*Discussion of:*

# Method to predict the minimum measurement and experiment durations needed to achieve converged and significant results in a wind energy field experiment – Revision 1

11 March 2024

This is a revised version of a paper that presents a virtual experiment-based methodology for estimating the amount of uncertainty in wind turbine load and power performance measurements, subsequently providing possibilities to estimate how long a measurement campaign will need to be in order to achieve a certain level of confidence in the results.

With their revision, the authors have attempted to address all reviewer comments and have satisfactorily addressed most of them. There are however a couple of items where I believe a bit more efforts are necessary. These are listed below:

1) It is great that the authors did add a mention of the IEC standards, saying that their approach is fully adaptable to the standards. I think however that they need to go a bit further and directly discuss how their approach should be adapted to the IEC. The vast majority of such test campaigns are for certifying a certain product or functionality, and then compliance with the standard is a requirement which will take precedence over many other considerations.
2) Section 2.2: as recommended, the authors have included statements regarding how simulations do not represent the full variability of the inflow. While this is good to start with, I do not fully agree with the example given by the authors. While TurbSim indeed will drive the distribution of wind towards Gaussian, I believe increasing the simulation period above 10 minutes will lead to relatively small changes in the variability of the flow, because the Veers turbulence model (and other similar models like the Mann model) do not have physical mechanisms that produce turbulence energy with low frequencies. If the tails are longer this is mainly due to more data, the distribution still being Gaussian. This is contrary to physical measurements and more advanced simulation frameworks such as LES. Therefore, more simulations per bin or longer simulations will generate some variability, but not all that is present in the measurements. Another major variability we see in measurements is due to the uncertainty in the inflow characterization, because the wind field is not fully observable (the cup anemometer may have measured 9.8m/s, but the mean speed over the entire rotor may have been 10.5m/s for example). Please discuss this rather than the Gaussianity of the flow which I think has little effect here. How can the lack of wind measurement uncertainty affect the validity and the usability of the outcomes of a virtual experiment? This is the important question that should be addressed.