

Interactive comment on “Tracing the spatial propagation of river inlet water into an agricultural polder area using anthropogenic gadolinium” by J. Rozemeijer et al.

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Thanks for your review and your compliments on our work.

Specific comments 1) Changed according to suggestion throughout the manuscript

2) We added: “, the polder Quarles van Ufford in The Netherlands.”

3) The time frame follows from the sampling moments that are mentioned in line 8.

4) Thanks for checking. We added Van Vliet & Zwolsman to the reference list.

5) Changed according to suggestion

6) Thanks for the references. These papers describe an (active) tracer test in and modeling of the propagation of storm water that is diverted into a treatment wetland. We agree that the general concept of these studies is similar. Nevertheless, in our polder catchment the river water is diverted into the polder in dry periods to prevent drought in agriculture, not during storm runoff for purification purposes. Also, the hydrology of our polder (canals and ditches) is totally different from these semi-natural treatment wetlands. Still, we consider pointing out the similarity between our work and these wetland studies a good suggestion. In the introduction we added: “Furthermore, the flow patterns of diverted storm discharge through treatment wetlands may affect their nutrient removal efficiency (e.g. Dierberg et al, 2005; Paudel et al., 2010).” In the rewritten discussion section we added: “Still, the approach of our study is comparable to studies on the propagation of storm water that is diverted into treatment wetlands (e.g. Dierberg et al, 2005; Paudel et al., 2010). With respect to these studies, there are large difference in properties of the receiving water bodies (semi-natural wetlands versus an agricultural polder) and in the hydrological conditions during main water inlet periods (storm discharge versus dry periods). Nevertheless, these studies support our finding that the diverted water takes short circuits through the receiving water body and will not be fully mixed.”

7) We changed this into: “. . .and 7% is arable land with other crops.”

8) We added: “An extensive description of the study site was given in Soppe et al. (2005).“

9) We changed this section into: “During wet conditions, the flow is directed from the smaller headwaters towards the main channels. During dry periods opposite flow directions may occur, as inlet water is distributed through main channels and possibly penetrates into the smaller headwater ditches.”

10) Changed according to suggestion

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11) Thanks again for checking. We added Siderius et al., 2011 to the reference list.

12) We removed the abbreviation here

13) Changed according to suggestion

14) Agreed, we removed the sentence on page 1420.

15) We added to the methods section: "Precipitation data for this research were derived from a nearby precipitation measurement station of the Royal Dutch Meteorological Institute (KNMI) in Megen. For estimating evapotranspiration, the Makkink relation (Makkink, 1957) was applied using temperature and net incoming radiation data from the main KNMI weather station in De Bilt."

16) Changed according to suggestion

17) We added the number of high anomaly stations (3) in the text. The reason for only presenting the stations with extremely low and extremely high impact of diverted river water is to illustrate the clear difference in water chemistry. This would be blurred when we would include all the locations where local drainage and diverted river water is mixed. It's a good idea to add a statistical test on the differences. We will add a table with test results and significance levels and refer to this in the text.

18) We enlarged the labels.

19) They're light blue (diverted river water) to dark blue (local discharge). We will consult one of our colorblind colleagues and improve the color combination.

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