

## TAHOPE Weather Summary (08/04~08/09)

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### **Analysis of current weather (0804 morning)**

From true-color satellite imagery we can see that the clouds over Taiwan have decreased significantly compared to yesterday (Figure 1). From radar imagery, environmental south-easterly wind brings some moisture to Hengchun Peninsula and Taitung, producing some scattered showers (Figure 2). Presently no strong-precipitating system affecting Taiwan.

From the skew-T diagram in Banqiao (Figure 3a) we can see that the atmosphere below 800hPa is really moist, but the subsidence near 800hPa and 470hPa has strengthened compared to yesterday. Although tropical depression is moving away from us, lower atmospheric conditions are still unstable, which could induce some afternoon thunderstorm activities. However, the sea breeze is not strong along Danshui River Valley and Keelung River Valley (Figure 4). Furthermore, compared with the diagram in Pingtung (Figure 3b), the subtropical high is obviously much weaker in the south, therefore we expect stronger afternoon showers in western mountainous area than in Taipei basin.

### **Tropical system forecast:**

96W has already been upgraded to a TD by JMA today's morning. From infrared satellite (Figure 5a) imagery we can see that the system has much more organized compared to yesterday, with convections popping up near the LLCC. From radar imagery (Figure 5b), 96W is very close to China and will soon make a landfall just east of Hong Kong. Because of that, this system is not expected to be a tropical storm.

At the same time, tropical disturbance 97W is formed just east of the Philippines. This system is still weak with disorganized conventions and ambiguous LLCC (Figure 6). However, according to the model forecasts, 97W will gain strength while it gradually moves west-north-westward towards Luzon, but significant development should happen after crossing Luzon.

From wind shear analysis we can see that 97W (Figure 7a) is affected by some wind shear from the north, but it is not strong enough to prevent it from strengthening. Sea surface temperature is very high (Figure 7b)(30 to 31 degree C) for tropical storm development. From water vapor imagery (Figure 7c) we can see no dry air is affecting 97W. Environmental conditions are not bad, however, there is no dynamical forcing for it until 96W dissipates and 97W is covered by monsoonal trough just east of Luzon or in South China Sea.

### **Tropical system ensemble forecast:**

EC ensemble (Figure 8a) shows that 97W is not going strong too much before crossing Luzon. After it passes the island and moves into the South China Sea, significant development may occur to 97W. Worth to talk about, some members of EC show that a

tropical disturbance could form between the Philippines and Mariana islands. This disturbance could strengthen and move close to Taiwan if it comes true.

NCEP ensemble (Figure 8b) tells a different story: half of the members support 97W to cross Luzon whereas the other half of them support it to stay east of Luzon with stronger intensity and a closer path to Taiwan. There is no new disturbance forming in the Philippine Sea according to the NCEP ensemble.

Model ensemble forecast shows that there is still lots of uncertainty for the future track of 97W and whether a new disturbance will form.

### **8/3 18Z Synoptic Forecast: (Figure 9)**

8/4, 96W have made a landfall near Hong Kong. At lower-level, there are southeasterly flow, high theta-e and moisture around Taiwan. Also, a weak easterly wave 97W is at east of Luzon island.

8/5, subtropical high will extend westward. At 700mb, dry air will be around Taiwan. The weak easterly wave 97W will make a landfall at Luzon.

8/6, subtropical high will keep covering above Taiwan. 97W will move into the monsoon trough which is at South China Sea. A new tropical disturbance seems like another easterly wave. It will move westward.

8/7, due to the effect of mid-latitude trough, subtropical high will become weaker.

8/8, monsoon trough including two tropical disturbances with higher moisture at lower-level will move northward.

After 8/8, monsoon trough with higher moisture at lower-level may move to Taiwan. But there is still uncertainty.

### **QPF verification (Figure 10):**

Both EC, and NCEP model forecast precipitation on the west north coast of Taiwan, NCEP forecast is appearing. WRFD and TWRF forecast precipitation is on the sea, but precipitation is on the coast in reality.

EC, NCEP, WRFD, and TWRF model forecast precipitation in southeastern Taiwan, and NCEP is estimate well. EC, WRFD, and TWRF are overestimate rainfall there.

### **QPF forecast (Figure 11):**

On August 4, as 96W moves westward and makes landfall on South China, the main source of rainfall in Taiwan will return to afternoon thunderstorms. Because the wind direction is roughly south-east on that day, the afternoon thunderstorm will happen in western Taiwan near the mountain area.

On August 5 to 6, subtropical high extent westward and cover all of Taiwan in 500hPa, and in lower level turn to eastly gradually, there will be afternoon thunderstorms near the mountain area, and it will be limited.

On August 7, a tropical disturbance 97W will move westward or west northward and its intensity will enhance. Subtropical high also weaker and move northward, Taiwan between them so easterly will enhance, afternoon thunderstorms will enhance in west of Taiwan especially near mountain areas.

After August 8, according to the tropical disturbance 97W location, wind direction and rainfall pattern will be different after August 8, it will have uncertainty. If a tropical disturbance is near, the rainfall in southeastern Taiwan will be heavier. On the contrary, the rainfall will mainly be caused by afternoon thunderstorms. The hot spot of rainfall will be near the mountain area in western Taiwan.

Figure 1. Himawari Satellite Imagery (true-color) on 08/04 00:00 UTC.

