Interactive comment on "Atmospheric turbulence affects wind turbine nacelle transfer functions" *by* Clara M. St. Martin et al.

Anonymous Referee #2

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General comments:

This paper demonstrates a nacelle transfer function for "decontaminating" wind measurements mounted on the nacelle of an operating wind turbine. They also explore the impacts of thermal stability and turbulence regimes. The paper is fairly well written, but the Introduction and Data and Methods sections require some clarification, and would benefit from concision.

I am not entirely convinced of the practical application of this technique. Your technique requires contemporaneous measurements from an "upwind" tower, but in practice such measurements often are not available. You even acknowledge this in the introduction:

"However, it is not feasible to erect "site calibration" met towers after the turbine has been erected. And, even if "site calibration" is not required because a site is in simple

terrain, tower erection is time consuming and unrealistic to complete for every turbine at a given park."

Perhaps I am missing important details, but I do not understand how this technique could be applied in the absence of an upwind measurement(s). And those measurements need to be representative of the site. In regions such as Europe, these kind measurements are exceeding rare at operating projects, and it is not clear how applicable this approach is in practice.

Specific comments:

(1) There is insufficient information about the methods and rationale. The reader is frequently referred other papers for these important details. For example, lines 149-151 of the paper state that: "Regimes or classifications for these stability and turbulence parameters are defined in Table 1 and described in detail in St. Martin et al. (2016), along with more detailed descriptions of the data from the lidar, tower and turbine, as well as filtering methods."

A scientific paper should be entirely self-contained, and provide enough information for the reader to readily understand what you have done and how you have done it. We should not be forced to locate and dig through other papers for the details of your methods.

(2) The classifications in Table 1 seem arbitrary, particularly for the TI and TKE "high", "medium", and "low". Without context and and understanding of how you arrived at these classifications, they seem very subjective.

(3) There are a number of confusion passages in the Introduction and Data and Methods sections. For example, the paragraph starting on line 58 is very hard to follow, and could be greatly shortened without losing the salient information. Here is my humble attempt, which combines the two paragraphs spanning lines 57-77):

"The relationship between UHWS measurements and NAWS measurements used for

generating NTFs has been found to depend on a number of factors, including: nacelle height, wind inflow angle, blade pitch angle, yaw misalignment, the position of the anemometer on the nacelle, the anemometer calibration, and the characteristics of the surrounding terrain (References ....). However, the impacts of inflow turbulence and atmospheric stability on NTFs have not yet been explored, even though it has been recognized that they may play an important role (References ....)."

(4) Lines 95 and 96: Change "(2.7 D upwind)" and "(2.0 D upwind)" to "(2.7 rotor diameters upwind; AND STATE THE PHYSICAL DISTANCE!)" and "(2.0 rotor diameters upwind)".

(5) Lines 100-104: This is really hard to follow, and keep the figures straight. I strongly suggest that you put this into a Table, which will be much easier to digest. This is also one of many places you refer the reader to some other paper for more details–in this case the configuration of met tower. Very frustrating!

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