Comment on acp-2021-932
Anonymous Referee #2

This paper presents analysis of dust deposition measurements over the tropical Atlantic together with back-trajectory analysis and satellite AOD observations to locate the source of deposited dust. The paper is well written and the collected data are valuable but their usefulness has not been explored in a broader context. It is not clear what is the motivation behind this study. Most importantly, I don’t see clear science questions. What is the purpose of this analysis? How does these results push science forward? The paper somewhat looks boring to the readers because the results are not tied with some interesting science questions. As mentioned in the conclusion by the authors, these observations could best be used for validation of model simulations. In the absence of such comparison, the study should have at least tried to provide some new scientific insights from these observations.

My detailed comments are:

Line 51: aerosol surface chemistry could be better called ‘ageing’

Page 4 line 5, spatial and temporal resolution of VIIRS level 3 data should be mentioned

Page 4 line 7, why these altitudes? Why not consider one at the surface because the high-altitude flow may not deposit to the surface, which is being measured during the field campaign.
Page 5 Line 12, each dust events: how many were considered may be mention here.

Fig. 3a, can we make the width of the locus larger so that it looks better?

Fig. 3a, The size of red circles for AOD don't look markedly different from each other, I don’t see any color-coded circles as mentioned.

Page 7 88 particulates.

Page 7, 73-76 Please also discuss here what does these numbers of Al mean.

Page 8, 88-90, again, discuss what does these values mean to a broader readers; not all readers could be familiar with the measurements techniques and the proxies or ratios used. It is better to discuss implications of these results here, rather than later, because the readers might have forgotten already. I see that it is discussed later in 91-100 lines, but that too is not clear. Please explain what all these numbers mean in an understandable language.

Figure 4, It is not a AOD Mosaic, I believe it is 5-day running mean AOD of level-3 data as mentioned in the Figure.

Page 9, Line 106, before saying ‘based on transport analysis ...., you have to explain first what is being presented in Figure 4. It is too direct to understand.

106-109: Okay, but is it one of the main finding of this study? We already know that dust is transported from Africa to the Atlantic and even USA with many previous observations, even without these measurements. Please highlight specific contribution of these results to science. These results should be discussed in light of the previous researches relevant to this study. For example, there has been an ongoing measurement of dust deposition in Florida: Prospero and Nees, 1987 [1] and Prospero, 1999 [2], listed as below. Although the study site is far from those in these past studies, there is indeed a connection and new insights could potentially be gained by combining all these observations.


Page 9, Line 121, okay, you have done back trajectory starting at 10m but you had not mentioned earlier, as I commented before.

Page 10, Line 135-140: Again, what does these findings about source regions tell us?

Section 3.2.1 to 3.2.5, these sections appear repetitive and could be organized and discussed better together in comparison to each other.

Section 3.3.1 to 3.3.6, these ratios are not introduced well to the readers and it is hard to interpret what these numbers mean. It has been introduced briefly earlier but not enough is done.

Section 3.3.7, Latitudinal dependency of dust composition may just be a coincidence because the pattern of results appear to follow sampling maneuver. Ca, Mg, and Fe all are characteristics of African dust so their high values are expected.

A continuous line numbering is also suggested to make the review more efficient.