

Interactive comment on “Capturing interactions between nitrogen and hydrological cycles under historical climate and land use: Susquehanna watershed analysis with the GFDL Land Model LM3-TAN” by M. Lee et al.

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This is a good, timely paper. It nicely described the need for the development of models like LM3-TAN and the need to link the terrestrial and aquatic transport. The inclusion of a soil denitrification module and the way the rivers are treated as active biogeochemical reactors rather than passive pipes is very nice. The model is described well, the data sources used, are traceable and generally the line of argument is correct. I have very little to comment on the paper, except a few minor things.

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p5677 Storage in groundwater, this is issue as the authors note, given the 12-80% additional delivery rate. Can the authors comment on the need for further model development in this area in the discussion? It seems that calibrating this for every catchment in the world is a bit of an issue.

p5686 Validation. the use of a correlation coefficient is a bit poor. Is it possible to have some more advanced metrics, like the Nash Sutcliffe efficiency that are more common in hydrological models?

p5686 I am somewhat surprised by the low r^2 of the discharge values and how the 28% lower flows translate back into the N-transport uncertainty.

p5686 Is it possible to add a table with these results. This makes a comparison between the various outputs a lot easier.

p5701 Figure 1 is rather complicated to read with too many arrow crossing the boxes. Either simplify or redraw to make it more clear (i.e. “route” the arrow along the boxes).

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