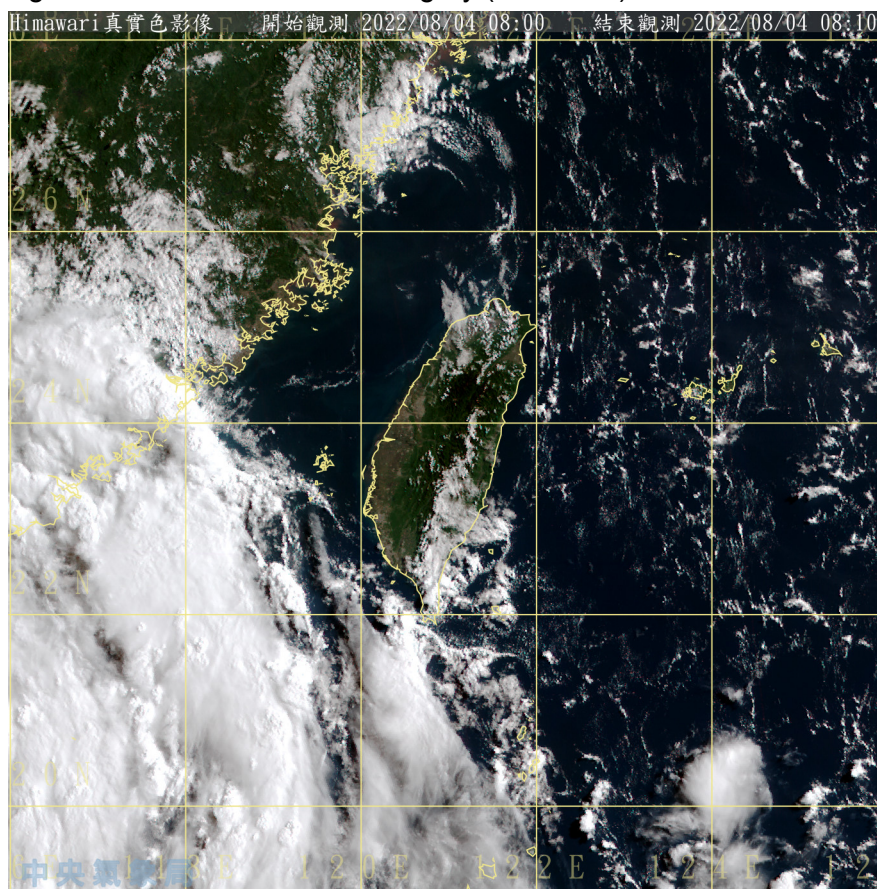


Figure 2. Radar Imagery on 08/04 00:00 UTC.

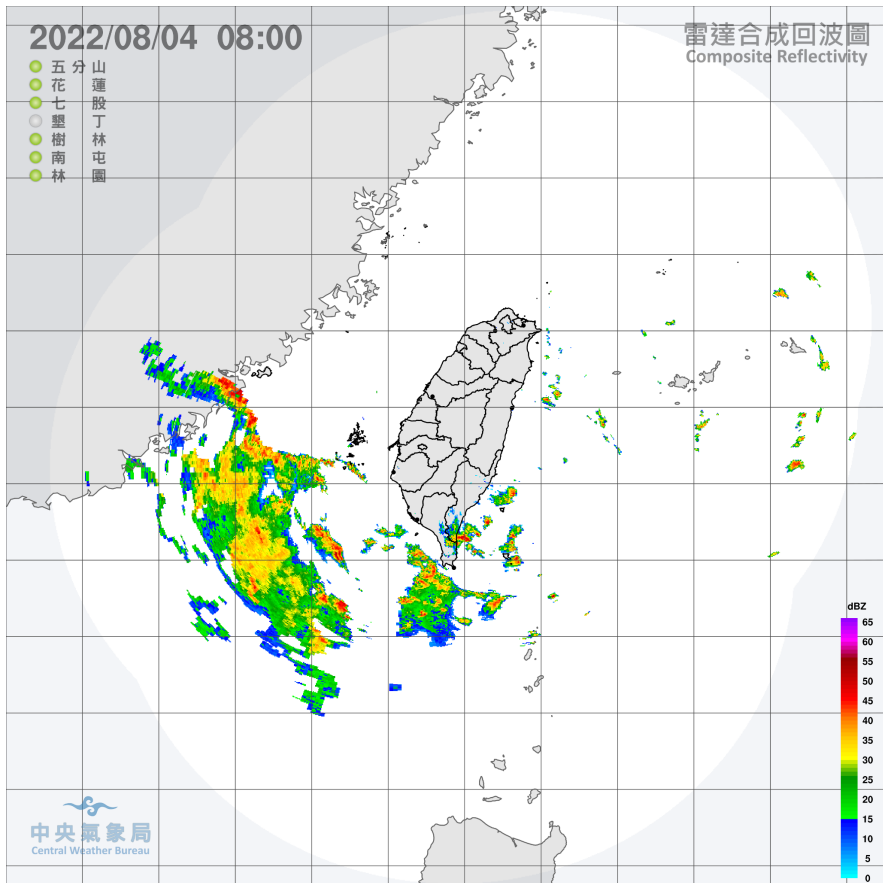
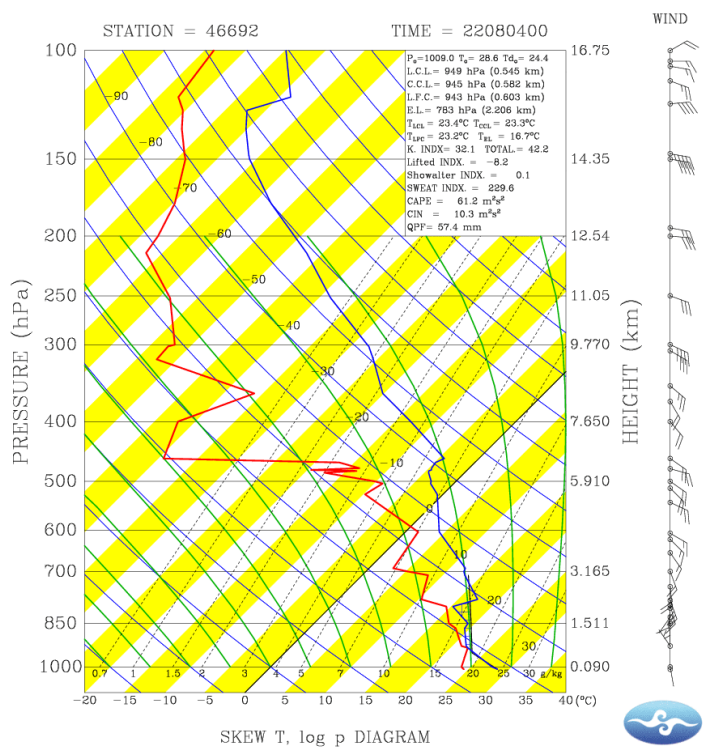


