Wind Energ. Sci. Discuss.,
https://doi.org/10.5194/wes-2018-57-RC2, 2018

eawe european academy of wind energy
Open Access WIND ENERGY SCIENCE DISCUSSIONS

Interactive comment on "The Aerodynamics of the Curled Wake: A Simplified Model in View of Flow Control" *by* Luis A. Martínez-Tossas et al.

Anonymous Referee #2

Received and published: 5 October 2018

In the manuscript, the authors present a model for the curled wake based on approximations to the Navier-Stokes equations. They compared the model predictions with the LES data of wind turbine wakes in uniform and turbulent inflow. The topic is interesting and useful for the wind-energy community, and the manuscript is well-written. However, there are some issues which are required to be addressed.

1. The results obtained from the other models, in particular, the ones proposed by Shapiro et al. (2018) and Bastankhah and Porte-Agel (2016), could be added to the text (in Fig. 5 and 7). In the current format, it is not possible to compare the performance of the proposed model with the other ones.

2. Since the experimental data of wind turbine wakes in yawed conditions is available (e.g., Bastankhah and Porte-Agel, 2016), it would be more useful if the model is also

Printer-friendly version

Discussion paper

compared with the experimental data.

3. In addition to Fig. 5 and 7, the vertical profiles of the wind velocity should be added to the manuscript to better compare the model with the simulations.

4. A figure showing the lateral displacement of the wake with downwind distance could be added to the text, and it should be compared with the other existing models.

5. In Table 1 and the related text, it is not mentioned which method for the wake superposition is used in the Gaussian wake model (e.g., Katic, Lissaman, Voutsinas, or a different one). Please clarify this issue in the text.

6. In Fig. 4 and 6, why the predictions from the proposed model is different in the laminar inflow for the ADM and ALM? Is there any difference in the simulation setup using different turbine models? Can the model differentiate between the ADM and ALM?

7. Regarding the eddy viscosity model, there is no wall in the simulation under laminar inflow condition. How the eddy viscosity is computed in that case? Is it zero? For the turbulent case, it would be useful if the authors could show the comparison between the eddy viscosity model in equation (15) and the LES.

8. It is not clear how the model includes the turbulence level in the incoming flow. Is it included in the model though the effective viscosity?

9. It is suggested that, in the ABL case, the authors consider another yaw angle (e.g. 30o) to make the model validation more complete.

10. In the ABL case, it would be useful if the incoming wind characteristics (i.e., vertical profiles of the mean wind velocity (in the log scale) and the turbulence intensity) are added to the text.

Interactive comment on Wind Energ. Sci. Discuss., https://doi.org/10.5194/wes-2018-57, 2018.