

Interactive comment on “Modelling extreme flood hazard events on the middle Yellow River using DFLOW-flexible mesh approach” by M. Castro Gama et al.

Anonymous Referee #1

Received and published: 12 November 2013

The presented paper considers and describes numerical modeling of severe flooding events along the middle reach of the Yellow River in China by means of a flexible mesh approach that discretizes and solves the shallow water wave equations. A first aim is to highlight the capabilities of a new numerical tool for river flooding. The authors of the manuscript also claim to present new characteristics of the spatial flooding process. Although the addressed topic is generally of interest to the readership of the journal, the manuscript in its current form is very difficult to understand. The authors present a numerical model of the Yellow river that they use to simulate a large variety of event representations. In this regard, many questions remain unaddressed. How were

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the upstream boundary conditions generated and how do these represent the natural conditions? How is the overall model performance with respect to measured events? Calibration and validation of the elaborated model is completely missing. There is also no discussion on the quality of the underlying spatial data with respect to the modeling results. What is more, the language of the manuscripts greatly suffers from grammar, punctuation and spelling mistakes and it is advised to let the paper in a revised form be corrected by a native speaker before re-submission. With the above mentioned arguments I recommend to thoroughly revise the manuscript firstly. Yet, a re-submission based on the general content of the paper with substantial improvements regarding the main conclusions and discussion seems feasible.

Detailed comments (small and big): - The abstract should be written clearer with respect to the main findings of the paper. The focus should more be on the methods and results than on mentioning “the new Deltares tool”.

- p6062, l23: Typo “due”
- The introduction seems rather long and content is widely known among modelers. There is substantial room for shortening the paper.
- p6063, l5ff: No citation on the presented content (number of flooding events)
- 6063, l10ff: Section fully unclear to the reader. How is the history and task of the YRCC connected to the presented material?
- p6064, l1ff: How could a digital model be expanded by the use of a new (? reference) software tool? Unclear content.
- p6064, l8: word: bi-dimensional?
- p6064, l19ff: Unclear how the two approaches fit into the scientific message of the manuscript.
- p6065, l15: grammar “are showed”

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- Fig. 1: The figure is meant to introduce the reader to the focus region and thus it is advised to work on the figure accordingly. Much more explanation has to be added in the figure label so that the reader is readily capable to understand what should be presented here. No explanation on the drawing on the lower and right side of the figure – maybe this is a top view of river dikes and river training work?!
- p6067, l3ff: Not all of the mentioned cities could be found in either of the figures. This is irritating to the readers.
- p6067, l5: Here, a number of reservoirs are mentioned. This could be a starting point in discussion how the upstream boundary was generated. In addition, it should be much clearer highlighted how these reservoirs are managed in order to explain how the overall river system works.
- p6068, l5-7: Sentence unclear.
- p6069, l13ff: It is advised to clearly present the set of equations that is solved within the “new software tool” in order to allow for latter reproduction by other scientists. From the given information it is rather difficult to understand what was solved how. In addition, a concise comparison of the chosen method with methods using regular grids should be given. With respect to Fig. 4 (which should also be redrawn and clarified), a table with results including i.e. run-time, mesh size, etc. should be added.
- p6070, l9-11: It is unclear to me, how the model easily allows for considering or discarding hydraulic structures?
- p6070, l22: Here it is referenced to a previous SOBEK model, yet no reference is given.
- p6071, l6: A mathematical description of the wellness of the grid should be introduced at that place.
- p6072, l3-5: How was the downstream rating curve generated? More explanation is needed.

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- p6072ff: Section 4 is meant to discuss und present the model results of the approx. 300 simulations, yet the section is very brief on presenting and discussion the many results. Besides, water levels, it could also be recommended to include analysis about spatio-temporal evolution of the flooding on the low-lying flood plains and how flow velocities evolve. In addition, no discussion is presented on which role the large content / concentration of fine sediments may play and how this could influence the flow behavior.
- p6074, Sec. 5: In the conclusion section no additional content should be presented. The comments regarding the NetCDF development is obsolete and should either be removed or shifted the method section totally. Only few conclusions are drawn and it is advised to much deeper elaborate on the conclusions that could potentially be drawn here.
- Fig. 6-10: Should be discussed in much more detail plus much more label text in order to understand the figures
- Fig. 11-14: See above comment for the other figures! More discussion is needed.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 6061, 2013.

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