AUTHORS' REPLIES TO RC1 COMMENTS

RC1.1 *The setup created by authors seems to be very idealized?.*

Authors: While the experimental setup is very simple compared to a real urban catchment, it is still considerably larger and more diverse in urban flooding phenomena than comparable studies (Fraga et al., 2015; Hakiel and Szydłowski, 2016; Testa et al., 2007). Moreover, most of the phenomena that occur in an urban catchment are represented, e.g.: manhole overflow, basement flooding, ponding, overland flow, pipe flow, flow into sewer inlets.

Changes: none.

RC1.2 *How it can be compared in real flooding problems in a big city or urban areas?.*

Authors: The experiments were planned and conducted with two purposes in mind: First, the data is being used to develop and/or validate novel flood monitoring techniques that make use of tools such as Particle Image Velocimetry (PIV) or Deep Learning. Second, the data will be used to develop and test model calibration techniques. These two points are now stated explicitly in the manuscript.

The first application area is not affected by the size of the experiment. The second is affected but there are still a large number of model parameters that can be adjusted during the model calibration, e.g. surface and pipe roughness, weir coefficient and manhole discharge coefficient. The calibration insights gained with the experiment data are expected to provide urban drainage modelers with better understanding of the key points/ methods needed to accurately calibrate flood models of real urban catchments. Also, what the experiments lack in spatial extent they make up with the number of events and the density and diversity of sensors.

Based on the above points, the authors are therefore confident that the experiments and the collected data will also be useful for research about flood model calibration.

Changes: The following sentence has been added to the introduction : "In summary, the floodX data will be used for two distinct but related areas of urban flood research: (i) automatic interpretation of image data into useful information for flood monitoring and model validation, and (ii) development of flood model calibration methods with overland flow data to improve the predictive power of the models."

RC1.3 *Generally, flooding is by severe rainfall which is some what distributed. In the experiments, it is coming from reservoir.*

Authors: The authors acknowledge the reviewer comment. In the specific case of the conducted experiments the spatial distribution of rainfall of flood is not considered or represented. Nevertheless, the experiment remains representative of urban flood events for which flood water comes from a peri-urban catchment or even from an upstream urban catchment.

Changes: none.

RC1.4 *how to identify important flood parameters such as 1) time of concentration; 2)time to peak?.3) Max.flood depth; 4) area of inundation etc.*

Authors: The flood parameters can be computed by analyzing the time series of the relevant sensors provided in the dataset. Two-dimensional information such as the area of inundation can be computed for pond s3 with the help of the water level and geometry.

Changes: none.

RC1.5 *What is the "preprocessing code"?.*

Authors: The preprocessing code is the code used to transform raw data collected by the sensors into clean, good-quality and coherent datasets ready to be used by everyone in the scientific community interested in this topic. It is provided so that potential users can track all modifications undergone by the data and verify its quality. We provide a short description on page 9, lines 31-33.

Changes: none

RC1.6 *How effectively, this data can be used in flash flood studies?.*

Authors: Please refer to the reply to comment 2.

Changes: none.

RC1.7 *"A loss of 20% recorded" - how much it is for real cases?.*

Authors: We assume the referee is asking about the water loss for individual flood experiments. This can be obtained with help of the figure 7 page 12 of the original manuscript, in which each point represents one experiment.

Changes: Based on feedback from other reviewers the discharge data from pipe p6 has been removed from the datasets and this discussion has been removed from the manuscript.

RC1.8 *How effectively, the data generated can be used?.*

Authors: Please refer to the reply to comment 2.

Changes: none.

RC1.9 *Any separation between "channel flow and overland flow"?.*

Authors: We assume the referee is asking whether the terms are differentiated in the manuscript. The difference is that channel flow is a form of overland flow that can be assumed to be one-dimensional without introducing significant errors. Channel flow can be assumed in all pipes and channels except c4, where the flow is 2-dimensional. This is now specified in the floodX documentation, Table 5.

Changes: We added column to Table 5 in supplementary material.

Table 5: Characteristics of open channels

Name	Max depth [m]	Length [m]	Surface	Flow	Shape	Width [m]	Start elevation	End elevation
C1	0.7	7.2	Pavement	1D	rectangular	5.5	420.48	419.94
C2	0.2	7.3	Pavement	1D	rectangular	1	419.94	419.91
C3	No	4.63	Pavement	1D	rectangular	1.06	419.76	419.69
C4	No	11	Pavement	2D	Ill-defined	variable	419.69	419.47

RC1.10 *What are the effects of area, intensity of rainfall, duration etc?.*

Authors: The effects of area and intensity and duration of rainfall are represented by the intensity and duration of the inflow events.

Changes: none.

RC1.11 *In flooding, what is the use of particle image velocimetry?.*

Authors: The anticipated application of PIV is to quantify overland flow discharge during flood events in a cheap and robust manner, using existing surveillance infrastructure. This is now specified in the manuscript, page 2 lines 5 and 6. These data will allow urban drainage modelers to validate and calibrate urban flood models to improve model reliability.

Changes: The following sentence was revised: "In particular, optical methods such as large scale particle image velocimetry (LSPIV) can be used to estimate flood discharges and researchers have started leveraging social media and crowdsourcing to collect data for this purpose (Le Boursicaud et al., 2016; Le Coz et al., 2016; Dramais et al., 2011)"

References

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