

Interactive comment on “Flowmeter data validation and reconstruction methodology to provide the annual efficiency of a water transport network: the ATLL case study in Catalonia” by J. Quevedo et al.

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First of all, thank you for your comment about this paper. All your comments are answered below. First of all, comments are numbered and then the appropriate answer is presented:

1. In this paper, measured flows entering a network are compared to measured flows leaving the network. Flow measurements inaccuracies are corrected. Unclear is how this was done. Also, it is not clear why this was done.

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The flow measurements inaccuracies are not corrected but estimated using the equation 3 of model residual and the equation 5 using confidence intervals. After measurements inaccuracies have been estimated, they are taken into account to estimate the inaccuracies in the evaluation of the network efficiency.

2. The example of fig 7 shows that even if 6 months of wrong data are present, there is a way to correct those. What the value of that exercise is, is quite unclear.

This example shows that the time series of the upstream flowmeter had an operating problem during almost half a year. But, the validation/reconstruction method proposed is able to detect and reconstruct wrong flowmeter data using the downstream flowmeter data.

3. The suggestion of the hydraulic performance of a network as the difference between the volume of water delivered measured by billing flow meters and the volume of water metering the system is not correct. This is the unaccounted for water, and it is not equal to water loss.

It is corrected in the new version as follows:

“..., the hydraulic performance measured using the ratio between the volume of water delivered (VAM) (which is computed from two sources, the measured by billing flowmeters and the unmeasured billed consumptions) and the volume of water entering the network (VED) is also computed.”

4. Figures 1-4 have no added value, they can be explained in text.

We think figures 1 to 4 even though they not add information, they could be useful to better understand the proposed methodology used and the topology of the studied network.

5. Fig. 5 is incomprehensible.

The problem with this figure is the network size that makes it unreadable without in-

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creasing the size in a considerable way. However, we think that it is important to keep in the paper to appreciate the network size. In any case, in the new version of the paper its quality has been improved.

6. The text to Fig 6a is incorrect.

The reviewer is right. The text has been corrected in the revised version of the paper:

The previous text: “Figure 6a presents the upstream and downstream flowmeter daily time series. It shows with a circle the outliers which have been detected and isolated by the time series models of upstream and downstream flowmeters.”

has been replaced by: “Figure 6a presents the upstream and downstream flowmeter raw data”

and in the text: “Figure 6c presents again the upstream and downstream flowmeter daily time series. It shows with a circle the outliers which have been replaced by estimated data obtained from time series models of upstream and downstream flowmeters.”

the word “again” is removed.

The legend in figure 7 has been corrected too.

7. The methodology in 2.2 describes how to calculate the network efficiency. In the results, this value is not given.

We present the results of two sectors and the network efficiency: a.- For the first example, composed of one input flowmeter and three output flowmeters: The confidence interval of the hydraulic efficiency corresponding to this sector is [98.7%, 98.9%] b.- The second sample sector is composed of one upstream flowmeter and one downstream flowmeter: The confidence interval of the hydraulic efficiency corresponding to this sector is [104.7%, 108.5%]. All these results are reported in page 8.

8. There is lack of international references to work on water meter inaccuracies and

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calculating unaccounted for water and water loss.

This has been corrected in the revised version of the paper. Now, an interesting and recent reference of Allan Lambert and Richard Taylor (corresponding to the chapter 3 of the Water New Zealand: Water Loss Guidelines (2010)) has been included. This chapter is dedicated to include errors and uncertainties in Water Balance using confidence limits in a way similar to our approach.

Allan Lambert and Richard Taylor, "Water Loss Guidelines" and presented also in Water Loss Conference 2010:
http://www.waternz.org.nz/Folder?Action=View%20File&Folder_id=101&File=100503_waterloss_guidelines.pdf

Finally, the attached version of this paper contains all these corrections. Figures 5 and 7 of the paper are attached also separately.

