

**Interactive comment on “Tidal variability in the Hong Kong region” by Adam T. Devlin et al.
Anonymous Referee #2**

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The authors set out to investigate how the observed tides around Hong Kong, and in the wider SCS, have changed over the last decades. The use of such a large data set from a small region is interesting, and there are some intriguing results, but there are issues I think must be addressed before this could be published. Both of these points are already raised by Review 1 and by Richard Ray in their comments, and I second them here (hence the brevity of this review).

-Thank you for your overview and gentle review. We have worked hard in this revision to make some major changes, based on the very helpful comments of Reviewer #1 and the additional helpful comments and explanations added by Richard Ray. It has also been a long time since our initial submission of this paper (we were waiting for an initial review for over 6 months), and a lot of new work and new discoveries are evolving in our examination of the HK waters.

In this version, we have removed a lot of the contentious material. We now only use the four major tidal constituents and the sum of the four as the delta-HAT. We also remove the overtide analyses, the SCS analyses and discussion, and the historical/modern comparisons. Finally, we have removed the “minor tide” discussion of the M_3 tide and other lesser components, because, as pointed out by Ray, this effort was somewhat flawed in execution. Richard’s comments were quite helpful in elucidating the proper method of analysing perigee-influenced tides (such as M_3 and N_2), in that a 9-year analysis window should be employed. In fact, we are moving forward in a new study to examine the global occurrence of the M_3 tide using 9-year analysis windows, and these results are quite interesting, including the HK results. However, these results are now not as relevant to the current study, so all previous material about this has been removed. We now focus only on the local HK results, and downplay talking too much about the mechanisms why, though it is still hypothesized that the local harbor changes are likely part of the answer. However, regional SCS changes under climate change may also be a factor, and, as Reviewer #1 points out, it is difficult to separate the local engineering changes from regional climatic changes. Therefore, we try not to suppose or speculate too much here, mainly we just report what is observed. We do intend to design a new modelling study in the near future that will employ a highly-accurate DEM of HK and apply some of the historical coastal changes to examine if tidal properties can be affected by such changes, and we mention this intention for the future in the new manuscript. Please also see our complete responses to Reviewer #1 for additional responses and explanations.

The relevant omissions are:

- The “minor tide” analyses (i.e., N_2 , K_2 , Q_1 , and P_1) and consequently the delta-HAT-8 analyses.*
- The South China Sea results and discussion. Also, much of the related introduction materials about the SCS dynamics, internal tide generation and propagation, etc.*
- The “historical” vs. “modern” comparisons.*
- The later discussion about M_3 and very minor tidal behaviour (this part was erroneous as pointed out by Ray).*
- Figures related to the above, which has allowed a better resolution to be used without “tiling” the results and making them too small.*

-Removal or downplaying of the suggestion of mechanisms to explain the behaviour, besides some short mentions of the possible importance of engineering projects in HK. This possibility will be explored in an upcoming modelling study using highly accurate DEMs

Major comments:

The paper is a difficult read, mainly because we are constantly interrupted by quantifications. The reader could look up numbers in the figures and tables rather than being told that this gauge changed this much compared to that gauge. Maybe consider saying that “A increased more than B with a factor N”.

-Thank you for the comments. We agree that the previous version was a bit confusing and had too many numbers to talk about. We hope that most of these concerns will have been alleviated by the removal of the SCS material, the minor tides, and the historical/modern comps. Beyond this, we have rewritten the remainder of the paper with a careful eye on giving a smooth dialogue without too many quantification interruptions.

The overtide analysis really doesn't add much, even if it wasn't flawed (see Ray's comment). If it is to be included, and I don't think it will be significant once it is analysed properly, we will have to be told why the changes are of interest. I think it would be more worthwhile, and this is seconding Review 1, to focus on the main constituents around Hong Kong alone, and delete the speculations about why the tides may have changed in the SCS. If the latter part is to be included, we need to be told with more certainty why these changes have occurred.

Thank you once again. We agree and have now removed the overtide discussion. We now focus only on the largest and most familiar four tides and have downplayed most of the discussion that speculates about the reasons why. As mentioned above, we do hypothesize that the harbour changes may be at play, but without any modelling or better explanations (which may be available after future studies are completed), it is difficult to explain the relative importance of local and regional changes to changing tides.

Minor comments:

L127: it is surprising to not see references to work by Alford and collaborators here.

-Thanks for the suggestion. We did in fact read some of Alford's papers and did have some references included in earlier versions of the manuscript. However, we edited many times and removed a lot of this discussion that was determined to not be as relevant to the new direction of the manuscript and had somehow removed a few papers that were done by Alford and other collaborators in the text, though they are still listed in the Reference list (e.g., Alford, 2008; Chinn et al., 2012). We have re-evaluated these sections, and now cite these two papers in the appropriate place now.

L176-196: I suggest deleting this and just give a very brief summary: we have NN gauges spanning NN years (see table and figures: : :).

-Thanks, we have now honed down this section to be brief according to your suggestion.

L273: why distinguish between historical and modern, using some arbitrary cutoff?
Technically, they are all historical, since they are in the past.

-Thanks for the comment. We agree and have removed the comparisons of historical/modern times.