Hydrol. Earth Syst. Sci. Discuss., 10, C5578–C5579, 2013
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Hydrology and Earth System Sciences
Discussions

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

Received and published: 11 October 2013

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 Qout = 0 (no hyporheic exchange, only lateral inflow to the reach) then Qin should reduce to Qin = Qfinal – Qinit. But this does not follow from equation 23; if one considers Qinit = C0Q0 (the tracer injection rate) divided by Cinit, and Qfinal = C0Q0/Cfinal, equation 23 ends up Qin = (Qinit – Qfinal)2ln(Qinit/Qfinal) when Qout =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 Cinit and Cfinal 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.