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Hydrology and Earth System Sciences Discussions

Interactive comment on "Technical Note: How image processing facilitates the Rising Bubble Technique for discharge measurement" *by* K. P. Hilgersom and W. M. J. Luxemburg

Anonymous Referee #2

Received and published: 14 November 2011

1. Does the paper address relevant scientific questions within the scope of HESS?

   Yes – effective means of flow measurement remains an important area of scientific enquiry.

2. Does the paper present novel concepts, ideas, tools, or data?

   The concept is not novel, as stated by the authors, but the contemporary application of digital processing is timely.

3. Are substantial conclusions reached?

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Interactive Discussion
Discussion Paper

This feels as if interim conclusions have been reached – useful ones, but more could have been achieved as outlined in the paper.

4. Are the scientific methods and assumptions valid and clearly outlined?

   In general, though I have made specific points in relation to the presentation of results in my comments.

5. Are the results sufficient to support the interpretations and conclusions?

   In general, though some revision is required.

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

   Yes, subject to the comments of Referee #1 in relation to the availability of code, though the methodology is presented.

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

   To the best of my knowledge, for which I must concede no background in image processing.

8. Does the title clearly reflect the contents of the paper?

   Yes.

9. Does the abstract provide a concise and complete summary?

   Yes

10. Is the overall presentation well structured and clear?

    Reasonably.

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11. Is the language fluent and precise?

    It is sufficient, subject to specific comments made below.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

    Yes.

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

    See comments below.

14. Are the number and quality of references appropriate?

    Yes.

15. Is the amount and quality of supplementary material appropriate?

    Yes.

General comments

The scope of the paper and the presentation of the methodology is well handled. The issue of nozzle design and its impact on bubble properties is discussed with useful findings.

However, the results are not dealt with in an objective way. For example, Table 1 includes a comparison with the average of the results obtained from the method under investigation – and this is termed "error". The comparison expresses a deviation rather than an average. The comparison should be with an independent estimate of discharge, for which only a single value is provided (46.6 l/s). Was there any variability in the measured flow that may have contributed to the variation in processed results.

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In the results obtained from the Lock, there is a generally good agreement between the ADM and RBT (Rising Bubble Technique). However, the use of a single measurement from the Valeport meter at a time of rapidly changing discharge is a missed opportunity. More measurements could have been made when the flow was reasonably constant. It may be a language problem, but the use of the word "verify" (line 2, p8511) is not applicable – especially since there is only a single measurement.

The Recommendations Section still reads rather like a discussion and does not seem an appropriate way to close the paper. I think most of these points can be included in a section before the conclusions – perhaps labelled "Discussion". That may help with the focus for the Conclusions Section.

Specific comments

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Ref	Comment
8500/l. 14	"Preferable" – this suggests comparison with other methods which should be mentioned in the paper and abstract.
8501/ l. 14	Sargent 1982 is not in the reference list – presumably 1982a or b
8502/ l. 11	Randomly is not the correct word – "more variable" cross section may be better.
8504/ l. 4	Found is not appropriate – try sampled or measured
8505/ l. 24	I was surprised that only 5 nozzles were used. A useful line of enquiry in relation to accuracy would be the number of nozzles that are required. 5 verticals would be deemed insufficient for current meter gauging for example
Table 1	As discussed above under General comments, the use of the term "error" is not appropriate here. If error is to be used, it should be with respect to an independent measurement, in which there is confidence.
8510/Fig 9	As stated above under General Comments, it is good to see the use of more than 1 method for independent measurement of discharge. However, the propeller measurements should have been done under more stable flow conditions. Note use of term: verification Note spelling of propeller on Table.
8511/l. 7	It is not clear where the 13% comes from – this needs to be supported by presentation of more detailed results. Similarly with the 3%. Need to consider what other factors may be affecting the reliability of the results.
8511/ l.16	Not sure what is meant by "surfacing bubbles very poorly".
8514/ l. 17	"Can compete" or is comparable with

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 8499, 2011.