

Interactive comment on “A novel approach for the assessment of morphological evolution based on observed water levels in tide-dominated estuaries” by Huayang Cai et al.

Anonymous Referee #2

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The paper presented a new analytical 1D approach to estimate the changes of morphological characteristics such as the tidally average depth, wave celerity and tidal amplification in an estuary. Despite of the assumptions made with the absence of river flow and a constant depth in the inverse model, this finding provides a useful and yet simple tool to obtain a first estimation of the morphological changes. Furthermore, it is applicable to be applied in region where minimal data is available.

The manuscript is well-organized, and the data and results are well-presented. There are few typos and grammatical error spotted but they are only minor. Nevertheless, there are some unclear sections that I would like to address in my comments below:

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1. Page 8, paragraph 1, Figure 3: Authors mentioned with $r_s = 1$, Equation (25) indicates that the tidally averaged depth varies proportionally with the tidal damping rate δH . However, in Figure 3 the different colours shades representing the changes in averaged depth only varies with the celerity (vertically) and not the tidal damping rate (horizontally). Also, there is no indication on which point or region the depth is minimum and tidal damping is at critical condition. Authors are recommended to revised on this section.

2. Section 4.1: The definition of tidal damping/amplification rate is confusing. Does the (/) means “or” or ratio? In line 312, it is mentioned that the tidal damping/amplification rate can be compute with Equation (27) and has the symbol δH . But, in line 317 there is another symbol representing the tidal damping/amplification rate which is β . In Figure 7, both symbols are presented with different indication, and β is the gradient of the regression between the tidal amplification and tidal amplitude. What does the gradient β means in this context? The same issue also goes to the wave celerity. Also, it would be nice if the authors can explain more clearly on how the negative gradient indicating stronger amplification and faster celerity during neap tide than spring tide.

3. Section 4.3: In Equation (25), $r_s = 1$ was used for analysis. In this section, the values used for r_s were calibrated against observed data using the shape preserving piecewise cubic interpolation in which the results are presented in Table 3. From the table, the values of r_s obtained is close unity. It would be more interesting if the calibration process in obtaining of the r_s values can be explained further showing in what sense the values are near to 1.

4. Figure 8: It would be nice if the authors can include the values of the geometry characteristics in this figure for each year. The lines could not show clear difference in the geometry changes over the years and look almost the same. With the geometry characteristics values included, it is easier to see how much the geometry has changed.

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I would gladly accept this manuscript if all the comments are addressed accordingly.
Thank you.

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