Clarify on CC1
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Community comment on "Deep learning rainfall-runoff predictions of extreme events" by Jonathan Frame et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-423-CC2, 2021

I’d like to make use of this extended discussion period to clarify the one question I have of some co-authors’ previous statement, the latter part of which reads “This [LSTM] ..... (i.e., is it not a one-step-ahead forecast model)” (CC1, paragraph 2).

Among the autoregressive (AR) class of time series models for prediction, a simplest one being a one-step-ahead extrapolation/forecast model. This is a second-order one, written as AR(2, 2, -1), i.e. $y^\_\{t+1\} = 2*y^\_\{t\} - y^\_\{t-1\}$.

The drawback of the AR(2) is to always overshoot by one time step the timing of peaks and troughs of an observed hydrograph (Mizukami et al., 2019, SC1 therein; Ding, 2018).

Isn’t AR(2, 2, -1) a special case of the LSTM network models?

References
