

## **Author Response to Reviewer Comments:**

### **Reviewer 1:**

Thank you for taking the time to review the manuscript. Your overview of the main findings of the paper are consistent with what we had intended to communicate and we are very glad that this came across.

We appreciate your feedback on the figures being hard to read and we will update them accordingly.

In terms of the minor text changes, we added the definition of ABF on page 6 as suggested. We also agree that it is important to clarify that we are talking about boreal spring/summer/fall/winter and we updated the text to reflect this.

### **Reviewer 2:**

Thank you as well for taking the time to review the manuscript. We agree with your point that the results also have relevance for PM retrievals and we will add this point to the manuscript and highlight its importance in the abstract and conclusions.

In regards to your question of whether we used MAN data, we did not. Since the MAN data is shipborne and available on a periodic basis, we would not be able to use it to evaluate the long-term AOD and PW relationship at a fixed location in time, as is done in this analysis. However, since AERONET observations are quite limited in marine environments, it is a good point that MAN data is very valuable and would be worth using in another evaluation of the aerosol and water vapor relationship on an event level. A sentence clarifying that this data is not included in the analysis was added to the manuscript.

We agree with the typos that you highlighted in the manuscript and these will be corrected.

In regards to your question on page 5, AERONET AOD is not assimilated in the NAAPS-RA. A sentence clarifying this point was added to the manuscript.

For your comment on page 9, we added a reference to previous manuscripts which include Figures of the same verification regions that are discussed in the manuscript.

For your comment on page 12 and 14, yes, exactly. Many of the sites in which discrepancies were identified were mountainous sites in which we know we don't capture the orography and small scale features in the NAAPS-RA.

For your comment on page 16, yes, as next steps in this work, we are looking at correlations in the vertical using various LIDAR and sounding data. These evaluations will be on a case-by-case basis.

In regards to your comment on page 17 and 22 about PW being a good tracer for AOD but not necessarily aerosol mass, yes, we agree with your point and we will add some text to highlight this point in our conclusions and abstract.