We would like to thank the reviewer for his thorough reading of the paper and his useful comments and suggestions. We feel that the paper has considerably benefited from his remarks. We provide in the following detailed responses to his comments, and significant additions and modifications of the manuscript are highlighted in blue in the revised version.

1 Response to reviewer #2

1. *The terminology in meteorology can sometime cause confusion for wind turbine design engineer, such as inflow angle in on page 6, line 3, please specifiy what is the definition here, as inflow angle is understood as angle formed by the tangential velocity and the wind velocity with respect to the airfoil of the blade.*

   We thank the reviewer for this remark. We agree that the term inflow angle can be confusing as it refers to two different notions depending on the context. Here, the inflow angle is defined as the angle difference between the tangential direction relative to the TC centre and the actual wind direction. This has been specified in the revised manuscript (L.168-171).

2. *Equation 10, why is unit of P1 is hPa and P2 is meter*

   We thank the reviewer for pointing this out. The unit given for P_2 was incorrect (hPa). This error has now been corrected in the revised manuscript (L.189).

3. *Page 12 in section 4.3.1 Site 1, it refers to Figure 4, should it be Figure 5?*

   We acknowledge that this was an error in the figure reference. It should indeed refer to Figure 5. This has now been corrected in the revised manuscript (L.284).

4. *Please mention how the wind direction is defined so that there is no misunderstanding.*

   As mentioned above, the wind direction in the OROWSHI model is defined through the inflow angle, which corresponds to the angle between the tangential direction relative to the tropical cyclone centre and the actual wind direction (L.168-171).

   In Section 6.4, the wind direction is the local wind direction measured by the wind vanes of the met masts. This has been clarified in the revised manuscript (L.394).

5. *For wind turbine design parameters for the turbulence model will be needed, can the authors provide some guidance how to translate the results of the paper into practical wind field generation to determine the loading of the wind turbine during TC, besides wind shear. Since misalignment between the wind direction and nacelle position as well as the rotor position have strong impact on the ultimate loading, can the TC model provide statistically guided values for the simulation. This can be extended to power spectra, coherence model that can be applied in a wind field simulation that capture the characteristics of TC.*

We thank the reviewer for this insightful comment. We agree that turbulence, misalignment (but also veer and gust) are essential for design. However, this aspect is beyond the scope of the present study, which focuses on the parametric reconstruction of averaged wind fields induced by tropical cyclones. The proposed model does not explicitly provide turbulence characteristics. While the dataset used in this work does contain relevant information on turbulence and wind direction (although turbulence estimates derived from lidar measurements need to be handled with caution), it has not yet been fully exploited since the detailed assessment of these parameters is out of the scope of the study. However, challenging the IEC recommendations and the ESDU model under tropical cyclone conditions is one of the research gaps we intend to address in future work using the available data. Detailed simulations (e.g. Sanchez-Gomez et al., 2025) can also provide insight into these aspects.

Further analyses will be carried out in future work to derive statistically turbulence properties and provide guidance for their integration into wind field simulations representative of tropical cyclone conditions. This has been added to the perspectives in the conclusion (L.486-488).

Sanchez-Gomez, M., Deskos, G. & Lundquist, J.K. (2025) Turbulence-resolving simulations of Hurricane Laura (2020): Insights into extreme winds and eyewall turbulence. Quarterly Journal of the Royal Meteorological Society, 151(773), e70003. doi: 10.1002/qj.70003