

Interactive comment on “New water fractions and transit time distributions at Plynlimon, Wales, estimated from stable water isotopes in precipitation and streamflow” by Julia L. A. Knapp et al.

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This is a well-written and well-argued paper. It will be a valuable contribution to the runoff literature, particularly the interpretation of separating storm flow components. The authors use a high temporal resolution isotope and chloride data set for several catchments in Plynlimon, Wales to address a number of questions related to the separation of new (event) water from older ‘stored’ water in runoff. They calculate transit times, fraction of event water, and spectral filtering to attempt to tease out catchment transport and storage processes. The paper uses inference from the outflow record and has no

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physical information to actually figure out transport and storage.

The results are not overly surprising – one needs to define well what one is analyzing and the appropriateness of various define characteristics are assessed relative to the research questions being asked. This seems obvious. The sensitivity of the results to the frequency of sampling is also not surprising but this is a nice empirical analysis of the effect. This study is a good example of the importance of stored water to storm runoff. It is also show a reassuring similarity between isotopic tracers – the isotopes producing essential the same result but Cl yields less event water than the isotopes. I suspect this is because the rain water signal for Cl is derived rather than directly measured as an input signal. This is not the case with the isotopes.

The paper is timely. As the authors state the high resolution data set they use is unique but with new, reasonably priced, technologies for measuring isotopes in a semi-continuous manner coming on line, the issues this paper raises will be very important.

Pg 3 – Ln 1 “gold standard”. There is no such thing in hydrology for this kind of word. One would have to understand the flow system to get one. Even in the constructed settings the variability is a problem. Not sure this term is useful – will it ever be obtained?

Pg 3 – Ln 20 – 25. This statement is correct but could be a little more forwarding looking to the future.

Pg 11 Ln 1 hints at this future. Why not be explicit?

Pg 11 – Ln 19-21. Not sure I understand why you did not filter the Cl? Something is not making sense to me here.

Pg 13 – Ln 22-26 The filtering issue again. How good it is depends on how you can eliminate the dry deposition issue. Can you elaborate?

Pg 14 Ln 8-15 Same issue. Not sure why the dry deposition would make the new fraction smaller?

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Pg. 14 In 26-34. This seems obvious and suggests that operational definitions need to be specified so in the future we know what we are comparing. Why not be more explicit in the definition of thresholds.

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