Interactive comment on "New methods to improve the vertical extrapolation of near-surface offshore wind speeds" by Mike Optis, Nicola Bodini, Mithu Debnath, and Paula Doubrawa

The study discusses vertical extrapolation methods for the estimation of wind speed time series from near-surface measurements. For that, the classical logarithmic approach has been compared to i) a single column model, ii) a logarithmic profile with a correction for long-term stability and iii) a machine learning approach using the Random Forest Regression. The authors could show that the machine learning approach is a valuable tool for vertical offshore wind extrapolation and discusses in addition the importance of the used features.

The manuscript is well-structured and the topic is interesting and of high relevance. The introduction describes the problem and state-of the-art, methods are well explained and results are presented in a clear way. Therefore, I would recommend accepting it with minor revisions in case the fact does not matter that most of the text and figures, except for the feature importance part, has already been published in the project report Optis (2020a)[1].

Specific comments:

Page 2, line 36/37: "These buoys generally provide years worth of wind speed measurements less than 5 m and" – please check this sentence, I guess the worth is not intended to be there. Also, I guess you mean at a height of less than 5 m?

Page 3, lines 50-51: This is really a beautiful, German sounding, nested sentence. I would suggest to ease it a bit.

Page 3, line 53: The separation between the classical and the corrected logarithmic profile is not clear here. As I understand, you talk about the classical approach in line 52/53 and afterwards about the corrected one developed by DTU, is that right? The confusing part is here the beginning of the sentence "This method, developed by researchers". It sounds to me as if you are referring to the classical method mentioned in the sentence before.

Page 3, line 61: I was expecting a description of the second novel approach somewhere below but could not clearly find one. Did you mean the machine learning approach? In that case, I would suggest to clearly state clearly that this is the second approach.

Page 9, line 164: please specify what you mean with "we randomly sampled 20 sets". Does it refer to the hyperparameter tuning?

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[1] Optis, M., Bodini, N., Debnath, M., and Doubrawa, P.: Best Practices for the Validation of U.S. OffshoreWind Resource Models, Tech. Rep. NREL/TP-5000-XXXXX, National Renewable Energy Laboratory (NREL), Golden, CO (United States), 2020a.