Response to Reviewer #1

Dear reviewer #1,
We are very grateful for your constructive comments to improve the quality of our manuscript. We shall make appropriate changes to the paper to account for your comments. For now we would like to provide a reply to the issues raised in your comment.

Main concerns:
1. In this paper, Cai et al. extend the framework recently proposed by Cai et al. (J. Geophys. Res., 2012) for the analysis of tidal wave propagation, in order to include the effects of river discharge. In my opinion, the paper addresses relevant scientific questions within the scope of HESS, and it can be a good contribution to the literature in general. Nevertheless, I found that a consistent part of the manuscript overlaps with previous publications (e.g., Cai et al., J. Hydraul. Eng., 2012). The analytical model for tidal wave propagation accounting for river discharge (compare for example the Appendix) is very similar to the one published by Cai et al., (J. Hydraul. Eng.,2012). On a related note, in the introduction, the paper of Cai et al. (J. Hydraul. Eng.,2012) is not cited at all, despite having a broadly similar focus. I think that the novel contribution of this manuscript must be absolutely clear to the reader. If there is sufficient new material here to justify a separate manuscript, then the Authors should summarize that previously-published work in the introduction and explain how this manuscript extends, but does not duplicate, those earlier papers.

Our reply: Indeed, we shall need to clarify the novelty of the present contribution compared with the previous works by Horrovoets et al. (2004) and Cai et al. (2012b). We realise that these papers deal with similar issues, but this paper highlights a different and better analytical method to include river discharge in tidal wave propagation and it provides expressions for more variables. In the new version of the manuscript, we will add one paragraph in the introduction to clarify the novelty of the paper compared to earlier articles..

The present paper builds on a variety of previous publications that described tidal propagation and damping making use of an analytical approach. Horrevoets et al. (2004) used the quasi-nonlinear method of Savenije (2001) in combination with river discharge, but assuming constant velocity amplitude v, wave celerity c and phase lag ε. This paper makes use of the analytical framework for tidal wave propagation presented by Cai et al. (2012a), but now it includes for this time the effect of river discharge. A similar paper accounting for river discharge presented an application to the Modaomen estuary (Cai et al., 2012b), but this was based on the quasi-nonlinear approach of Savenije et al. (2008), whereas this paper is the first time that we combine the better performing hybrid model of Cai et al. (2012a) with river discharge. Moreover, fully analytical equations accounting for four spatial variables (v, η, c, ε) of tidal propagation are presented.

2. The overall presentation of the paper can also be improved. For example I do not feel it is necessary to spend a consistent part of the paper (6 pages over 28) for the description of the five different solutions obtained from the five different approximations of the friction term (section 4), when most of the results has then been obtained considering only the hybrid model. Comparison among the results obtained from the different approaches (page 9206) should be deepened, or other formulations can be removed, as better performance of the hybrid model with respect to the other approximations has already been tested elsewhere (Cai et al., JGR 2012). Finally, I think that the results section (pages 9207-9210), which is the most interesting one, could be definitively extended.

Our reply: We agree with the comment. It is true that the main results have been obtained on the basis of only the hybrid model, which is derived as a weighted average of the two solutions, characterized by the usual Lorentz's linearization (Lorentz's approach) and the nonlinear friction term (Quasi-nonlinear approach). Hence we will remove the descriptions of Dronkers' approach and Godin's approach in the revised paper.

In addition (to account for issues raised by other reviewers), a fully nonlinear one-dimensional numerical model will be used to test the performance of the proposed new analytical model for a wide range of parameters, which would definitely deepen our understanding of strengths and weaknesses of the hybrid model.

Minor comments:
Regarding the minor comments and corrections, we shall make all the suggested corrections. Again we thank the reviewer for his/her detailed comments and corrections.

References:

Cai, H., H. H. G. Savenije, and M. Toffolon: A new analytical framework for assessing the effect of sea-level rise and dredging on tidal damping in estuaries, *J. Geophys. Res.*, 117, C09023, doi:10.1029/2012JC008000, 2012a.

Cai, H., Savenije, H.H.G., Yang, Q., Ou, S., Lei, Y.: Influence of River Discharge and Dredging on Tidal Wave Propagation: Modaomen Estuary Case. *J. Hydraul. Eng.*, 138, 885-896, doi: 10.1061/(ASCE)HY.1943-7900.0000594, 2012b.

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