

**Explicitly Resolving Lightning and Electrification Processes from the 10-12 April
2019 Thundersnow Outbreak**

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Additional Supporting Information (Files uploaded separately)

Captions for Movie S1, Movie S2, Movie S3, Movie S4, Movie S5, Figure S1, and
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Introduction

This supporting information contains captions for the five movies and two figures that were included in the submission process.

Movie S1. A) Multi-Radar Multi-Sensor composite reflectivity and Geostationary Lightning Mapper gridded flash extent density observations. B) NASA Unified Weather Research and Forecasting with electrification composite reflectivity and lightning flash extent densities. C) NASA Unified Weather Research and Forecasting with electrification maximum electrical electric fields in the vertical and lightning flash extent densities.

Movie S2. Difference between the absolute sum of simulated non-inductive and inductive charging and demonstrates that both non-inductive and inductive charging mechanisms played a role in electrification production. Blues (reds) indicate that inductive (non-inductive) charging was more important in the vertical column.

Movie S3. Cross-sections varying with time for: A) simulated radar reflectivity, B) simulated total space charge density, and C) total hydrometeor concentration and simulated positive and negative volume lightning channels. The solid black and purple contours represent equivalent potential temperature and frontogenesis, respectively. In contrast, the dashed red and blue lines represent temperature. The yellow stars with black outlines were simulated lightning initiation points.

Movie S4. Similar to cross-section analysis in Movie S3 but at 0710 UTC on 11 April 2019. The bottom two panels show various simulated hydrometeor charge densities and concentration. The solid black and purple contours represent equivalent potential temperature and frontogenesis, respectively. In contrast, the dashed red and blue lines

represent temperature. The yellow stars with black outlines were simulated lightning initiation points.

Movie S5. Similar to Movie S3 but displaying only snow hydrometeor characteristics with time rather than total hydrometeor characteristics.

