

The authors are grateful for the detailed suggestions from the reviewer. We give our response to these comments in the following, point-by-point. The reviewer's comments and suggestions are in blue and our responses are in black.

Congrats, the manuscript improved significantly. I have the following minor comments left:

Line 8: This is done using WRF with the code bug fixed ...

-> This sounds strange: Maybe: This is done using a bug-fixed WRF version that includes the correct TKE advection following Archer et al. (2020).

*Reply:* Agreed. Suggestion taken.

Line 58: Wagner et al. (2019) showed that LLJs are a common phenomenon in ...

-> The sentence is confusing. I suggest the following (please check if this is in-line with the findings of Wagner et al.): Wagner et al. (2019) showed that LLJs are a common phenomenon in the Southern North Sea. By analyzing 1.5 years of lidar and passive microwave radiometer data, they found that LLJ occurred on 65% of the days at least for a short period.

*Reply:* The original sentence from Wagner et al is "LLJs occurred at 14.5% of the time (449 of 3107 measurements) and on 64.8% (162 of 250) of the days". In this revised version we simply cited it the way it is, in order to avoid misunderstanding due to translation.

Line 144: The studies...

-> Better: These studies...

*Reply:* Suggestion taken.

Line 212-214: For some wind farms, e.g. Alpha Ventus ...

-> I think it would be good to mention all turbine types, where the actual turbine data was not used but a similar model was used.

*Reply:* Good suggestion. The corresponding text has been re-written to "For Alpha Ventus and BARD Offshore, we could not obtain the thrust and power coefficients for the actual turbine. Therefore, the power and thrust curves of M5000-116 were scaled from the NREL 5 MW turbine. The Senvion 6.2M126 turbine in Nordsee One, OWP Nordergründe and OWP Nordsee Ost was similarly scaled from the DTU 10 MW reference turbine. Other power and thrust curves have been taken from Langor (2019) or from WAsP (<http://www.wasp.dk/>). In Table 2 the wind farms are listed with the turbine model used in the simulations". In addition, in Table 2, these scaled turbines are marked and explained in the Table caption.

Line 440: It remains inconclusive... (2 times)

-> I understand these sentences but I think both sentences would benefit from some elaboration. Please briefly explain "why".

*Reply:* Agreed. The corresponding text has been revised for both sentences. The new text reads: “It remains inconclusive which scheme is better at describing the wind field, as sometimes the EWP scheme outperforms the Fitch scheme, and some other times, it is the other way around. It also remains inconclusive which correction factor should be used in connection with the turbine-induced TKE generation in the Fitch scheme: we only tested two factors (1 and 0.25) here and we observe a better performance when using  $\alpha=1$  than  $\alpha=0.25$ , which does not support the conclusion from Archer et al. (2020)”.

Line 443: Neither scheme can not capture...

-> I guess you mean “Neither scheme can capture...”

*Reply:* indeed, it is now corrected. Thanks for spotting this.

Line 307: This is also often called ...

-> I suggest to “this is referred to global blockage effect” and a recently discussed topic. And please refer to one or 2 recent relevant studies, e.g. <https://www.mdpi.com/1996-1073/11/6/1609> or <https://wes.copernicus.org/articles/6/521/2021/>

*Reply:* Suggestions taken. The text was revised accordingly and the two studies were referred to.

Line 355: These characteristics can also be seen in a bird view of the spatial...

-> I suggest to use “horizontal wind field at XXXm height” instead of bird view.

*Reply:* suggestion taken.

Table 2: To my knowledge, the official reference of Ostia is:

<https://www.sciencedirect.com/science/article/pii/S0034425711002197>

*Reply:* Thanks for pointing this out. The reference has been corrected.

Everywhere: Please use the abbreviation Sect. instead of Sec. in accordance with Journal guidelines

*Reply:* Suggestion taken.