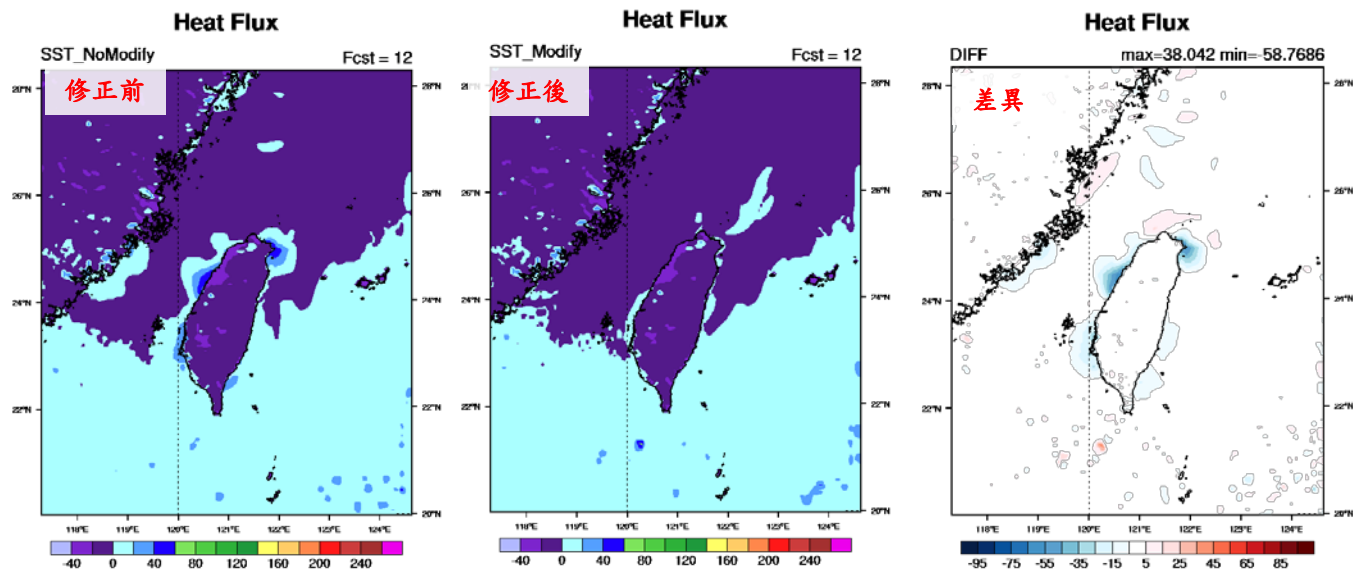
SST_NoModify

SST_Modify

DIFF

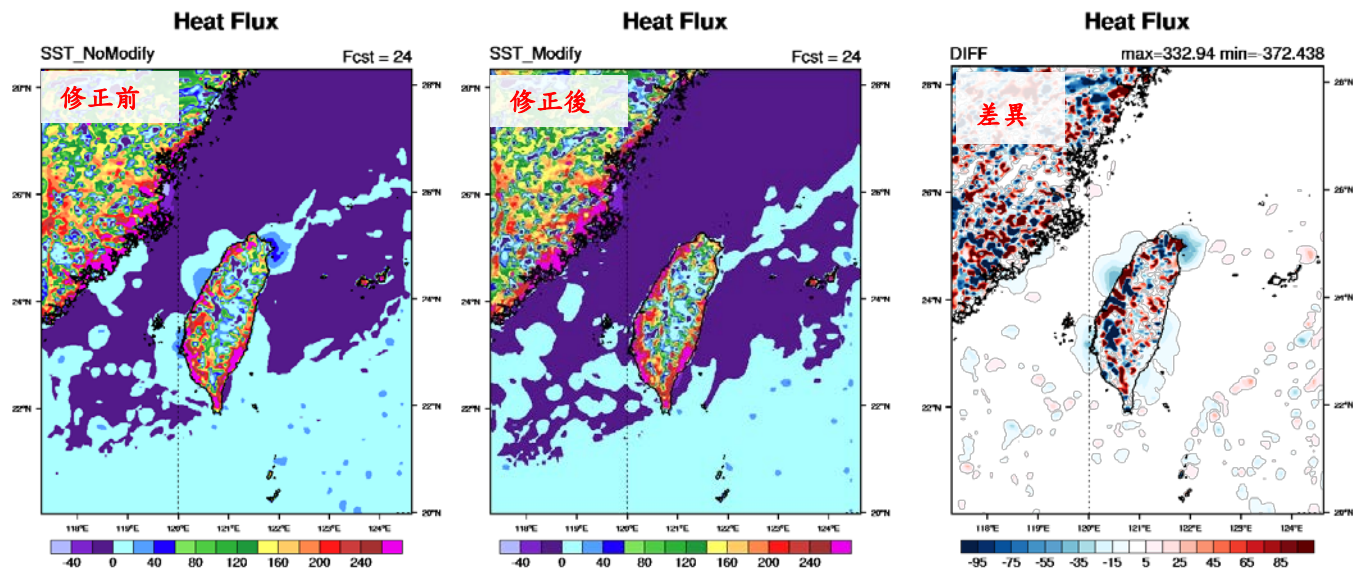
Fcst : 12 hr

Valid time : 14071018



Fcst : 24 hr

Valid time : 14071106



