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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Hydrogeomorphological analysis and modelling for a comprehensive understanding of flash-flood damaging processes: The 9th October 2018 event in North-eastern Mallorca" *by* Joan Estrany et al.

Jorge Lorenzo-Lacruz

j.lorenzo@uib.es

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After a careful reading of this manuscript I have several questions and concerns about the data (rainfall, discharge) and methods (modelling) the authors used for analysing the flash-flood occurred in October 2018 in eastern Mallorca: 1. The abstract states: "Continuous streamflow monitoring data revealed a peak discharge of 442 cumecs"... but it is not clear if the event was continuously monitored, as in line 226 the authors say "with the absence of direct flow measurement for the Q estimation"; and in line 382 they say that the hydrological monitoring period excluded the October 2018 month,

when the flash flood occurred. Therefore, there was no direct measurement during the flash flood and this statement cannot be used neither in the abstract nor in the rest of the manuscript. 2. Related to the discharge and following line 226, with the absence of direct flow measurements, the next line explains that the authors applied the two-dimensional hydraulic model HEC RAS 5.0.6. However, where this simulation can be found in the paper? 3. The peak discharge of the flash flood was estimated through a stage-discharge rating curve (figure 4) calibrated with only two events with values over 1 cumec. Therefore, the estimated value of the maximum discharge is suspicious or may contain a significant error. There is a study made by Lorenzo-Lacruz et al. (2019) (https://doi.org/10.5194/nhess-19-2597-2019) addressed on the same event, and published in NHESS one month ago. In this published article, Lorenzo-Lacruz et al. obtained peak discharges of 306.9 cumecs and 303.4 cumecs with FEST and KLEM models, respectively, and successfully validated it with in situ measurements after the event. As a new contribution, Estrany et al. must discuss the significant difference with the result they have obtained (442 cumecs). Nevertheless, the authors not even mention the article of Lorenzo-Lacruz et al., (2019), in spite of it was published for open discussion three months before Estrany et al. submitted its manuscript for discussion and review. 4. Figure 6 show the total rainfall during the flood event. It is weird how the authors distributed the rainfall showing that the highest values were recorded in the western-central part of the basin and not in the headwaters, where the relief is higher (around 400 meters). The figure also shows 13 rainfall radar points for what purpose? to calibrate the rainfall? In Lorenzo-Lacruz et al. (2019) they show a complete reconstruction of the radar data for the same flood event and it is completely different to the data depicted in Figure 6. Lorenzo-Lacruz et al. draw the highest values (up to 400 mm) on the headwaters. This highest rainfall recorded in the upper parts of the catchment would explain why the flash flood also occurred in the surrounding basins (barranc de Sa Canova and s'Ametllerar), which share the headwaters with the studied catchment. 5. The authors used the hydrological modelling GSM-SOCONT and it is also surprising, since this model is "a

semi-distributed glacio-hydrologic model to simulate daily discharge from catchments with glacier cover" (https://www.mathworks.com/matlabcentral/fileexchange/43452-gsm-socont-glacio-hydrological-model). Surface runoff was computed with the SWMM (a conceptual glacio-hydrological model for high mountainous catchments). It seems not to be the most appropriate model for this watershed and for a catastrophic flash-flood analysis or reconstruction. There are other studies addressed in the Mediterranean region in which more appropriate models for flash flood episodes were used (Amengual, A., Homar, V. and Jaume, O., 2015: Potential of a probabilistic hydrometeorological forecasting approach for the 28 September 2012 extreme flash flood in Murcia, Spain. Atmospheric Research, 166, 10-23. Amengual and Carrio, 2017: A Comparison of Ensemble Strategies for Flash Flood Forecasting: The 12 October 2007 Case Study in Valencia, Spain https://doi.org/10.1175/JHM-D-16-0281.1). 6. Therefore, it is embarrassing to say that the "observed and modelled hydrograph and corresponding peak flow (442 cumecs)" showed in Figure 6 contains major flaws as: i) there is no observed hydrograph, ii) a glacio-hydrological model was used for a small Mediterranean watershed with low elevations and semiarid conditions, and iii) what is more surprising, the peak flow is reached one hour before the peak of rainfall. Is there any reasonable argument to defend such hydrological behaviour? 7. It is at least strange that this study not even mention the work by Lorenzo-Lacruz et al. (2019) "Hydro-meteorological reconstruction and geomorphological impact assessment of the October, 2018 catastrophic flash flood at Sant Llorenç, Mallorca (Spain)", accepted for publication in October 22nd and published one month ago in NHESS. The study by Lorenzo-Lacruz et al. can be used for discussion about the different results that Estrany et al. obtained on rainfall data, peak discharge, hydraulic and hydrological modelling, geomorphological reconstruction, etc. This is, indeed, the objective of an open discussion journal. Explicitly speaking there is a resemblance of some of the content of this contribution (Estrany et al.) with the contents of Lorenzo-Lacruz et al. (2019). Not only the title and structure of the manuscript are similar, some figures included in this paper show a direct and evident inspiration on the published paper by Lorenzo-Lacruz

et al. (i.e.: figure 2 of the published paper and figure 2 of this manuscript; figure 6 and figure 7; figure 9.c of the published paper with figure 8.c of this manuscript). In science, the right of any particular to carry out research freely on any topic is respected, of course, but it is also necessary to cite and mention the work already done by others to avoid plagiarism.

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