# Review for "Robust active wake control in consideration of wind direction variability and uncertainty"

This manuscript investigates how dynamic wind direction changes affect wake deflection wind farm control. The normal distribution is used, which is supported by measurements. Numerical simulations using FLORIS are performed to find optimal yaw angle settings for different wind direction uncertainties, which are later used to find power gains over greedy wind farm control. It is found that the dynamics need to be considered when performing wake steering and failure to do so can lead to power losses compared to greedy optimization.

In general the manuscript is carefully prepared and written in a coherent, understandable way. Figures are explained and discussed clearly. Section 2.2 needs information on how the wind direction was measured. If nacelle anemometry was used a discussion on the effect of the rotor is also necessary. Regarding the bias of wind direction measurement in section 3.1 alternative measurement devices need to be discussed, like nacelle lidars and blade loads. Regarding the controller proposed in section 3 (fig. 10), is the yaw angle changed every iteration? No dead-band is applied? If so, this is not feasible for a utility-scale turbine as was also mentioned in the manuscript earlier.

Minor comments at specific places in the manuscript:

- p.2 ll.20: and missing before 3)
- p.2 ll.30: "A more elaborate…" is not a complete sentence
- p.3 ll.2: hysteresis is not the same as dead-band. Please correct. (Also p.14 ll.12)
- p9. ll.9: Shouldn't ±2sigma cover 95% of the normal distribution?
- p9. ll.31: "In the blue graph (sigma= 4), the yaw misalignment is considerably reduced compared to the first case". This is only true for wakes onto T11 and T13. For the closet turbines there is no reduction in yaw misalignment compared to the first case. I suggest rephrasing this sentence.
- p.11 ll.3: Why was 172deg chosen? Intuitively, I would think that 90 or 270deg gives the largest wake effects.
- Fig. 9: What if you calculate $\int_0^{2\pi} \rho(\varphi) P_{diff} d\varphi$ for the 3 robustness factors? Is this measure positive or negative, i.e. do you get an overall improved performance or not?
- p.19 ll.4: missing bracket
- p.19 ll.13: In the manuscript perfect accuracy (no bias) and imperfect precision (Gaussian error that is introduced in section 3.3) is assumed. Please rephrase
- p.19 ll.14: control instead of contgrol