

Interactive comment on “Impact of airborne cloud radar reflectivity data assimilation on kilometre-scale NWP analyses and forecasts of heavy precipitation events” by Mary Borderies et al.

Anonymous Referee #2

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This manuscript explores the benefits of assimilating airborne cloud radar observations (reflectivity and wind) to improve forecasts accuracy during heavy precipitation events. The first part of the paper described the radar observations, the AROME-WMed NWP model as well as the assimilation technique used in this study. The study is using a 1D retrieval to best estimate vertical profile of RH pseudo-observation from the radar reflectivity measurements. These profiles, as well as the wind observation, are then assimilated using a traditional 3DVar scheme. Results from the different experiments are presented to establish the impact of the cloud radar observations. This manuscript

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was interesting to read (especially the 1D Bayesian retrieval), and dealt with current problems associated with convective-scale data assimilation. I recommend this paper for publication following some revisions.

General comment(s):

1. At the end of section 2.1, a list of the different weather patterns present during HyMex-SOP1 campaign is presented. I am surprised to see that the authors did not use this information during the impact study (section 6). It would have been very interesting to see how the impact of assimilating the radar observation is affected by the meteorological configuration.

Specific comment(s):

1. P 6 – section 2.2: The authors should tell us a bit more about the assimilation system. For example:

- What is the resolution of the analysis grid?
- Does the 3Dvar scheme is using an IAU?

2. P 6 - section 2.3: It is not clear if the data are thinned vertically?

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2018-314>, 2018.

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