Initial time : 14071006

Var : Q2

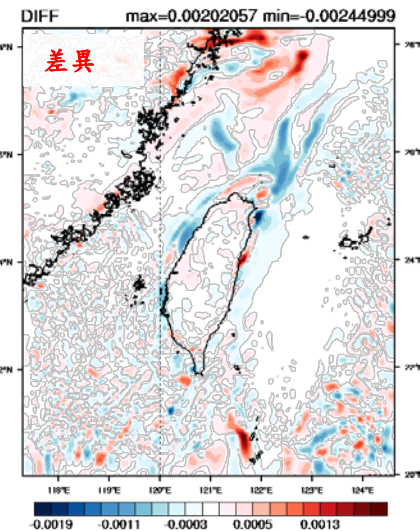
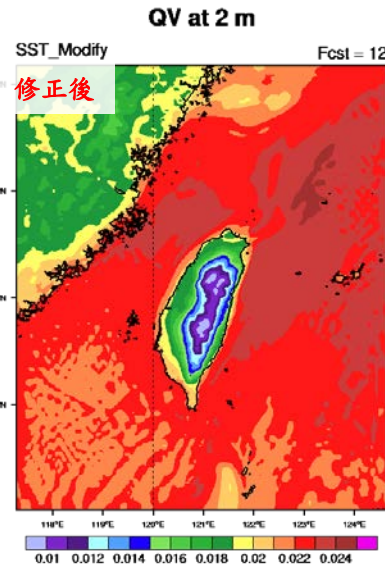
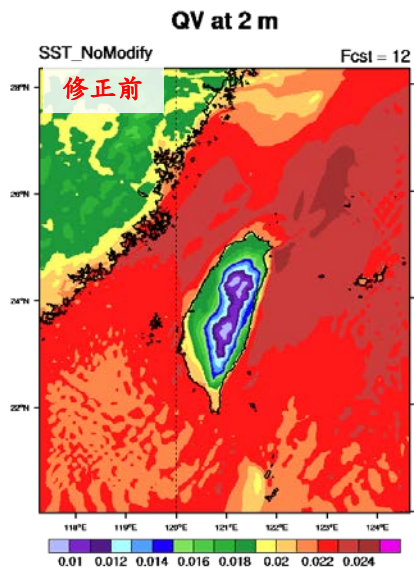
SST_NoModify

