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Drinking Water Engineering and Science Discussions

Interactive comment on "Online modelling of water distribution systems: a UK case study" *by* J. Machell et al.

Anonymous Referee #3

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General comments

The authors present in a clear and well-structured way an application of an online hydraulic model to a District Metered Area (DMA) in the UK. The addressed topic is of current interest to water companies since the application of online hydraulic models has the potential to improve the operation of Water Distribution Systems (WDS). The authors discuss the necessary prerequisites to applying online hydraulic models and demonstrate the potential advantages on a real-life case study. Substantial conclusions are drawn and possible future applications are suggested. Given the nature of the paper, i.e., it uses an off-the-shelf modeling tool and applies it to a real-life, but artificially created event, it does not present any material of exceptional scientific significance and quality. However, it is believed that it can serve as a good practice paper

that may be of a particular interest to water companies and practitioners.

Specific comments

The literature review presented in the first section is found rather generic and lacks any methods of WDS state estimation that are typically used in online hydraulic modeling. The authors might consider including following publications:

Sterling, M. J. H., and Bargiela, A. (1984). "Minimum norm state estimation for computer control of water distribution systems." Control Theory and Applications, IEE Proceedings D, 131(2), 57-63.

Andersen, J. H., and Powell, R. S. (2000). "Implicit state-estimation technique for water network monitoring." Urban Water, 2(2), 123-130.

The validation procedure mentioned on P285, L26 does not seem to be described in sufficient detail. The provided information suggests that the online model was capable of reproducing the same results as the conventional model, however, it is unclear how this can infer that the online model also reflected the actual pressure and flow measurements in the real system under normal conditions.

As discussed by the authors Figures 4-6 describe the effects of an open hydrant in a downstream DMA on the studied DMA in Fig. 2. The authors should comment on the sudden pressure drop at 11 a.m. (more than 20m) shown in Fig. 3 and how it is related to the open hydrant given the fact that there was no corresponding increase in flow to explain the drop in pressure (e.g., similar to the flow increase and pressure drop at 7 a.m.)

It would be interesting if the authors included a table comparing the modeled and observed pressures at the two pressure monitoring (DG2) points in addition to the model results shown in Fig. 6. The purpose of these pressure monitoring points should be described too and in particular as if and how these were used by the online hydraulic model.

Technical corrections

P283, L20: Rather than simulate a fixed 24 h period as conventional models, an online model is most useful...

P285, L4: This is achieved by a SCADA system to provide the flow and pressure data for simulation of boundary conditions,...

P286, L9: It would be beneficial if the authors described in the text at what measurement point (i.e., inlet or export) were the SCADA measurements shown in Fig. 3 taken.

P286, L28: i.e. Fig. 6 is generated by the model using SCADA data measured at 11:00

P289, Fig. 1. Online model geographical extent showing all pipes, background map and DMA boundaries.

Fig. 2 should also indicate the location of the DG2 pressure monitoring points mentioned in Fig. 6.

Interactive comment on Drink. Water Eng. Sci. Discuss., 2, 279, 2009.