

## Author Response to Reviewer 2 (RC2)

I would like to thank the reviewer for the careful evaluation of the manuscript and for the constructive and detailed comments. The feedback has been valuable in improving the clarity, methodological consistency, and interpretation of the results. The manuscript will be revised accordingly. Detailed responses to each comment are provided below.

### **Comment 1:**

*Description of DELs and energy yield is missing...*

Response:

I agree that a clearer description of how the DELs and energy yield are obtained is necessary.

In the revised manuscript, I will include a concise summary of how these quantities are computed, along with explicit references to the original dataset publication where full methodological details are provided. This will ensure clarity while maintaining consistency with the source dataset.

### **Comment 2:**

*Additional explanations required in Section 2...*

Response:

I thank the reviewer for these helpful suggestions. In the revised manuscript, I will improve the clarity of Section 2 by incorporating the following additions:

- A figure illustrating the load positions listed in Table 1, including a coordinate system.
- Explicit specification of constants such as  $\epsilon$  in Eqs. (3) and (26).
- A clearer explanation of how spatial gradients are computed using Sobel operators.
- Justification for the choice of  $\alpha = 0.1$  in Eq. (13).
- Additional explanation of the left–right and top–bottom mean difference descriptors.
- A schematic illustration of the grid points used for the structure function calculations ( $r = 1$  and  $r = 2$ ).
- A consolidated overview table listing all 31 spatial descriptors.

These revisions will improve interpretability and reproducibility.

**Comment 3:**

*Different surrogates used for DELs and energy yield...*

Response:

I agree that the use of different surrogate models introduces ambiguity in interpreting the results.

The revised manuscript will adopt a consistent modelling framework across both fatigue load and electrical power prediction. This will eliminate the confounding effect of model choice and allow for a clearer assessment of the role of input representation. This change will also enable a more reliable interpretation of the observed differences between fatigue load and power prediction.

In addition, I will expand the justification for the chosen surrogate models and briefly discuss their relation to state-of-the-art approaches, including Gaussian process regression (GPR), to provide better context for the modelling choices.

**Comment 4:**

*Justification of surrogate settings...*

Response:

I agree that additional justification of the chosen model configurations is required.

In the revised manuscript, I will provide further explanation of the architectural and hyperparameter choices, including their relation to standard practices and preliminary experimentation. I will also clarify that the primary objective of the study is comparative evaluation across input representations under controlled settings, rather than exhaustive model optimization.

**Comment 5:**

*Clarification of training/validation/test split...*

Response:

I thank the reviewer for this important point.

In the revised manuscript, I will clarify the evaluation protocol by explicitly distinguishing between training, validation, and testing procedures within the group-based cross-validation framework. The terminology will be aligned with standard machine learning practice to avoid ambiguity.

**Comment 6:**

*Results are not intuitive... contradiction with expected physics...*

Response:

I thank the reviewer for this important observation. I agree that the observed

differences between fatigue load prediction and energy yield prediction require careful interpretation.

As noted by the reviewer, the current results may be influenced by the use of different surrogate models, which can obscure the underlying relationship between spatial information and the target quantities. In the revised manuscript, this issue will be addressed by adopting a consistent modelling framework across both tasks, thereby removing model-dependent effects.

Furthermore, the discussion will be expanded to provide a more detailed interpretation of the results in the context of known physical behavior. In particular, I will examine whether the observed trends persist when controlling for model architecture and will clarify the extent to which the conclusions reflect properties of the data versus artefacts of the modelling approach. This will include explicitly revisiting the comparison between fatigue and power prediction under a unified modelling setup.

This revision will ensure that the conclusions are consistent with both the empirical results and the underlying physical expectations.

**Comment 7:**

*Conclusion should be more concise...*

Response:

I agree with the reviewer. The conclusion section will be revised to reduce repetition and improve clarity, focusing on the key findings and their implications.

Once again, I thank the reviewer for the constructive feedback, which has helped improve both the clarity and scientific rigor of the manuscript.