Review of the manuscript

"Flash flood occurrence and relation to the rainfall hazard in a highly urbanized area "

submitted to NHESS by K. Papagiannaki, K. Lagouvardos, V. Kotroni, and A. Bezes

Reviewer: Martin Mergili

The authors present an interesting study on the consequences of flash floods in the metropolitan area of Athens. They use meteorological data, an event database and records of the fire brigade to correlate rainfall intensities with the impacts of the associated flash floods, and to explore which rainfall parameter in terms of magnitude and duration serves best as predictor for flash flood impacts. The manuscript is generally well written and illustrated, and interesting for the audience of NHESS. I would like to place a number of comments and suggestions to be considered before final publication. I therefore recommend <u>minor revisions</u>.

General comments

- The term vulnerability is frequently used in the paper. However, this term may reflect various concepts. Somewhere in the beginning it should be clearly defined how the term is used in the context of the article.

- Language and style are largely o.k., but need some polishing.

Specific comments

- 2 Data collection: I suggest to put the paragraphs from 3124:22 to 3125:16 to the front of the section. This would result in a more logical order, starting from the general description of the study area, and continuing with meteorological data, the event database and finally the records of the fire brigade.

- How did you determine the most relevant rain gauges for an event? Are they just the gauges closest to the affected area, or those in the catchment upstream, ...?

- 3130, 22ff: As I understand it, it is assumed that all recorded flood-related fire brigade operations during those events really took place in the city of Athens (and not in surrounding areas which might also have been affected, but where the precipitation parameters used might not be valid). This is acceptable in my opinion, but it should at least shortly be mentioned.

The figures are well prepared in general. Some comments:

- Figs. 1–3 need a scale bar (alternatively, you may mention the grid spacing).

- As the article concerns both natural and socio-economic issues, it would be good if you could add the most important towns (if possible, as areal signatures) to Fig. 1. Further, the green and red symbols should be shown also in the legend (even though it is clear what they mean).

- Fig. 4: I think that the y axis label of the right pane should be replaced by "R10"? In fact, the two figures look very similar, probably the right one has to be replaced by another one at all ... Further, you should write in the caption that the fraction of data relates to the fire brigade reports.

- Fig. 5: Be careful, the x axis tick mark labelling is incorrect. E.g., R24 of 30 mm is actually assigned to two classes, this is not allowed. 30 - <60 mm, 60 - <90 mm etc. would be correct.

- Figs. 5 and 6: It might be good to show a graph relating the number of events and the number of the fire brigade operations (e.g., building a ratio between the two). However, it is the decision of the authors whether they would like to try doing so.

- Fig. 7 is very informative and calls for a bit more explanation in the caption: I guess that the red dots represent the events which led to reported flooding, and the blue dots those which did not – but this has to be explained.

The authors shall feel free to contact me at <u>martin.mergili@univie.ac.at</u> in case they disagree with my comments or if they wish to discuss the one or the other issue.

With best regards

Martin Mergili