Comment on acp-2022-335

Anonymous Referee #1

This is a well and clearly written submission that uses Terra and Aqua MODIS observations to analyze aerosol-cloud interactions represented by how liquid water path changes, conditioned by number concentrations. Additionally, they incorporate other combined satellite observations to investigate the role of precipitation in the evolution of liquid water path. They find that liquid water path tends to decrease with increasing number concentration, suggesting the liquid water path adjustment has a warming effect due to aerosols. I especially appreciated the discussion of the overall limitations of using these types of observations and potential paths foreword (i.e. Geostationary satellites).

Overall, I didn't find many issues with the manuscript, with most of my questions focusing on different aspects of the methods. Once these are addressed, I expect that this manuscript will be ready for submission.

Major Comments:

- Methods: Why do you use different time periods for the MODIS (2011 – 2020) and the CCCM combined product (2007 – 2011) that do not overlap?
- Lines 80-82: Your analysis does not involve ship tracks, so do you only mention ship tracks here because to justify your tracking method?
- lines 88 - 91: CloudSat is limited to a much narrower swath width than MODIS, so how

representative is the CloudSat precipitation flag in a $1^{o}x1^{o}$ box?

Minor Comments:

Line 6: "a increase" should be "an increase"

Line 99: Figure 4 is referenced before Figure 3.

Line 121: Should "clean conditions ($N_d > 25$ cm^{-3})" be clean conditions ($N_d < 25$ cm^{-3})"?