Thank you for constructive and concise comments. Here is the reply to your comments:

1 Comment 1

It's still not clear how building a surrogate for a simpler model helps with a more complex model. Surrogate modeling is highly dependent on the problem at hand (e.g. behavior of the function to approximate, discontinuities, non-linearities, correlation, etc). If the problem at hand completely changes (more complex model) then the whole methodology here described will have to be re-assessed entirely. The authors should detail what exactly is the usefulness of approximating this simpler model, what is this "necessity" you mention? If the purpose is to guide future research for more complex models, as repeatedly mentioned throughout the manuscript, then a wider exploration of options and discussion on how well they adapt to your problem should be priority. You only mention the number of evaluations required but for what level of fidelity/error? Generally, an L2 error norm vs points used for surrogate building plot is used for the rigorous comparison. How many points you need for what level of error, etc. Rigorous discussion is missing for proper justification of the approach and not just comparison based on number of evaluations. You may be happy with the error you get with the point-collocation method but the error with the sparse quadrature approximation might be smaller (even if you don't want to pay the price of the extra simulations), in which case the comparison is not fair, and again, all of this is with the foresight of going to more complex models in the future for which this aspect might be important. In this regard, the L2 error norm of Figure 7 seems rather large. A good surrogate model should not exceed 1% error. The argument made by the authors who claim to care about the statistics should be revised by computing the same metric on the statistics instead. Error on the standard deviations and means, for instance. Is that error acceptable and why?

1.1 Reply

Thank you for your comment.

- As the reviewer mentioned, the main goal is to guide future research, and more clarification is added to the manuscript.

- The mentioned necessity is not about the model simplicity but the reduced Veers model. To make the surrogate model work, using the reduced Veers model is necessary. The used model is not simple. The model is less complex than the model used in the commercial wind turbine simulation packages.

- We tested the Sparse Gaussian Quadrature (SGQ) method to build the surrogate model. The error of the SGQ was much higher than the point-collocation method. We added a section to present the results and errors from the SGQ method.
- We used Hellinger distance as a statistical error metric in this study. It means we used Hellinger distance to show the convergence of the reference case and the statistical error of the surrogate model. We clarified the applications of Hellinger distance in the manuscript. As the output distribution is Weibull, we calculate the error for Q_1, Q_2 and Q_3 for the reference case from Figure 4.
- While working on the revised version, we found an error in the code to calculate Hellinger distance. All the plots that show Hellinger distance is updated accordingly.

2 Comment 2

Fine with referencing the model and treating it in black box fashion but I don't see changes in the paper structure. The same concerns remain. For instance, Section 2. mixes the physical model, surrogate model, statistical convergence, etc. It is confusing. Section 2.5 is one paragraph long.

2.1 Reply

Thanks for your comment. We updated the paper structure to tackle this issue. We restructured the paper into six sections without any small subsections to make the manuscript more clear.