SST_Modify

DIFF

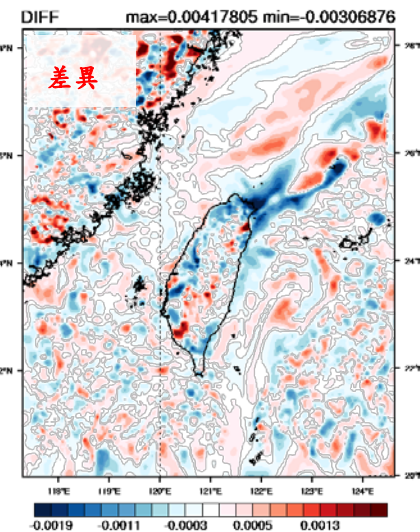
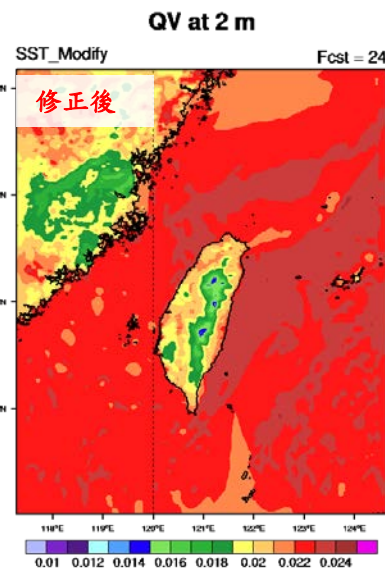
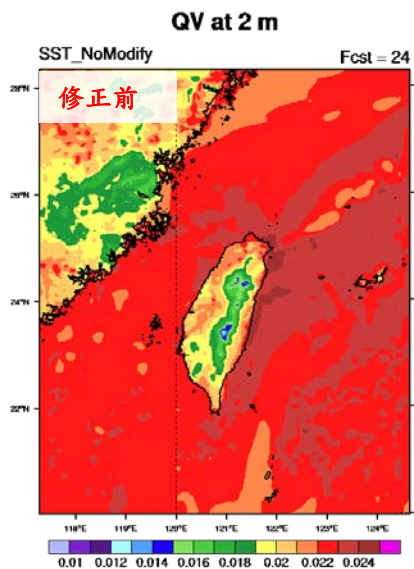
Fcst : 12 hr