Figure 3. Skew-T Log-P Diagram at 08/04 00Z.  
(a) Banqiao



(b) Pingtung

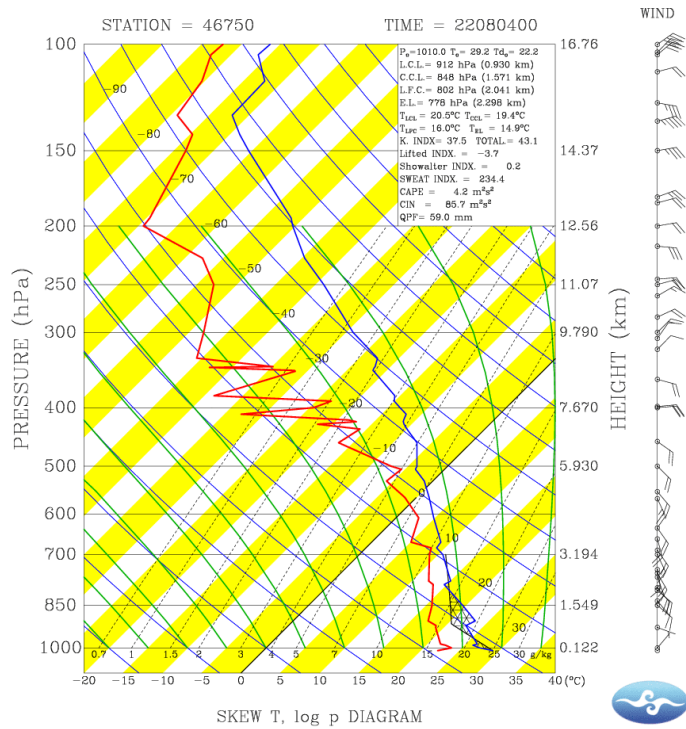


Figure 4. The wind speed and wind direction from observation stations at 8/4 01Z.

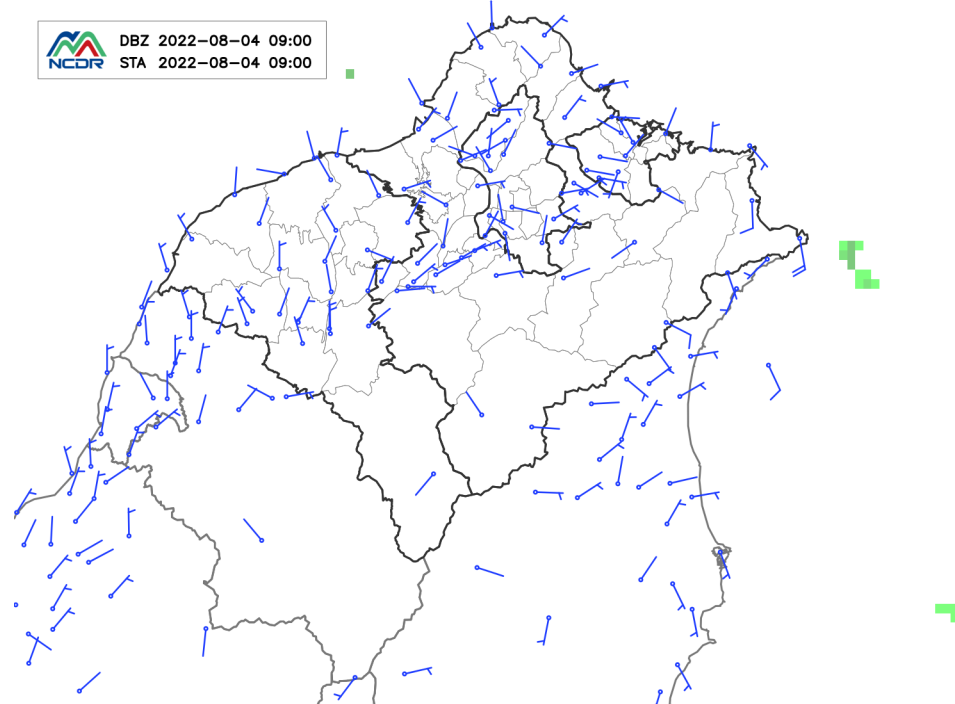


Figure 5. Infrared satellite and radar imagery of 96W at 05:30 and 05:36 UTC. At this time 96W has already made landfall in China.

(a).Infrared satellite imagery (left) (b).Radar imagery (right)

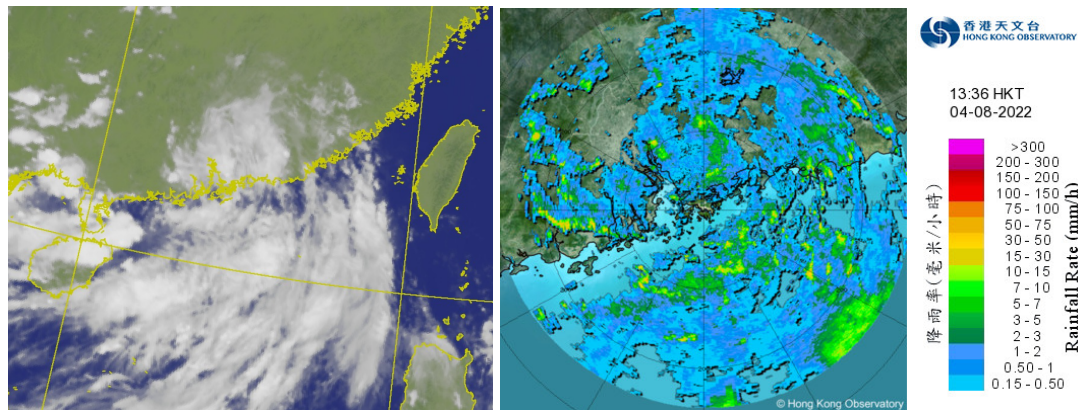


Figure 6. Infrared satellite imagery of 97W at 01:00 UTC.

