Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2017-166-RC2, 2017

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Subcatchment characterization for evaluating green infrastructure using the Storm Water Management Model" *by* Joong Gwang Lee et al.

Anonymous Referee #2

Received and published: 24 July 2017

General Comments: The manuscript "Subcatchment characterization for evaluating green infrastructure using the Storm Water Management Model" demonstrates a new discretization approach within SWMM for better representing green infrastructure (GI) components in urban storm water modeling. The topic is well placed and tackles an increasingly popular area - high-resolution hydrologic modeling as a result of increasing availability of high-resolution imagery. However, the lack of key information on model setup and modeling processes made it very difficult to understand how flow connectivity and thus hydrologic response were better represnted on the subcatchment level through finer classification of impervious and pervious areas. I am not convinced by the 'reduced-order' calibration approach, and do not believe that this approach is trans-

ferrable to other systems given its fundamental issue (see detailed comments). Lastly, the authors should provide references and/or justifications to many modeling assumptions regarding parameterization in particular. Detailed Comments: 1) P2 Line 16: Please provide references of relevant studies. 2) P3 Line 32: Explain and provide references of unit-area based analysis. 3) P5 Line 27: Add 'to' following 'adjacent'. 4) P6 Line 5-10: It is not clear to me how the 'intersect' tool was used to separate BPA and SPA. It is also unclear how the buffer widths (0.30, 0.61, and 1.52 m) were chosen. 5) P6 Line 18-22: How was 0.5 acre chosen? Why subcatments of similar size help maintain hydrologic continuity? 6) P7 Section 2.4.1: 1) Move the description of calibration procedure from section 2.5 to here; 2) What are the values of Suct and IMD, and how were they initialized? Please also include them in Table 1; 3) Please provide how subarea routing was characterized within each subcatchment? 7) P8 Line 8-10: The authors stated that the initial values for "Length" were decided by averaging multiple field measurements of perceived overland flow lengths for each land cover type. How was overland flow length measured and generalized for each land cover that are spatially dispersed in the catchment? Plus, it is not reasonable to rescale the lumped flow lengths for each land cover to subcatchments with distinctive spatial connectivity to their respective outlet. The conventional SWMM approach is much more reasonable in this context. 8) P8 Section2.4.2: I do not understand how BPA and SPA was represented and spatially connected in SWMM. Based on the description, BPA was modeled as an LID component that receives flow from ICIA of subcatchment(s)? Looking at Figure 3&4, however, BPA seems to be lumped into a subcatchment. Why choosing the buffer width of 18.3m? Please clarify. 9) P10 Section 2.5: It is common in both spatially distributed and lumped hydrologic modeling that the land cover- and soil-specific parameters are fixed across the catchment. However, it is inappropriate to aggregate and calibrate by land cover the parameters of slope and overland flow length that are much more topography than land cover dependent. I can't agree with author's argument that this calibration approach is efficient or can be transferrable to other systems. 10) P10 Section 2.6: 1) If I understand it correctly, SWMM was calibrated using

the option 6 setup. The calibrated parameters include overland flow lengths and slopes as in Table 1. In this section, the authors provide new sets of flow lengths and slope parameters for different cover type, which are different from the values given in Table 1. Did all 6 options use the same parameterization or not? If yes, why not using the calibrated parameters? If no, the comparisons do not seem fair – calibrated option 6 vs. non-calibration options. 11) P14 Line 16-18: Why option 4 has the highest peak flow (in Figure 8a) if only DCIA discharges runoff? Figure 2: I suggest that the authors label the ID and show the baseline flow path of each surface record so the readers can better understand the difference between DCIA and ICA.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2017-166, 2017.