

Wind Energ. Sci. Discuss., referee comment RC2
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Comment on wes-2021-22

Anonymous Referee #2

Referee comment on "The 3 km Norwegian reanalysis (NORA3) – a validation of offshore wind resources in the North Sea and the Norwegian Sea" by Ida Marie Solbrekke et al., Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2021-22-RC2>, 2021

The paper "Norwegian hindcast archive (NORA3) – A validation of offshore wind resources in the North Sea and Norwegian Sea" by Solbrekke et al provides a validation of a new mesoscale dataset NORA3 to measured wind speeds. Despite the fact that the dataset is new, I see a lack of novelty in the study. Neither are the data compared to further existing mesoscale datasets nor is the improvement compared to the boundary conditions (ERA5) shown). In my opinion, the manuscript is just acceptable for publication in WES after dealing with major revisions. However, this opinion is mainly impacted by the fact that there is a new dataset suitable for wind energy applications that might deserve some documentation than due to the novelty of the study or the quality of the dataset.

I have the following major and minor comments:

Major Points:

- 1) FINO1 results: The FINO1 results differ strongly from the other sites. A quick online search could have given the authors the answer why this is the case. Since 2010 the wind farm alpha ventus started operating only about 400m east of the mast. Since 2015 the mast is located in the center of a large wind farm cluster. This change in time is by the way nicely reflected in Figure 6c. The deviations discussed in the manuscript thus mainly originate from the fact that FINO1 is in most of the years investigated here not measuring free wind conditions but winds that are strongly impacted by the turbines surrounding the mast.
- 2) Comparison to other datasets: In the introduction several other datasets are discussed but no comparison is made, not even to the ERA5 data. Thus, it is not even evaluated if the NORA3 is at all an improvement over ERA5. Thus, the study in my opinion does not show that NORA3 really is a suitable dataset for wind energy applications in comparison to all the other data products that are available.

3) Novelty of NORA3: After reading the whole manuscript, I have not understood what the novelty and improvement of NORA3 data are.

The resolution in space is similar to NEWA, the resolution in time of 1 hour is poor. The wind industry would benefit from 30 min or even 10min resolutions. Doesn't this would also have an impact on the extremes discussed in the study? A mesoscale model does provide sub-hourly fluctuations and could improve the ramping. Is the novelty just the fact that NORA3 will be available for the time period from 1979 and further continued?

4) Wind Speed Interpolation: The wind speed interpolation is done using a power law relation. This is a an empirical method with deficiencies in unstable conditions. I suggest to use a logarithmic interpolation here.

Minor Points:

1) Line 80: 31 x 31 km -> I I think you mean 3x3km here.

2) Line 83: ... and research by many European countries ... -> I think European weather services and research institutes is better suited here.

3) Line 108: ... are hourly wind observations ... -> I think it is better to write something like "10 min average values provided at every hour" directly in the text than with the footnote

4) Line 139: ... the turbine park ... -> "wind farm" fits much better here.

5) Line 181: ... exploting NORA3 as a planning tool ... -> How is NORA3 a planning tool. Isn't this just a dataset and a wind farm planning tool could make use of these data?

6) Table 3: Weibull parameters are much more commonly abbreviated by lambda and k than b and a

7) Line 230: ... wind park configuration and internal position... -> better: wind farm layout

8) Line 242: But we cannot rule out... -> better: "conclude"

9) Section 3.4: I would rather put this section as 2.2.1

10) Line 283: ... an hour-to-hour variability typically 7%-9% (Table 7) of the installed capacity -> ... variability OF typically ...

11) Line 377-378: The general picture is that the NORA3 data is rather well suited for wind power estimates in the absence of in situ data -> afterwards all deficiencies are discussed. This conclusion does not fit to the sentences before.

12) References: Please add availability for ALL publications that are not books