Ocean Sci. Discuss.,
https://doi.org/10.5194/os-2019-133-EC1, 2020
© Author(s) 2020. This work is distributed under
the Creative Commons Attribution 4.0 License.

Ocean Science
Discussions

Interactive comment on "Predicting tidal heights for extreme environments: From 25 h observations to accurate predictions at Jang Bogo Antarctic Research Station, Ross Sea, Antarctica" *by* Do-Seong Byun and Deirdre E. Hart

Philip Woodworth (Editor)

plw@noc.ac.uk

Received and published: 14 February 2020

14 February 2020

Comments on 'Predicting tidal heights for extreme environments: From 25 h observations to accurate predictions at Jang Bogo Antarctic Research Station, Ross Sea, Antarctica' by Byun and Hart (OSD)

Here are some comments from me as editor additional to those of the two reviewers. My comments seem to be closer to those of Reviewer 2 than Reviewer 1. It will be best

if all three sets of comments are taken together for any new version (see below).

In the following I give a list of comments on the writing (there are several sentences without verbs, for example). But the main thing is that I thought there were 3 sections that either need considerable improvement or should be dropped.

(1) Section 3. I understand that the method is some kind of response method, and I have read the authors' 2015 paper. However, I defy anyone to understand this section as it stands. It is made worse by not defining many variables (e.g. line 128, what are r, eta and tau. I believe s is species; line 136, what are k,m etc.). And I am sure there must be errors in equation 2 although I am not sure what e.g. it has a parameter j which is a subscript of a constituent like 'i', but which is not summed over but used only as a lower limit i=(j,m), but the left side of the equation is not a function of j. That cannot be right. Then also, what is a 'representative harmonic constituent'?

I think a simpler thing to have done would have not included the little bits of maths here which just confuse everyone but just referred the reader to the 2015 paper for the method. I have many detailed comments on this section also which I list below.

(2) Section 5.1. You have records of the order of a fortnight so I daresay it is inevitable that there will be mismatches on that timescale between your method and the data. However, do you need a page to say that? I suggest that this aspect should be summarised in 5-6 lines in the Discussion section where it can be a pointer to improvements in the method. Also I wondered if you considered the missing fortnightly tide was consistent with that in FES2014.

(3) Section 5.2. Having shown that the Ross and Weddell Seas have different dominant tides (and form factors), end of story to me, you embark on generating predictions over 18.6 years which lo and behold have the ranges (you don't explain range = 2*amplitude) which have exactly the equilibrium amounts that T-Tide must be coded with. So what have you learned? Nothing. The finding is presented as some kind of new result. I suggest, having indicated the map of form factors, you just say that because diurnal

tides have larger 'f' and 'u' variations than semidiurnal tides (reference a text book) then they will have larger ranges of tide over 18.6 years. In 5-6 lines again.

Also, on line 67, you say that section 5 will discuss double tidal peaks. I can't see anything about that in the section or the paper.

Because of the problems with these 3 sections, which make up most of the paper, I expect that it will not be acceptable for OS without considerable improvements. Anyway, I am unclear what has been learned new here which you didn't learn from NZ and Korea data in the 2015 paper - I realise this is a different tidal regime but a step change might have been to write a larger paper with as many regimes as possible if you wanted to demonstrate that your method works well.

Detailed comments:

9-10 - sentence 'Though obtaining'. This sentence has no verb.

13 - by a different tidal regime

18 - I have never seen this 'tropic-spring' description before (there are other examples below). Could you not just replace this simply with 'at high lunar declination', or whatever, which means something physical rather than poetic.

28 - the Rignot reference is rather old. There has been a lot of work using GPS for tides under ice sheets, and there new data sets (IceSAT etc.). I am sure you can find a couple of better references.

46 - though –> although

50 - transfers –> transfer

59 - GPS is usually called GNSS these days

67 - see above

75 - what does high-frequency mean?

89 - year-long

92 - this needs rewording. the 2 main diurnal and semidiurnal tides are K1 and O1 and M2 and S2 of course - what you mean here are the 2 main relationships taken from Cape Roberts

97 - they have similar amplitudes. not 'characterised by'

97 - between –> at

98 - for S2 respectively.

99 - close –> short

But I don't consider 269 km a short distance. I am sure the tide around Korea or NZ, for example, changes enormously in that distance. And what does 'in tidal terms' mean?

100 - phase lag usually has no hyphen

101 - what does tidal patterns mean? You mean tidal characteristics?

