Second Review: *Fully Coupled High-Resolution Atmosphere-Ocean-Wave Simulations of Hurricane Henri (2021): Implications for Offshore Load Assessments*

General Comments

The revised version of the article needs drastic improvement in figure quality, and continues to overstate the performance of the AOW case, or, at the very least, does not recognize the deficiencies in model performance. The article fails to put the findings in context to relevant literature. Much of what is claimed has been shown before in other articles outside of wind energy and the tie to wind energy within this study is entirely conjecture.

I believe in the importance of coupling the atmosphere, ocean, and waves as there have been numerous studies on the topic to date that have clearly shown reasons to include the fully-coupled effects in simulations. This paper does not build off of the previous papers on the topic and instead simply tries to loosely apply the same findings specifically to offshore wind energy. This paper doesn't show the impacts to wind energy production, wakes, or structural loads on wind turbines, it just simulates a single hurricane (poorly) and highlights the portions of the simulations that are improved by including atmosphere-ocean-wave coupling (which has been well documented in the literature).

I recommend the paper be rejected by Wind Energy Science. There is no novelty to this study and there are no relevant findings or analysis specific to wind energy.

I would encourage the authors to pursue the future work mentioned within the study which does contain novel ideas. The model framework shows promise (as have the other atmosphere-ocean-wave coupled frameworks) and if the impacts on wind energy are desired, consider targeting specific wind energy applications in future publications.

As mentioned previously, the figures are not publication quality and as a reviewer are extremely discouraging to see. The figures tell the story. When they run off the page, have illegible text and symbols, etc., the paper suffers greatly.

Specific comments

For example, the paper states that the vertical profile of wind speed for the AOW case "aligns more closely with observations… [which] is critical for offshore wind energy…" but the figure shows that only bias is improved. None of the simulations capture any of the structure as shown in the observations that are relevant to wind energy (e.g., apparent jet-like feature, low-level shear, shear across the typical rotor swept area, etc.) and this is not discussed at all by the authors.

It is clear that AOW increases SST cooling, but it is not clear if this is being done accurately. From table 3, the first column shows that A was already below the OSTIA temperature and AOW continued to cool it further from observations. The second and third columns again show cooling but at this point the starting point was warmer than OSTIA so it comes off as an improvement. Do you only show “improvement” if you start with a warm-biased SST?

The Sanchez Gomez et al. 2023 paper is commonly cited as an offshore paper. It is not. Additionally, in the paragraph starting on L331, the authors claim wind-wave interactions have been “overlooked” and call this an “oversight” of the papers they cite. Assuming they meant to reference the offshore Sanchez Gomez et al. 2023 paper, this is clearly stated as a limitation of the study and note the potential importance of including these effects in future work. To call this an “oversight” is dishonest and misleading. The references selected in this paragraph are cherry-picked to overemphasize the findings in this paper. Where are the studies that have already looked at atmosphere-ocean-wave coupling for hurricanes? A quick google search shows that several exist and have already highlighted the importance of such coupling.
Kim, Hyun-Sook, et al. "Skill assessment of NCEP three-way coupled HWRF–HYCOM–WW3 modeling system: hurricane laura case study." Weather and Forecasting 37.8 (2022): 1309-1331.
Li, Zhenning, et al. "How Does Air‐Sea Wave Interaction Affect Tropical Cyclone Intensity? An Atmosphere‐Wave‐Ocean Coupled Model Study Based on Super Typhoon Mangkhut (2018)." Earth and Space Science 9.3 (2022): e2021EA002136.
Chen, Shuyi S., et al. "Directional wind–wave coupling in fully coupled atmosphere–wave–ocean models: Results from CBLAST-Hurricane." Journal of the Atmospheric Sciences 70.10 (2013): 3198-3215.

L343-345 - the claim is that because the AOW model reasonably captures wind/wave misalignment the simulation now represents more realistic turbine loads?
Minor corrections:
Fig. 3 - off the page, impossible to read labels, legend, etc.
Fig 7 - The caption says this is a vertical distribution but it is not. The word “panel” should be changed to “row” and the lines/dots are very difficult to see. Ticks are illegible and there is a bunch of very small font around the figure.
Fig 8 - Panel A is already shown in a previous figure. Labels impossible to read.
L378-379 - Charnock does not ignore wave effects. It is a function of wind speed but estimates the roughness *due to waves*. If you want to say it ignores wave direction; sure.

Technical Suggestions:
L166 - “cecentering” spelling?
L171 - “fro”
L242 - “To To”
252 - “this this”...
L378 - “Charnock formulation’s formular”
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