

# ***Interactive comment on “Use of polarimetric radar measurements to constrain simulated convective cell evolution: A pilot study with Lagrangian tracking” by Ann M. Fridlind et al.***

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## **Response to Anonymous Referee #1**

This study investigates the potential value of polarimetric weather radar observations in studying isolated convection. Thunderstorms observed by the operational KHGX weather radar, Houston, Texas, US, are located, tracked, examined and in a single case study of onshore flow conditions during July 2013 are also compared with NU-WRF regional model simulation outputs. The analysis focuses on Kdp and Zdr signatures above and below the melting layer. The study demonstrates that polarimetric weather radar observations can set additional constraints to atmospheric model simulations im-

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proving the understanding in convective cells physics. The study also underlines the need for high spatial and temporal resolution observations that can be achieved by mobile research weather radars. Overall, the scientific significance and quality is good. The work is clearly explained with proper language. Some minor type mistakes and some additional explanations can improve the paper.

Response: We appreciate the careful reading and helpful comments.

Minor comments

Line 67 “at least 30°C” is “at least –30°C”

Response: Clarification added: "...at least 30°C below their melting temperature..."

Line 160. NU-WRF configuration: the number of model vertical levels is missing. A table summarising NU-WRF configuration should be reported in the paper for the sake of clearness. Moreover, NUWRF initial time for simulated cells is not clear: when NU-WRF model runs started to simulate the cells?

Response: Clarification added: "...a nested inner domain with 120 vertical levels and 500-m horizontal grid spacing..." Clarification added: "At 16–17 UTC, convective cells begin to appear within 100 km of the KHGX radar location in both the simulation and the observations." We did not further add a table since we consider ancillary simulation details unimportant to the conclusions of this pilot study, whereas we agree such details would be very important for a full-fledged study with additional field campaign observations. Appended to acknowledgments: "Results of this pilot study were used to inform design of the Tracking Aerosol Convection Interactions Experiment (TRACER) field campaign (<https://www.arm.gov/research/campaigns/amf2021tracer>)."

Ackerman et al. 2003, Donner et al., 2016, Mather and Voyles, 2013 are reported in References but never cited in the text.

Response: References removed.

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