

hess-2023-256

General Comments

The revised version of the manuscript entitled “Simulation of spatially distributed sources, transport, and transformation of nitrogen from fertilization and septic system in a suburban watershed” presents an augmented version of the RHESSys Model for simulating the impact of spatially distributed anthropogenic N and water inputs in suburban watersheds. The authors chose a well-monitored watershed to calibrate the augmented ecohydrologic model for subsurface hydraulic parameters and compare the model results against observed NO₃- concentrations in streams. The augmented modules of the model rely on a rich composition of data sets obtained in previous surveys and studies.

The results prove that the presented approach successfully improves the prediction of nutrient loads in streams by integrating spatially explicit anthropogenic N inputs. It delivers valuable insights about the impact of N retention hot spots and could help planners decide on effective sizing and situating of best management practices.

As the presented framework is transferable to simulate the ecohydrology of other watersheds with scarcer or absent nutrient load data, it is a valuable contribution to watershed restoration efforts.

I suggest accepting the manuscript for publication with minor revisions.

Specific comments

#1) The overall quality of the manuscript and presented Figures and results improved significantly. The current state of knowledge and the novelty of the presented approach have been well elaborated. The methodology is now presented clear and well sorted, highlighting the rich input of collected data that backs up the authors augmentation scenarios.

#2) The length of several sentences (some are 3 to 4 lines long) should be revised.

#3) The conclusion should be revised for redundant points.

#4) Typos should be improved (see technical corrections in the report)

#5) The contribution of one author is not described in the respective section. Please make sure all authors contributions are described in concordance with the CRediT contributor roles taxonomy (suggested by HESS)

Technical corrections

I. 28 space/time ?

I. 29 With?

I. 69 typo: requires

I. 85 please improve the grammar

I. 91 typo soils

I. 120 add the: [...] facilitates [the] scientific assessment [...]

I. 223 might “we noted” at this line be a remnant of the reply to the review?

I. 224 Please correct the typo: from. Lastly

The standard deviations in the text are not showing the +- symbol right (e.g. I 341, 343 etc.)

I. 350 the unit mm must should in front of parenthesis

I. 379 please correct typo close-t- zero

I. 380 simulated instead of simulation

I. 409 why two values? “(-0.1, -0.3%) “

I. 431: please improve this sentence: Septic drainage patches (i.e., scenario septic only) was almost 5-fold higher (+368%) than the reference scenario none.

I. 211 Caption Table 1. what does physics of the parameters refer to?

Caption Figure 3: making 2 sentences will help the reader following on the complexity of the figure.

I. 371 Caption figure 4 is instead of was

I. 339: replace “turned on” with include

I. 465 Table 4 caption: I suggest for clarity to replace “others” with “each scenario”

I. 482 typo: transform

I. 494: it would be interesting to read here for how many years you suggest to spin up the model instead

I. 510: I like that you call it N retention hot spots here in the title, I suggest to consider to use this term throughout the text to differentiate more from N input hot spots which are described, too (Sec 2.4). This can increase clarity for the reader.

I. 545 missing “of”

I. 573-576 this last sentence is very long and redundant in some parts of it content

I. 578-581 Please divide this first very long sentence into several

I suggest to improve the conclusion. There are some redundant points and very long sentences covering 3 to 4 rows.

Figure A2: what values does the legend in panel a for soil texture represent?

I. 620: Figure A4 why (meter) and not (m)?

I. 645: The contribution of one author is not described. Please make sure all authors contributions are described in concordance with the CRediT contributor roles taxonomy