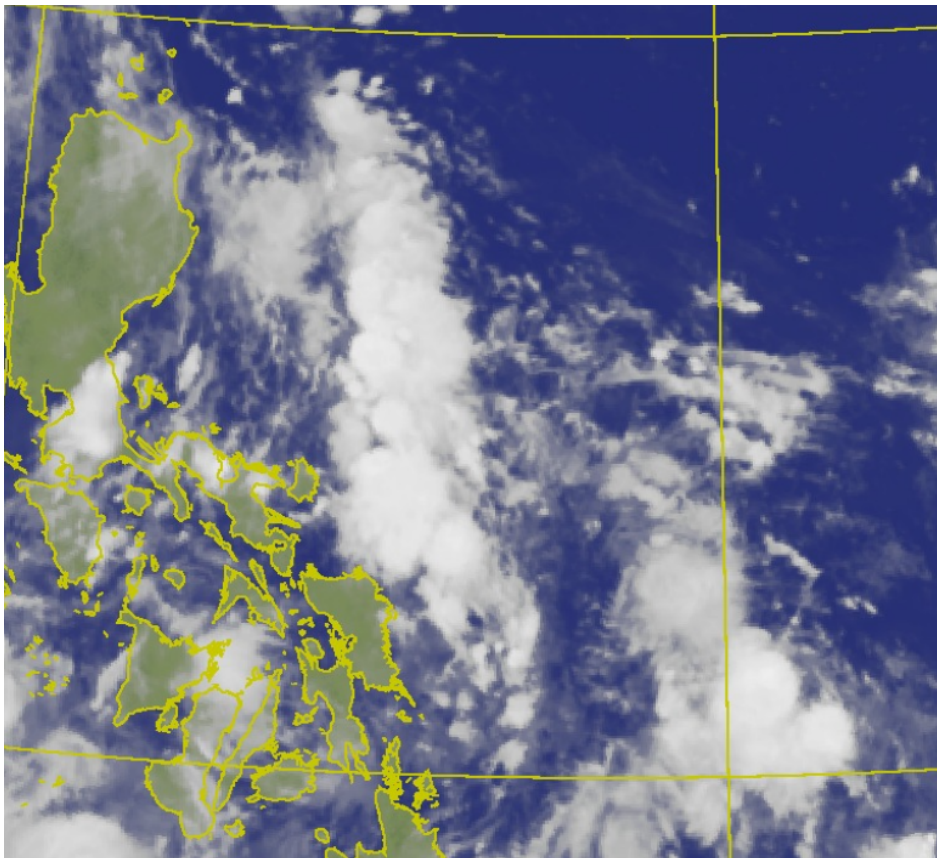
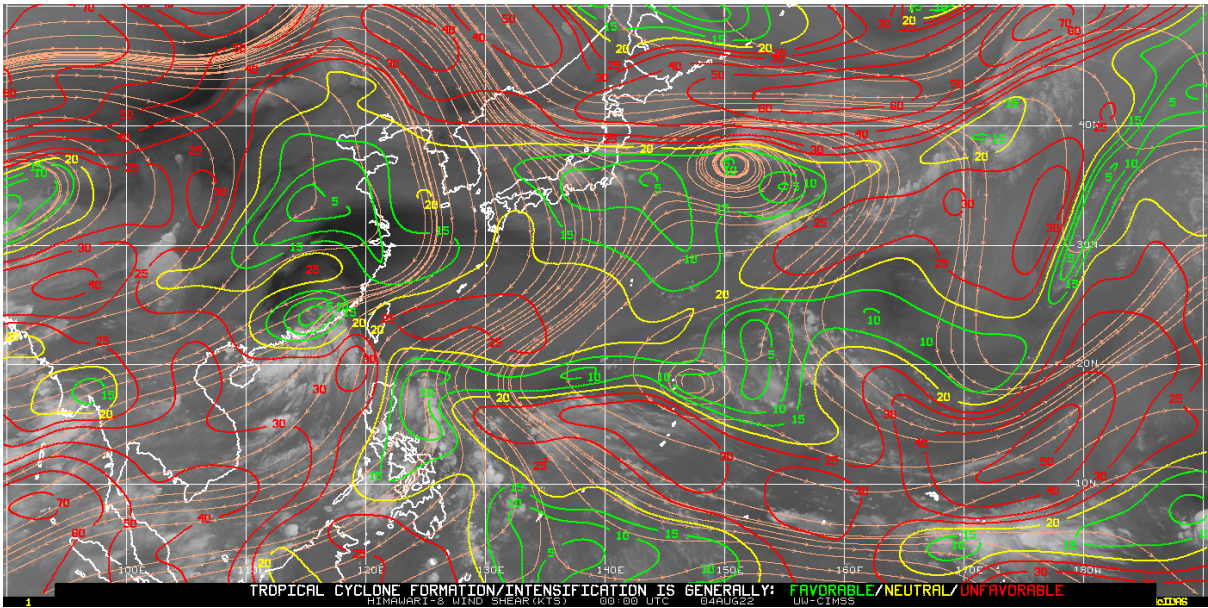
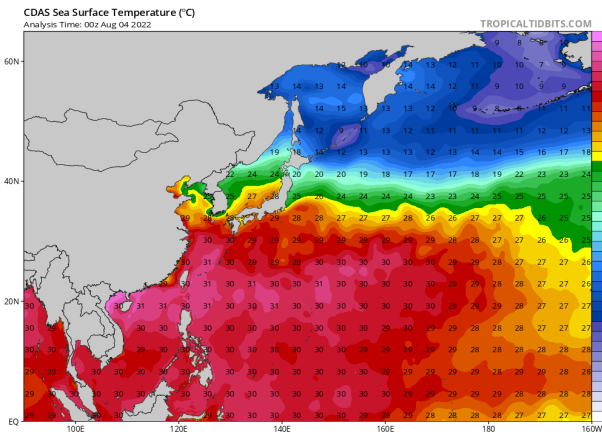


Figure 7. Wind shear, SST and water vapor imagery ( $6.9\mu\text{m}$ ) of 97W at 01:00 UTC.

