Drink. Water Eng. Sci. Discuss., 5, C67–C69, 2012
www.drink-water-eng-sci-discuss.net/5/C67/2012/


**Drinking Water Engineering and Science Discussions**

# *Interactive comment on* "Modelling water quality in drinking water distribution networks from real-time direction data" *by* S. Nazarovs et al.

**S. Nazarovs et al.**

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Received and published: 16 May 2012

We thank the referee for the comments

1) However, it is not clear to readers that how precise the simulation results should be, how precise the flow calculation can be and why the approach applied by authors can provide more precise results (compared to which method?).

Simulation results may be affected by two types of errors: false positive results and false negative results. False positive results may increase decontamination costs and cause unnecessary disruption in operation of water distribution network. False negative results may put consumers in risk as some contaminated areas will be declared "clean". The approach discussed in the the paper is aimed to eliminate false negative results



thus reducing risk to public health. However this approach is still prone to false positive results.

2) However, it is not clear to readers the method to create a DMA, which size the DMA is qualified for the research and why this size is selected.

The term "DMA" in this paper represents a part of water purification system that is separated by pipes with flow direction sensors. So DMA areas are created "automaticaly" as sensors are installed and the more sensors are installed in the network, the smaller are DMA areas. The size of a DMA (and the corresponding number of sensors) used in the paper, is selected because further decrease of DMA size and addition of sensors has not much effect on total contaminated pipe length. Recommendations for sensor optimal location are described in the paper.

3) It would be helpful to readers to understand how the real-time flow direction data are used for simulation with the model, how to calculate the total contaminated pipe length with the model.

Contamination is spreading downstream from the source. The real-time data from the flow direction sensors enable to identify downstream pipes. The total contaminated pipe length is the total length of pipes downstream of the contamination source.

4) ... but without specifying how to realize the scenarios and which type of contamination is considered here.

We consider bacterial contamination that travel downstream with the flow and can attach to pipe walls.

5) In the section of "results", normalized data and average data are presented in chart without detail explanation of what those data mean and how to acquire these data.

The data presented in the "results" section represent total contaminated pipe length obtained from simulations of three different contamination scenarios for various numbers of flow direction sensors. The data are normalized for each scenario by taking the

total contaminated pipe length for 927 sensors as unity. Averaged data points are obtained by calculating an average of total contaminated pipe lengths of three scenarios for every number of sensors. The averaged curve is also normalized by taking average contaminated pipe length for 927 pipes.

6) The authors are suggested to reconsider the title of the paper to make it more concrete for this research so that the readers may know at the first glance that this paper is about modeling contamination transport. It is suggested to reorganize the structure of this paper, for example, separating the section of “objective and method” into two sections, moving the description about the cases studies with different number of sensors in the section of “results” to the section of “method”.

Thank you, we will take these comments into account.

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Interactive comment on Drink. Water Eng. Sci. Discuss., 5, 31, 2012.