Dear editor:

We appreciate your efforts in reviewing our manuscript and providing us with constructive comments. We have revised our paper accordingly, and the point-to-point responses to your comments are as follows.

Comments:

Dear Authors

Thank-you for your revised manuscript. I am asking for "minor revisions" according to the comments below and will then consider it again.

Yours sincerely

John Huthnance (editor)

There are some places where I think you should include (in the revised text) more of your response to referees. It is best that a finally-published paper is self-contained and does not rely on the separate (albeit public) responses to comments. In particular:

1). Referee 2 point 2; your response would best be merged with lines 215-219.

Response:

Thanks. We have added our response (Referee 2 point 2) in lines 216-228.

2). Referee 2 point 3; paragraphs 2 and 3 of your response might be added to the end of section 4.4.

Response:

We have added our response (Referee 2 point 3:paragraphs 2 and 3) in lines 775-790.

3). Referee 2 point 4; best add at line 219 that there were no "wind and wave effects" in MD2.

Response:

Thanks. We add the text in line 233.

4). Referee 2 point 5; Figure 3 caption should state that the figure shows "tidally and vertically averaged" circulation. Information required to interpret a figure is best included in its caption. You might add "For the hydrodynamic characteristics of the HE during the flood and ebb tides, Chen et al., (2020a) have investigated the intratidal dynamic processes in detail" in the main text.

Response:

Thanks. We have added the text "tidally and vertically averaged" and the dates "from March 10th 00:00 to 11st 00:00 (25h)" in figure 3 caption, and added "For the hydrodynamic characteristics of the HE during the flood and ebb tides, Chen et al.,

(2020a) have investigated the intratidal dynamic processes in detail." in lines 345-346.

5). Referee 2 point 6; Are figures 4, 5 and 6 also tidally-averaged? Please clarify in their captions and add the dates. If the resolution is 85m in the deep channel then figures 5 and 6 are not showing all the model values; especially figure 6 raises the reviewer's question about resolving vorticity. The captions should explain that only every second(?) arrow is shown.

Response:

Thanks. Figures 4,5 and 6 are all tidally-averaged results. We add "tidally-averaged" and the dates in their captions. Indeed, figures 5 and 6 are not intend to show all the model values. For better visualization, we plot and sparse them as figures in paper.
We have added "The arrows indicate the magnitude of lateral flow and vertical flow per unit length: 10 cm/s (/5cm/s) and 1.5 mm/s (/0.2mm/s), respectively." in captions of Figures 5 and 6.

6). Referee 2 point 7; Are figures 7 and 8 tidally-averaged, and if so what does the acceleration term represent in figure 7? Please clarify in their captions and add the dates – and for figures 9, 10, A.1, A.2.

Response:

Yes, the results of figures 7,8,9 and 10 are all tidally-averaged.
The local acceleration term in figure 7 is the time rate of change of longitudinal flow from March 10th 00:00 to 11st 00:00 (25h), and the acceleration terms in Figs. 9 and 10 represent the time variation of the longitudinal vorticity on the two cross-sections in one tidal cycle (from March 10th 00:00 to 11st 00:00 (25h)), respectively. We have clarified these in the figure caption of Figures 7, 8, 9 and 10.

7). Referee 2 point 8 "evidence to show that river sediment is trapped in the estuary?". Your response is "discussion" rather than "conclusion" but might best be merged in to the first paragraph of the "Conclusion" which raised the referee's question.

Response:

Thanks for your suggestion. We have merged this part into the first paragraph of the "Conclusion". It reads " It had been revealed that the sediment transport pattern changes in response to the changes in river discharge and tidal mixing (Gong et al., 2014). Generally, there exists a sediment convergence zone in the middle of the estuary, and the riverine sediment is trapped inside the estuary to form a turbidity maximum." (lines 800-804).

8). However, maybe you need a "Discussion" section in view of your response to Referee 2 point 9 which ought to be included as "discussion".

Response:

Thanks. We have revised the section Discussion 4.4 to include our response to Referee

2 point 9 in lines 760-771. It reads “Being a micro-tidal partially mixed estuary with standing tidal wave, the estuarine circulation in HE is stronger during the neap tide than during the spring tide. After analyzing the circulatin during spring tide, we found the longitudinal circulation reached maximum in 2010 when the water depth was the largest. Simlar to the phenomenon during the neap tide, the longitudinal circulation was dominated by the increase in the baroclinicity. However, the changes in the lateral circulation were more complicated than that during the neap tide. In addition to the baroclinicity, the change in vertical diffusion caused by the width change also played an important role. The changes in lateral circulation at the upstream section (Section B1) were mostly controlled by the changes in the baroclinicity. On the other hand, the changes in lateral circulation at the downstream section (Section B2) were mainly controlled by the changes in the vertical diffusion.”

Other detailed comments

1). Line 429. Omit “much”

Response:

We delete “much” in line 449.

2). Line 447. Better “. . and was largest (0.0594 m/s) in 2010.” [Only use “which” immediately after what it refers to. You have written that 2010 was 0.0594 m/s – that makes no sense.]

Response:

We changed “and reached the largest in 2010, which was 0.0594 m/s” into “and was largest (0.0594 m/s) in 2010” in lines 466.

3). Line 476. Better “. . we try to explain . .” or “. . we explain . .”

Response:

We changed “we effort to explain” into “we explain” in line 495.

4). Line 497. Delete “in the”.

Response:

We delete “in the” in line 516.

5). Line 505. ". . The friction term at Sec. B1 was largest in 2010 . ." [By ". . was the largest . ." you tend to imply that the friction term was larger than all other terms, but I think you mean that friction was larger in 2010 than in other years.]

Response:

We changed "The friction term at Sec. B1 was largest in 2010" into "The friction term was larger in 2010 than in other years" in line 524.

6). Line 534. ". . was strongest in 2010 . ." (same reason as line 505).

Response:

We changed "This effect was the strongest in 2010" into "This effect was larger in 2010 than in other years" in line 555.

7). Line 536. What does "it" refer to? Please replace "it" by the process name.

Response:

We changed "it induced" into "the tidal residual current shows" in line 558.

8). Line 556. Better ". . show the acceleration and first three right-hand-side terms in Fig. 9."

Response:

We changed "show the first four terms in Fig. 9." into "show the acceleration and first three right-hand-side terms in Fig. 9." in line 580.

9). Lines 630, 631. "horizontal" might mean "longitudinal" – maybe you mean "lateral" – please clarify.

Response:

Thanks for your suggestion. We added "(especially the longitudinal advection term)" in line 658.

10). Line 652. Better "upper HE"?

Response:

We changed "upstream of the HE" into "upper HE" in line 680.

11). Line 672. "logarithmic" –> "logarithm".

Response:

We changed " logarithmic" into"logarithm" in line 700.

12). Line 745. "altered": increased or decreased?

Response:
Thanks. We added “(decreased at Sec. B1 and increased at Sec. B2)” in line 806.