(a).wind shear (upper)



(b).SST (lower left)



(c).Water vapor imagery (lower right)

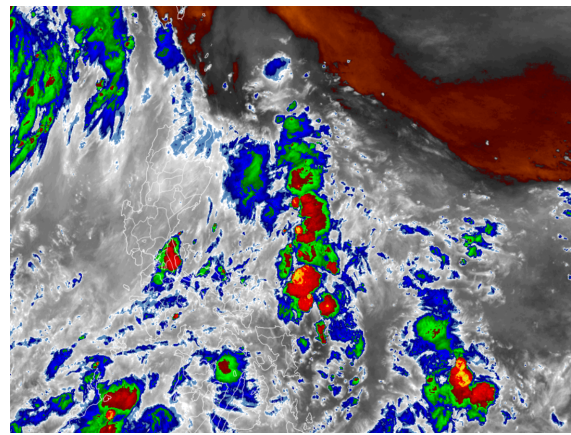
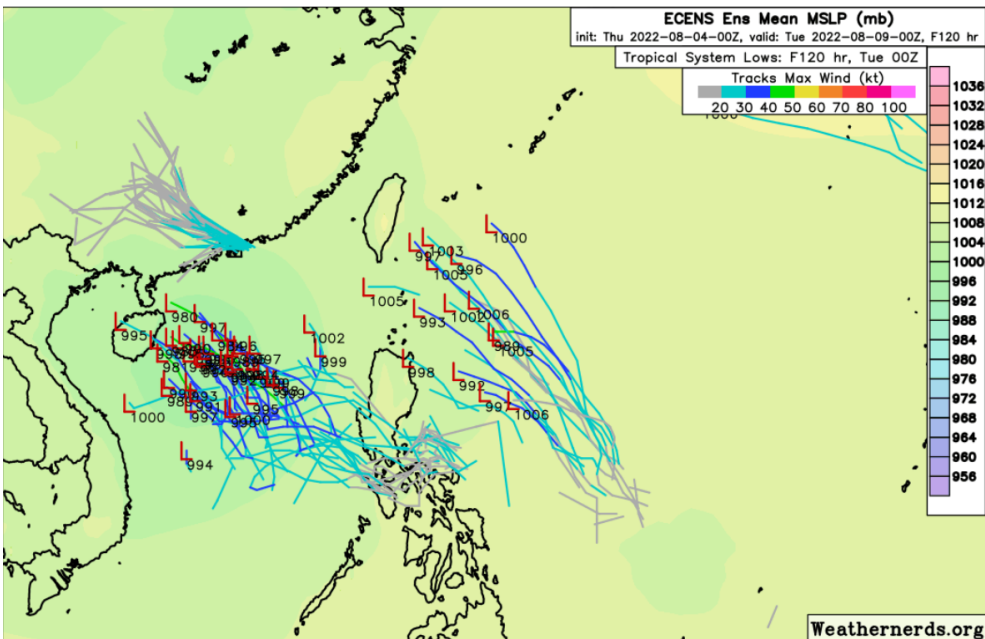


Figure 8: Ensemble forecast

(a) ECMWF (initial at 8/4 00Z, 120hrs forecast)



(b) NCEP (initial at 8/4 00Z, 120hrs forecast)