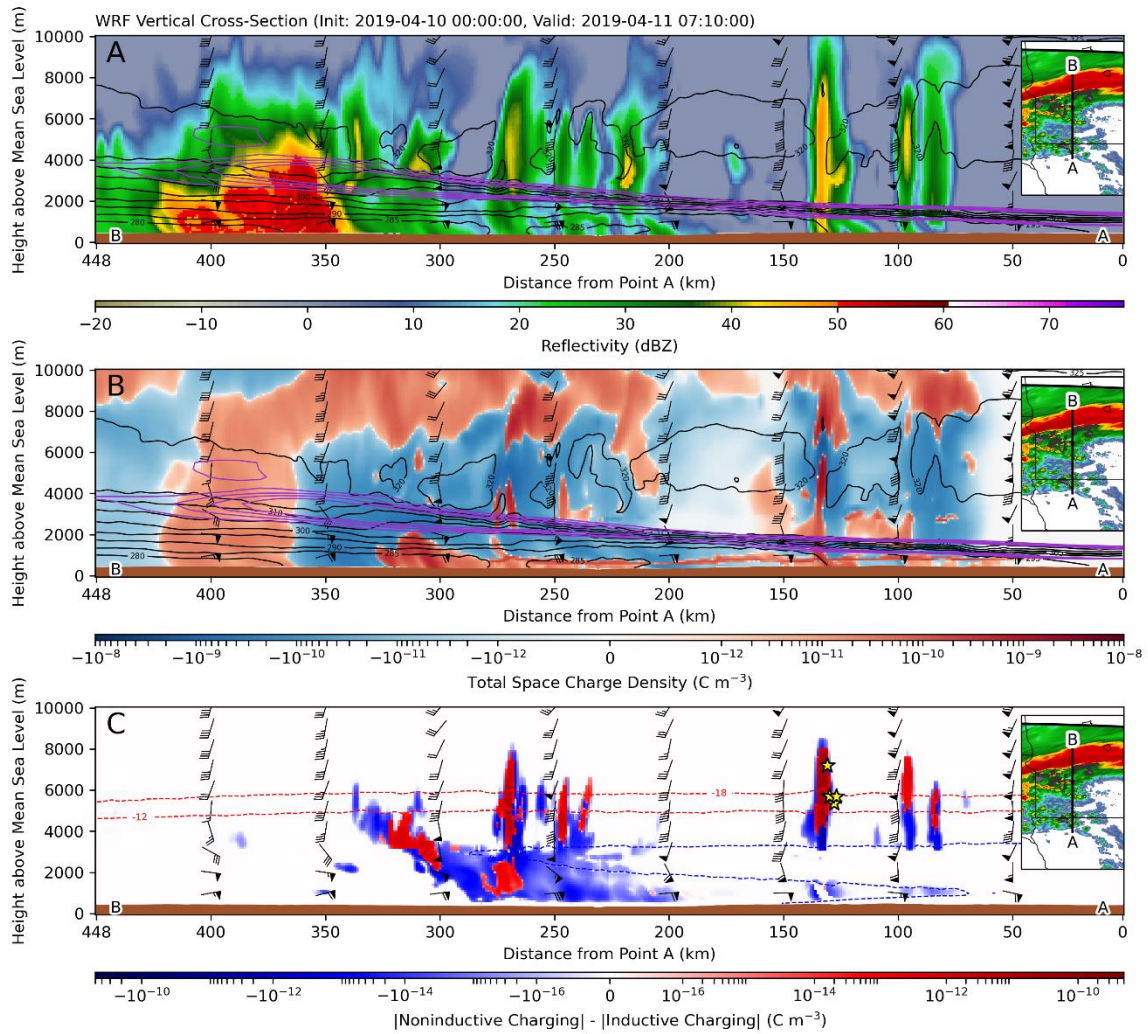


Figure S1. Similar to Figure 4. Only difference is that c) shows the difference between the absolute charging rates between non-inductive and inductive charging. Reds (blues) indicate that non-inductive (inductive) charging is more dominant at that location.

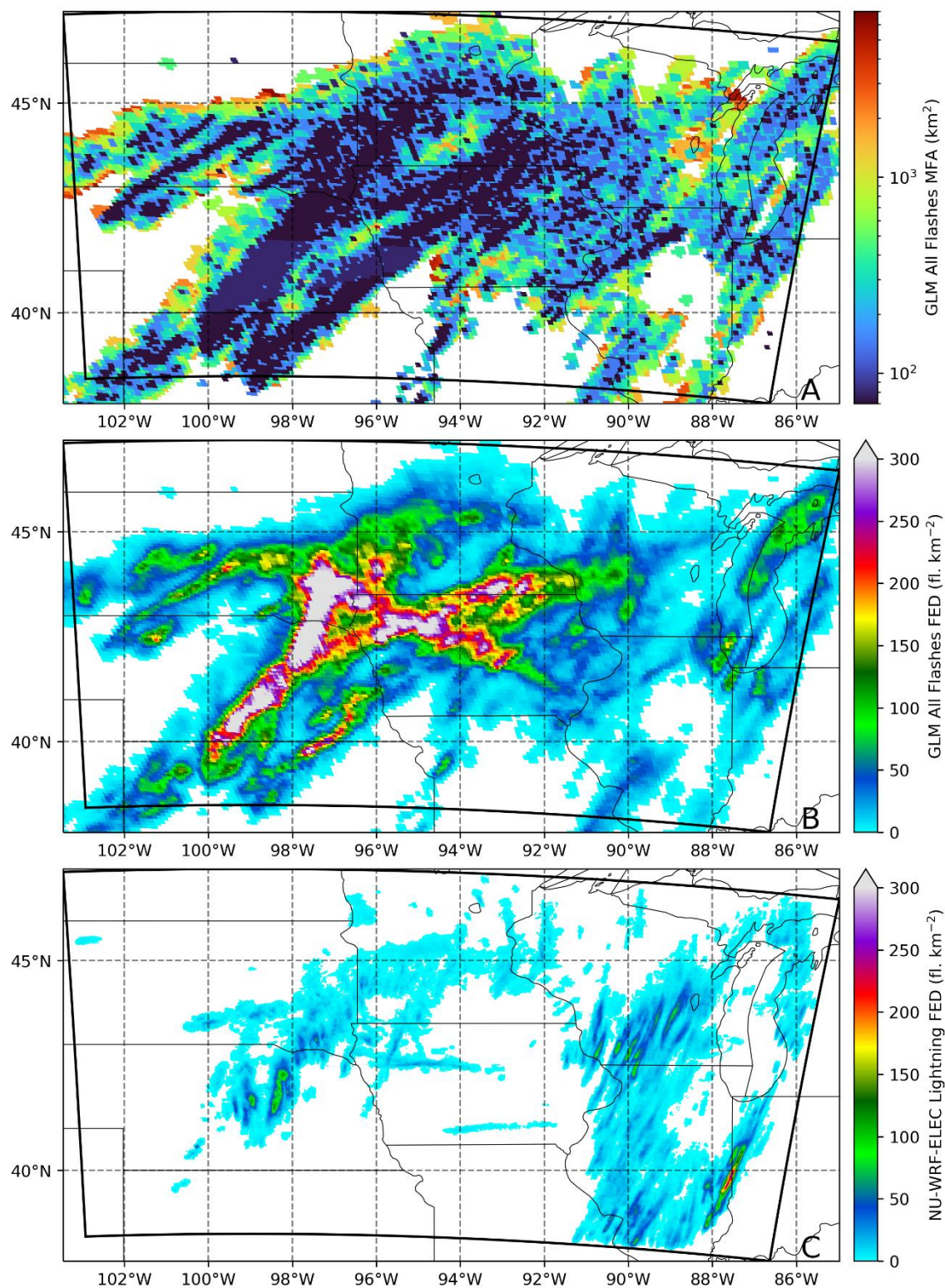


Figure S2. Exact same as Figure 6 but now displays total lightning characteristics instead of just thundersnow.