Review of the paper "Assessing changes on urban flood vulnerability through mapping land use from historical information

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This paper offers an interesting approach to the analysis of the changes that could be produced in the flood exposure and vulnerability as a consequence of the changes in land uses, demography and buildings. To this end the authors compare two catastrophic flood events produced in 1910 and 1930 in two little French cities. The main interest of the work would be its application to adaptation and mitigation strategies, and its reproduction in other cases study is revealed as useful for the flood community. For this reason, and although the paper seems to be based in a very rigorous work (the PhD of M. Boudou) I would recommend some minor changes before to be published in order to facilitate to the reader, the criteria and methodology applied.

General Comments

One of the main problems is the concept associated to the expressions flood vulnerability and flood exposure that should be clearly defined in the Introduction. This last is too much short and due credit to other works in the same matter has not been made. I would suggest developing a little more the Introduction, coping with the concepts of vulnerability and exposure (there are a notable controversy between the different authors and administrations about them) and any previous literature on the topic of this paper.

Specific Comments

P. 6154, l.13. Could you include the criteria to define a "major flood"? You say afterwards that three points are considered, but they are very general. The same in Figure 1

P. 6154, l.20. Which is the second level?

P. 6154, l.26. You speak about a "evaluation grid", could you provide it?

p. 6155, l.7. In the figure 1, the 1910 event has not one of the "highest score".

p. 6155, l.8. Return period near 100 years, for flow or rainfall? In which river was it? The Seine? Or in Besançon?

p. 6155, l.10-11. What is the mean here of "indirect deaths"? How do you know that 150000 people was affected by the 1910 event in Paris?

p. 6155, l.11. 1,5 billion of euros of which year? Usually damages are adjusted by changes in the gross value to a specific year near to the present. Could you indicate it? The same for l. 23, and other economic damages estimated along the paper.

p. 6155, l.17. Could you introduce in a bracket the value of this maximum water level?

p. 6155, l.17-19. This short meteorological explanation should be placed at the beginning or at the end of the paragraph, but not in the middle of a section focused on the impacts.

p. 6156, l.4. Attending the description the problem was in the flood "management".

p.6156, l.13. Could you include the flow value achieved in the Tarn? I suppose is 8000 m3/s, following your explanation, but in this case, which would be the return period? (significantly larger than 100 years could be 200 or 500…). What is the average discharge of the Tarn in Moissac?

p.6156, l.16. In English language is 20th century, not XX century.

p.6158, l.5-9. Could you indicate the historical sources of information you have used?

p.6158, l.19-24. Could you include a table with those “simplified descriptors”?; why you associate structural exposure with urban growth but structural vulnerability with land-uses? Usually structural vulnerability refers to the capacity of the buildings in front of the specific risk. In the following page, lines 16-20, it seems that you interchange the concepts because you associate structural exposure to land-use classification. The same problem is observed in p.6161, l.3, when you associate structural vulnerability to urbanized area. Figure 6 cannot help to understand it

p. 6159, l.4. How many historical maps? For which years?

p. 6160, l.13. How do you know the building height? Does Equation 1 explain the volumetric method?

p. 6161, l.21-23. When you represent the flood extension in 2013, do you consider the existence of new structural flood protection measures like the river channelling or new dikes?

p. 6162, l.12. Why the flood risk vulnerability decreased since 1910?