Hydrol. Earth Syst. Sci. Discuss., 6, C2423–C2425, 2009
www.hydrol-earth-syst-sci-discuss.net/6/C2423/2009/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Dying to find the source – the quantitative use of rhodamine WT as a proxy for soluble point source pollutants in closed pipe surface drainage networks" *by* C. H. Mines et al.

Anonymous Referee #2

Received and published: 20 October 2009

Review of "Dying to find the source – the quantitative use of rhodamine WT as a proxy for soluble point source pollutants in closed pipe surface drainage networks" by C. H. Mines, A. Ghadouani, and G. N. Ivey.

There is interest in the use of tracers such as RWT for providing insights into the movement of water and contaminants in the environment. This paper provides some useful data concerning the likely sources of errors in carrying out such studies. The paper is well written, the study design is mostly good and the overall conclusions are sound. I have two main concerns with the paper.

1/ The lack of flow measurements in the field experiment, which is acknowledged by the authors, means that no mass balance is possible. All the calculations from that point onwards are circular and this lack of flow data impacts on the authors' ability to meaningfully discuss the quantitative use of RWT. A flow gauging, if a continuous flow record is not possible, is usually reasonably easy to carry out and should have been part of the study.

2/ The multiple peaks observed in the field experiment were stated to be either a result of the tracer properties (2 isomers with different sorption properties) or a result of the drainage network. The authors leave the issue unresolved which I do not think is acceptable for a manuscript claiming to use RWT in a quantitative way. As a tracer, RWT is conservative in some environments and non-conservative in others and in most studies using RWT as a tracer, which I have carried out and are aware of, the first experiment involves comparison of RWT with a truly conservative tracer such as Br or tritiated water. It is very straightforward to use another tracer, such as Br, in conjunction with RWT to determine what is due to tracer behaviour and what results from the system being studied.

I would like to see these concerns addressed before the manuscript is published. This would probably involve some additional experimental work. If this is not possible then the title needs to be modified as it is no longer a "quantitative" use of RWT.

Specific Scientific comments

1. (p 4539, line 6) The excitation and emission wavelengths used to measure the RWT should be given.

2. (p 4539, line 25) The detected salinity and specific conductance should be less than a detection, rather than stated to equal to zero.

3. (p 4541, line 27) Mention of what measures were taken to ensure mixing of the RWT dye in the pipe and an assessment of how well-mixed the dye was by the time it

travelled 160 m or 260 m to the measuring point.

4. (p4544, line 8-10, also fig 2) Most of the variation from the expected concentration in the 10 μg/L sample in Swan River water would be due to background fluorescence equivalent to 5-6 μg/L. You talk about it for the field experiment but it also affects this lowest concentration for the laboratory study.

5. (p 4561, fig 8 caption) The last sentence should read “mean background fluorescence value equivalent to a RWT concentration of 6.7 μg/L)”

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 4535, 2009.