

2nd Review of manuscript wes-2023-71 entitled “Tropical cyclone low-level wind speed, shear, and veer: sensitivity to the boundary layer parameterization in WRF” by Sara Muller, Xiaoli Guo Larsen, and David Verelst

General comments

Thanks to the authors’ great effort, the revised manuscript has been much improved. The authors did consider my comments for the paper revision although they did not follow some of my suggestions, particularly for how to define the eyewall region. But I respect their decisions.

I have two additional comments. First, in the introduction, the authors stated that wind veer should be considered in wind turbine load assessment (line39), but it is not accounted for the IEC standards (line 35). So, one of the objectives of this paper, I think, should be the examination of how wind veer can be included in the IEC standards for wind turbine loading based on this research. But this issue has not been clearly addressed in the paper. Based on the research, a recommendation should be made in the conclusion or discussion whether wind veer should be included in the IEC standards and how.

Second, the eyewall is now defined as the region of 80th percentile of 10-m wind speed and the radius is smaller than 250 km. But 250 km is a large radius, which would include both eyewall and inner rainbands. It could also include a part of the outer rainbands. So, such defined “eyewall region” is not really the eyewall commonly referred to in tropical meteorology. This can cause confusion. Here are my two suggestions. If possible, I’d suggest defining the “eyewall region” as the area with 80th percentile of 10-m wind speed and within the vicinity of the maximum wind (RMW), i.e., [RMW-dR, RMW+dR]. This is closer to the traditionally defined eyewall. If this is a burden for the authors as they have to redo all the analyses, then, alternatively, the authors could specifically note in the paper that such defined “eyewall region” should not be interpreted as the true eyewall in tropical cyclones, rather, it refers to a rough region with high wind speeds that includes the eyewall and inner rainbands, or maybe a part of the outer rainbands.

Other comments

1. Although Figure 2 is an illustration figure. It is not appropriate to use longitude and latitude as x- and y-axis without any marker. I’d suggest using radius so that readers can have a rough idea of the size of the storm and ranges of defined eyewall region and outer cyclone.

2. Caption of Figures 8, it reads “Profiles of a,b) wind speed, and shear exponent c,d) for the a,c) eyewall region, and b,d) outer cyclone region”. This is an awkward sentence with so many a,b), c,d), a,c), and b,d). Please simplify the sentence. You can just say: “a, c) and b, d) are the vertical profiles of wind speed and shear exponent for the eyewall region and outer cyclone, respectively. The same problem is for Figure 9 caption.