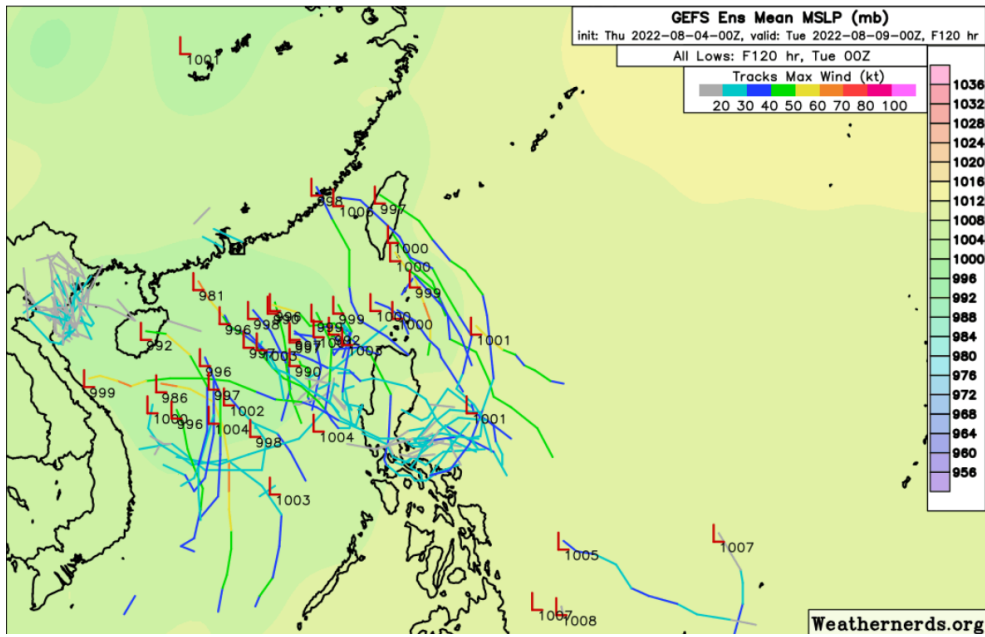
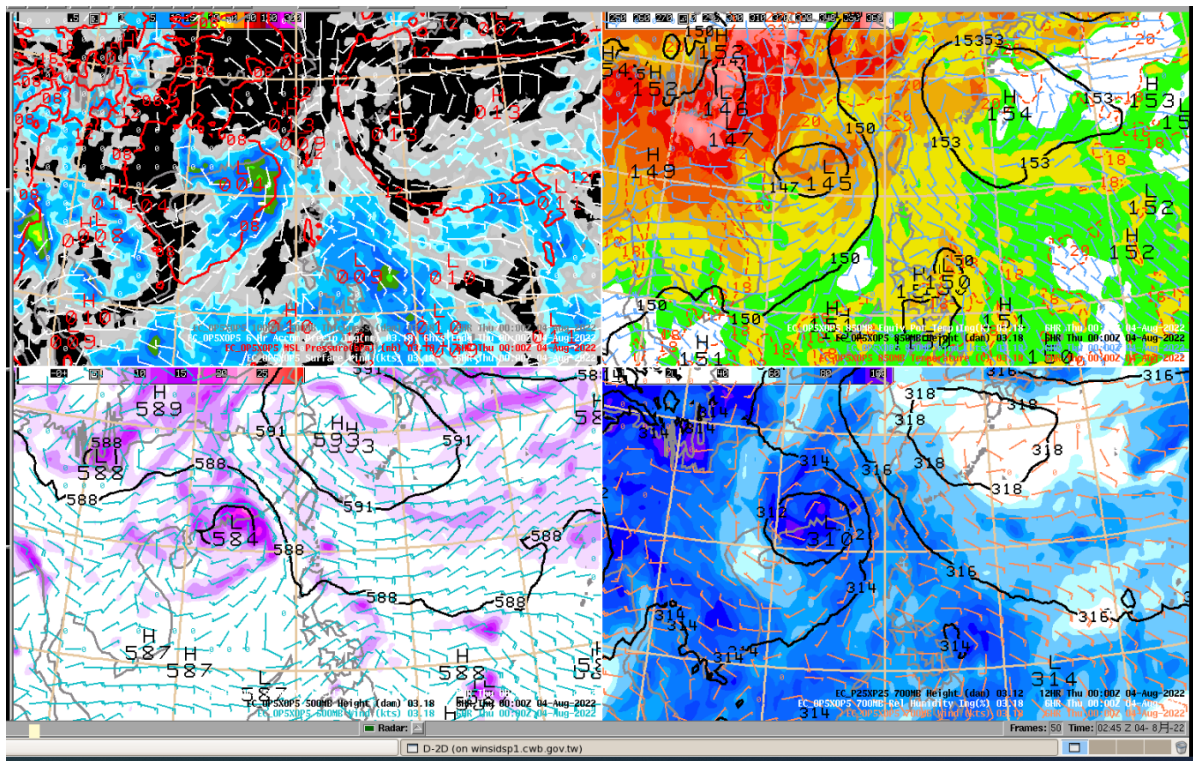
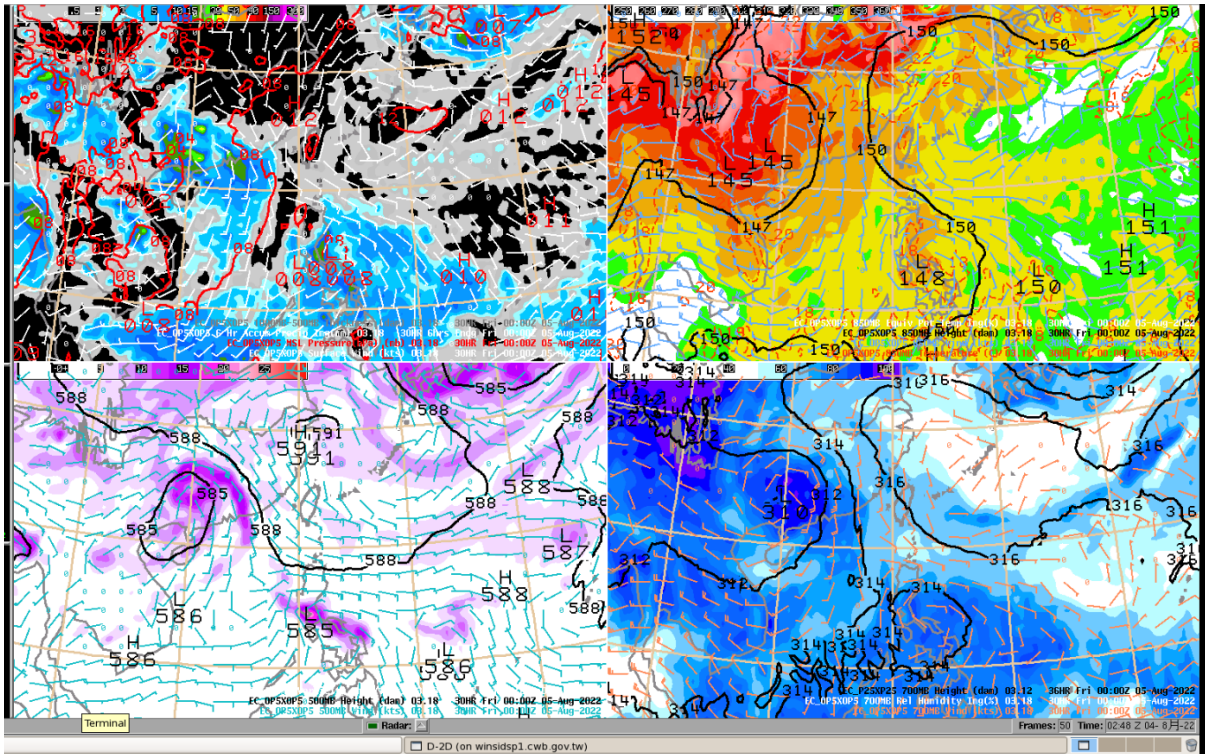


Figure 9. 8/3-8/9 Synoptic field forecast(Init 8/2 18Z)

