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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.

Anonymous Referee #2

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General comments

This paper uses the approach of Davidson and Bouchart (2005) in Riga distribution network to model the contamination transport by using the real-time flow direction data that is acquired from flow direction sensors, rather than using flow demand data. This paper clearly summarized that optimal number of flow direction sensors for Riga model is around 200 through simulations of several contamination scenarios. This paper shows that with this approach the total contaminated pipe length and the location of contamination source can be found precisely. This paper has a main contribution to the practical application of this approach on a large scale distribution network with multiple water sources supply.

However, the main contribution of this paper is not clearly mentioned in the abstract.

The manuscript doesn't clearly state why this approach is chosen for this research and why it is better than other possible methods. The results and the method should be discussed in a clear way so that the readers can easily understand what needs to be done with this approach and if the results are same as what is expected.

Specific comments

This paper states that the precise calculations of flow in pipes may be an impossible task and the errors in flow calculations will lead to errors in contamination spread simulation results, while it is possible to determine affected area "more precisely" with the approach applied. 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?). It would be better to compare this approach with other approaches on the aspect of results precision, costs and effectiveness.

According to this paper, the change of flow direction is important information and is caused due to the issue of public health notices. It would be helpful to describe how the network operators react in case of the contamination, how quickly they inform customers to stop using drinking water, which types of contamination were detected, and how they detect the contamination in the distribution network (based on the on-line water quality analysis, or the water quality analysis after sampling, and where the water quality is monitored).

Optimal choice of DMA size is a crucial part. 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.

A lots of flow direction sensors are available in the distribution network and the sensors are placed in the model by Rubulis et al. (2010) for simulations. 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. Three

different scenarios are considered in this paper, but without specifying how to realize the scenarios and which type of contamination is considered here.

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.

Technical corrections

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”.

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