

Interactive comment on “Uncertainty in river discharge observations: a quantitative analysis” by G. Di Baldassarre and A. Montanari

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We appreciated the Anonymous Referee #2 comments and believe that addressing these comments will improve the quality of the manuscript.

The main concern of the Reviewer is that the manuscript does not take into account some previous works related to the uncertainty of river flow data. Unfortunately, the Reviewer only cited some authors without including any specific reference to these works. It is our belief that the majority of the previous studies focused on uncertainty of direct river discharge measurements, that is, those taken by measuring the flow velocity and the cross sectional area. Our study analysed the uncertainty of the river flow estimated by using the rating curve method (that we believe it is the most used in practice) by investigating several sources of uncertainty (measurements, interpolation,

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extrapolation, roughness changes and unsteady flow). Nevertheless, we acknowledge that the discussion of previous works is now too concise. Thus, besides the papers already quoted in the original manuscript (Arico' et al., 2008; Clarke, 1999; Franchini et al., 1999; European ISO EN Rule 748, 1997; Pelletier, 1987; Petersen-Overleir, 2004), the revised version of the manuscript will discuss other works (e.g. Herschy, 1978; Kuczera, 1996; Pappenberger et al., 2006; Sivapragasam et al., 2005; Yu, 2000; see below, ADDITIONAL REFERENCES). Also, we will take into account the studies of the authors cited by the Reviewer (e.g. Sauer and Meyer, 1992; Schmidt, 2002; Harmel and Smith, 2007; see below, ADDITIONAL REFERENCES). Discussing the previous studies will allow us to highlight the original contribution of our work which, in our opinion, is in fact related to uncertainty analysis of the rating curve method by investigating several sources of uncertainty.

The Reviewer raises also another important issue, by saying that "the analysis is restricted to the particular case of the Po River". We do not agree with the Reviewer on this point. A quantitative uncertainty analysis does need the use of a specific test site. Our study focused on the longest and most important river in Italy, which can be considered representative of the conditions of many important rivers in Europe. Also, the proposed methodology is general and can be easily calibrated and applied to other test sites. We will make this point clear in the revised manuscript.

Finally the Reviewer gave a technical correction that will be addressed in the revised version of the manuscript.

ADDITIONAL REFERENCES

Herschy RW, 1978. Accuracy in Hydrometry, R.W. Herschy (Ed.), 353-397, Wiley, New York (NY).

Kuczera G, 1996. Correlated rating curve error in flood frequency inference, Water Resour. Res., 32(7), 2119-2127.

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Harmel, Smith, 2007. Consideration of measurement uncertainty in the evaluation of goodness-of-fit in hydrologic and water quality modelling, *Journal of Hydrology*, 337, 326- 336.

Pappenberger F, Matgen P, Beven KJ, Henry JB, Pfister L, de Fraipont P, 2006. Influence of uncertain boundary conditions and model structure on flood inundation predictions, *Advances in Water Resources*, 29, 1430-1449.

Sauer VB, Meyer RW, 1992. Determination of Error in Individual Discharge Measurements, Available from Books and Open Files Reports Section, USGS Box 25425, Denver, CO 80225. USGS Open File Report 92-144.

Schmidt AR, 2002. Analysis of stage-discharge relations for openchannel flow and their associated uncertainties. Urbana: University of Illinois.

Sivapragasam C, Muttill N, 2005. Discharge Rating Curve Extension - A New Approach. *Water Resources Management*, 19, 505-520.

Yu B, 2000. A systematic over-estimation of flows. *Journal of Hydrology*, 233, 258-262.

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