

Interactive comment on “Patterns and comparisons of human-induced changes on river flood impacts in cities” by Stephanie Clark et al.

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General comments The topic of this paper is clearly both interesting and of great importance. The paper is well written and has a clear structure. However, it seems to me that the paper does not really fulfil the promises implicit in the title. Which are the patterns in flood impacts on cities that are revealed in the paper?

There are some problems with the method used, and there is a problem with the general approach. The latter problem is related to the presumption that it is possible to draw conclusions about individual cities based on a global model. It is also doubtful whether any meaningful patterns can emerge from such a rather superficial study. The method issues are covered below.

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Before publication, technical corrections need to be made. Specific comments can be dealt with by comments/clarifications in the paper or via rebuttal.

Specific comments (p.3, lines 41-44) The objective is given only in rather general terms. It would have helped the reader to get some more precise information about which types of “global patterns and relationships” that is meant to emerge from the study.

(p.4, lines 11-20) The main problem with the method is the data source used in the paper. This source consists of output from a global tool produced by the World Resources Institute. In the paper this model is described as made up of “global hydrologic and hydraulic models” and more. It raises some concern about the accuracy of such models when they are “global”. Unfortunately, the only reference in the paper leads to a web site, which in turn refers to the name of a model but with no proper literature reference. So, it is quite difficult for the reader to judge for herself how useful the data used in the paper is. Considering the spatial resolution given in the said website the usefulness is doubtful. As an example of interest for the reviewer: the country of Sweden is presented as one “basin” !

(p.4, lines 29-34) Another weakness in the method is that the actual, real flood protection level is not included. Instead flood protection level is based on the assumption of proportionality with national income level.

(p.4, line 18-22, 38) On the one hand: changes due to socioeconomic development are driven by population and economy. On the other hand: protection level, which is assumed proportional to national income level is kept constant over time. This is inconsistent.

(p. 6, lines 16-19) The present situation is in the paper characterized based on conditions 2010 while effects of climate change is based on projections for 2030. This time interval, 20 years, is a bit short for meaningful comparisons.

(p.8, 3 lines 5-15; Fig. 1a) While the colouring of the maps allows for different absolute

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impact on people and material damage for an individual city, the location of all cities are exactly the same on both people and damage maps. This latter fact seems to indicate that the relative difference in impact between cities remains almost identically the same for both people and damage.

(p.17, lines (23-38) The actual, on the ground flood management measures and other socioeconomic development are presented for Marrakech. However, in the model producing the source data for this paper only some of these factors were incorporated. See previous comment re page 4.

Technical corrections (p.1) The title is “. . . .changes on river. . .” should be “. . . .changes in river. . .” (p.7: 25) “. . . .Whist. . .” should be “. . . .Whilst . . .” (Fig. 1) Fig. 1a) is difficult to read because of the many cities and the small font; however still ok. Fig. 1b) is too blurry due to combination of background colours and text. More or less impossible printed; still difficult on the screen. (Fig.2) Similar problems as with Fig. 1 (Fig.3) Similar problems as with Fig. 1 &2. Difficulties reading this figure exacerbated by all the information crammed into one page. The gradients indicated along the axes are impossible to interpret. (p.13:1) “. . . .reduction on. . .” should be “. . . .reduction of . . .” P.16:16) “. . . .loses. . .” should be “. . . .losses . . .”

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