

Review of “US East Coast synthetic aperture radar wind atlas for offshore wind energy” by Ahsbahs et al, submitted to Wind Energy Science Discussions

The paper provides the first atlas of the offshore wind resource along the US East Coast derived from high spatial resolution (2 km) SAR products from four satellites at 10 m above sea level. A detailed comparison against two independent data source is also provided, buoys and WIND Toolkit, as well as a discussion of biases, seasonality, and gradients. This is one of the best papers I have ever reviewed and it should definitely be published soon. I only have a few minor comments and suggestions.

1. It was not until page 5 (line 15) that the 10-m height was mentioned. It is important to let the reader know that the atlas is valid at 10 m asl earlier than that. I recommend that you add this information in the abstract (“We present the first synthetic aperture radar (SAR)-based, offshore, 10-m wind atlas ...”) and even in the Introduction around p. 2 lines 20-30.
2. Similarly, you need to mention the height of the buoy measurements in section 2.3 (it is mentioned later (p. 6 line 24) but it should be here) and the height of the WIND Toolkit output in section 2.4 (10 m – is this a real model level or an interpolated value? If interpolated as I think, how?)
3. In the abstract, the WRF model is mentioned, but also the WIND Toolkit project should be mentioned, otherwise the reader thinks that the authors ran the WRF model themselves. Instead, they used WIND, which is a well-documented, publicly available dataset.
4. P. 2, l. 19: a noun is missing “SAR-derived [what?] show...”
5. P. 4, l. 5: what is a “scene”? A snapshot? A picture?
6. P. 5, l. 13: what exactly is the “normalized radar cross section of the ocean surface”? I am unclear on what exactly it is that the SAR measures on the ocean surface. Is it a reflectivity of some sort? Is it related to white caps of the waves? Please add a brief description here. Also, briefly describe how the GMF works.
7. P. 5, l. 20. Either a period “.” is missing (before “Climate Forecast...”) or the phrase is incomplete. It’s good that it was not the WIND’s wind direction that was used here.
8. P. 6, l. 25: briefly describe how the extrapolation from 5 m to 10 m is calculated in the COARE 3.0 algorithm for the buoy data.
9. Figs. 2 and 3: what are the black lines with vertical error bars? Medians? Please add info in the captions.
10. Fig. 4: please use the same color bar for Fig. 4a and 4b. They are similar but not identical in the current figure.
11. Fig. 7: the month of “Feb” should be capital.
12. P. 27, l. 4: missing noun after “from”, maybe “SAR”?
13. Future work, item ii). I do not agree with this recommendation, remove it or explain it better. Why would randomly sampling model output, which actually includes seasonal and diurnal variability correctly, be a better way to present a wind atlas? This procedure would mimic the SAR behavior, but it would not necessarily provide a better estimate of the actual wind resource. I think the authors are saying that this random sampling

method would be a better to validate SAR, not a better way to represent the wind resource. If so, please clarify/rephrase.