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Comment

## ***Interactive comment on “River flood risk in Jakarta under scenarios of future change” by Y. Budiyo et al.***

### **Anonymous Referee #1**

Received and published: 18 September 2015

General Comments: In this manuscript, authors presented flood (river) risk assessment in Jakarta for current and future period considering multiple drivers i.e., climatic change, land use change and land subsidence. The paper is based on a previous study by the authors, Budiyo et al. (2014), in which current river flood risk in Jakarta has been assessed by using Damagescanner-Jakarta risk model. The improved version of the previous model is used to simulate future flood risk here. According to the assessment, the most dominant driver for increased flood-risk in future (2030) is land subsidence. Overall, the presented research is innovative and timely. The major conclusions are highly relevant for flood risk management in Jakarta. Despite the paper is already in good quality, I found several limitations (see below). In order to publish the paper in NHESS, I suggest 'major revisions' taking into account following comments:

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Comment 1: Authors found that direct economic damage for current flood risk is USD 143 million p.a.. They compared the results with previous estimate of Budiyo et al. (2014). However, I do not find any comparison with official flood damage record of a historical flood event. For a reliable estimation of flood damages, this comparison is essential.

Comment 2: The major conclusion of the paper is that land subsidence is highly responsible for increased flood risk in future. However, future land subsidence is calculated based on a strong assumption that current rate of subsidence remain same for the future period. Based on such a strong assumption, providing a quantitative value (173% increased risk due to only land subsidence) might be misleading for decision maker. I understand that authors already discussed their assumption. However, authors should clearly mention that in realistic scenario of land subsidence, this estimation might change significantly.

Comment 3: Assessing flood risks for current period, authors have used a land use map of 2002. How a land use map of more than 12 years old can represent current land use? There are plenty of sources for developing land use map.

Comment 4: For assessing flood risks of 2030, authors have used official land use plan 2030, which is ideal scenario (not a realistic scenario) of land use. In order to be consistent with other drivers (land subsidence, climate change), simulation based land use scenario is more appropriate.

Comment 5: The term 'vulnerability' has multiple notions and in this paper authors have considered only physical based depth-damage functions. Authors should mention this limitation taking into account several important literature such as Cutter and Finch (2008); Cutter et al. (2013); Gain et al. (2015) and Giupponi et al. (2015).

Comment 6: In my opinion, development of vulnerability map is a complete black-box. After reading the manuscript it is not immediately clear how expert meeting following Fuzzy Cognitive Mapping was used to generate vulnerability curve, along with the

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method developed by Budiyo et al. (2014)

Comment 7: Authors did not consider changes in the vulnerability for the future period. I understand that this is a lot of work. Authors should at least include the work by Mechler and Bouwer (2014) on vulnerability changes.

Comment 8: Authors have nicely described the implication of the study in the context of Jakarta. However, authors should provide a synthesis about the novelty of the approach to the general readers.

I have no technical comments.

Suggested References:

Budiyo, Y., Aerts, J., Brinkman, J., Marfai, M. A., and Ward, P.: Flood risk assessment for delta mega-cities: a case study of Jakarta, *Nat. Hazards*, 75, 389–413, doi:10.1007/s11069-014-1327-9, 2014.

Cutter, S.L., et al., 2013. Integrating social vulnerability into federal flood risk management planning. *Journal of Flood Risk Management*, 6, 332-344.

Cutter, S.L., Finch, C., 2008. Temporal and spatial changes in social vulnerability to natural hazards, *PNAS*, 105(7), 2301-2306.

Gain, A.K., Mojtahed V., Biscaro, C., Balbi, S., Giupponi, C., 2015. An integrated approach of flood risk assessment in the eastern part of Dhaka City. *Nat Hazards*. doi:10.1007/s11069-015-1911-7

Giupponi C, Mojtahed V, Gain AK, Biscaro C, Balbi S (2015) Integrated risk assessment of water-related disasters. In: Paron P, Di Baldassare G (eds) *Hydro-meteorological hazards, risks and disasters*. Elsevier, Amsterdam, pp 163–200. doi:10.1016/B978-0-12-394846-5.00006-0

Mechler, R., Bouwer, L.M., 2014. Understanding trends and projections of disaster losses and climate change: is vulnerability the missing link? *Climatic Change*.

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doi:10.1007/s10584-014-1141-0

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 4435, 2015.

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