

Reply to Anonymous Referee #2

We appreciate your constructive critique of our work very much. We have discussed the changes we have made in response to each of your comments below.

Reviewer's Comment: *"The abstract is comprehensive but contains too much detail."*

Reply: We have shortened the abstract and modified it to contain more on the major findings of our work and the novel aspects of the paper.

Reviewer's Comment: *"The title does not read well. Please insert "the Mt." in front of Redoubt."*

Reply: We have done this.

Reviewer's Comment: *"p. 26697, l 3-4 What is the difference between "vertical placement" and "heights" in this sentence?"*

Reply: "Heights" refer to plume top altitudes and "vertical placement" refers to where the plume resides vertically in the atmosphere. This has been clarified in the revised manuscript.

Reviewer's Comment: *"p. 26698, l. 11 Please explain what an "ash reduction level" is."*

Reply: "Ash reduction level" is an option in the HYSPLIT model for volcanic ash, which reduces the size of the volcanic ash cloud. This is sometimes necessary when satellite data shows a smaller ash cloud than what is forecast by the model. Because this is not important for our study, we elected not to use ash reduction. Therefore, we feel that touching on "ash reduction level" in the text is unnecessary and will cause confusion for the reader. We have deleted our mention of "ash reduction level" in the revised manuscript.

Reviewer's Comment: *"p. 26699, l. 10-13 What does the sigma refer to in eq. 1 and 2?"*

Reply: Sigma in these equations is the log of the standard deviation. This information has been added in the revised manuscript.

Reviewer's Comment: *"p. 26702 The columns of images in figures 3 and 4d are not explained in the text or figure captions, nor are they clearly distinguished in the figures themselves."*

Reply: We have edited the figures and captions to explain the columns more clearly.

Reviewer's Comment: *"p. 26705, l. 14 For clarity, I recommend that "each AOD" be changed to "each measured AOD"*

Reply: This has been changed.

Reviewer's Comment: *"p. 26706-7 I would suggest that referring to 55_ as the "higher zenith angle" and 75_ as the "lower zenith angle" may be confusing to readers unfamiliar with the nomenclature used in atmospheric radiation. I would suggest that instead of "high zenith angle," you refer to those situations as "high sun (SZA=55_)," and similarly, "low sun (SZA=75_)."*

Reply: We have taken the reviewer's suggestion to clarify the text in the revised manuscript.

Reviewer's Comment: *"p. 26708, l. 22 I think that you really mean "thick plume over seawater" at the end of this line."*

Reply: Yes. This has been changed.

Reviewer's Comment: *"p. 26711, l. 25 The reference here is to Fig. 16a here, not 17a, correct?"*

Reply: This has been corrected. .

Reviewer's Comment: *"p. 26712, l. 3 Likewise, the reference here is to Fig. 16b here, not 17b, correct?"*

Reply: This has been corrected.