Please also note the supplement to this comment:

<http://www.drink-water-eng-sci-discuss.net/6/C26/2013/dwesd-6-C26-2013-supplement.pdf>

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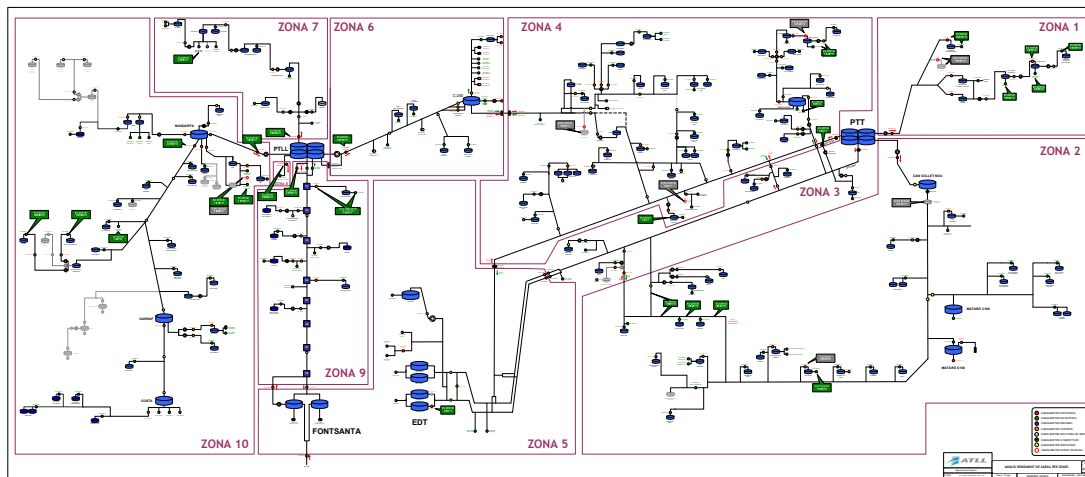


Fig. 1.

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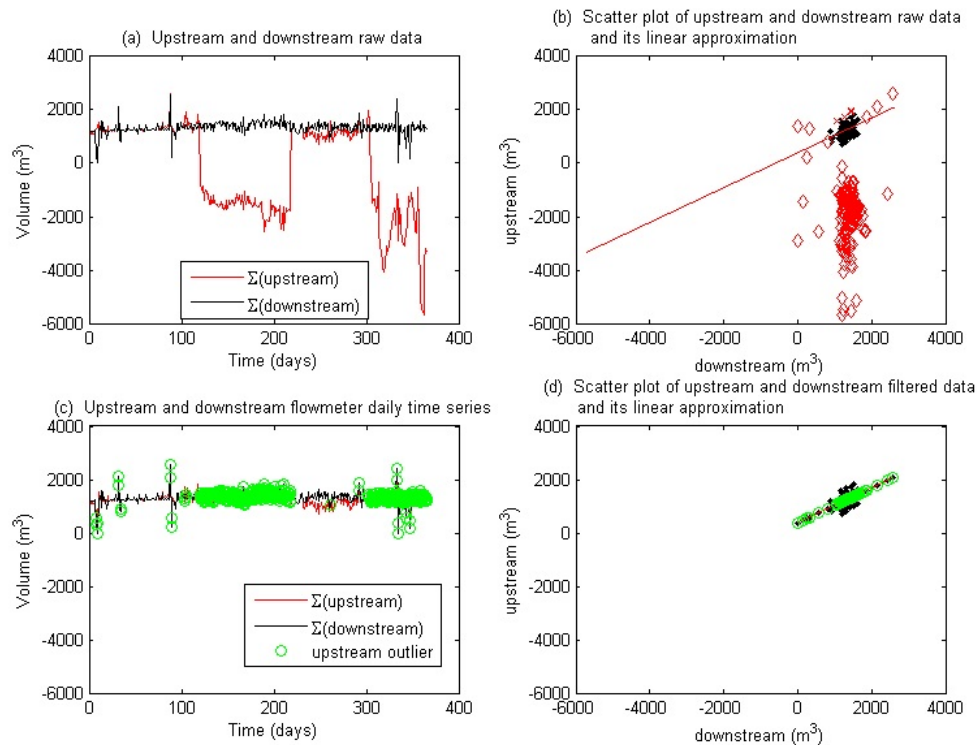


Fig. 2.

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