

## ***Interactive comment on “3D-hydrodynamic modelling of flood impacts on a building and indoor flooding processes” by B. Gems et al.***

### **Anonymous Referee #1**

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I consistently reviewed the paper entitled “3D-hydrodynamic modelling of flood impacts on a building and indoor flooding processes” by Gems, Mazzorana, Hofer, Sturm, Gabl and Aufleger. The manuscript Ref. No. is nhess-2015-326. The paper deals with the assessment of flood flow impact on a single building with respect to wall and floor openings. The analysis is based on 3D numerical modelling using flow3D. Different scenarios have been simulated, among stationary as well as transient flood discharge. Only clear water is considered. The building is located on the flood plain near the torrent. An important point is that there is a bedload retention basin upstream of the site, therefore, bed load and coarse sediment transport can objectively be neglected in the simulation. The paper is well structured and the reader can follow it from A to Z without difficulties. The presented study addresses relevant scientific and technical questions within the scope of NHESS. The only numerical approach may be criticized, but no

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on-site measurement or past damages have been assessed. There is not a strong theoretical base on this type of loading on a building (but one might look into the national codes on these types of loads on buildings, maybe as well from Tsunami resistance), the chosen approach be considered judicious. The paper present a more or less novel concept, but it is slightly away from actual research, and potentially a high-quality consultancy firm could do the work as well. The in depth analysis and presentation of the results can be considered as relevant for the journal. The numerical model set-up is sufficiently explained and presented; the used references are consistent with the subject. The introduction chapter dealing with the vulnerability assessment within integral flood risk management presents the state of the art. The simulation and main results are sufficient to endorsement the analyses and the conclusion. The description of the data used, the numerical methods and main assumptions and the results obtained are adequately and comprehensive; peers should be able reproducing the main procedures. The most relevant aspects are well explained and mastered with concise literature references. There are no particular questions that need to be considered in addition. The use of the English language is of sound quality. The proposed title allows a good start point to the manuscript, and the reader should not be disappointed. Figures are adequate and sufficiently explained. A more in depth discussion on the results and conclusions to be drawn for new buildings in the same situation is lacking, as well as indication on evacuation of persons or early warning. The paper never mentions the uplift on a building that may structurally damage it. I think that this article gives nice work through careful and thoughtful numerical investigations, proposing comprehensive new insight on flow impact on a building in the flood plain. It can be published with minor revision on the points raised in the above paragraph. It has to be mentioned here that no real English proofreading has been performed by the reviewer.

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