

Interactive comment on “An evaluation of analytical streambank flux methods and connections to end-member mixing models: a comparison of a new method and traditional methods” by M. Exner-Kittridge et al.

Anonymous Referee #2

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On this paper there is already an excellent anonymous peer review on line from “Anonymous Referee #1”. I agree with the comments provided there and will only augment a couple of them.

As pointed out by referee 1, the paper should use spatial terms (upstream, downstream, homogeneous or uniform), rather than temporal terms (initial, final, simultaneous), to describe the spatial phenomenon under consideration (using temporal terms to describe spatial concepts is confusing).

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At equation 11, I think “x” is not really “stream length”, it’s “distance along the channel”, and $Q(x)$ is the stream discharge at a given x.

I followed the derivation to equation 21, but could not see how equation 22 was obtained.

Referee 1 had some good comments about the unexpected behavior of equations 21–24. In addition to those, if $Q_{out} = 0$ (no hyporheic exchange, only lateral inflow to the reach) then Q_{in} should reduce to $Q_{in} = Q_{final} - Q_{init}$. But this does not follow from equation 23; if one considers $Q_{init} = C_0 Q_0$ (the tracer injection rate) divided by C_{init} , and $Q_{final} = C_0 Q_0 / C_{final}$, equation 23 ends up $Q_{in} = (Q_{init} - Q_{final}) 2 \ln(Q_{init} / Q_{final})$ when $Q_{out} = 0$.

The derivation of equation 25 was also quite unclear, the text above it is confusing (e.g., “. . . setting itself equal to itself except replacing one side with the C_{init} and C_{final} prior to the injection of the tracer. . .”??).

This is an interesting paper but not clear and lacking in physical-mathematical explanation at the most critical places (the new equations presented near the end of section 2.2).

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 10419, 2013.

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