| | Comment | Response |
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| 1 | Consider re-organizing the sections as there are currently methodology aspects on results. | The authors prefer to keep the paper organizations as they are. Regarding NREL 5MW characteristics, the authors cited NREL documents with all turbine details. There is not site in this study. We took samples from U, TI and alpha based on the defined distrubutins in the manuscript. As there are only two turbines, the turbine layout does not seem required in this case. |
| 2 | The actual response of the turbine should be included as results. This will help the readers see how are the fatigue loads distributed for the free-stream and wake operating turbines. Consider showing DEL vs mean wind speed. | We added a plot with the distribution of DEL for each output. |
| 3 | It is a well reported fact that a significant amount of the variability of the load response of the turbine is due to the different realizations of the turbulent flow fields. Note, that two turbulent fields can have the same flow parameters (U, TI, shear) but have different turbulent structures and therefore very different DEL's. It is very common on literature to use multiple seeds in the turbulent inflow generation in order to quantify this impact. The IEC 61400 recommends to use at least 6 seeds, but several of the references you cite report that a larger number is necessary, for example Liew et al. (DOI 10.1088/1742-6596/2265/3/032049) recommend 21 seeds. | It is worth checking for sure. However, as we are taking Sobol's samples, we already covered those different TIs for a wind speed. Also, we have hardware limitation and this number of simulations was the limit we could go. Even two seeds per sample would have been too much for our setup. |
| 4 | The authors should consider using the 3 components of turbulence instead of only longitudinal component, as the v, and w components have a noticeable impact on the response. Additionally, the authors should consider increasing the resolution of the turbulent fields as they are on the coarser end (15x15). | For running the simulaitons, we took into account all the wind components. However, for training and testing we did not see any improvement in the results by taking into account u, v and w from the wind field. The models are porvided and the interested reader can use them to test them. The increase in the number of grid points would increases the turbsim output file size while it would not have a meaninngful effect of on the presented methodology. Therefore, due to hardware limits we decided to go for a 15x15 grid. |
| 5 | The article does not provide any insights on how was the NN architecture was selected for both FCNN and TCN-FCNN. This should be part of the article. | We architecture obtained exprimentally. |
| 6 | TCN is used as a dimensional reduction or feature extraction step. Then a FCNN is used to map the latent variables to the DEL. Please report the number of latent variables used (shape of feature vector). It would be interesting to present the dependency of the DEL on the latent space variables (maybe for few examples). | The features vector length is added to Table 2. The sensitivity analysis is out of the scope of this work. |

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| 7 | Why are only 9 of the 15x15 inflow field time-series are selected to be used with TCN-FCNN? One would expect that the dimensional reduction algorithm (TCN) should benefit from more data, and therefore extract better quality latent variables if feed with all the data. | The point for us was figuring out the minimum amount of data in windfield which is required to have an accurate prediction. The end goal is having a model that can predict the DEL only based on one wind time series. We tested this for one, to 9 time series, and we figure out the minimum number for an acceptable accuracy is 9 wind time series. Increasing the number of wind time series did not have any significant effect on the accuracy of the prediction and made the training training/testnig longer. Therefore, we decided to use only 9 time series from the wind field. |
| 8 | The application of the article is turbine load surrogates based on inflow parameters and/or inflow fields. This application makes sense for turbine design and site suitability. But later on the article a load surrogate that uses both inflow and tower top acceleration signals is introduced. These type of surrogates have a different application, such as virtual sensors or digital twin as the accelerations signals are not available on turbine design without performing an aeroelastic simulation. The article could benefit for a clearer statement of the intended applications of the different surrogates. Maybe you could consider dropping the virtual sensor application on this article, and maybe plan another article where you apply you surrogate techniques on setups that challenge the DT application for example testing the surrogates using lidar as inflow measurements, and SCADA data that contains accelerometers. | This is a valid point and authors agree with this. Wethe manuscript to include statements about DT and virtual sensing. |
| 9 | Consider adding a discussion about the impact of non-stationary wakes on the accuracy results of your TCN-FCNN SM. Currently you consider a stationary wake model for deficit and added turbulence, this means that the effect of the wakes on the inflow-time-series inputs to your SM consists on shifting the means and scaling the standard deviations, it is unclear to me that your SM would have the same accuracy if tested on higher fidelity models such as dynamic wake meandering or large eddy simulations, on cases where the dynamics of the inflow are altered. | This is a very interesting idea, and further exploration is required. This is added to the future work as DMW and high fidelity simulations is out of this work scope. |