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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The temporal evolution of three-dimensional lightning parameters and their suitability for thunderstorm tracking and nowcasting" *by* V. K. Meyer et al.

Anonymous Referee #1

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General comments

The manuscript investigates the temporal evolution of 3D lightning characteristics of thunderstorm cells and correlates them with the cell-parameters lifetime and cell area. This is done on a statistical basis using a 3D lightning data set recorded during five summer month in southern Germany. The lightning data provided the discrimination between IC/CG stroke and IC stroke heights inside the thunderstorm cells. Three case studies were also thoroughly investigated using volumetric radar data. To perform the study a newly developed lightning-cells tracking algorithm was applied to the lightning data set. The correlations discussed in this work show the presence of two different

discharge regimes depending on the cell area and allowing the discrimination between rather simple and short-living thunderstorm cells and more complex, longer living cells.

The manuscript is scientifically interesting, well-written, and should be accepted for publication after the author addresses some minor concerns outlined below.

Specific comments

- p. 2222, line 8-9: The ability of the lightning-cells tracking algorithm to nowcast the future cell positions could be an interesting subject for an additional application study of the developed system.

- p. 2222, line 16: "...maximum search radius of 7 pixels...": radius or diameter? Please compare p. 2186, line 22 in the companion paper ("Automated thunderstorm tracking: utilization of three-dimensional lightning and radar data") and clarify.

- Fig. 1b caption: "...with standard deviation...": please clarify.

- Fig. 2 caption: "The first three cell entries are marked yellow...": it is difficult to identify the first three cell entries.

- Fig. 2 caption: "...indicated by green arrows...": please add the green arrows in the figure.

- Fig. 3: Please indicate the azimuth angle and the recording time of the RHI.

Technical corrections

- None

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 2217, 2013.