Interactive comment on "The importance of city trees for reducing net rainfall: comparing measurements and simulations" *by* Vincent Smets et al.

Anonymous Referee #2

Received and published: 7 November 2018

This manuscript describes some useful work to estimate canopy interception from urban trees. The experimental data appear to generally follow expectations, and conclusions are apparently well supported.

The manuscript is, however, unusually long, and contains extended reviews of basic and standard canopy interception concepts that are not necessary and make the original contributions of the work difficult to extract. For example, Figures 1 and 5 are unnecessary: these have been standard for 50 years, and also the same analysis as Figure 5 was done for this research and presented as Figure 10. Sections 1.2, 1.3, and 2.6 could all be reduced substantially.

The choice of and behavior of WetSpa for interception modeling is difficult to evaluate. The WetSpa equations in Appendix A contain symbols that are not defined and the cited source for these is a white paper not contained in the References. As far as I can determine the simple assumptions it makes have never been tested in the refereed literature, despite the citations to support use of the WetSpa interception formulation (e.g., P5L15) that do establish that it has been used. There appears to be no scientific reason to include this model in a comparison, and it seems likely that it was chosen because of its familiarity to the authors.

The simplicity of the WetSpa formulation as an ultra-simple bucket model with, e.g., no provision for drip when storage is less than capacity or reduced evaporation rates from partially wetted canopy, is an interesting test against the more sophisticated Gash and Rutter models. That it appears to give empirically similar or superior results is a very useful finding for canopy interception science. However, the discussion makes essentially no attempt to explore the ramifications of this finding, either from a utilitarian (e.g., "should we be using simpler models") or physical (e.g., "what does it mean that only the coarsest components of the water budget need modeling?" Or "Is the superior performance of the super-simple model a fluke of this environment or should we be applying it more generally?") perspective. Re-stating and discussing the "WetSpa" formulation in terms of other, similar models in the older literature would help it to make the biggest contribution to the canopy interception literature.

I think the urban hydrology modeling is a separate topic that is best left for another paper. Removing it would help shorten the paper to a more manageable size and also allow the strengths of the interception data to be better emphasized. Perhaps it is only a matter of taste, but I think the style in which the urban hydrological modeling text is written suggests bias on the part of the authors about the importance of urban trees, when a dispassionate evaluation would be more effective.

The canopy interception conclusions mostly consist either of simple data or bland inferences based more on previous understanding of urban hydrology than on the results

of this work. Adding theoretical discussion and making theoretical inferences from the data would help readers understand the scope of the work beyond the immediate context of this experiment.

A few detailed comments: P12L15 Salvadore et al. 2015 published a general review of models of urban hydrology, and it is not clear how that review supports this work.

Figure 2 is not needed; its function is duplicated by Figure 3.

Section 3.1 should be Methods.

Sections 2.5.2 and 3.3 the sensitivity analysis is difficult to understand. It seems like the data in the two panels of Figure 9 probably came from the same assumptions, but I cannot follow the text P9L34-37

Figure 10 the inflection point is plotted at ∼2.5 but listed as 4.72.

Figure 13e is unnecessary. The same information is in a-d. The equations for the regressions should be presented.

Table 2 I disagree that regression does not account for evaporation during the event. It simply does so implicitly.