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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.

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Thank you to the reviewer for their thoughts and queries.

>The paper presents a case study in which novel techniques are applied to transfer data >from the distribution system to an existing network model. The model is then run and >analysed, and conclusions regarding the state of the network are drawn. The results >demonstrate that online modelling can be used to identify issues (such as bursts) in >the network and to assess impacts on customer service. The principal conclusion (not >currently stated by the authors, but which should be included) is that online modelling >of distribution networks offers tangible benefits for system managers.

We thank the reviewer for this observation and agree it should be included.

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Interactive Discussion

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> However, the paper presents just the one example of a single DMA drawn from a larger > network model. The paper would benefit from a brief discussion regarding the feasibility > and likelihood of being able to extend this form of modelling to a wider geographical >range.For example, what would be the computational and human resource cost of covering >increasingly larger areas?

Human resources increase proportionately as the model is extended to a wider area, with likewise increases in the computational infrastructure needed. But as this type of modelling moves from the R&D realm to a "business as usual" the resources should be manageable.

>Other points for the authors to consider are as follows: The authors state that “even >low accuracy data will produce an apparently sensible, if not wholly accurate solution” >(284:19-20). This statement requires some discussion. Are the authors suggesting >that a low accuracy, inaccurate model can be fit for purpose, or are they suggesting >that such a model should be avoided. Their meaning is unclear.

This was as regards to calibration. Calibration data is often low accuracy for industry standard built offline hydraulic models. The recommendation was for higher quality calibration data for online models.

>The paper would benefit from a discussion regarding the selection of operator defined >rules (285:15). At which times and under what circumstances are the different rules >(last / default / average) invoked?

If raw data is missing or corrupted (as specified by being outside predefined limits) then a rule can be configured by the user to use either the last valid data point, a specified default value or an average over a number of values.

>The authors state that online simulation results were comparable to those produced by >the conventional hydraulic model (286:1). The authors should provide some indication >of the degree of error found (and tolerated) between modelled and measured

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data.

The main difference we are presenting in this paper is the move from using from an offline to an online model. Doing this has no detrimental effect on the existing model, and provides comparable results under normal conditions. Since we only have inlet/export flow and pressure which are being used as the boundary conditions a comparison to measured data is not relevant.

>The authors mention the possibility of acquiring data at 15 minute resolution (287:3). >Some discussion regarding any potential implications of such a regime (e.g. computational >expense) should be discussed.

The online model is running every 30 minutes on 15 minute sampled data and takes only a minute or two to run one real-time cycle on an average spec desktop PC. Even scaling up to the larger 16 DMA model mentioned in the paper, this frequency of recalculation is feasible.

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