

Response to Anonymous Referee #1:

General comments:

I have reviewed the manuscript 'Evolution of Wind Field in the Atmospheric Boundary Layer with using of Multiple Sources Observations during the Transit of Super Typhoon Doksuri' by Wang et al. The authors investigated the vertical structure of tropical cyclone (TC) boundary layer during Super Typhoon Doksuri using coherent Doppler lidar (CDL), radar wind profiler (RWP) and automatic weather station (AWS). The wind speed profiles obtained using a data fusion method fit well with traditional models in the lower part of the Atmospheric Boundary Layer (ABL) before wind speed changes rapidly. In general, the topic of this study is interesting; however, there are some unclear points that require clarification. I recommend it for publication after major revision. Please consider the following comments in revising the manuscript.

Major comments:

1. Line 198: "The maximum wind speeds of 18 and 50m/s occurred at 11:00 LST". I don't see it from Figure 1d.

AR: Thanks for your suggestion. This sentence has been revised to "The maximum wind speeds of 18.50m/s occurred at 11:00 LST." And it could be found in Figure 3 (d).

2. Figure 4: There is a sharp increase of wind direction at 54 m by CDL-1 and 71 m by CDL-2 at 04:00 LST on 28 July, which is not at 10 m by AWE-1 and AWE-2. It would be helpful that authors provide few sentences explaining that.

AR: Thanks for your suggestion. Actually, the wind direction measured by two CDLs showed a sharp increase because that the ordinates are set from 0° to 360°. Wind direction of 0° and 360° both refer to the north wind. Thus, there was no abrupt change in wind direction and the variation of it was less than 10°.

Additionally, the wind direction differences observed by the CDL and the AWS may be due to the differing temporal resolution. The wind directions observed by the above two instruments were averaged over 10 min and 1 h separately. Hence it is reasonable that the obvious differences in wind direction occurred especially when north wind

dominated and the wind speed varied in 0° to 10° and 350° to 360°.

Considering your comments, some explanations have been added in the section 4.2 as following “The wind direction measured by two CDLs showed a sharp increase at about 04:00 LST on 28 July because that the ordinates are set from 0° to 360°. Actually, there was no abrupt change in wind direction and the variation of it was less than 10°. When north wind dominated and the wind speed varied in 0° to 10° and 350° to 360°, it is reasonable that the wind direction measured by the CDL and the AWS exhibited obvious differences as the obtained wind directions were averaged over 10 min and 1 h, respectively.”

3. Lines 256-257: “In general, it would cause a large error (up to 73%) to describe the exact wind speed profiles with traditional models during and after the typhoon’s passage, especially when the wind speed is almost constant with height or when wind shear exists”. How did the authors get 73%? From Figure 8? Also, the sentence is unclear. Figure 8 indicates that the difference between the exact wind speed profiles and traditional models is large above 200 m, even before the typhoon’s passage. Since this is one of the major conclusions, it would be helpful if the authors rephrase the sentence for clarity.

AR: Thanks for your question and suggestion. As exhibited in Figure 7 and Figure 8, the measured wind speed profiles show the best agreement with the power law generally. Therefore, we evaluate the estimation error between the measured wind speed and the power law model. It could be found that the largest error occurred at 1435 m during the period of 11:00 LST ~ 12:00 LST at Position 1 from Figure 7 (g). The measured wind speed was 22 m/s while the wind speed estimated from the power law model was 38 m/s, and the error of 73% could be calculated as:

$$\varepsilon = \frac{38 - 22}{22} \approx 73\%$$

The conclusions have been revised both in section 4.3 and section 5 as following:

Section 4.3: “it would cause a large error (up to 73%) to describe the exact wind speed with power law model, especially when the wind speed is almost constant with height

or when wind shear exists.”

Section 5: “And it would cause a large error (up to 73%) to describe the exact wind speed in the upper part of the ABL. As the typhoon landing, the differences in wind speed at each height decrease obviously and the wind speeds even become almost constant with height. And wind shear or low-level jets occur at several heights after the typhoon landing.”

Minor comments:

1. Line 196: “the pressured dropped ...” -> “the pressure dropped ...”.

AR: Revised. Thanks for your suggestion.