Author's response to reviewers

The reviewers' comments and questions are marked in red while the author's response to the reviews including a list of all relevant changes made in the manuscript are marked in blue.

5   I want to thank the authors for making the adjustments to the manuscript. I now feel much more confident in the findings they present. My only remaining minor comments would be some small textual things (mainly relating to too many decimals/significant digits) and elaborating slightly on the rationale for irrigation (in results) and on the limitations (resolution/irrigation) they found
10   in this study (where they come from and how to address in future).

Respond: We appreciate the reviewer's time and effort to improve the quality of the paper, we have revised the paper accordingly. The detailed revisions are presented below.

Abstract:

15   1.92 x 10^3 km2 -> 1920 km2

Respond: We have revised the approach for reporting numbers in the abstract and in the rest of the manuscript.

in line 11 at page 1:

"*we estimate a 1920 km^2 area affected by the flooding*"

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Western France along Rhone River (Rhone is not in western part of France! check how you describe the region later in the manuscript)

Respond: Thanks for pointing out this. Rhone River runs through south eastern France. We have revised this in the abstract as well as those in the
25   manuscript.

From line 13 to 14 at page 1:

"*Most agricultural flood exposure is found in eastern France along Rhône River, southern Netherlands along the Meuse River and western Germany along Rhine River.*"

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line 28-29: I would remove the inserted line about oxygen supply, creates more confusion than it adds.

Respond: We have deleted this sentence in the revised paper.

line 105: Put a full stop after "[...] in north-eastern France." Then make "Arles in south coastal France is presented as well." a seperate line (also to seperate the inundated areas from this other area of interest more clearly).

Respond: We have revised it accordingly.

From line 101 to 103 at page 4:

"*Figure 2 (b) shows the inundation extents over western Europe, while the regions where extensive flooded areas are found from the RAPID inundation map, e.g., the floodplains along Meuse in southern Netherlands, Rhine in western Germany, Rhône in north-eastern France are displayed. The inundation extent over Arles in south coastal France is presented as well.*"

line 113-115: I miss the line of argumentation about the pattern of the flooded areas from RAPID (patchy, not linked to river) as an indication that this is probably an irrigation signal, and not a flooding signal.

Respond: The explanation of the patchy pattern of the flooded areas in south-eastern France can be found in the revised paper.

From line 109 to 110 at page 4:

"*The flooded areas in south-eastern France whose pattern is primarily patchy, not linked to rivers, are mostly arable land, shown as Figure 3 (a).*"

and

From line 113 to 117 at page 4:

"*The croplands labeled as inundated in south-eastern France may be caused by irrigation instead of floods, because the irrigation starts from June 15 in France. As stated in the RAPID algorithm (Shen et al., 2019a) RAPID does not tell the cause of an incremental area of submerge so the labeled inundation could be caused by irrigation. But authors intend to leave such*

reasoning to local flood managers or stakeholders because they have better local knowledge and therefore do not think such limitation could cause an issue in disaster response."

line 117: would say about 162 km2 (remove the .02)

Respond: We have revised it accordingly.

line 120: remove the decimals again, so area of 140 km2

Respond: We have revised it accordingly.

Line 124-156: you now quote too many decimals / significant digits (sometimes 5 significant digits and 3 decimals!). The results are not that precise in terms of uncertainties, plus it is a lot less easy to grasp for the reader. I would remove the decimals everywhere. Only when number is below 10 you can use 1 decimal (so 2 significant digits then).

Respond: Following your suggestion, we have modified the approach for reporting numbers throughout the paper. In the revised paper, the decimals are removed when numbers are greater than 10, and 1 decimal is used when number is below 10.

Line 164: Also not a fan of x10^3 notation. Just say 1920 km2 and 1320 km2 as that is easier for reader to interpret.

Respond: We have revised it accordingly.

line 172: You start with 'one of the limitations', but actually list three limitations (IMERG precipitation, smaller tributaries, irrigation). I would make that more explicit. I would also spend maybe a few more words on this; indicating where the limitation comes from (i.e. spatial resolution for Geul) and how it can be addressed (higher resolution land-use; expert assessment of flood patterns and local knowledge).

Respond: We have rewritten the limitations of the study in the revised paper.

From line 174 to 180 at page 6:

"The findings of this study have to be seen in light of some limitations. The first is that RAPID system in Europe is triggered by IMERG precipitation data, which is a satellite-based precipitation product found to systematically underestimate precipitation in complex terrain areas, such as Alps [Navarro

et al., 2019]. The more accurate precipitation data over Europe is recommended to provide more reasonable inundation results over these areas. The second limitation concerns spatial resolution. RAPID can not

95 *capture the inundation well in the limited floodplains along the small rivers due to the spatial resolution issue, such as those in the floodplains along the Geul river, in southern Netherlands. Higher resolution data, including satellite imagery data and land use data, could help RAPID system to map the flooded area along the small rivers. Lastly, the irrigation on croplands during*

100 *to the flooding period, like the case in south-east France, may cause uncertainty on RAPID inundation results. The local knowledge from the users can inform RAPID to further improve its accuracy."*