Authors answers to EC1 comments/questions/recommandations

(for commodity reasons, we have reproduced the reviewer text in black, answers are in light blue, further action to the revised manuscript in bold blue)

23 November 2020
Comments on 'FES2014 global ocean tides atlas: design and performances' by Lyard
et al. (OSD)
Below are some general comments on the draft with an editor hat on, I leave any more scientific comments to the reviewers. I found the text rather intense and technical but that is probably inevitable. However, there is at least a need to define all acronyms, for example, and have proper referencing. There is also inevitably some french-english. A second problem is that, while most of the figures might be acceptable (although parts
(c) of Figures 2 and 3 are missing), they are a mixture of styles which does not look good. I make some comments on each below.

We agree with most if not all recommendations of the reviewers.

All mentioned typos and language issues have been already fixed in the revised manuscript. Also all figures have been re-processed to increase homogeneity and graphical quality.

Comments on the text, apologies there are so many:
p3, 5, title - tides –> tide, performances –> performance
13 - with a tidal
20 - tidal constituent spectrum
22 - diagnostics and the Lowest and Highest Astronomical Tide and other hydrographic datums.
24 performance
32 performance
34 accuracy towards the end
41 error covariance data sets.
p4, 5 methodological
8 pretty –> very
13 define CNES
the decision was made
15 performance
18 by the GOT model (reference)
21 resolution grid on the
22 website (give http)
in 2019 by extending its long-period spectrum to include low-frequency ..
28 the reader with information30 a basic accuracy
34 dependence
36 define these acronyms
38 based on the usual ..... with a non-hydrostatic
41 The ITWD
42 parameterization,
pioneering
p5,5 accounts for a significant
15 times smaller
19 solver's
23 parameter
28 Consequently, we will confine ourselves
33 velocity
37 currents
41 adapted for the global ocean to include near-shore
p6, 5 elevations
17 Reversely –> Conversely, it
24 Reversely –> On the other hand, minor
27 What is Go? GBytes?

31 define acronyms and give proper references
38 give year and add reference for Timmermann et al.
p7, 6 we have always
8 even on a regional level
19 you have defined these FES versions before and later without the hyphens
20 ditto
32 difference RMS reduced by nearly a factor
36 performance such as
40 because of the intrinsic variability of the atmosphere we consider
41 clearly
p8, 8 have been used in validation of simulations and in data assimilation steps
11 by means of harmonic
13 how much –> how
19 put 'respectively' at the endd of the sentence
21 time series raise more ... dependence
23 signals
29 dataset, but with larger uncertainties than
31 higher spatial
32 temporal under-sampling
36 Reversely –> Conversely
37 not only are the S1 and S2 tides projected
42 completed –> complemented
p9, 8 targeted
9 applied to the altimeter
12 noted –> denoted
13 ditto
14 what is the funny 18)
17 aliased to
18 and to the annual
19 analysis by the non-tidal signal is severe
virtue of the Parceval Rule (reference)
23 guarantee
24 portion of the annual
26 and so to tidal
27 harmonic
34 K1, and will.
The misfits –> Such differences were found to be consistently
35 demonstrating the benefits of the model-based correction
40 Because this signal was stronger during the TOPEX period [and why was that?]
41 Jason-1/Jason-2 relatively recent record.
p10, J1-J2. I think these sort of acronyms are asking a lot of the normal reader. I know what this means but I am not sure other people will. Also should not J1-J2 appear in Table 3 for example?
13 accurately the harmonic separation performance.
C5
17 consequently larger errors in the harmonic
19 damaging
24 tide model
by essence –> by definition?
25 internal tide
28-29 I don't understand this sentence. Could you reword it? Maybe it also needs a reference
31 tide becomes shorter.
33 with the notable
34 substituted by
35 forcing terms
36 as a variational

