Wind Energ. Sci. Discuss., community comment CC1
https://doi.org/10.5194/wes-2021-36-CC1, 2021

Comment on wes-2021-36

Alfredo Peña

Community comment on "Meso- to microscale modeling of atmospheric stability effects on wind turbine wake behavior in complex terrain" by Adam S. Wise et al., Wind Energ. Sci. Discuss., https://doi.org/10.5194/wes-2021-36-CC1, 2021

Dear authors,

Thanks a lot for this manuscript. The results are really impressive and interesting. I have some questions/comments on your work and I hope you can address them:

1. As far as I understand you do not nudge your simulations. Is there any reason why you don't? I would tend to think that under complex terrain nudging could be good to avoid the runs to drift apart too much. And you mentioned that you chose GFS due to better agreement with ERA5 (or perhaps ERA-interim)... would nudging turn the agreement to be better using ERA5?

2. We recently published a paper where we compare lidar RHI scans of a hydraulic jump at Alaiz and the results of a multi-scale WRF-LES run of the event (Peña and Santos, 2021). Similarly to your results the model was able to capture pretty well the dynamics and features of the hydraulic jump. We did not use a CPM method to trigger turbulence and I wonder whether you have results without using CPM.

3. Since you use CPM (I guess you could comment on how you setup your CPM in a better detail in the corresponding section), I wonder how resolved + SGS turbulence (velocity variances or TKE) compares against the measurements. It would be really interesting to see time series of simulated and observed TKE and TKE vertical profiles of the simulations against those from the masts in the inflow (no wake). TKE transects between simulations and the lidar RHIs could also be really nice to see, although I know of the difficulties in attempting such type of comparison.

Thanks a lot in advance!

Peña, A., & Santos, P. (2021). Lidar observations and numerical simulations of an atmospheric hydraulic jump and mountain waves. *JGR Atmos.* 126, e2020JD033744. https://doi.org/10.1029/2020JD033744