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Interactive comment on “Estimating suspended sediment concentrations using a broadband ADCP in Mahshahr tidal channel” by P. Ghaffari et al.

Anonymous Referee #2

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The title gives a good indication of the contents of the manuscript. The science here is not really new, indeed the manuscript itself gives several references to similar studies in other locations. The interest is therefore rather limited, to the context rather than scientific understanding. This work might therefore be better published for a local readership rather than disappoint the readers of Ocean Science who would be looking to learn new science to advance their research. The description of the methodology is rather long, with detail as if it were new. More seriously, there are many inconsistencies and errors or omissions in the methodology descriptions. The following points need attention before any publication.

Page 1602 line 27 and page 1603 line 1. This is a very bold statement. There are surely counter-examples where tides do not play the main role in net estuarine circulation, e.g.

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Interactive Discussion

Discussion Paper



in the Mediterranean. Why is “sub-tropical” part of this statement?

Page 1603 lines 2-3 and lines 5-6. The first of these sentences should end “natural problems in estuaries.” These two sentences should be brought together and merged.

Page 1603 lines 18-25 should be shortened.

Page 1604 lines 4-19. This should be shortened. The point about “bio-fouling” in line 18 is a repeat of lines 1-2.

Page 1604 line 29. Omit “uncomplicated”.

Page 1605 lines 14, 17. Douragh channel, Shadegan pond and Imam Port Complex should be shown on a location map.

Page 1605 line 22 to page 1606 line 7. This looks like motivation and should come at the beginning of the Introduction.

Page 1606 lines 9-14. Much repetition.

Page 1606 line 15. It is unclear here whether this means six profiles per hour or six samples per hour. Page 1607 lines 6-7 suggest six profiles per hour.

Page 1607 line 6 and lines 9-11. Bursts “for 12 minutes each hour” are inconsistent with “150 pulses every ten minutes” / 900 profiles per hour.

Page 1607 lines 17-20. This could be reduced to “. . . performed for two spring tide cycles (16:00LT, . . . 2006) and two neap tide cycles (14:00LT, . . . 2006). The times given imply 24 not 25 hours recording.

Page 1607 lines 24-25. Errors like “data endpoints” are not “environmentally based”.

Page 1608 lines 3-12. This is fairly standard and could be shortened. One most relevant reference in line 9 would suffice. If going into the detail that it is a symmetrical Doodson filter, the real point is the filter width (spread of weights) which influences the amount of smoothing.

Interactive
Comment

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Page 1608 line 24 should read “. . response depends on distance . .”

Page 1609. Equations (1) and (2) are equivalent, only one of them is needed unless there is some distinction between SSC(est) and (SSCmeasured) which is not explained.

Page 1609 line 22 to page 1610 line 7, and page 1610 line 21 to page 1611 line 1. These two sections are related; they should be together and merged; they should not be in the middle of the analysis (equations 1 to 7).

Page 1611 lines 2 and 4. Actually equations (3) and (5) are substituted in equation (2). Equations (4) appears not to be used at all – could it be omitted? Going from equation (2) (or equation (1)) to equation (6), it seems that $B = 0.1$. Why?

Page 1612 line 3. $B = 0.0060728$ contradicts (1) or (2) going to (6).

Page 1612 line 19 to page 1613 line 2. There is a lot of repetition of previous statements.

Page 1613 lines 25-27. The sentence beginning “Approaching . .” is very unclear, I think it might mean “Current velocity variations are almost the same approaching high and low water level at spring and neap tides, and no significant difference . .”

Page 1614 line 3. “at the main channel of the MC” contradicts figure 1 and other text where the ADCP is at C3 in the barge harbour basin.

Page 1614 line 4. “tidal forcing can be expected as the main cause of fine sediment suspension” depths on the relative strength of tide, wind and density-forced currents. No real reason is given for “tidal forcing can be expected . .” but the current data certainly suggest that tidal currents are the strongest element. However, 24 hours is a very short time to rule out fluctuating winds as a cause.

Page 1614 lines 20-21 and figures 7, 8. The different colour scales in the two figures need to be pointed out for this comparison between spring and neap tides. The caption

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Discussion Paper



in figure 8 is not clear about this (it says something but the meaning is not clear).

Page 1614 lines 22-23. "currents and turbulence were too weak to disperse sediment". What is the basis for this statement?

Page 1615 lines 4-6. Repetition.

Page 1615 lines 8-10. This sentence "Threshold . ." looks like discussion and should be in section 4.4.

Page 1615 lines 10-11. I do not understand "efficient role of spring and neap cycle". What role? What is different from what would happen if the tidal cycle were constant with amplitude equal to the average of springs and neaps?

Page 1615 line 20. How "enhance turbulence"? This seems to contradict lines 25-26 "Fine sediment plumes . . could damp turbulence . .".

Page 1615 line 25. "transport during spring tides". There seems to be a net transport because the plume occurs mainly during ebb tides. This also applies at neap tides (although the transport may be less then).

Page 1615 line 27. "On the other hand" suggests contrast but the rest of the sentence actually reinforces the previous sentence. Probably best to omit this, just begin "In stable stratification, . ."

Page 1616 lines 25-26. No direct evidence is shown for "bottom morphology is changing . ." – is this a prediction?

Page 1617 lines 16-19. This should either come much earlier (in describing the data) or in Acknowledgements.

Page 1617 lines 20-22. No need to repeat this methodology here.

Page 1618 line 17. "higher" – it is not clear whether this means "neaps > springs" or "bottom > higher up".

Interactive
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Interactive Discussion

Discussion Paper



Page 1618 line 18. Omit “Although”. “but” serves the purpose in line 20.

Page 1622, Table 1 heading, line 2. This could end “. . surface in 1 m bins.” [“bins” not “been”. The velocity units are stated in the Table].

Page 1623 Figure 1 caption. This should say something about C1 and C2 which are in the figure and not noticed by me in the text. Caption line 2, sentence should end “. . barge harbour basin.” Caption line 3, omit “which”. There should be a location map with places referred to in the text.

Page 1624 figure 2. Within the figure, “data” not “dara”. Why is the SSC scale inverted? This must be wrong since $P1 > 0$. Use either A, B or P1, P2, not both sets of symbols.

Figure 8. As noted in comments on the text (page 1614), the last sentence of the caption should be something like “Note the smaller SSC scale values compared with Fig. 7 for spring tide.”

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