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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.

K. Engeland (Referee)

koe@nve.no

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The paper demonstrates a methodology developed by Van Eerdenburgh (2016) for detecting in-consistency, e.g. step changes or trends, in rating curve models. It deserves publication after some modifications. Please see my comments below.

1: In the introduction it could be useful to explicitly define objectives (and if necessary sub-objectives). It makes the paper easier to read and it will be easier to write more crisp conclusions.

2: The main part of the last paragraph in the conclusions fits better into the discussion

section (section 3.9).

3: In the explanation of the bidirectional reach step 5, I miss a small clarification since it is possible that more than one parameter sets could be regarded as acceptable for a set of data points. I think this sentence from Van Eerdenbrugh (2016) gives a nice explanation: "the vertical distance between the bisector and the maximum left reach indicates the maximum amount of data points before the investigated data point that can be described by at least one parameter set and under the prevailing degree of tolerance".

4: It might be confusing to use the terms "left" and "right" reach. in the plots it is the vertical span of the grey-shades that shows the "left" and "right" reaches. Would it be better to call it "lower" and "upper" reach?

5: I have one question about the shape of the BReach plots. The black shaded areas seems to be well symmetric around the bi-sector, whereas for the other tolerance levels, the symmetry around the bi-sector is lost. Why is it so? I would expect symmetry around the bi-sector. One example: if you at data point 20 look forwards and find that until data point 60, at least one rating curve model falls outside the error bars at less than 5% of the data points, you would get the same result if you look backwards from data point 60 towards point 20? Is the explanation that you have a directional search for the left (and right) reaches, and that the data points where the search stops, depends on from which direction you start the search?

6: Why do you consider the 0% tolerance in the BReach plots? Would it not be more correct to set the minimum tolerance at 5% since you used 95% C.I. to define an interval for the measurement errors?

7: The figures are not well explained by the information given in the legend and the figure captions. The legend with the grey shades could have "Tolerance" or "Tolerance level" as a title. In the caption it would also be nice to add one or two sentences that explain the plot briefly. Something like "The shaded areas below and above the

bisector shows the left and the right reach (vertical axis) of each data point (horizontal axis). The tolerance levels indicate the maximum tolerated ratio of data points for which one (or more) rating curve models are outside the measurement uncertainty"

8: The grey-shades used in the plots do not correspond to the grey-shades in the legend. In particular, the 0% error bar seems to be black in the plot and a grey-shade in the legend.

9: Standard regression analysis also provide tools for analyzing residuals and in particular other methods are available for detecting step-changes in ordered data. It would be interesting to compare your results to existing methods.

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