

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 θ_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).

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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?

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