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Interactive comment on "Monitoring offshore wind farm power performance with SCADA data and advanced wake model" *by* N. Mittelmeier et al.

Anonymous Referee #3

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Dear Authors,

thank you for a interesting and novel idea for the detection of underperforming wind turbines. While I agree with the overall tenet of the paper, there are a few issues I would like to have clarified. Particularly, the SCADA system delivers data at a much higher rate than the 10-min averages. What would happen if you'd make use of the 1-sec resolution available from the data? 130 values would suddenly be 2 minutes instead of 21 hours, if every assumption stays unchanged - which it probably doesn't. How do you deal with intra-10-min variability? Do you require a relatively stable weather situation or at least wind direction to be able to do it?

More detailed comments:

Page 2 Line 1: Offshore met masts are very expensive. Are people really putting up

met masts offshore to verify the turbine performance? Or onshore?

P3L17: I think this is debatable. Since you need quite a number of values / quite some time to detect the deviations, the method is not really real time anyway, so it could also be analysed retroactively every now and then. It also could be run on a larger high-performance computer based on downloaded SCADA data. Besides, the connection between higher computational cost and accuracy of the wake models is sketchy at best, see e.g. the results presented in WindBench.

2.1.1: I wonder why you do not use the same correction method on all the wind farms wind vanes? It just requires SCADA data and some computer power, so it would not be too difficult. Also, when you're calculating a mean wind direction for the whole farm, aren't you relying on a smaller size farm far away from the coast? For example, if you have a location like Anholt, then you have wind and direction gradients due to the proximity of the land across the wind farm. How would that influence your method and its accuracy?

P4L1: Is that one reference turbine for the whole farm, or one particular one for each of the other turbines? If it is one for the farm, how is it defined?

P7L23: So the Type A uncertainties do not multiply in a multipe wake situation?

P10L15-22: This is quite interesting. Has this behaviour been observed anywhere else? Another explanation could be that the overall wind flow is skewed at the Ormonde location, which judging by the map is not impossible, seeing that the wind farm is wedged between land and a larger offshore wind farm. Or do I understand this wrong, and it is an effect from Fuga which is described here? Did you switch on the meandering mechanism in Fuga?

Figure 5: A map of the location would be good here (see above).

Figure 7: There seems to be a shift in wind direction between the SCADA system and the calculations - any idea where that is coming from?

Table 2: Is the source of that the IEC Annex D uncertainty estimation, or own values?

Textual issues:

P1L9: The presented method or the present method?

P1L18: "The common [...] definition defines that the system is ready to operate" might not be exactly what is in the availability standard. Please rephrase.

P1L23: What's the difference between IEC 61400 and IEC TS 61400?

P2L25: To lower uncertainties, ... ??

P6L15: You might want to explain what you mean by "wake drift".

P9L9/L15: "of demonstration wind farm" could be deleted without detriment.

P9L13: This value is used_for the uncertainty...

P10L5: I would drop the brackets around the version number of Fuga.

P10L14: I don't think I've seen zeta_naught introduced before?

P10L15: While wind and nautical terms can easily be construed to have a connection, not everyone is familiar with "starboard".

Figure 1 center: Should that really be called Uncertainty, or rather something like Deviation?

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