37 as is the case
p11, 7 - a representor
9 Although the variational
11 poorly able
13 has been constructed to ... error
14 demoniation is a mis-nomer as the error covariances of state vectors are not idealised ... but are justified
18 are run
26 experiences –> experiments
27 dependence
37 in Figure 6
40 global-average
p12, 7 - sloping
11 in Figure 7
13 global-average
16 regions using either synthetic
19 extracted from what we call 'gridone',
21 of the reference
28 the Weddell Sea region
p13, 6 solving an assimilation
11 feasible of the
18 why 20 years? There has been 28 years since T/P launch?
24 estimate of
26 errors
30 consisted of
38 enables us
40 Stammer et al should be 2014
43 what are Kowalik etc. (I know but the reader will not). Please give proper references. Define acronyms
p14, 7 - very peculiar –> particular
10 between the
16 separate the M4
17 in the M4 analysis
18 kept from –> kept in??
21 Avon Mouth –> Avonmouth
Bay of Bristol –> Bristol Channel
24 components (twice)
25 performance is
28 drop 'rather'
29 - why don't you include third-degree tides, especially M1? Although only a few mm or a centimetre at most places, it will be larger than some of the second-degree tides you have here
p15 top - I think, as becomes evident from the figures, you need to make clear that Sa and Ssa come from an ocean model as well as tidal forcing
27 - Stammer 2014
36 gauge data
37 The TPX09 atlas
40 performance in
p16, 7 - tide gauge
why do you define TG here when 'tide gauge' has been used a lot before. Please defineit first time and use from there.
9-10 I don't understand this sentence. Please reword.
11 the GLOSS
14 .. regions, ... no data has
15 the GOT
16 gauge
19 using the

20 the GOT4v10
21 in the global
29 the Jason
30 of all the models tested ... variance
31 tidal models respectively.
34 Statistics for Altika
37 reduces
38 to the GOT
42 variance when using the
for the Altika .. to the coast
p17, 10 current maps ... budgets in the global
17 elevations where tides are the major contributor to variability .. validation of tidal currents
29 (as they are based
30 , and vertical current profiles
36 ellipse
37 dop 'Precisely'
42 in Figure 19
p18, 7 Globally –> Overall
16 depicts
20 The barotropic tide energy budget is a valuable diagnostic .. performance
22 proxy for the interaction
32 used to provide additional vertical diffusion information in ocean ..
36 In the
37 using a spherical harmonic/Love number approach ... Green's
41 Green's function
p19, 8 why is this final as you mention a version 'c' at the start
12 assessment
14 constituents
15 Mean Lower Low Water (MLLW) and Mean Higher High Water (MHHW)
These are not just used by NOAA. They are two of many rather archaic hydrographic datums. You could maybe refer to one of the annexes of the Pugh and Woodworth (2014) book.
21-22 where the accuracy of tidal atlases .. limited for precise
28 define ITRF and give reference
29 user community were able to accumulate
30 performance in the tidal
33 short-list
36 - define SWOT and give a reference (probably Morrow et al. in Frontiers a couple of years ago)
38 emphasis on
42 existing public data release
p20, 5 future atlas
10 believe that the
11 ... correction, in terms of surface elevations as well as tidal
14 The FES2014 project ..
16 - framework no [superscript to be consistent]
Comments on figures - sorry quite a few here. My main complaint is that their styles are very different, and (although I am not convinced it is necessary) but maps using have Longitude and Latitude axis titles.
Fig 1 - the lon/lats numbers are very small and the colour scales are cramped with them.
line 9 - you haven't defined in the text what resolution ratio means. You should define it here otherwise.
Fig 2 - (a) and (b) annotation needs adding. But figure (c) is missing completely?
Fig 3 - ditto
Fig 4 - say what the units are in the caption or the colour bar

Fig 5, line 1 - signature. What does number of points mean? I couldnn't see that in the text.
You can see this is very different style to Fig 1 for example
Fig 6 - Watt should be W
It seems strange to have negative numbers increasing to the left, but ok.
Are the region numbers used in the paper? If not I would remove them.
line 1 - dissipated by bottom
Figs 7 and 8 - you can see on one page what I mean about different styles
Fig 12 - the fonts are very small
Figs 13 and 14 - please can you remove all the clutter on land with lakes and rivers? It is hard enough as it is to see the coloured dots. And in Fig 14 a simplified coastline might be best as your eye is taken by all the detail.
In the colour bar cm2 should be superscript
Fig 15 line 1 - variance
line 2 - for the Jason-2
It would be good to remove the lakes etc. from these maps also. Who cares about them?
Fig 17 - the font is again very small on the axes
Fig 23 line 2 - for the Jason-2
Fig 24 - Lowest Astronomical Tide (LAT) relative to mean sea level ..
Table 2 - Wave period should be (days). Please could you have decimal points and not commas?
Interactive comment on Ocean Sci. Discuss., https://