

Interactive comment on “Full field assessment of wind turbine near wake deviation in relation to yaw misalignment” by Juan-José Trujillo et al.

Anonymous Referee #2

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The manuscript entitled "full field assessment of wind turbine near-wake deviation in relation to yaw misalignment" deals with scanning LIDAR measurements in the near vicinity of a wind turbine in order to track the near-wake position and to correlate it with the yaw misalignment conditions of the wind turbine.

The objectives of these measurements are of great interest since the actual influence of a yaw misalignment on the development of near-wake of a full scale wind turbine is still partially unknown since information is generally provided through wind tunnel experiments (not at the same Reynolds) and numerical computations (high degree of modelling).

The technical challenges of this kind of measurements are very important and the paper describes in a precise manner all the technical parameters necessary to make

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the measurement set-up reliable. The method to track the near-wake and the way of filtering data versus the yaw angle are well described.

Consequently, I recommend the publication of the article, considering that corrections will be made according to the recommendations given below.

Major comments:

- The selected site is well documented and the measurement period is long enough to ensure statistically converged results. One could regret that no classification of data versus the thermal stability was performed. Would it be possible to do this classification and observe the consequences on the results? If not, please at least comment on it within the document. What is the average turbulence intensity at hub height?

-\$4.1. Knowing the thrust coefficient, it is possible to assess the expected velocity deficit and so, the expected axial induction factor. One can then compare this velocity deficit with the one obtained in the present data base. One can also assess the expected skew angle of the wake, which depends on the axial induction factor and the yaw angle. According to a rapid calculation, the skew angle of the wake should be 1.16 times higher than the yaw angle. However, this skew angle is not taken into account in the present study: why?

- Figure 7: the data scatter at the first position cannot be due to a physical behavior of the near-wake. It is unlikely that the wake changes its position in such a magnitude really close to the rotor. One might conclude that the tracking method based on a Gaussian distribution is not appropriate to capture the very near wake and one could suggest not to interpret results from this very near position

-\$4.2. the systematic shift angle of 3° between the wind vane and the wake path sounds as a systematic bias in the vane measurement. This is confirmed in \$5.1.2 since a bias of 3° is mentioned. Why not taking this bias into account from the beginning of the data processing in order to remove this systematic shift?

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-5.1.1. “Delay” sounds like a temporal characteristic whereas the authors describe a spatial behavior. The present study does not deal with unsteady properties of the near-wake since the data are time-averaged. “Shift” might be more appropriate in the current situation. This raises also the question of the settling time of the near-wake position after a modification of the yaw angle. In the present study, the history of the misalignment is not taken into account.

Minor comments:

-please indicate the measurement volume (or length?) of the Lidar system : the LIDAR system spatially integrates along a line-of-sight distance, meaning that when you state to measure at a certain position, it is in reality an space average of along a given distance.

- Line 250 : “Vortices “instead of “vortexes”

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