



Interactive comment on “Are interactions important in estimating flood damage to economic entities?” by David Nortes Martínez et al.

David Nortes Martínez et al.

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We thank you for your feedback and your suggestions for improving our manuscript. Below we provide our replies to the general comments of this referee, using the following structure: the referee's comment is highlighted in bold font, whereas the answer of the authors is included in normal font.

- **It (the article) is too much fragmentated in subsections that it is almost impossible to read and understand by readers who are not expert of their calculation model. As it currently appears, the manuscript is more like a technical report than a scientific manuscript.**

- We thank referee #1 for this observation, but we partly disagree with it, the global structuration of our manuscript is organized as the one of an article and not of a technical report. Its structure has been carefully considered to provide the reader the key elements to understand the interest of our work, our method, the protocol of simulations followed to test the hypotheses enounced, the results obtained and the meaning of such results.
- Concerning the use of subsections, we will reconsider carefully their use in the next version, and limit our structuration in tow levels (section and subsection).
- Regarding the expertise required on our model, we provide a full answer in the next point.

- **The description of the model and the workflow are too synthetic, they need to be enlarged and supported by a workflow.**

- We thank referee #1 for this suggestion.
- The current description provided summarizes the key points that the reader needs to understand the work accomplished in our article. For those readers who would like to deepen their knowledge in our model, the authors have also provided the reference to Nortes Martinez, D., Grelot, F., and Rouchier, J.: COOPER - Flood impacts over Cooperative Winemaking Systems, CoMSES Computational Model Library, <https://www.comses.net/codebases/6038/releases/1.0.1/>, version 1.0.1, 2019. This is the repository of the COOPER model in the COMSES model library, where readers have free access to a 76-page technical report

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documenting the model –according the precepts of the ODD protocol– as well as to the source code of the model.

- Nonetheless, the referee's suggestion is duly noted and a more extended description of the model will be provided, including workflow diagrams, a better characterization of the coping tactics (also suggested by the referee #1. See below), impacts calculations and cost distributions.
- **[...] section 3, 4 and 5 should be completely restructured and better described.**

Answer of the authors:

- We thank referee #1 for this suggestion.
- Concerning section 3, we propose to make a new presentation based on what we explained in the previous point.
- Concerning section 4, we propose a restructuration, limiting the number of subsections.
- Concerning section 5, we do not understand what should be restructured as in this section the use of subsections is limited.
- **The figures should be better described in the text and it would be better to add the labels of the x-y axes and the unit of measurement, also specify which axis the various curves refer to.**

Answer of the authors:

- The authors thank the referee #1 for this observation.
- The description of the figures will be better described, labels to x-y axis will be provided next to the axis in addition to the labels already provided in the remarks that accompany each figure, and secondary axis will be suppressed to avoid confusions.

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- Please give an extended explanation of what the farm coping tactics are since they are important in the model results.

Answer of the authors:

- We thanks referee #1 for this suggestion.
- The authors agree with the comments of the referee #1. This remark will be included in the extended version of section 3.
- **The referee recommends the author improving the discussion, explaining their results in the light of past flooding events and making practical cases of the different interactions occurred between and within the damaged elements to better understand how the different damage (to buildings or to plots) had negatively impacted the CWS.**

Answer of the authors:

- The authors appreciate the recommendation of the referee #1 to strengthen the discussion of the paper and agree on the convenience of such an inclusion.
- Unfortunately, available information on past flood events is, at best, fragmented and rarely available in public form with the level of detail that this comparison would need. In particular, very few farms are insured and the sinistrality data are unusable for validation or discussion. Indeed, to overcome these problems in the development of the COOPER model, authors have targeted past events and used different elicitation methods available to them: GIS, field interviews, professional expertise, census and statistical data as well as analysis of technical reports and scientific literature. The massive amount of data collected allowed the authors to reconstruct the way a real French CWS works and reacts to a flood event. Then, over this

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meta-model, authors were able to build the COOPER model for flood impact simulation.

- This approach not only enables us to overcome the challenges provoked by the data quality and availability in the model design but also to allows us to validate our model. Indeed, insofar as the data to validate the model COOPER is limited, we opted for the so-called conceptual validation (Rykiel Jr., 1996). This kind of validation relies on the theoretical plausibility, accuracy and justifiability of the relations cause-effect built in the model.
- Consequently, although the authors agree with the referee's recommendation, such an comparison exercise is not possible with the data publicly available.
- The authors will include this argument in the next version

- **It would also be important to understand how this ex ante analysis can help the economy of the wine sector.**

Answer of the authors:

- The authors appreciate the recommendation of the referee #1 to strengthen the discussion of the paper, we will mention this point in our next version.
- Nonetheless, the goal of the article is not to study the wine sector per se but rather, using a specific case study taken from the wine sector, to illustrate how important could be to consider interactions for flood damage assessment at microeconomic, local levels. From this point of view, we discuss the relevance of our work for the analysis of any local organization or supply chain that works in a similar way as the cooperative winemaking system. This is the reason not to focus specifically the on wine sector in our discussion and conclusion. Indeed, as stated in Meyer et al., 2013, "most stakeholders are interested in assessing the indirect impact of various types

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of events, both large and small, at micro (cities) or meso (catchment) scale, with or without risk mitigation measures. However, most of the methods discussed can only assess the impacts of an extreme event on the national or sometimes regional scale". Our work benefits from the potential of Agent-based models to become computational laboratories in which to evaluate the response of a system to an external perturbation of variable magnitude. Indeed, the goal of the COOPER model is to evaluate the potential disruption caused by different floods over a system bounded to a local, very concrete, highly detailed, monosectoral and spatially-explicit supply chain. Furthermore, impacts and disruptions in the COOPER model can be studied either at the level of one individual or groups of individuals. Therefore the model has a very clear microeconomic orientation. The goal of the present article is to present how current practices in damage assessment at local level can benefit from more thorough and spatially-explicit representations of local networks.

V. Meyer, N. Becker, V. Markantonis, R. Schwarze, J. C. J. M. van den Bergh, L. M. Bouwer, P. Bubeck, P. Ciavola, E. Genovese, C. Green, S. Hallegatte, H. Kreibich, Q. Lequeux, I. Logar, E. Papyrakis, C. Pfurtscheller, J. Poussin, V. Przyluski, A. H. Thielen, and C. Viavattene. Review article: Assessing the costs of natural hazards - state of the art and knowledge gaps. *Natural Hazards and Earth System Sciences*, 13(5):1351–1373, 2013.

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