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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Analytical approach for determining the mean water level profile in an estuary with substantial fresh water discharge" *by* H. Cai et al.

Anonymous Referee #1

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In this paper, Cai et al. apply an existing analytical model (Cai et al., 2014) to quantify the contributions made by tide, river, and tide-river interaction to the water level slope along the Yangtze estuary. I have two major criticisms: the first one is that the Authors do not present any new model, but only an application of an existing model to a real estuary; the second one concerns the method itself. I think the Author should better state in the Introduction and also in the Discussion section what's the advantage to employ a simplified analytical approach to study the hydrodynamics in an estuary, when in literature, several numerical models, solving the problem in a complete way (even incorporating the morhodynamics), already exist. Usually, simplified analytical

approaches have the advantage to reduce computational times compared with numerical models, hence they can be powerful when performing very long term simulations, but this does not seem to be the case of the present investigations. I have also some minor observations:

Page 8384 Lines from 12-to 15. Is this result and, in particular, the quantification of the effect (1.25

Page 8386 Line 9. Add references.

Page 8386 Lines from 14 to 23. Too long sentence. Split line 20, as follows: '. . .). Note that in Table 1 η indicates tidal amplitude, . . .'

From line 15 of page 8387 to line 1 of page 8389. Too long sentence!

Page 8390 line 14. Add parenthesis before and after equation number 19.

Page 8391 lines from 5 to 9. I'm not sure the approach is always valid. Is it still valid also in the case of strong longitudinal gradients of the bottom and of the flow field? Please explain better.

Page 8395 line 2. Rephrase as follows: '. . . estuary where the influence...'

Figure 0. Add a figure reporting also the longitudinal profile of the estuary with the notation used in the article.

Figure 5. Is the mean depth of the estuary the same in the different seasons? Is the plotted value an annual average? Please specify better.

Figure 8. Because of the different scales used to plot Q, it is not easy to appreciate when tide or river discharge dominates.

Figure 11. Add also a line for the bottom elevation, in order to better appreciate what's the local value of the mean flow depth.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 8381, 2015.