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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Consistency assessment of rating curve data in various locations using Bidirectional Reach (BReach)" *by* Katrien Van Eerdenbrugh et al.

Anonymous Referee #1

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Detecting instable stage – discharge relationships, and the generation of rating curves under such conditions, are considered as major problems in hydrometry. Methods for general cases do not exist in the literature. The present paper considers a general approach to the detection of instable/stable periods. It is however disappointing to see that the generation of rating curves under instability is not considered, but this does not hinder the paper from being interesting. The paper is well written and the case studies are comprehensive. Plots and figures are fine. The basic method used stems from another published paper, and its technical characteristics are therefore of less importance here. All in all, the material should be interesting to read for hydrologists and for hydrographers in particular. But in my opinion the study must be slightly improved

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before it is ready for publication.

I do not feel convinced about the capabilities of the BReach technique after having read the paper. It assesses consistency based on a fixed rating curve model and a fixed sampling space for parameter values assumed plausible. General, or average, values on measurement uncertainty from various sources are applied to justify the acceptable zone for measurements. Besides these intrinsic limitations, the method is not compared to a simpler and established method to assess any novel capabilities.

One has to select the number of segments and associated break-points before the analysis in the BReach method. This procedure probably introduces at least two problems. First, assume that there are no channel changes, but that the segmentation model used is inappropriate. Some ranges will be affected more than others of this model error. Can this lead to problems (i.e. consecutive measurements in such areas can lead to the BReach method to indicate so-called discontinuities) and if so, what can be done to avoid them? The authors should provide an answer to this in the form of a discussion in a section prior to the application of the method. Second, the values in the assessment of the uncertainties on measured stage and discharge are based on material where the correct segmentation model is assumed. The tolerance limits applied are also built on the presupposition of a correct segmentation model in the simulation. Can this lead to problematic results and if so, can anything be done to minimize the effect? The authors should provide answers in the same section as suggested above.

The application of the BReach method is rather comprehensive in the study. Many case studies are used. It can be debated on how accurately the results fit with the prior information on channel changing characteristics. To convince me about the appropriateness of the BReach framework, a simpler and established method must also be applied to the case studies. More precisely, a rating curve model with similar segmentation characteristics could have been applied to all measurements. A simple analysis of the corresponding residuals (residual – time plots) can then act as a fair comparison.

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