

Wind Energ. Sci. Discuss., referee comment RC1
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Comment on wes-2022-45

Anonymous Referee #1

Referee comment on "Predictive and stochastic reduced-order modeling of wind turbine wake dynamics" by Søren Juhl Andersen and Juan Pablo Murcia Leon, Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2022-45-RC1>, 2022

The authors present a predictive and stochastic reduced-order model based on proper orthogonal decomposition for wind turbine wake flow application. The authors did an excellent job explaining the methodology, which I expect will be used by others in the field. The paper should definitely be published. I just have a few minor comments and requests for clarifications.

1. The introduction section does not provide recent state of art in using POD and/or ROM for wind energy applications. Also, some of the motivations of the current work are already resolved by other studies. For example "Cluster-based probabilistic structure dynamical model of wind turbine wake", and "Clustering sparse sensor placement identification and deep learning-based forecasting for wind turbine wakes". There have been many more studies that should be mentioned here.

2. Can you provide details on the time resolution considered in evaluating the POD? How did the authors avoid the correlated features in POD calculation?

3. Figure 7: It is helpful to add the energy profile of the POD eigenvalues to the figure to visualize the trend of both.

4. Fig 8: Can you explain why cases $CT=0.422$ and $CT=0.578$ showed less correlated Eigenvectors than the other cases?

5. Fig 13: Can you provide details on the energy content in these 50 modes?

6. It is very practical of the authors to explain the limitations of the current work. Please explain your insight on how to develop the current approach to capture the non-Gaussian trend and if we have yaw/ tilt mechanisms.