Hydrology and
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Discussions

Interactive comment on "High-quality observation of surface imperviousness for urban runoff modelling using UAV imagery" *by* P. Tokarczyk et al.

P. Tokarczyk et al.

piotr.tokarczyk@geod.baug.ethz.ch

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The authors would like to thank the reviewer for his valuable comments. We are happy to address them in our preliminary reply (interactive discussion). Comments will find in-depth consideration in the formal review resulting in a revised manuscript version. Its completion is envisaged when all invited reviewers completed their assignments.

We address the comments in the same order as the reviewer.

1) Thank you for pointing out this issue. In the revised version of the manuscript we will expand the state-of-the art section and add references concerning applications of

UAVs in different contexts.

2) We deliberately did not include too many detailed information on operational UAV data and further specifications, because we rather want to focus on the use of UAV 'products' for urban drainage applications. But we agree upon to include some of the technical specifications on the flight itself (e.g. flight parameters) and image post-processing in the main text. We will add this information in the reviewed version of our manuscript. Details regarding the flight platform are available in the Supplementary Material.

3) We agree that the description of the urban drainage model in Chapter 2 should be improved. A more precise and explicit terminology will be used in the revised version of the manuscript. This should resolve the potential confusion regarding surface runoff (hydrological) and channel flow (hydraulic) model. Regarding the recommendation to straightly use and discuss 2D model applications (two-dimensional dynamic overland flood model coupled with a one-dimensional sewer network model) we would re-comment as follows: 1. We decided to use and discuss just a 1D sewer model (EPA SWMM) since it is - to date - the state-of-the-art approach for sewer network modelling, plus SWMM is one of the most established tools used. We do not want to retract to this, but due to the fact that a large community in practice is dealing with particular this application, we thought it would be most valuable to discuss the use of UAV data in this way. 2. Including the 2D modelling approaches would impose several other, partly relevant, issues apart from land cover data (input data accuracy, i.e. spatial resolution of DSM, discussion on preferential flow pathways depending on the overland flow model used). It would extend the scope of the paper significantly and, most likely shift the focus of the discussion. However, we do acknowledge that opening the discussion regarding 2D modelling approaches, becoming more and more popular, would clearly make sense. Hence, in the revised version we will extend the already included section in the discussion chapter (line 498-505) to address the issue in more detail.

4) Fig. 2: we will enhance the quality of this figure. Fig. 3: Thank you for pointing out

this issue. Here, we want to highlight the differences between two datasets (swisstopo vs. UAV data). In the reviewed version we will include a zoom-in of a selected part of the images, so that the readers can visually identify the differences; Fig. 4: similarly to Fig. 2, we will enhance the quality of this figure. The scale bar will be added; Fig. 5 and 6: The purpose of this figure was (similarly to Fig. 3) to show the results of the classification in regard to different classification settings (datasets, classification methods, number of target classes). We deliberately showed a building and its surroundings so that the reader can see how does our method cope with all kinds of objects on the image (building, trees, grass, roads). We think that the scale-bar is not necessary and will blur the figure. In addition to this, we believe that the colors used in this figure are well contrastive; Fig. 7 and 8: we will improve this figures (units, colors)