Response to Reviewer 2 – WES-2021-5
March 23, 2021

We thank the reviewer for taking time to assess this manuscript and for the useful comments below. Please find our responses below in blue.

General Comments

The article considers improved characterization of offshore wind resource observations. The study is comparing the conventional logarithmic profile method against three novel approaches; a long-term stability correction, a single-column model, and a machine learning methodology. The result shows very promising results and that the machine-learning model significantly outperforms all other models.

The article is well written and structured. It does describe the three methodologies used well and include a good discussion of the result ending up in a conclusion.

We thank the reviewer for the positive feedback.

The article could benefit from an extended introduction to what is novel in the work presented. Three "novel" approaches are presented but it is not very clear what is new contributions and what is existing novel methods that are used for comparison. Perhaps the method name "DTU model" created this confusion. A short introduction to chapter 3 might be a suitable place to add it.

We agree with the reviewer that these novel methods could have been more clearly identified. As suggested, we have included this introductory paragraph in Section 3 to provide that clarity:

"In this section we describe the different wind speed extrapolation models considered in this study. We first describe the conventional logarithmic wind profile and this discuss the DTU method, which is adopted for this study. We then discuss the most novel approaches that we have developed explicitly for this study, namely the single-column-model and machine learning methods."

The discussion about the result in figure 4 is rather short and could benefit from increased clarity. It is perhaps also not needed information depending on previous question? The extended introduction with clarity on new contributions will probably solve this.

We agree with the reviewer that this figure was not adequately described. Given how we are merely adopting the DTU method, that it is not our novel contribution, and that the DTU

method did not perform nor is the focus of this study, we have decided to omit this figure from the manuscript and any related discussion.

A comment and discussion of the accuracy of the data used for comparison would also be suitable.

We have included in Section 2 that the lidar-measured wind speed uncertainty is 3.3%, as referenced from a recent energy assessment report published by DNV-GL.