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Comment on hess-2022-295

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Community comment on "Continuous streamflow prediction in ungauged basins: long short-term memory neural networks clearly outperform traditional hydrological models" by Richard Arsenault et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-295-CC2>, 2022

What is a hydrologic model?

I've read the discussion, CC1 vs. AC1, on whether or not the LSTM is a hydrologic model, though both agree it is the best one, model or not.

I feel it was about time again, since the late 1960s, for the hydrology community to define what is a model. Back then, we had to differentiate it from what we knew a human one in the fashion industry.

I believe the word "model" had been conscripted by the community since the debut in 1966 of the Stanford Watershed Model IV (e.g., Crawford and Burges, 2004). Prior to that, the word has been used in hydraulic engineering as a scaled-down object in a laboratory as opposed to the prototype, the real thing.

The tools of our trade such as the Rational formula, SCS runoff curve number and triangular unit hydrograph methods, and Muskingum channel routing procedure, to name a few, have almost all been elevated to a generic "model." I don't think a widespread use of the word represents a progress in scientific hydrology.

The Fortran version of the Stanford model was later called by the originators as the hydrologic simulation program (HSP), again Crawford and Burges (2004). Personally, I'd call the LSTMs as such, or "P" in HSP for the package.

Thanks for the opportunity to offer my comment.

References

Crawford, N. H., & Burges, S. J. (2004). History of the Stanford watershed model. *Water Resources Impact*, 6(2), 3-6.