

Interactive comment on “Technical Note: Testing an improved index for analysing storm nutrient hysteresis” by C. E. M. Lloyd et al.

Anonymous Referee #2

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This technical note gives a review of some indices that are used to describe direction and magnitude of hysteretic relationships between discharge and concentration and proposes a new hysteresis index. Hysteretic relationships between concentration (geochemical tracers, nutrients) and discharge or also between storage (i.e. moisture contained within a control volume) and discharge have been used to describe catchment functioning and to compare catchments or different time periods. Observed hysteretic behavior could help to infer flow processes and better understand runoff generation. In that respect, this technical note, although more geared in its current scope towards nutrient and sediment export from (agricultural) catchments, could be interesting for many readers dealing with hillslope and catchment hydrological processes.

This technical note is well-written and mostly clear in its explanations and structure.

C3669

I understand that a technical note has to be brief. Still, I would recommend to provide a short explanation in the introduction of what is meant by hysteresis in this context and to elaborate a bit on the value of a hysteresis index (HI). Why can it be a useful descriptor of catchment functioning? Has the examination of hysteresis patterns advanced process understanding? How can it help to pinpoint release mechanisms for nutrients or sediments beyond a mere comparison of numbers between catchments? What does it mean if a hysteretic loop is clockwise or anti-clockwise in terms of processes? This also refers to the conclusions section where authors state that the new HI could “become a standardized analytical technique to be used by the water quality research community”.

P. 7879, L 3: Please explain TNU

P. 7879, L 19-21: Please make the explanation of the calculation of the adapted HI clearer. What exactly does it mean to calculate HI “at every 25, 10% etc of the discharge” and to calculate for different “sections” (e.g. p. 7884, L 15-19) or use different “increments”. This remained somewhat unclear to me throughout the text.

P. 7881, L 25 – p. 7882, L 4: redundant, as it is explained in the figure caption

P. 7883, L 7-14: this description belongs to methods (section 2.3), not results

P. 7884, L 6-7: meaning of sentence unclear

p. 7884, L 7: “These” means these recommendations?

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