

Interactive comment on “The potential of urban rainfall monitoring with crowdsourced automatic weather stations in Amsterdam” by L. de Vos et al.

L. de Vos et al.

lotte.devos@wur.nl

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REVIEWER: The paper discusses the advantages of crowdsourced weather station data (rainfall measurement) to obtain rainfall information suitable for hydrology studies in urban areas, i.e., rainfall measurements that the need to have high temporal and spatial resolutions. The paper is, to the best of my knowledge, the first attempt to quantify the errors of rainfall data made available from local, distributed and crowdsourced weather stations, which makes it an interesting study. In the paper the crowdsourced rainfall data are compared with dedicated rain gauges and rainfall radar data as these are the common rainfall data sources used in urban hydrology.

AUTHORS: We thank the reviewer for the valuable review of this paper. We appreciate

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the constructive comments, and address each of them below.

REVIEWER: Here some suggestions:

(1) Some sentences are too vague and need to be rephrased to convey a clear message: e.g., what do authors mean by “... return time of less than a few years”?

AUTHORS: The section discussed here was intended to highlight the limitations of the filter that was used on the Amsterdam dataset. “a return time of less than a few years” refers to the return times of Dutch rainfall amounts found by Buishand and Velds (1980), Overeem et al. (2008) and Buishand and Wijngaard (2007), as documented by the latter.

The filter that is discussed in this section contains a dynamic maximum threshold, which filters out intervals with values higher than 50 mm h^{-1} above the median rainfall intensity of the surrounding stations. For example, in case of 10 min time series the filter works as follows; If for a certain 10 min interval the median rain intensity of surrounding stations is 4 mm h^{-1} , the upper threshold for rainfall intensity becomes 54 mm h^{-1} for this particular interval. According to the values found in the research, this corresponds with a return time between 1 and 2 years (Buishand Velds, 1980; Buishand Wijngaard, 2007).

As these return time values are different for other interval lengths and median values of surrounding stations, the statement was phrased in a general way.

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In conclusion, realistic rainfall measurements could be excluded by the filter. We would like to stress that visual comparison with gauge adjusted radar data indicates that this was not the case for the dataset used in this paper. However, for operational application of a filter with an upper threshold, this should be taken into consideration.

Other sentences will be reevaluated for vagueness.

(2) The structure of the manuscript deserves to be revised. See for example: (a) the order figure numbers appear in the manuscript is cumbersome and makes the manuscript confusing (why Fig. 5 appears earlier than Fig. 3?)

AUTHORS: In Sect. 2.1.3 the experimental set-up is described, and the reader is referred to the inset in Fig. 5 where the set-up is visualized. This reference precedes references to Fig. 3 and Fig. 4, as the results that are also visualized in Fig. 5 are discussed in Sect. 3.1. The authors acknowledge this may be cumbersome to the reader, though prefer to not split up Fig. 5 in two figures.

(3) Lines 18-24 in Page 12 are not conclusions. The authors may want to move these sentences to another section of the manuscript. Also, lines 29-33 page 12 are not conclusions.

AUTHORS: The authors agree these sentences should be moved to the results section.

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(4) Figure 5 does not show "a dedicated experimental set-up" (page 6, lines 2-3), i.e. the text does not match what is seen in the Figure. The authors may want to adjust the text of the Figure.

AUTHORS: With this sentence the authors refer to the photo in Fig. 5 that shows the experimental set-up of the rain gauges. This will be rephrased in the text.

(5) Figure 1. The "black dot" KNMI radar product is not visible in the plot (only in the legend). Authors may want to adjust the plot /or legend).

AUTHORS: The symbols in Fig. 1 will be adjusted in the revised version.

(6) There is room for improving the English language; incomplete sentences (e.g., Page 5, line 6) and minor typos (e.g., "criterium" should read "criterion" in Page 11, line 19) can be found in the manuscript; "CV" is only defined in Fig. 10 legend.

AUTHORS: The overall English language will be reevaluated, and your suggestions will be implemented.

References:

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Buishand, T. A. and Velds, C. A.: Neerslag en verdamping [Precipitation and evaporation], Royal Netherlands Meteorologic Institute, 1980.

Buishand, T. A. and Wijngaard, J.: Statistiek van extreme neerslag voor korte neerslagduren [Statistics of extreme rainfall for short durations], Royal Netherlands Meteorologic Institute, 2007.

Overeem, A., Buishand, A. and Holleman, I.: Rainfall depth-duration-frequency curves and their uncertainties. *Journal of Hydrology*, 348(1), 124-134, 2008.

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