

## ***Interactive comment on “Inundation mapping based on reach-scale effective geometry” by Cédric Rebolho et al.***

**R. Romanowicz (Referee)**

romanowicz@igf.edu.pl

Received and published: 2 May 2018

The paper presents a new approach to the derivation of inundation maps in data-scarce areas, the so - called MHYST approach. The approach applies concepts of hydraulic geometry to describe channel geometry and DEM-derived elevation geometry on the floodplains at a reach-scale.

It is an engineering approach to inundation mapping and is a good counter-part to “model-based” mapping which sometimes relies more on modelling results than on reality. The approach is based on an experimental study proposing a parameterisation of a turbulent momentum exchange between the channel and the floodplain. The uniform flow assumptions allow the streamflow value to be defined from the conveyance

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capacity and the channel slope.

The operation of the approach on a reach scale sums up to the derivation of a discharge- water level threshold relationship, assuming it is one-to-one. The approach’s main advantage is its simplicity and speed of computations and it can be used as the first approximation of inundation mapping.

The MHYST approach is tested on one extreme event that occurred in May-June 2016 in France. The River Loing, a tributary of the River Seine, was used as a case study. The inundation data were obtained from observations, thus omitting the application of a hydrological model.

The validation procedure is based on the maximum inundation area. However, it is not clear which data were chosen for the calibration and validation stages. The authors are asked to explain this point in detail. A number of different criteria were used but the description is very vague. The choice of roughness coefficients for a channel and a floodplain raises the most concern.

The authors present the drawbacks of the approach proposed, which covers most of my concerns.

The illustration map presented in Fig. 11 does not give enough detail. Perhaps the authors could present a larger scale map focussing on some specific area?

The authors stress the importance of the DEM in the derivation of inundation maps. Perhaps some sensitivity studies could be performed to assess that influence in a quantitative way.

I am also worried about the possible inconsistency between flood inundation assessment on adjacent reaches of the same river. The authors are asked to discuss that point. Finally, the authors are asked to compare the inundation mapping using MHYST with the straight-forward DEM based mapping in order to show the advantages of the proposed method to the simplest possible, “filling the volume” approach.

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