

Interactive comment on “Quantifying error of remote sensing observations of wind turbine wakes using computational fluid dynamics” by J. K. Lundquist et al.

Anonymous Referee #3

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This study is a good idea, but it has an underlying logical flaw, in my view. We do need to know the magnitude of errors in profiling lidar measurements introduced by inhomogeneous flow, and this appears to be a creative way of addressing the topic.

My question is, What is the uncertainty of the model? Clearly the extent to which the model accurately represents the flow behind a turbine can only be determined by measurements; a reference is provided to support the validity of the LES model (Churchfield et al. 2012b, a conference proceeding) which most likely utilized some kind of lidar measurement. So it appears that a model verified by lidar measurements is used to assess the uncertainty of lidar measurements.

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In my view the above doesn't undermine the basic idea of the paper. I just would like to see model results—whatever their source—presented with the explicit understanding that they, too, have inherent uncertainties.

Do averaging periods longer than 10 minutes further obviate the errors? It is true that the wind industry uses 10-minute averaging as a standard, but this is quite short compared to that used by the boundary-layer met community. What happens if averaging is carried out to 30 minutes?

At least one lidar manufacturer is using vertical beam turbulence measurements to address inhomogeneous flow. Some mention of this would be helpful, although admittedly a) the details of the technique used are difficult or impossible to find in published reports and b) a turbine wake likely represents an extreme example of inhomogeneous flow, compared to that generated by complex terrain.

The role of scanning lidars in addressing the issues raised here could be mentioned explicitly, as well.

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