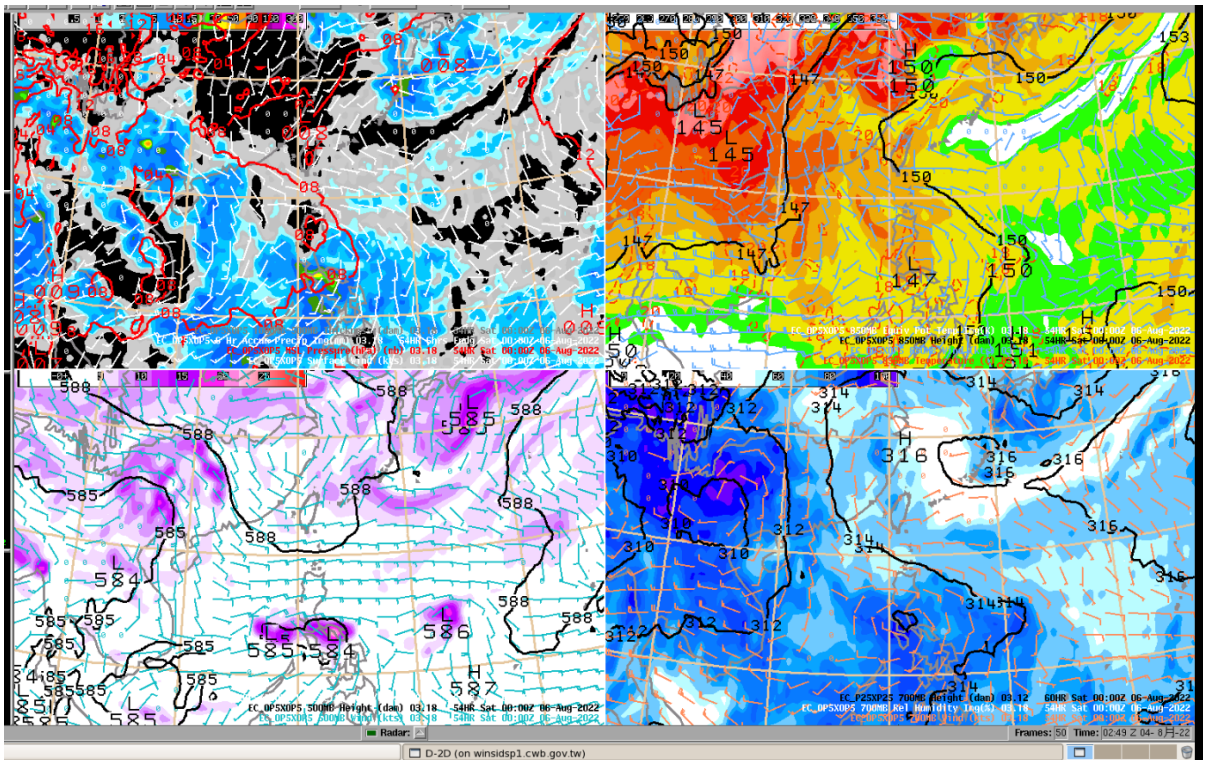
(a) 8/4 00z



(b) 8/5 00z



(c) 8/6 00z



(d) 8/7 00z



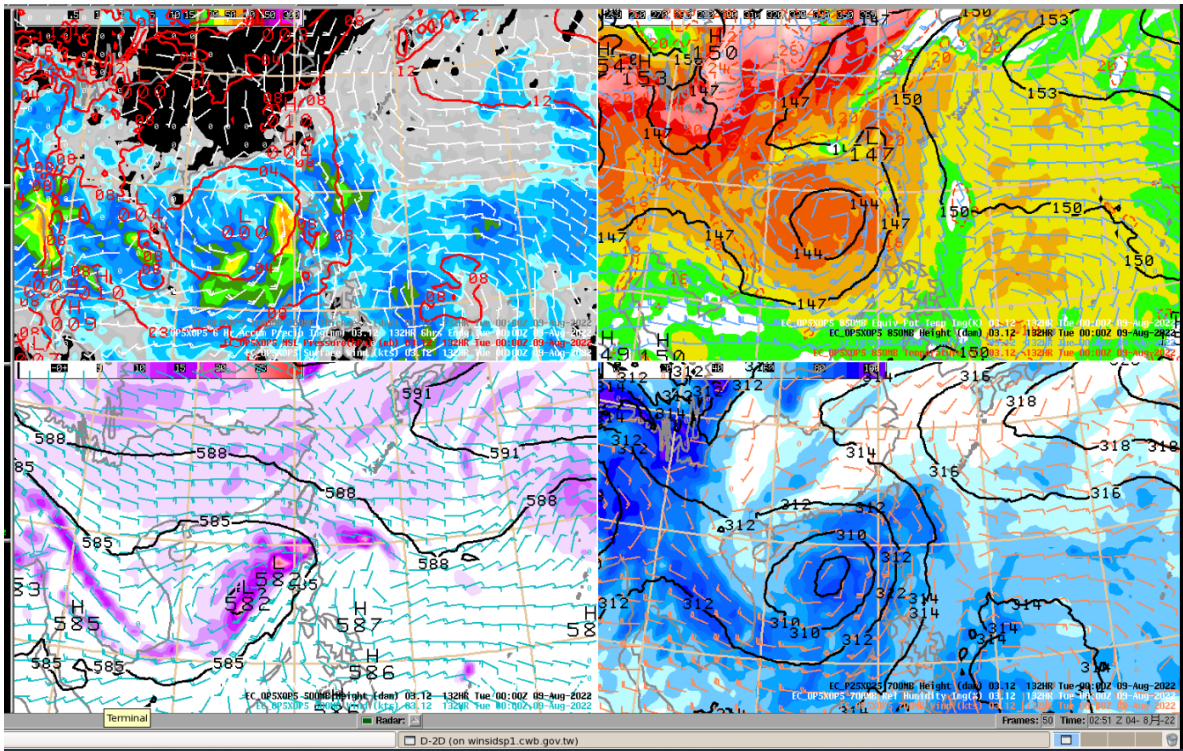


Figure 10. QPF Verification (initial at 8/3 00Z, forecast time: 8/3 12-24Z)

