Reply to reviews – WES-2023-124

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08-01-2024

Reviewer #2

Thank you for the positive evaluation of our manuscript. Your comments are in agreement with those of referee #1 and led to a slight revision of the paper. The specific changes are outlined below. In our response, the reviewers' original comments are in black along with an English translation, our responses and additions to the manuscript are in blue, and deleted text from the manuscript in strike-through red:

本手稿的作者将 WRF 模型中两种广泛使用的 WFP 与使用同一模型执行的涡轮机尾流的 LES 进行了比较。评估了 Fitch 方案和显式尾流参数化在中性、不稳定和稳定大气稳定性条件下表示双涡轮风电场布局中的风速和湍流动能 (TKE) 的能力。本文讨论的主题很有趣，而且论文结构良好且易于理解。我衷心祝贺这篇手稿的作者，我认为在稍作修改后应该考虑出版。

Translation: The authors of this manuscript compared two widely used WFPs in WRF models with LES of turbine wakes performed using the same model. The Fitch scheme and explicit wake parameterization are evaluated for their ability to represent wind speed and turbulent kinetic energy (TKE) in a twin-turbine wind farm layout under neutral, unsteady and steady atmospheric stability conditions. The topic discussed in this article is interesting and the paper is well structured and easy to understand. I sincerely congratulate the authors of this manuscript, which I believe should be considered for publication after minor revisions.

我认为，这些手稿值得在以下问题上进行修改。

Translation: In my opinion, these manuscripts deserve revision on the following comments.

Q1 . 第 120 行。请添加一些解释，说明为什么选择 2% 作为阈值。

Translation: Q1. Line 120. Please add some explanation as to why 2% was chosen as the threshold.

The ideal criteria would be almost "no change", but due to the inherent unsteadiness of LES, and considering the boundary layer growth and inertial oscillations, we use a larger threshold. We follow the criteria of 2% threshold following the work of Maas and Raasch (2022) for large offshore

wind farm simulations in LES under different atmospheric stability conditions. The reference has been added to the main text.

Q2 第 215-225 行应提供更多定量结果，尤其是在描述显着差异和相当大差异时。

Translation: Q2 lines 215-225 More quantitative results should be provided, especially when describing significant differences and considerable differences.

As suggested, we have added supporting numerical values to these sentences

Q3 . 第 320-325 行文本中应提供定量值，以显示最佳一致性和良好对应关系。*Translation*: Q3. Lines 320-325 Quantitative values should be provided in the text to show optimal consistency and good correspondence.

As suggested, we have made the following changes in the manuscript: ~~For unstable conditions (Fig. 9g),~~ Fitch-0.75 offers the best agreement with the reference ~~in both the maximum and distribution of TKE values than Fitch-0.25. Under the stable ABL, Fitch-0.5 shows good correspondence with the maximum TKE from the LES reference~~ hub-height $\Delta\langle\overline{k}\rangle$ with overestimations of 8.9% and 4.8% under unstable and stable conditions, respectively.

References

Oliver Maas and Siegfried Raasch. Wake properties and power output of very large wind farms for different meteorological conditions and turbine spacings: A large-eddy simulation case study for the German Bight. *Wind Energy Science*, 7(2):715–739, March 2022. ISSN 2366-7451. doi: 10.5194/wes-7-715-2022.