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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Hectometric scale simulations of a Mediterranean heavy precipitation event during HyMeX SOP1" *by* Olivier Nuissier et al.

Olivier Nuissier et al.

olivier.nuissier@meteo.fr

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General comments:

1) More comparison against observations:

We agree that a deeper analysis comparing the simulations and the available observations should improve the paper. However, it must be emphasized that such analysis has been performed previously in the studies of Duffourg et al, 2016 or Martinet et al, 2017, for which the numerical design was similar. Although the goal of the present study is to focus more on comparing the 150 m simulation with the 450 m simulation,

additional observations have been added in the revised Figure 6 and 7, as it is done in Figure 4. On the other hand we did not modify former Figure 5 since it is more difficult to compare the simulations to a radar quantitative surface precipitation estimate strongly impacted by large uncertainties over the sea.

2) Compare the results with other similar studies:

We agree that compare the results with other similar studies using LES should improve the paper. Furthermore we are grateful to the referee #2 for providing a list of references which has been included in the revised version of the paper.

Specific comments:

1) Page 2, line 14: The text has been corrected.

2) Page 2, line 27: This problem has been corrected throughout the text in order to be consistent.

3) Page 3, line 19: The year of the reference has been added.

4) Page 3, line 20: We meant plural. The text has been modified accordingly.

5) Page 3, line 21: The text has been corrected.

6) Page 4, figure caption 1: The IR channel used here is 9 (10.8 μm). The figure caption has been modified accordingly.

7) Page 6, line 5: The text has been corrected.

8) Page 6, line 10: The text has been corrected.

9) Page 7, line 5: The sentence has been rewritten.

10) Page 7, line 30: The text has been corrected.

11) Page 7, line 30 (and elsewhere): The word has been corrected here and throughout the text.

12) Page 8, line 1 (and elsewhere): The word has been corrected here and throughout the text.

13) Page 8, line 15: The text has been corrected.

14) Page 9, Figure 5b: The y-axis title has been modified accordingly. Regarding the remark of including a surface precipitation estimation from radar observations see please response to general comments above.

15) Page 9, line 14: The text has been corrected.

16) Page 10, Figure 6: Figure 6 has been redrawn adding another column with the observed radar reflectivities.

17) Page 11, line 8: The text has been corrected.

18) Page 11, line 10: The text has been corrected.

19) Page 12, Figure 7: Figure 7 has been redrawn adding another column with the observed infrared satellite observations.

20) Page 12, line 3 (and elsewhere): The word has been corrected here and throughout the text.

21) Page 12, line 9: The text has been corrected.

22) Page 13, line 10: The text has been corrected.

23) Page 15, Figure 10: We agree with this remark. It is not obvious to compare all simulations against observations as the simulation domains are different initially. However former Figure 10 has been redrawn zooming over the region of interest for the observations and including a grid on each panel.

24) Page 17, Figure 11: The caption has been corrected.

25) Page 18, Figure 12: All the hydrometeor contents are represented (rain water, cloud water, graupel, snow aggregate and ice water contents). The caption has been

modified accordingly.

26) Page 20, line 18: The text has been corrected.

27) Page 20, line 30: The text has been corrected.

28) Page 20, line 32: We meant that we need to consider more convective case studies and use more statistical approaches. The sentence has been rewritten.

29) Page 24: The reference has been corrected.

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