104 - database –> model

105 - drop horizontal

105-111 - there are amplitudes and phase lags, and there are co-amplitude (or sometimes co-range) and co-phase charts, sometimes combined as co-tidal charts. But there is no such thing as an 'increasing co-amplitude'. Please rewrite this paragraph. See below for the figures also.

113 - why a minus before CTSM?

114-115 - why the italics?

125 - remove simply

126 - remove accurate. You have no way of showing how accurate they are.

127 - remove sentence 'In short'. This is obvious.

128 - see above. Also mention that phase lags are Greenwich lags.

130 - sentence 'Note that'. Again I think that assumes you understand the method

134 - peculiarities –> properties?

169 - again, I guess the reader will have to read the 2015 paper to understand why you produce 17 data sets? This has to be clearer.

175 - where –> when

227 - versus –> and

day –> days

add respectively at end of sentence

229-230 - sentence 'Hence the' has no verb

246 - remove the minus sign. Replace the tropic jargon business.

249-256 - I think I would replace this woffle with simply saying that good knowledge of tides is important for understanding ice shelf dynamics and give one reference as an example.

265 - .. periods, rather than seasonal. (I think)

270 - with additional exclusion (I think)

272 - well, you don't do that do you?! You have spent a page showing that the method could be improved with a digression into the ice shelves. There is very little in this section (see above also).

273 - Decadal timescale ..

274 - drop daily

276 - I don't understand this. The small magenta blob on the west coast of the Weddell Sea indicates a large (diurnal) form factor, right? Not semidiurnal. (You might also mention its latitude rather than 'half-way'). Most of the Wedddell Sea is blue (semidiurnal).

278 - you could point to Fig 1 for mention of Prydz Bay

279 - drop 'the increase in'

286 - drop 'feature ..tidal' which is just repetition. influences –> influence

292- 298 - see above. This is just an inevitable consequence of the way T-Tide is coded with the equilibrium nodal dependencies.

302 - Drop 'Of note', unless you want to refer to a tidal text book

328 - drop database

Fig A1 caption - drop horizontal.

co-amplitudes –> amplitudes. co-tides –> phase lags (Greenwich)

In the caption of the 4 figures, remove the dot after deg as there is no dot after cm. remove all the co- things. And co-tide should be Greenwich phase lag.

Figure A2 ditto the above. In (b) and (d) there is a mess of annotation of phase lags at a couple of amphidromic places. Please remove that mess.

Table 1. Please move the information in the Note column to be extra lines under ROBT etc. You give only one set of ADI and AT for JBARS but there must be two different sets of values in 2017 and 2019.

day –> days. No hyphen in phase lag.

Table 2. .. harmonic analysis of year-long .. No hyphen in phase lag

Figure 1 caption. Please say year and month this photo was taken

Figure 3 - y-axis phase lag should be (deg) and not (cm)

Figure 4 caption should say what (a), (b) etc. are and not just have text. Anyway I think the last two sentences contradict each other

Figure 5 - under (b) you should have Time (month/day) as for Figure 6

I think the last line should say JBARS and ROBT

Figure 6 - Time (day) should be Time (month/day). (a) and (b) are missing from the plots.

Line 429 - (thick line with o) should have a filled and not open o to correspond to the plot

Figure 7 - why the == on the y-axis? There is no break in the numeration. Time (day) should be Time (month/day)

Figure 8 - Time(month/day).

A difference like this is usually defined as an Obs minus Pred but I guess it doesn't matter too much.

The caption says 15 February, but the x-axis in (a) only goes up to 14 Feb. The caption should say what RMSE and R-squared are.

Figure 9 - the caption and the x-axis in (a) say 15 Feb, but the header says 16 Feb In (b), the caption and x-axis say 30 Jan but the header says Jan 18. I thought at first you were referring to the dates of the dashed boxes but it seems not.

line 1 of caption - estimated –> shown

Figure 10 - Time (month/day)

450 - Msf and Mf tides ('Exp2'). At least I think that is what is meant.

Figure 11 - please have an arrow on the colour scale to indicate values over 3. The

longitudes on the map are fuzzy.

caption - drop horizontal.

Figure 12. What you are showing here are the 'f' and 'u' nodal factors. They are both nodal factors, not just 'f'. They are not 'estimated', they are hard coded into T-Tide and can be found in any tides text book.

So you can tell I found many small problems with the paper, in addition to the problems with the three sections mentioned above. I hope you can produce a considerable better (and probably shorter) version.

Interactive comment on Ocean Sci. Discuss., https://doi.org/10.5194/os-2019-133, 2020.