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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "The heavy precipitation event of 14–15 October 2018 in the Aude catchment: A meteorological study based on operational numerical weather prediction systems and standard and personal observations" *by* Olivier Caumont et al.

Anonymous Referee #2

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The heavy precipitation event of 14–15 October 2018 in the Aude catchment: A meteorological study based on operational numerical weather prediction systems and standard and personal observations

submitted for publication to Natural Hazards and Earth System Sciences

The paper presents the analysis of a case of heavy precipitation which led to several damages in south-western France. This case study is analyzed by means of observations and different operational numerical weather prediction models. The manuscript is interesting and the analyses presented are rather extensive. However, in the current form, the presentation of the event and of the results is confusing. Moreover, there are too many figures. I therefore suggest reorganizing the manuscript in order to improve its readability.

Major remarks

1) I would completely remove the hydrological description of the event, since it is not important and essential for the other parts of the paper. Therefore, I would remove lines 197-216, Figs. 8 and 9 and Tables 1 and 2.

2) In my opinion Section 5 is not easy to follow. There is a mix between the mesoscale description of the event and the evaluation and interpretation of numerical weather prediction models. I would move all the parts where the event is simply described to Section 3, where the case study can be described both at the synoptic scale and at the mesoscale. So, for example, I would move the description contained in Section 5.1 to Section 3.

3) Figure 17: Authors say: "Figure 17 indicates that higher precipitation is associated with lower pressure over the Mediterranean Sea, which can be interpreted as a deepening of the mesoscale trough". The lower pressure highlighted in Fig. 17a may be caused by a different timing of the low pressure moving eastward. In my opinion, it would be clearer showing the pressure field of the three members with higher precipitation (all the members or the average) and of the ensemble mean. In this way, the position and the values of the low pressure can be directly appreciated and compared. I think that this comparison would be useful also in the following section where the intensity of the low-level wind is analyzed. The same considerations apply also for panel b). In panel c) I would plot the specific humidity and not the relative humidity, to have

an idea of the absolute amount of water vapor. Finally, it is not clear what time is “the middle of the period”.

4) In Section 5.3 the Authors discuss the relation between the virtual potential temperature gradients and the localization of heavy precipitations. In my opinion, this temperature gradient is a consequence of the precipitations, so it is not so important for the analysis of the different performance of the members of the ensemble. The Author say: “In this case, near the ground, observations show an existing cold air mass before the event begins, which is cooled during the event, increasing the west-east gradient of temperature along the front”. However, this is not shown in the paper, so it is not clear how this cold air mass may have influenced the localization of the precipitations.

Minor remarks

Abstract: the Authors say: “it is shown that the positive Mediterranean sea surface temperature anomaly may have played an aggravating role in the amount of precipitation. . .”. However, this is just a speculation of the Authors, which is not demonstrated in the paper. Therefore, I suggest removing this sentence from the abstract.

Page 2, line 55: I do not understand why this event is “atypical”.

Figure 3: I suggest keeping only one of the four panels of Fig. 3, as the information contained in the four panels is very similar.

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