Hydrol. Earth Syst. Sci. Discuss., 9, C2665–C2667, 2012
www.hydrol-earth-syst-sci-discuss.net/9/C2665/2012/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Uncertainty in computations of the spread of warm water in a river – lessons from Environmental Impact Assessment" *by* M. B. Kalinowska and P. M. Rowiński

Anonymous Referee #1

Received and published: 2 July 2012

General Comments:

The authors raised an important and practical issue on how to assess the environmental impact of thermal discharge to rivers with insufficient data and presented some results from numerical computations in this manuscript. The topic is of interest but the methods adopted by the authors are in contradiction to their statements and thus questionable. More specifically, the authors stated that they consider "the environmentally most severe situation" for the environmental impact assessment. However,

the longitudinal dispersion coefficient formulae they used actually resulted in a favorable environmental condition instead of severe environmental condition. The authors applied various formulae, derived from 1-D flow, for estimation of the longitudinal dispersion coefficient (DL) in a depth-averaged 2-D river flow. The dimensionless longitudinal dispersion coefficient values for 1-D flow used in this manuscript are several orders of magnitude higher than those for 2-D dispersion coefficient, causing significantly higher longitudinal dispersion or much rapid spreading of the thermal discharge to the river and creating a favorable environmental condition. This result is in contradiction to author's statement about capturing "the environmentally most severe situation." In addition, the quality of this manuscript is also plagued by some English grammar errors which should have been addressed before the submission of the manuscript. The English usage could also be improved.

Specific Comments:

1. Page 5871/Title: The title is misleading. I thought this manuscript involves a detailed analysis of various uncertainties involved in thermal discharge modeling. It turns out that this manuscript just shows what the authors did in thermal discharge modeling due to insufficient data and some results from numerical computations.

2. Page 5872/Abstract: The abstract section should include major findings from this study.

3. Page 5887/Eq. (7): As the authors pointed out, the longitudinal dispersion for 2-D flow is different from that for 1-D flow. Eq. (7) may be applicable to 1-D flow but not the 2-D flow the authors are considering in this manuscript. The value of the ratio DL /hu* for 2-D flow should be much smaller than those listed in Eq. (7).

4. Page 5890/Conclusions: This is a summary instead of conclusion. You need to make conclusions on how major uncertainties affect your results and what you found from this study.

5. It appears to me that the temperature distributions in Figure 7 do not meet the thermal energy conservation principle. In principle, the peak temperature should decrease with increasing value of parameter a in Eq. (6) or the dispersion coefficient due to enhanced spreading of the thermal discharge in the river. It means that the integration or the area below each curve should be identical. However, the area covered by each curve in Figure 7 decreases with increasing dispersion coefficient. Please clarify Figure 7.

In summary, while the authors present some interesting results, there is no any evidence that could support or confirm that the results presented in this manuscript represent "the environmentally most severe situation" due to the use of 1-D dispersion coefficient formulae.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 5871, 2012.