Valid time : 14071018



Fcst : 24 hr

Valid time : 14071106



Initial time : 14071006

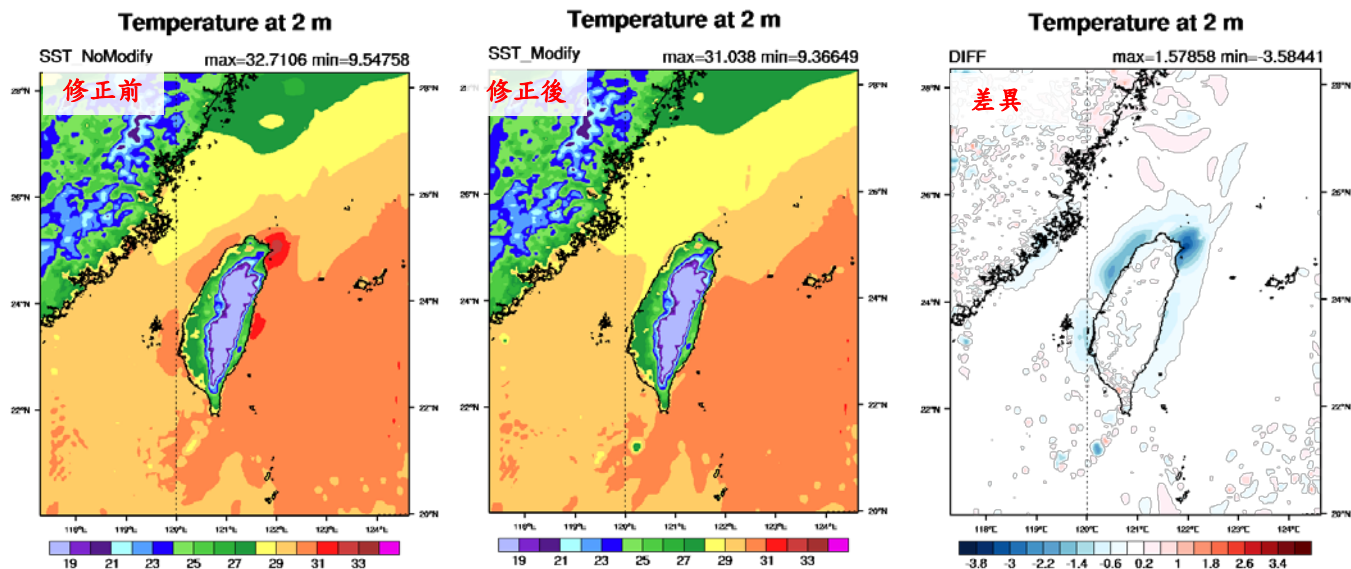
Var : T2

Fcst : 12 hr
Valid time : 14071018

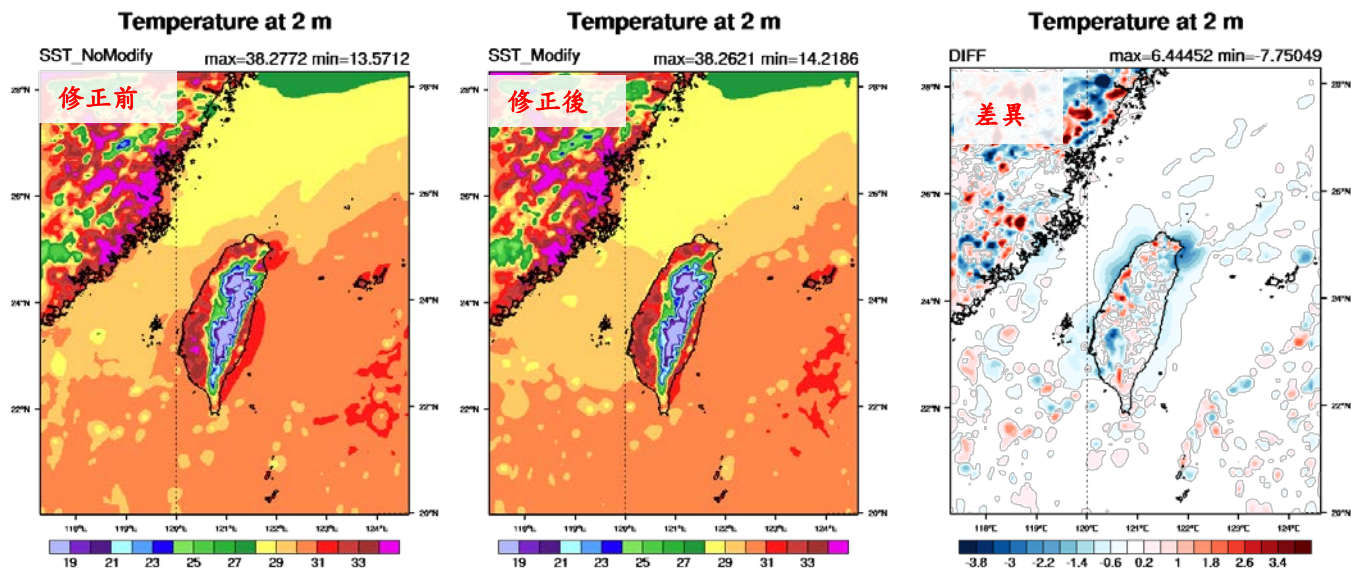
SST_NoModify

SST_Modify

