

Hydrol. Earth Syst. Sci. Discuss., referee comment RC3
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Comment on hess-2021-482

Anonymous Referee #3

Referee comment on "Hydrological modeling using the SWAT Model in urban and peri-urban environments: The case of Kifissos experimental sub-basin (Athens, Greece)" by Evgenia Koltsida et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-482-RC3>, 2021

General comments:

The authors present a modeling study of an urban catchment with the SWAT. The study aims to compare the performance of daily simulations (using the curve number method) and hourly simulations (using the GAML method). The paper is within the scope of the journal, address relevant scientific questions and the presentation is of quality. The Methods and assumptions are well described and understandable. However, Results and Discussion could be developed: at the moment they read a little like a list of comments (especially section 3.3) without enough physical discussion. The authors find that different modeling timesteps and different runoff generation methods impact model parameters and performance, which is somehow expected and established. The novelty of the contribution therefore needs to be detailed and explained.

The reasons why the subdaily model did not perform as well as the daily model deserve more physical discussion about hydrological processes and implications. In addition, is it really fair to compare hourly and daily performance metrics directly? Shouldn't the results of the GAML method be aggregated to the daily timestep to really be compared with the CN method?

Specific comments:

Abstract:

The abstract does a good job at summarising the work in concise and clear language. The novelty of study could be explained in the Abstract and numerical values of Results could

also be given.

L12: Is 'demonstrate' is the right word? The paper rather "examines" the influence of precipitation timestep on performance metrics

L21: "long periods of time": in the paper the modeling period is 3 years which is not very long

1. Introduction:

L74: water level data of water flow data?

2. Materials and Methods:

L95-96: "in different times and under different weather conditions" : is the monitoring continuous?

L101-106: The authors could consider adding a sentence about velocity measurement? Can the real life accuracy of the probes be somehow estimated (especially since observational errors are mentioned later in the discussion)?

L133: and subdaily?

L198: mean and standard deviation of daily discharge? In m³/s ?

3. Results and Discussion

Section 3.1

This section describes the results of the sensitivity analysis. It shows that the daily simulation seems to be more sensitive to runoff generation parameters whereas the sub-daily simulation is more sensitive to channel routing parameters. The section could be better structured: for example it starts with a discussion on CH_N2, then discuss GWQMN and GW_REVAP, then again CH_N2 and in the same paragraph discuss CN2, which makes it hard for the reader to follow the reasoning.

L241-242: repetition from lines 234-239.

L252: is this difference physically meaningful?

L253: CH_N2 or CN2?

Section 3.2

This section presents the performance metrics of the daily and subdaily simulations. The authors conclude that the CN method is better than the GAML method. But, as stated above, is it fair to compare daily simulations with hourly simulations? Shouldn't the hourly simulation be aggregated to a daily timestep to have a 'fair' comparison?

L272: an explanation for the underestimation?

L274: it is expected that a daily timestep performs better than a subdaily timestep. It could be interesting to compare both methods at the same timestep, as stated above.

L284: performance metrics are satisfactory, but performance metrics also depend on what we want to use the model for: for example, though the model here replicates the timeseries quite well, it could not be trusted for flood analysis (poor performance on

hourly peaks).

L289: what is 'ET runoff generation' ?

L296: This is interesting but a little unclear: what is meant by 'too large' ? Would the results be better with, say, 10 min rainfall? Why?

Section 3.3

This section focuses on six "heavy" rainfall events in which the authors describe, in text, peak flow values and average flow values during the events. The hourly model underestimates peak flows. This section comes as a surprise for the reader as it is not mentioned in the Methods. Moreover, it is unclear how the events were selected: are they the 6 larger events of the timeries? It would be interesting to have an estimation of their return period to define "heavy"? From line 312 to line 335, the text simply describes hydrographs, without comments or analysis. Maybe the authors could consider a Table instead with rainfall characteristics (totals, duration, return period, etc.) and standard descriptors of hydrographs (peaks flows, difference between peaks, etc.)? It is concluded that the underestimation of peak flows is due to uncertainty in observed data or input data (rainfall), but without many arguments or any estimation of these uncertainties. How can one be sure that the errors are due to the data and not to the model? There probably exists a parametrization which can replicate high flows much better, with poorer performance on low flows?

L336-340: It is correct that errors in a model can be explained by 1/ uncertainty in the observed data 2/ uncertainty in input data or 3/ the model structure/parametrization. But what about this particular study? This could be further discussed.

4. Conclusions:

L366: 3 years is not really "long time".

Comments on Figures:

Figure 1 and Figure 2 could be merged

Figure 3: It could be worth to add rainfall?

Minor comments and typos:

L12: this study demonstrates (remove the comma)

L29: they are 'used to monitor', not 'able'

L30: they monitor groundwater

L81: "route" is unclear

