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Atmospheric Measurement Techniques Discussions

Interactive comment on "Combined use of volume radar observations and high-resolution numerical weather predictions to estimate precipitation at the ground: methodology and proof of concept" *by* Tony Le Bastard et al.

Anonymous Referee #2

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The paper present a proof of concept on the use of NWP forecast to support and enhance radar QPE through an innovative way to define the vertical profile of reflecivity (VPR) to correct the estimation of surface reflectivity from upper layer observed one.

Further the method is able to provide a spatial variability for the VPR overcoming one of the limit of the standard techniques use to define VPR.

Major limitation of this method rely on NWP performances. Only two events are discussed in the paper and seems that NWP perform quite well in both, whats happen if

NWP does not perform well? Could be important to test the method over a wide range of meteorological events in order to understand and compare this method with Panthere QPE. Nevertheless, as clearly stated in the paper title, this is a proof of concept so we can refer and discuss only the idea, leaving a full demonstration and comparison to a next step.

For this reason I recommend to publish this paper with some minor issues.

Specific comments:

1) Page 31 line 21 Please clarify better what means "All the scans .... advection field." Are radar scans not synchronous?

2) page 3 line 23 It is stated that 300 profiles are obtained varying 4 parameters. Could you explain how do you change the parameters .? (ie random choice within a predefined range for each parameter)

3) page 3 line 24 "compared with observed rain rate accumulation ratio" Do you compare with radar rain rate or with others data? please specify.

4) page 4 lines 6-7 The sentence "Thus, to compensate ....QPE product." is a speculation could be not true the the difference comes only from the VPR limitation. Please reformulate the sentence.

5) page 5 line 3 Please provide a range of variability for "delta" (threshold to reject noisy pixel).

6) page 5 lines 8-10 The laste sentence of the paragraph seems to be a personal guess, not support by any data,. please reformulate.

7) page 6 - line 11 Sect 1.1.1 ????? Could be a wrong reference to the text.

8) page 7 line 2 Drad - You aggregate all 5-min radar reflectivity during the hour centered around the model time. This seems to be a limit in a quite fast changing freezing level height event. Could you comment please.

9) page 8 figure 3 This figure is very helpful to understand the method. I strongly suggest to move this figure to the begin of section 3.

10) page 10 line 11 As comment 7. Sect 1.1.3 ?????

11) page 9 -line 9 Add "observed" before "reflectivity". From this sentence I understand that in fig. 5 i will see "simulated Z" from AROME-NWC. From figure caption I read "observed Z". This is misleading.

12) page 9 line 19 I'm not sure that Sect 2.2 is correct or is as comment 7.

13) page 9 line 34 As comment 7 Sect 1.1 ????

14) page 10 line 33 —- page 11 line 4 I strongly suggest to reformulate this text. It is much more close to a newspaper article than a scientific one. There is nothing dramatic (refer line 33) in the altitude reached by the radar beam. This is a propagation effect well known. Further overshooting as well as evaporation below the sampling height are clearly highlighted in any radar school book.

15) page 10 line 31 - Figure 12 and figure 13 In the text is referred figure 12a, but it refer to fig 13a. Same for any time where figure 12 and fig 13 are used. Please correct.

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