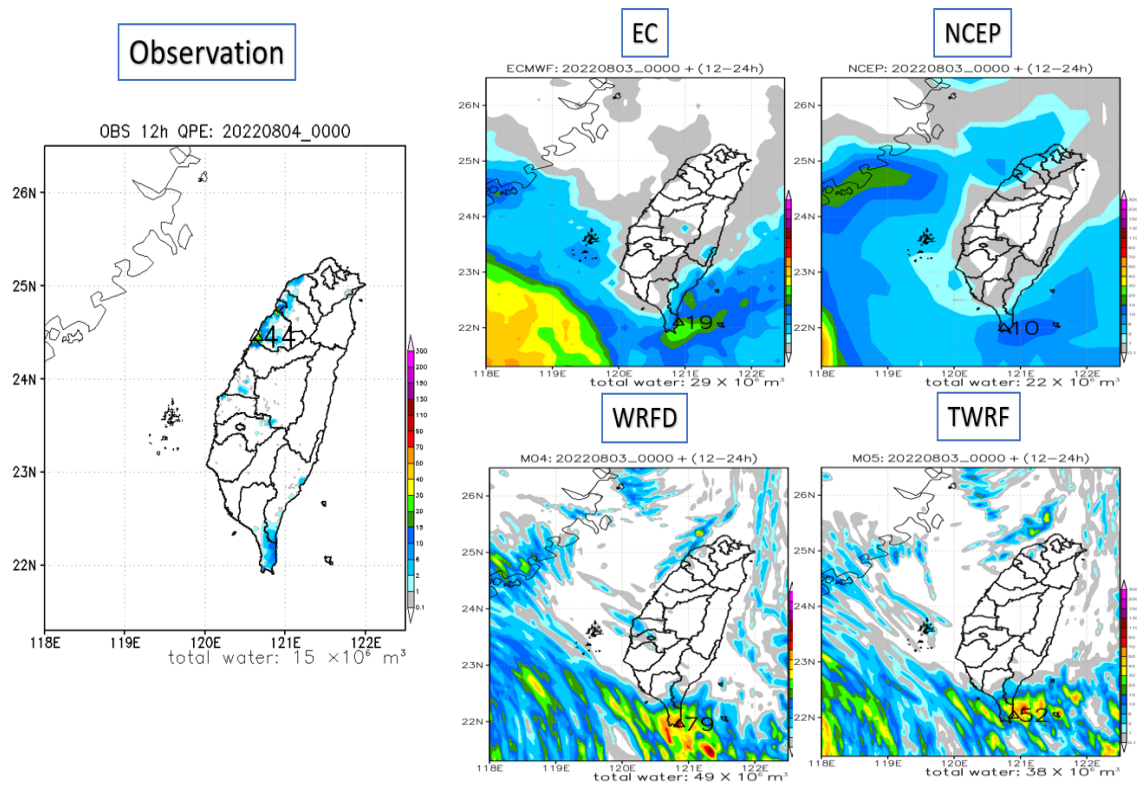
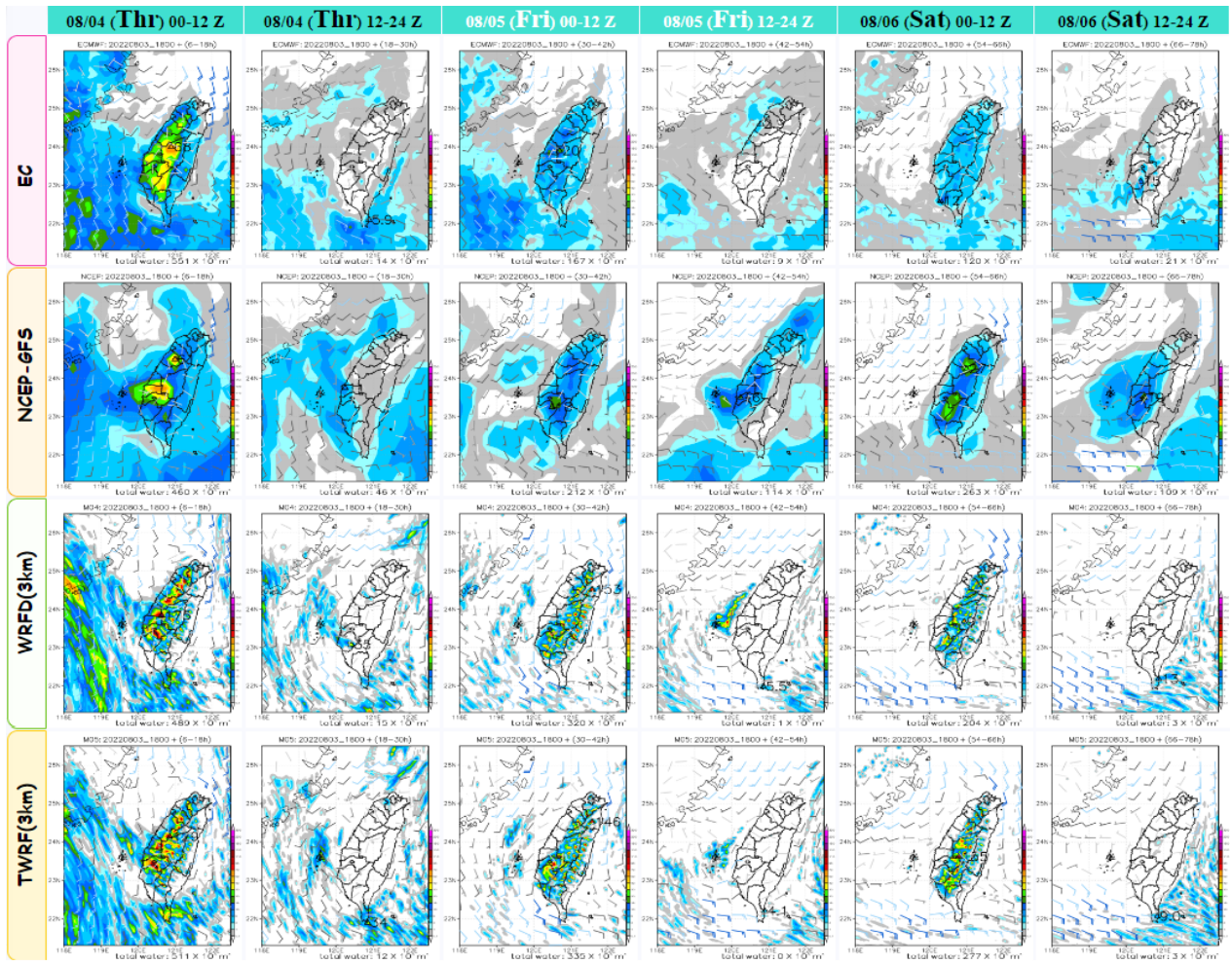


Figure 11. 8/3-8/8 QPF forecast (initial time at August 3 18Z)

(a) EC, NCEP, WRFD, TWRF (8/4~8/6)



(b) EC, NCEP, WRFD, TWRF (8/7 ~ 8/9)

