

Interactive comment on “A numerical study to investigate the roles of former hurricane Leslie, orography, and evaporative cooling in the 2018Aude heavy precipitation event”

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Anonymous Referee #2

Generic comments

This study focuses on the investigation of a heavy precipitation event in October 2018 in the Aude region, south-eastern France. Following the investigation by Caumont et al. (2020), there main aspects are evaluated in this investigation, the origin of moisture with particular attention paid to the role of the hurricane Leslie, the role of the Pyrenees and the role of the evaporative cooling. Numerical simulations and near-surface observations are examined with this purpose.

Given the exceptionality of the event, but the increase in the frequency of such situations, and the enormous fatal consequences, the understanding of this heavy precipitation event is of relevance. The paper is clear and well structured. However, sometimes too descriptive, which could make it difficult for the reader to follow the main investigation line of the article. Therefore, I suggest shortening too descriptive sections and focus with more detail in the description of those aspects pointed out as goals of this investigation.

The literature cited in the introduction is appropriate although I suggest additionally introducing more recent references, also providing some information and references of previous publications, focusing on the key role of moisture and its origin, topography, and evaporative cooling on heavy precipitation events.

Specific comments

1. It could be important to clearly state in the abstract and more in detail in the introduction what is the novelty and contribution of this investigation.
2. The model and resolution used for the numerical simulations could be provided already in the abstract.
3. Try to substitute 4.5° in the abstract for a “easier location definition” for the reader.
4. The autumn 2018, and particularly October, was a period in which the western Mediterranean region was strongly affected by damaging heavy precipitation events, including the known as the Aude 2018 event. Also, on 9 October 2018 the Balearic Islands suffered catastrophic consequences due to similar heavy precipitation phenomena. Thus, the manuscript will benefit from a description of the conditions in the autumn period for the western Mediterranean, the comparison with the climatological conditions particularly for the north-western Mediterranean, and the description of any possible connection between the two events.
5. The case description and the numerical simulations section could be shortened with major focus on the information relevant for the case analysis and answering of the questions initially raised.
6. Please rethink the sentence in L215 “... is run to realistically simulate the case”.
7. It would be interesting providing an additional simulation in which the Pyrenees were removed since its position is upstream and one goal of this study is provide and analysis of the role of topography. If this is not possible, a hypothesis would be needed.
8. Please provide information of why only near-surface information is analysed and validated.
9. There are too many figures in the article, and multiple panels in some of them. Please, restrict the number of figures to those strictly necessary and try to combine when possible several information in one figure.