

Atmos. Chem. Phys. Discuss., referee comment RC2  
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## Comment on acp-2021-79

Anonymous Referee #2

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Referee comment on "Measurement report: In situ observations of deep convection without lightning during the tropical cyclone Florence 2018" by Clara M. Nussbaumer et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-79-RC2>, 2021

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The manuscript "Measurement report: In situ observations of deep convection without lightning during the tropical cyclone Florence 2018." by Nussbaumer et al. describes HALO aircraft observations (3 flights during CAFE campaign) of atmospheric trace gases in a tropical storm and discusses the evidence of (or the lack of) lightning occurrence during this event. The manuscript, while very synthetic and somewhat lacking detailed discussion, is very well written, clear and, in my opinion, useful and pertinent for the ACP readers. The lack of deep discussion might be due to the fact that this is a "Measurement Report" manuscript type. I wonder if, with a bit more committment in drawing conclusions, this might as well be a "Letter"/"Short Communication" manuscript. I leave these considerations up to the Editor and Authors. In any case, I recoment this paper for publication in ACP after these minor issues are clarified.

1) I agree with the other Reviewer that references are lacking for other previous aircraft campaigns. I add, for the observation of the UTLS composition in deep convection area, the StratoClim campaign; maybe this reference is a good pick, with respect to StratoClim: Bucci et al.: Deep-convective influence on the upper troposphere–lower stratosphere composition in the Asian monsoon anticyclone region: 2017 StratoClim campaign results, Atmos. Chem. Phys., 20, 12193–12210, <https://doi.org/10.5194/acp-20-12193-2020>, 2020.

2) L20-21: Maybe add a sentence to very briefly explain mechanisms of formation of tropical cyclones from tropical disturbances

3) L24: "...within about 5° of the equator..."

4) L37: add the year of the publication "Zipser" in the text

5) L50-51: "Over the ocean...aircraft": to link with the previous sentence, you might probably very quickly cite NO source over land.

6) L58-60: "Another possible...iodide": you could add a few words on how methyl iodide is formed from dust

7) L61-62: "Its lifetime depends on the abundance of OH and NO<sub>3</sub> which oxidize DMS and ranges from 1 to 2 days" please rephrase (it sounds like "OH and NO<sub>3</sub>" or "DMS" range from 1 to 2 days...)

8) L61: "abundance" --> "atmospheric abundance"

9) L78: "WVLLN": what is the meaning of this acronym?

10) L89: "...satellite images...": what are exactly these satellite images and from which instrument? NASA Worldview is just a data repository and visualisation tool but the exact type and origin of data should be mentioned.

11) L92: "...compare Figure 1...": compare with what? You mean "...compare panels b and c of Figure 1...?"

12) L116: "GEOS": please define acronym

13) L123: "The colored IR images show that the research aircraft was above, but close to cloud top at both occasions.": It rather looks like you were flying under clouds tops (flight altitude in light green: ~-50°C, corresponding cloud top temperature in dark green: ~-60°C).

14) L127: "bars": is it "shadowed areas in the plot" or something like this?

15) Fig. 3: this is hardly visible, maybe this figure would be better organised as a 2 rows 1 column?