

# ***Interactive comment on “Offshore wind power intermittency: The effect of connecting production sites along the Norwegian continental shelf” by Ida Marie Solbrekke et al.***

## **Anonymous Referee #1**

Received and published: 10 July 2020

**General Comment:** The manuscript by Solbrekke et al analyses the impact of connecting different sites that would in principle be suited for (floating) wind power generation on the fluctuation of offshore wind power production. In general, the paper presents novel research, is well written and structured and the figures are clearly readable. However, I have three major comments mainly related to wind turbine technology and the data quality and several minor points. Thus, I recommend publication after dealing with major revisions.

## **Major Comments:**

1. The long-term measurement data used in this study is based on wind measure-

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- ments on oil and gas platforms which are quite massive structures that might quite heavily distort the flow. The manuscript lacks in a description of the expected accuracy of the measurements. A subsection on this should be added to section 2.
2. The authors are interpolating the measured winds to a height of 100m. This is done using the power law. The interpolation in height is quite significant (up to 55 meters). However, the power law has issues in unstable stratification that can e.g. also occur during storms. (see e.g. Emeis 2018). I recommend that a discussion and analysis of the uncertainty this interpolation has on the final results is added to the manuscript before publication as journal paper.
  3. The authors assume a full storm shutdown at a cut off wind speed of 25m/s. Recently, several wind turbine manufacturers introduced concepts of a slow shut-down of the turbines in which they operate at a lower level even at wind speeds >25 m/s with a full shutdown in the range of 30m/s in case of the Siemens turbine studied here this is referred to as high wind ride through. The authors should discuss the effect of such an option and at least mention how the occurrence of zero power events would change assuming a gradual reduction of the power in storm conditions.

### Minor Comments:

1. Title of manuscript: Remove dot and consider reformulation. → I asked myself what “effect” you mean when reading the title for the first time.
2. Abstract – Line 5: “wind power shut-down” → I recommend to add something like due to too high/low winds
3. Line 41 (and throughout the paper): → Space between unit and number and why are units sometimes in italic face and sometimes not?

4. Table 1 and Table 2 (and throughout the paper): → Add a column with the abbreviation. In general I found it a bit difficult to go back and forth between abbreviated and fully spelled names of the stations. I think it is helpful to work with abbreviations everywhere and when the station is spelled with its full name in the text add the abbreviation in brackets.
5. Line 75 – 80: → Are there any physical reasons for the filtering chosen?
6. Figure 1 (caption): sites and the distance (km) between them → I would add: red lines somewhere
7. Line 106: at nameplate capacity: → Better: rated power
8. Line 107: reaches a cut-out value... → I suggest to add the name of what this is (storm shutdown) somewhere here
9. Line 117-118: retrieved from the SWT-6.0-154 → I think it is meaningful to mention here that this turbine was chosen as it is the first commercially operating floating wind farm. Was it?
10. Line 121-123: → I think this can be shortened. A reader of WESC knows that wind speeds are typically Weibull distributed.
11. Figure 2 (caption): → Add abbreviation (ek) to the caption (see minor comment 4 as well)
12. Line 181: Sinden (2007) found a: → I think it is important to mention here where they did these investigations as there might be differences between low/high latitudes etc.
13. Line 190 – cover → covered

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14. Line 214: During winter. . . → I think it would be good to add somewhere in the manuscript what a typical size of a high / low pressure system is because that is driving the distances isn't it?
15. Line 261: Nevertheless it is worth mentioning. . . → I think it should be mentioned here that this is due to the very high “superb” wind speed climate
16. Line 264: produces → produce
17. Line 265: a shut-down in the production → Shut-down sounds so technical to me. Better: production of zero
18. Line 281: separation distance needs to exceed 600 km → add: for the investigated region (see Minor comment 12 as well)
19. Line 288: upper panel of Figure 9 → I guess you mean left panel or better: 9a
20. Line 299: the lower panel of Fig. 9 → I guess you mean right or better: 9b
21. Line 374: the wind speed was classified as “superb” → The wind climate is classified not the wind speed
22. Line 375-376: The mean wind speed range. . . → Add the height (100m) here.
23. Line 377: slightly over 30
24. Line 382: . . .wind power production sites are connected → I think “sites are connected” is sufficient
25. Line 395: . . . from approximately 10
26. Line 397: Thus a short zero-event is more likely to occur than a long-lasting zero-event → What is short and long?

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27. Line 399: ... too low wind (high wind) is 684.5 (102.75) ... → What is the unit here? Hours?
28. Line 408: → Somehow, I miss an outlook. What are open questions that could not be solved? Would be interesting to have a short section at the end here.

## References:

Emeis, 2018: Wind Energy Meteorology, Springer, 2018,

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Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2020-67>, 2020.

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