

Review of: In-situ airborne measurements of atmospheric and sea surface parameters related to offshore wind parks in the German Bight

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General Comments:

This paper provides a description of a relatively unique and comprehensive dataset collected using an aircraft platform that contains measurements to evaluate the impact of offshore wind turbines on atmospheric properties. I believe that the paper is very appropriate for ESSD and that the material, in general, is well described. I did have several comments on the material in the paper that may help to improve the usefulness of the paper to readers outside of the team that collected these measurements. These are included below.

Specific Comments:

- Line 74: In the conversion to static temperature, are the pressure and temperature measurements co-located? It may be helpful to have some photographs or diagrams of the payload configuration on the aircraft to better understand how everything is laid out.
- Line 102: How does this 1.2 K uncertainty vary with temperature? How linear is this relationship? Is the 20 C value listed the instrument temperature, the air temperature or the surface temperature? Also, what impact does the vertical structure of temperature between the sensor and surface have on the quality of the measurement?
- Line 107: Significantly more information could be provided on how surface deflection is calculated using aircraft attitude corrections.
- Lines 120-126: Given that the camera images are not publicly available and that they are not included with the main dataset described here, does it make sense to provide more than one sentence on them? I'm not sure that the current configuration aligns with ESSD policies about data availability (not that I disagree with not making the imagery public).
- Lines 128-137: It would be very useful to show some statistics on the regions sampled (e.g. distributions of flight altitudes, distributions of distance from a known shore point, distributions of distance from known wind-farm points).
- Figure 2: What are the flight tracks that end abruptly at the coastline? There are several clusters that clearly are going into/out of an airport, but then there are also several singular lines that don't seem to go anywhere.
- Lines 130-131: It might be useful to show a wind rose with these directions on one or both of the maps. It may also be useful to show the extent of German-controlled airspace.
- Section 4.2: Without going into evaluation/analysis of the data, it might be useful to show an example dataset from one of these CROSS flights. One figure that illustrates the flight pattern followed and some of the structure that might be observed in the key quantities measured might be insightful for the reader.
- Section 5: For all of these quantities, it might be interesting to pick a few altitudes (e.g. 100, 200, 500 m) and come up with distributions of the mean quantities at these altitudes to plot. This will provide insight into the heterogeneity of the conditions sampled (or lack thereof). One could also imagine looking at scatter plots comparing these mean values (e.g. mean 50 m temperature vs. stability or similar). As an example, instead of showing the mean temperature profile and the range of values around that mean, perhaps it would be insightful to include the distribution of some "stability statistic" (e.g. LTS, etc.). Also,

while the mean profiles are interesting, maybe it would also be interesting to show a time-height plot of all of these profiles to demonstrate when the flights took place and whether there were clusters of flights that had similar conditions.

- Line 185: What is “cut-in speed”?
- Section 5.3: Here again, it might be more insightful to look at some statistic (e.g. ratio of wind at 50 m to wind at 100 m) as a function of other variables and/or location.
- Line 189: Am I understanding correctly that these profiles include all data, and aren’t necessarily at a single location? This makes these very difficult to interpret.
- Lines 191-192: This could be a very interesting 3-component plot (e.g. a scatter plot of wind direction vs. strength, color-coded by stability).
- Lines 195-196: For unstable conditions, wouldn’t you expect that mixing would result in an adiabatic profile that has an increasing RH with height?
- Line 196: Is the increasing humidity with altitude for stable profiles the result of layered advection impacting temperature, or are there moisture plumes being advected? Or something else?
- Section 6: I would have liked to have seen a bit more information in this conclusion. Some discussion on other complementary datasets, how these are expected to be used, etc. could be useful. Also, surprisingly, there was no mention of anything going wrong/not working/etc. during the campaign, which would be very remarkable for a campaign of this extent. Did anything go wrong that the reader should know about?

Technical Corrections:

- None at this time. The grammar, while sometimes different than I would have personally used, is perfectly suitable and readable. Perhaps the editorial team finds reasons to reword/correct, but I did not come across anything that required being corrected/changed.