DIFF



Fcst : 24 hr
Valid time : 14071106



Initial time : 14071006

Var : PBLH

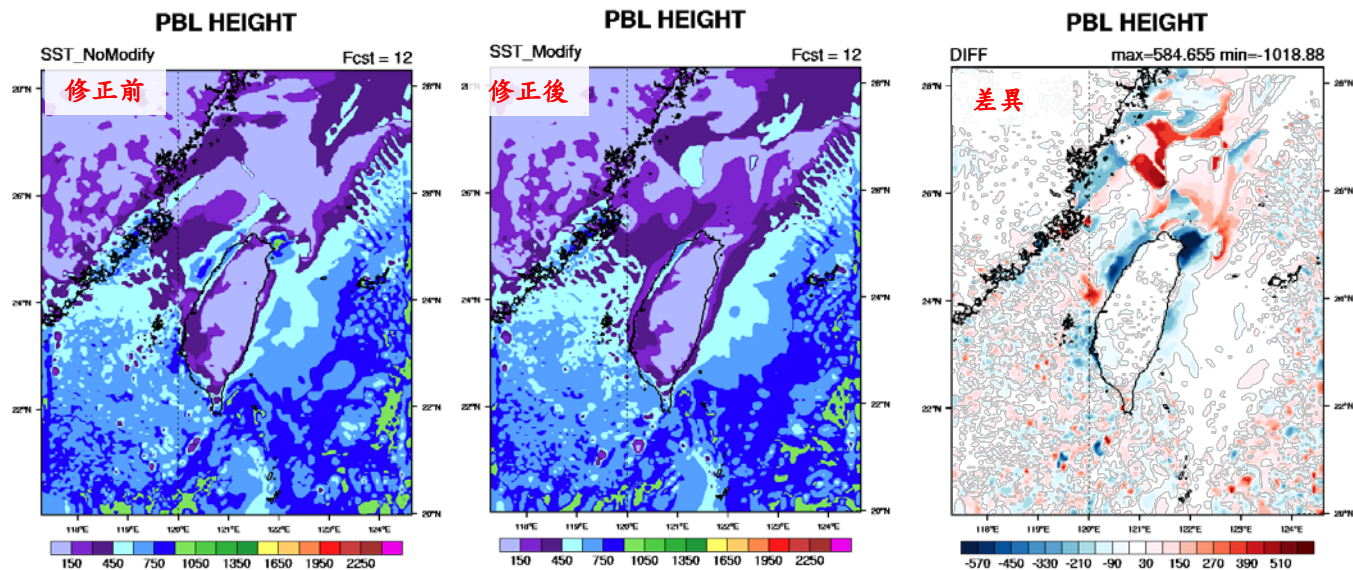
SST_NoModify

SST_Modify

DIFF

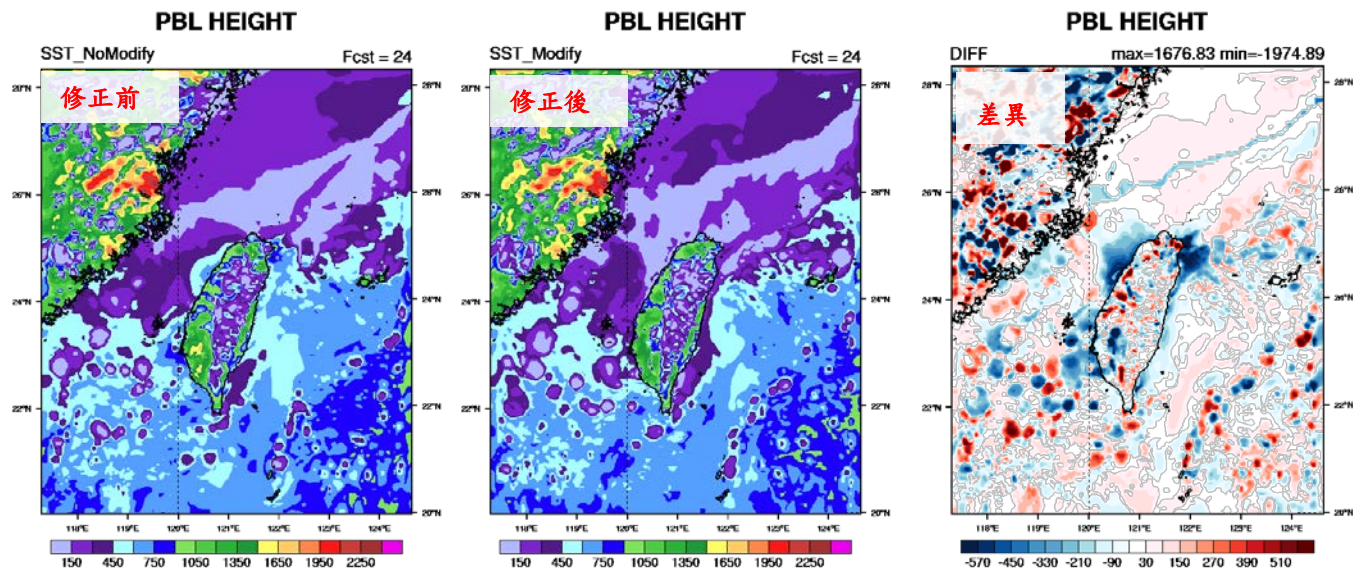
Fcst : 12 hr

Valid time : 14071018



Fcst : 24 hr

