

Authors' Response to the comments on the manuscript:

Radar shows graupel and increased turbulence near small-scale intermittent lightning discharges at the top of intense thunderstorms

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#. **Reviewer's comment.** AR: Authors response. CH: Changes to manuscript with new text and **removed text**

Note: Line numbers correspond to the document created with latexdiff, not the manuscript from first submission.

We are pleased that both reviewers recommend our manuscript for publication. Hereby we respond to the reviewers (minor) comments

RC1

1. ***Both the title and abstract of the paper emphasize the increase of graupel, which is from HMC. However, graupel is relatively large, usually in the middle layer of clouds. In this paper, graupel should refer to relatively large ice crystal particles or aggregation, rather than true graupel?***

AR: Actually, we think that the radar data does suggest the presence of graupel or hail, even at such altitude. Otherwise, the reflectivity values would not be so high. The convective systems probably have very strong updrafts that allow the heavy particle to be lofted to high altitudes. We believe we have emphasized this point throughout the manuscript.

To be clearer, we have changed the title subtly. Additionally we have added a small paragraph in the method section that explains that graupel, refers to the graupel/hail HMC category.

CH: Title: "Radar data shows graupel and increased turbulence **observed** near small-scale intermittent lightning discharges at the top of intense thunderstorms"

Line 147-150: "Throughout this work, ... identifies graupel."

RC2

1. **174: course should be coarse**

AR: Indeed. Changed.

2. 182: incomplete sentence; suggestion: “low — for example, ...”

AR: Indeed. Changed.