

Interactive
Comment

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

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General comments: The paper is presented clearly and is of great scientific value for on-going research, as it improves the understanding and interpretations of DBS measurements in wind turbine wake environments.

Specific comments: In section 2.1 on page 9325 the wind speed deficit is increasing from 60% at 3D to 75% at 7D. These calculations are a bit unclear to me, as figure 2 and figure 3 show an increase of stream-wise velocity as the normalised values increase from $uA/uH=0.5$ to $uA/uH=0.7$, so the deficit should become smaller.

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In the presentation of the simulations in section 2, additional contour plots of horizontal slices would be interesting to see. The plots could include one or two selected sets of four DBS measurements (N, E, S, W) so that it complements the gradients at the wake edge and rotation effects at the central line discussed in section 3.

It would also be interesting to see in section 3 how the estimated error not only changes with averaging period but also with only taking 0.25Hz data. Sathe and Mann (2012) show that the 1Hz data may measure turbulent eddies twice, which could be avoided by reconstructing the wind vector only with 0.25Hz, after a full measurement circle is completed (Kumer et al., 2013)

Technical corrections: There is a typo in equation 2. In the denominator a sinus is missing (2θ instead of $2\sin\theta$)

Sathe, A., & Mann, J. (2012). Measurement of turbulence spectra using scanning pulsed wind lidars. *Journal of Geophysical Research*, 117(D1), D01201. doi:10.1029/2011JD016786

Kumer, V.-M., Grubisic, V., Dorninger, M., Serafin, S., Strauss, L., and Zauner, R.: Turbulence analysis of lidar wind measurements at a wind park in lower Austria, EWEA Proceedings, Vienna, Austria, 4–7 February, 2013, available at: http://proceedings.ewea.org/annual2013/proceedings/Posters/PO_256_EWEA2013presentation.pdf, 2013

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 9317, 2014.

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