

Reviewer#2

General comments

1. The model's resolution is too coarse (10km and the most physics is not good for this resolution (note that model could only resolve the cloud processes over 20 -40 km range). Also there is no detailed comparison between model simulated and large-scale analyzed moisture fields.

R: In this revision, we conducted a fine-scale (3 km) simulation and explore why the mesoscale processes leading to this continuous heavy rainfall in section 4 in detail. (Page 13-23 ). In order to cover most of the typhoon region and the SW monsoon flow, we set up a huge domain (1081x 691 grid-points, 3 km resolution) with 45 levels in the vertical. Our purpose is to further understand the mesoscale processes of the interaction between typhoon circulation and southwesterly monsoon and hence conducted a large domain to include these two meteorological processes. This fine-resolution numerical simulation has suggested details of dynamical processes, which were only partially resolved and revealed by the analysis of the half-degree-resolution analysis data, i.e., the convergence zone. Please also check the discussion in detail in Section 4.

Specific comments:

1. Fig 2 is discussed before Figs. 1a, 1b and 1c.

R: We dropped this figure as Reviewer#3 suggested.

2. P13498, Line 10: Do you imply that 10 km grid spacing model simulation is better than 3 km grid spacing model simulation? Note that 10 km grid spacing can only resolve the cloud systems over 40 km (4 dx wave). Not sure the model "explicit" moist processes are good for this resolution.

R: Same as the response of General Comments #1.

3. P13499, Line 20: What data (T, Qv, U, V and W) were assimilated? How was the 4D data assimilation used (whole domain, or just a few layers near lateral boundaries)?

R: The whole domain 4DDA data was used.

4. Fig. 1c: It is nice. What is the temporal resolution (ground based observed rainfall)?

R: Hourly data were used.

5. Figs. 1d and 1d: How different between modeled and observed rainfall? (In addition to maximum rainfall accumulation)

R: Our simulation results can measure up with observed data well. The same colored scales are used in Figure 1d (Observation) and Figure 6(simulation).

6. Figs. 4d and 4e are good pictures. Not sure what we can learn from these (quantatively).

R: Our intention is to qualitatively describe the different moisture flux transport between northern and southern Taiwan in the figures 4d and e. It clearly showed the moisture flux blocking by the mountain in the southern Taiwan.

7. P13504, Line 20: Please conduct a simulation with 27 vertical layers to validate the maximum rainfall issue.

R: As response in question #1, we dropped the results of 10-km resolution simulation. The impact of the model vertical resolution will present in the separate paper in the near future

Fig. 5: The differences between model and NCEP GFS are significant. Why (even with utilization of the 4D data assimilation scheme)? P13505, Line 10: The 10 km grid spacing could not resolve the terrain well. The lifting may be underestimated. Therefore, the model results should underestimate the rainfall.

R: It is due to the resolution improvement in our simulation. The resolution of NCEP GFS is 50 km while our modeling study is 10 km.

Here we provide 10 km resolution of the terrain in the model (right) and the actual terrain by USGS 1 km resolution (left). In our simulation, the topographic is smoothing but with the similar pattern. The modeling terrain still could as high as nearly 3 km. We agree the review's comment that the lifting may be underestimated. In this revision, the simulation of 3 km resolution could as high as 3000 mm.

