Interactive comment on “Tornado-Scale Vortices in the Tropical Cyclone Boundary Layer: Numerical Simulation with WRF-LES Framework” by Liguang Wu et al.

Anonymous Referee #1

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This manuscript documents the small-scale vortices in the tropical cyclone boundary layer found in a two-way nested WRF-LES set up using the large-scale conditions of a real typhoon. The results are interesting and the presentation is quite clear. I have only a few minor comments about the model setup and interpretation of results.

Minor Comments:

1. The 100-m vertical resolution is relatively coarse for adequately resolving structures like the high theta_e layers shown in Fig. 7b. It is also coarse compared to the 37-m horizontal resolution. A higher vertical resolution is also desirable for capturing the strength and scale of the horizontal roll vortices mentioned by the authors (Fig. 3a). Have the authors done any sensitivity tests to examine the impact of vertical resolution on the structure and distribution of the small-scale vortices focused on in the work?

2. I couldn’t quite infer the exact connection between the “quasi-linear bands” and what is shown in Fig. 8 (paragraph starting on Line 334). Are the authors implying that the wind speed horizontal variability associated with the quasi-linear features could explain in part the wind speed jump associated with the “tornado-scale vortices”? Please be more explicit.

3. By categorizing the vortices into 3 groups, are the authors suggesting that they are generated/maintained by different physical mechanisms? Could they simply represent different phases in the life cycle of these coherent structures?