

## ***Interactive comment on “Assessing rating-curve uncertainty and its effects on hydraulic model calibration” by A. Domeneghetti et al.***

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We are very grateful to B. Guse for his positive review. General comments on the quality of the work are really appreciated and we are sure that suggestions provided by the Reviewer#3 will certainly improve the overall quality and the comprehension of the manuscript. The authors' reply is structured as follows, we report all referee's comments (indicated by RC) together with our reply (denoted by AC, Authors' Comment).

RC: Comments to Sect. 3.2: The models are named according to the cities at the upper and lower bound of the modeling reach. This makes sense, but for a non-Italian it is difficult to distinguish the models, especially the two 2-D models. I would propose to show the modeling reaches of the three different models either in the existing map or  
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in a new map. For a better understanding, it would be enough to have three schemes of the Po River where the modeling reach of the considered model is colored. The section 3.2 would benefit from an additional structure. This is especially important since it is a rather important section of the paper. I would recommend to add three sub-sections (3.2.1-3.2.3) which shall be named according to the use of the model to receive paper's goals. Please find some suggestions below.

“3.2.1 Model for simulating historical flood events” (from 10511),

“3.2.2 Model for rating curve identification” (from 10512, line 17),

“3.2.3 Model for rating curve uncertainty” (from 10512, line 27).

P. 10512, Line 17: I would recommend to write as transition between 3.2.1 and 3.2.2 something such as “50 synthetic flood events with 15 pairs of h-Q values were provided for the 1 D model.”

P. 10512, 27: I would recommend to add as transition from 3.2.2 to 3.2.3: “to obtain a hmax-Qmax-pair for each campaign. In this way, the 1D model provides additional information for the constrained approach.”

AR: We agree with Reviewer#3 and we will provide a better graphical representation of models in order to facilitate the distinction between them (we will include a new panel in the existing Figure 1, illustrating the reach represented in each model, as per suggestion). We also thank the Reviewer#3 for his suggestions for a possible additional structure. The future version of the manuscript will be organized considering a new structure for Section 3.2. Furthermore, the text will be modified accepting Reviewer#3's recommendations.

RC: Comments to Sect. 4 The beginning of the section 4.1 is difficult to understand because it is not said that the traditional approach is considered at first and the constrained approach is presented later on. Therefore, I suggest to add a sentence at the beginning of Sect. 4.1 saying that the results of the both approaches are presented

consecutively.

P. 10513, line 26: I propose to add at the end of this sentence something such as “showing a large part of extrapolation without any data, i.e. for  $Q > 6000$  or  $3000 \text{ m}^3/\text{s}$  respectively.”

P. 10514, 10: I propose to add at the end of this sentence that the blue curve is the same curve as in Fig. 4.

P. 10515, 24: I would propose to include the Figure 5 in the explanation. I could be noted: “(see Figs. 4 and 5)”

P. 10530, Fig. 5: I would suggest to show the boxplot apart from the figure because the scale is completely different, since it is related to the maximum discharge values. Even though, that all scales are clear, the first impression of the range of the boxplot is different than it is in reality. Another possibility would be to draw lines from vertical axis of the main figure to the boxplot axis to show which part of the figure/axis is only considered.

AC: Again, we agree with Reviewer#3. All proposed suggestions will certainly improve the clarity of the manuscript and the text will be adapted to them. Also, Figure 5 will be modified following Reviewer#3's suggestion. All specific points will be addressed by modifying the manuscript as suggested by Reviewer#3.

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