2. Reviewer 2

We would like to thank the reviewer 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.

2.1. How to account for uncertainties deriving also from the integration of flood-type specific forecasts? Even if it is not the purpose of this paper could you provide some ideas on how to account for the uncertainties resulting from the combination of the two separate approaches (EFAS RRA and ReAFFIRM)?

As described in section 3.3 and in the conclusions in lines 386-388, the chosen approach to combine the impact estimates from the two methods is very simplistic. As pointed out by the reviewer, this simple way of combining the estimates introduces additional uncertainties into the resulting compound impact estimates. For instance, some areas with simulated fluvial flood impacts might in reality be affected also by flash floods with potentially different damaging mechanisms. As described in the conclusions in lines 416-419, an alternative to mitigate these uncertainties could be to use coupled hydraulic models for combining the methods already at the stage of the hazard estimation (e.g. in terms of compound water levels), before translating these jointly into socio-economic impacts. As of today, however, running such coupled hydraulic models in real time is not feasible, mostly due to computational constraints (as described in lines 419-425).

2.2. Which are the most relevant sources of uncertainty that can be associated to the ReAFFIRM methodology? Maybe it is reported in previous papers from the same author but a short discussion should be also reported here.

Yes, that is indeed important to mention. We have added the following sentence to the description of ReAFFIRM in section 3.2 (before line 201):

"As discussed in detail by Ritter et al. (2020a), the most pronounced sources of uncertainty affecting the ReAFFIRM impact estimates are the qualities of the employed rainfall inputs and flood maps. Additional important uncertainty sources include the purely rainfall-based hazard estimation and the vulnerability datasets used for translating flood hazard into socio-economic impacts."

2.3. How the uncertainties in the flood estimation can be translated into uncertainties in impact estimation? I think this process is different from flood and flash-flood processes. A short discussion related to this issue should be added.

For both methods, the uncertainties in the flood hazard estimation propagate down to the impact estimates. In ReAFFIRM, some of the uncertainties in the flood hazard estimation are reflected by the lower and upper bounds of estimated impacts (see lines 201-203 and for greater detail Ritter et al., 2020a). To provide some more information on this, we have added a summary of the most significant uncertainty sources along the ReAFFIRM model chain (see the previous comment).

In EFAS RRA, the flood hazard and thus the impacts are estimated deterministically (using as input the ECMWF ensemble median, see Table 1). A fully probabilistic estimation of impacts would require running the methods in real time on numerous ensemble members, which is – given the computational requirements and the need for fast generation of the warnings – currently not feasible. In the meantime, the simple deterministic impact estimation presented in this paper offers a sound solution.

REFERENCES

Ritter, J., Berenguer, M., Corral, C., Park, S., and Sempere-Torres, D.: ReAFFIRM: Real-time Assessment of Flash Flood Impacts – a Regional high-resolution Method, Environment International, 136, 105 375, https://doi.org/10.1016/j.envint.2019.105375, 2020a.