Valid time : 14071106



5. 結論

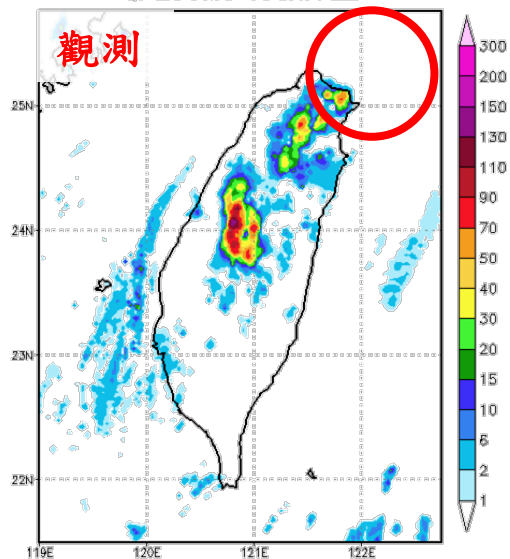
Initial time : 14071006

Fcst : 00~48 hr

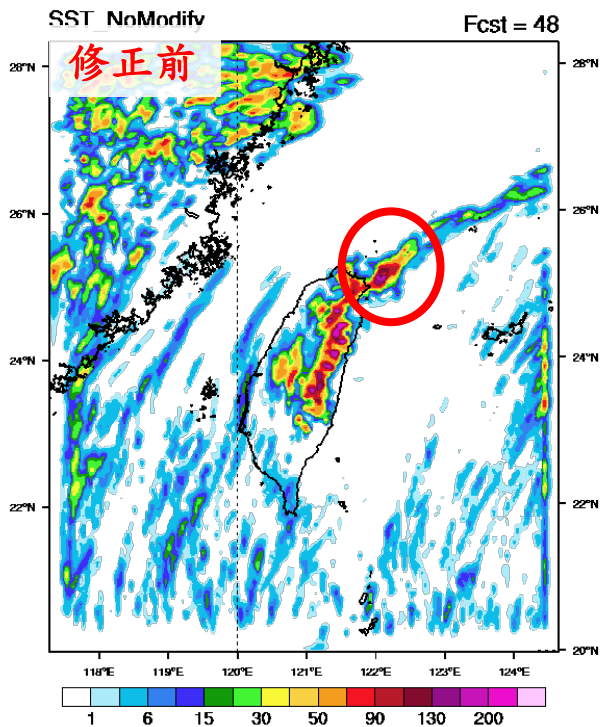
Var : RAINNC

經過海溫修正後，模式對於台灣
東北部海域累積雨量高估的情況
明顯被修正

QPESUMS RAINFALL



RAINNC



RAINNC

