NHESS-2023-192

Authors' Responses to Reviewer 1 (RC1, anonymous)

Date: 7 January 2025

Title: Investigation of an extreme rainfall event during 8–12 December 2018 over central Viet Nam – Part 2: An evaluation of predictability using a time-lagged cloud-resolving ensemble system

Authors: C. C. Wang et al.

Firstly, **we thank the reviewers for spending valuable time reviewing the paper again and giving us constructive comments that helps to improve the clarity of the paper.**

These are our responses to reviewers:

Authors' Responses to Reviewer 1 (RC1, anonymous)

COMMENTS

There are quite a bit of formatting issues and typos. I recommend technical corrections.

Here are some examples.

Line 17: Could-resolving --> Cloud resolving

Reply: Thank you for your correction. We corrected it. The correction is shown on page 1, line 19, in the marked-up manuscript version.

Line 353: Formatting error.

Reply: Thank you for your comments. You are right! We corrected it. The correction is shown on page 20, line 409, in the marked-up manuscript version.

Line 512: Not sure what is happening here. I think the authors might have accidentally deleted some text.

Reply: Thank you for your comments. You are right! We got mistake while trying to deleted the text here. We corrected it. The correction is shown on page 32, line 600, in the marked-up manuscript version.

Authors' Responses to Reviewer 2 (RC2, anonymous)

Major Comments (Comments are not listed in order of importance):

1. No hypotheses are presented in this work, this comment remains the same from the previous review. Please include specific hypotheses. This will also help guide the reader into making clear what the manuscript adds to the body of literature. As I have said before, having model simulations are not alone publishable unless used to evaluate a scientific question/hypothesis. It is thus important to outline scientific based hypotheses in which the experiments in the manuscript are designed to evaluate, which will then make it clearer how the work adds to the body of literature. Please state them.

Reply: Thank you so much for your valuable comments and for reminding us stating our specific hypotheses. We are sorry for forgetting to state it in previous revision. We have added it in this version, on page 10, lines 203-214, in the marked-up manuscript version.

2. From the last round of revision: Some discussion and framing of the work here from a context of intrinsic versus practical predictability is needed. Additionally, the scale dependence of predictability. I suggest Melhauser and Zhang (2012), Nielsen and Schumacher (2016), Weyn and Durran (2018), and citations within as starting points. There is also some useful suggestions from an ensemble analysis within these papers. The authors mention in the review responses that there was discussion on intrinsic vs. practical predictability added as well as these references. I could not find where in the manuscript this was done.

Reply: Thank you for your comments. We added more the discussion using your suggested materials to clarify the scientific rationale of our study. Besides, we also cited one more reference (Ying and Zhang 2017) to support our discussion. The added information is shown on pages 7-8, lines 142-154, in the marked-up manuscript version.

3. How was the WRF data mentioned in the methods section used? I did not see this in the new version of the manuscript. It is possible I missed it. If it is not used, please remove from the methods.

Reply: We sincerely apologize for your confusion. Initially, we included this information to provide additional details about the mesoscale model (WRF model) whose forecasts were used to discuss the predictability of the D18 event in Fig. 1. However, we have removed this information based on your comments. The change is shown on page 12, lines 268-274, in the marked-up manuscript version.

4. As I have mentioned above and in the last review, there needs to be some aspect of the conclusions/experiments that add to the body of literature ensemble prediction of extreme precipitation. This is currently missing in my opinion, as we generally know predictability increases as lead-time decreases. The authors claim that this is a novel result for this geographic region in their review responses. I can be convinced of this, if this is clearly demonstrated with correctly posed hypotheses and results discussion (see point 1). One potential avenue could be comparing the spread in the event given by a time lagged ensemble compared to a traditional ensemble initialized at one specific time leading up to the event. This might speak to more general predictability in the region. The above citations can potentially aide in adding this piece to the paper.

Reply: Thank you very much for your comments. we have adjusted the conclusions part to provide clear answers regarding our scientific hypotheses and the goals of the study based on your comments/suggestions. The change is shown on pages 39-40, lines 712-721, and 740-754 in the marked-up manuscript version.

Additional Comments (Comments are not listed in order of importance):

1. Throughout: Please make use of more concise paragraphs to organize the manuscript. Some paragraphs in the current version span the entirety of a page or more. Breaking these up into smaller paragraphs at logical points will help with the flow and readability of the manuscript.

Reply: Thank you for your comments. Based on your comments and suggestions, we have made substantial revisions to the manuscript, including breaking up some paragraphs into smaller sections to improve readability, as you recommended. We believe the manuscript is now slightly shorter and more concise. The change is shown on all pages, in the marked-up manuscript version.

2. Figures 10-13: These are quite hard to read. I cannot make out the light blue contours that are overlaid on these plots. I can barely make out the black contours. Please evaluate the color choices on these. Additionally, the panels are quite small. It might make sense to break these into multiple figures.

Reply: Thank you for your comments/suggestions. Unfortunately, we are currently unable to replot the figures due to limitations in accessing the supercomputer. Additionally, we believe that breaking the current panels into multiple figures might make it challenging for readers to follow the evolution of variables over time. To address this, we have removed the latitude and longitude labels from all panels displaying the same region. This adjustment saves space between the panels and allows us to enlarge them slightly. The changes are shown in mentioned figures in the marked-up manuscript version.

3. Lines 336-338: This is true for a well calibrated ensemble, only. I would mention this.

Reply: Thank you for your suggestion. We have added this information into the manuscript. The added information is shown on page 19, line 392 in the marked-up manuscript version.

4. Table 1 and lines 266: How many moments is the bulk microphysics scheme?

Reply: We are sorry for your confusion. We used a double-moment Bulk cold-rain scheme. We added more information to Table 1 for clarification.

5. Line 55: Remove “until now,” as it contradicts the rest of the sentence.

Reply: Thank you for your comment. We have removed it. The change is shown on page 3, line 65, in the marked-up manuscript version.