

1. Response to Reviewer 1 (Mario Rohrer)

We would like to thank Mario Rohrer for the time and effort spent on reviewing this manuscript, and for his positive and constructive feedback. Please find below the details of the modifications we have introduced in response to the comments.

- 1.1. *Abstract, Lines 7ff: "..., this paper proposes the integration of different flood type-specific approaches into one compound flood impact forecast. This possibility has been explored by combining the simulations of two impact forecasting methods (representing fluvial and flash floods) for a recent catastrophic episode of compound flooding." I think it's important to mention already in the abstract on what existing products your proposed impact forecast is based. Suggestion:*
..., this paper proposes the integration of two flood type-specific approaches (representing fluvial and flash floods) into one compound flood impact forecast. For this scope a 'unified system' was developed by combining the simulations of two impact forecasting methods: One based on the European Flood Awareness System (EFAS), the other on flash flood hazard nowcasts obtained with the European Rainfall-Induced Hazard Assessment (ERICHA) system. This possibility has been explored by combining the simulations for a recent catastrophic episode of compound flooding:...

Thank you for this nice suggestion. We agree that it is important to mention already in the abstract the employed methods. We have adopted the suggested phrasing with a few minor adjustments. The first mentioned sentence, we prefer to keep general, as this paper does not only propose the combination of forecasts for fluvial and flash floods, but the combination of flood impact forecasts in general (also including other flood types). Fluvial and flash floods are used in this paper as an example to illustrate the benefits of integrating forecasts of different flood types. In the revised manuscript, the paragraph will then read as follows:

"..., this paper proposes the integration of different flood type-specific approaches into one compound flood impact forecast. This possibility has been explored through the development of a unified system combining the simulations of two impact forecasting methods: the Rapid Risk Assessment of the European Flood Awareness System (EFAS RRA; representing fluvial floods) and the radar-based ReAFFIRM method (representing flash floods). The unified system has been tested for a recent catastrophic episode of compound flooding: ..."

- 1.2. *Lines 10-11: "the DANA event of September 2019 in Southeast Spain." For the non-Hispanic reader, it may not be clear what DANA means. Suggestion:*
the DANA (Depresión Aislada en Niveles Altos, Cut-off Low) event of September 2019 in Southeast Spain.

We have included the explanation of the acronym in the revised abstract.

- 1.3. *Line 14: "Although the compound impact estimates were less accurate at municipal level, they corresponded significantly better to the observed*

impacts ...". It's only one case, thus 'significantly' may not be adequate, I would say: MUCH better. Suggestion: Although the compound impact estimates were less accurate at municipal level, they corresponded much better to the observed impacts...

Agreed and changed.

- 1.4. *Introduction, Line 85: "has been taken as an opportunity to explore the possibility of such an integrated system". I think to make a system more complex may always also imply some disadvantages/drawbacks. Suggestion: has been taken as an opportunity to explore the possible advantages and drawbacks of such an integrated system.*

Thanks for this suggestion, we have adopted this phrasing.

- 1.5. *Perhaps you can explain a little bit more in detail what a DANA-event is: see e.g. Ferreira, 2021; Garcia-Ayllon, S.; Radke, J., 2021; Giménez-García et al., 2021.*

We have included some more information on the DANA phenomenon and a reference to the interesting paper of Ferreira et al. (2021). Thanks for pointing out this recent work. The paragraph introducing the DANA phenomenon reads now as follows:

"From 11 to 15 September 2019, a weather phenomenon commonly known in Spain as "DANA" or "Gota Fría" (MartínLeón, 2003) affected the south-eastern part of the country. The term DANA means "upper tropospheric cut-off low", a situation occurring typically in autumn when easterly winds push warm humid air masses from the Mediterranean Sea towards the steep topography of the coastal region (Ferreira, 2021)."

- 1.6. *Fig. 2. Concerning the legend: I suppose the colors are representing the RETURN PERIOD! If this is the case, please write it! This is a very nice figure, but I don't see how the reader can compare the return period at a gauging station with a peak flow runoff in m³/s. Perhaps you can calculate a return period of the runoff gauges, if not, perhaps you can indicate the rank of the runoff, or a similar metric which is in a way comparable to a return period.*

We have added to the legend of Figure 2 the missing term "return period".

The selection of the EFAS flood maps along the Segura is based on comparing the measured peak flows to the input discharges used for the hydraulic simulations of the flood maps (see lines 152-155). To make this connection clearer, we have added to the labels of the stream gauges in Figure 2 the discharges that were used as input for the hydraulic simulation of the selected flood map. The caption of the Figure has been adjusted accordingly:

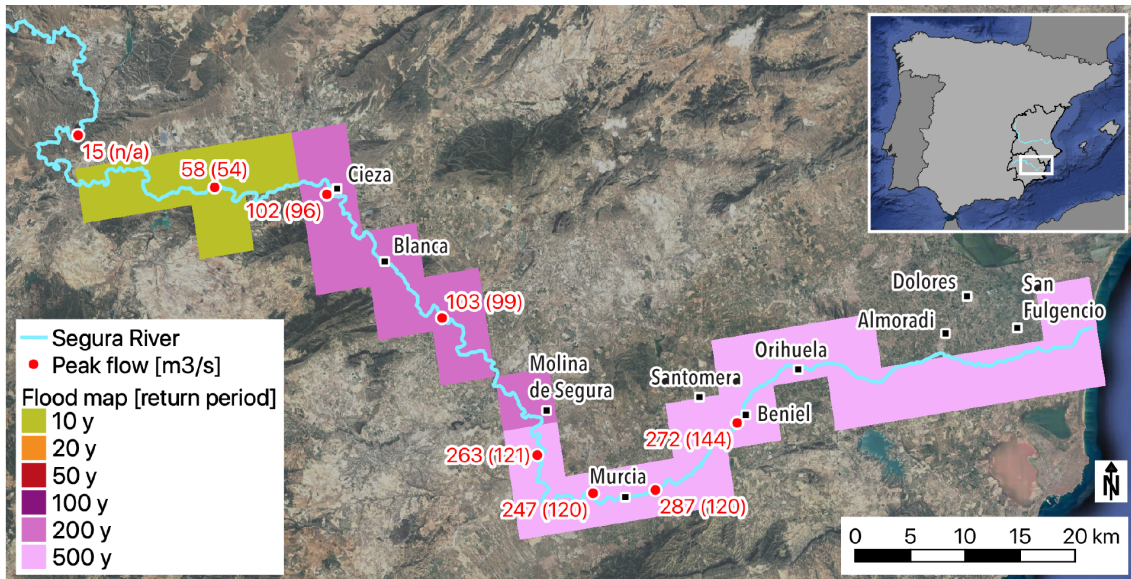


Figure 2. Peak flows measured at the gauging stations in the Segura River during the DANA event, and (in brackets) at each station the input discharge of the most closely corresponding EFAS flood map. The 5 km-grid cells represent the resulting selection of EFAS flood maps along the LISFLOOD drainage network. Map data ©Google Earth 2015.

1.7. *Perhaps you should mention in the conclusion that this is a case study and that is important to try this method also for other extreme large events as for example the event of 01.09.2021 over Castilla to explore better the advantages and drawbacks of the proposed product.*

Yes, this is an important point. We have modified the related statement in the conclusions (lines 426ff) and included the need for further testing of the approaches on other compound flood events.