

## ***Interactive comment on “Numerical modelling of the tides in the Caspian Sea” by Igor Medvedev et al.***

### **Anonymous Referee #2**

Received and published: 10 September 2019

SPECIFIC COMMENTS I generally find the paper and topic interesting but in many ways the paper is positioning itself between two chairs. One describing the result of the numerical modelling (not the numerical model) and the second the effect of lake level change. So given the title of the paper this was a bit of surprise to me.

So I would very much like to see the title reflecting this better like "ocean tides under changing lake level". In general I find the scientific approach and the applied methods valid though I have the same problem as the first reviewer that no information of the presented model is given as this is given in previous work. (Medvedev et al. 2017, 2019: tide gauges). I find the investigation of love numbers misplaced in this context as this is likely dealt with in the reference work, and I suggest this is substituted with more quantitative discussion on the quality of the model.

C1

TECHNICAL Figure 1 is nice but identical to another publication by the leading author. As the evaluation of the ocean tide model in Table 2 is done for a number of cities surrounding the Caspian it would be much more appropriate if Figure 1 was changes to represent the location of these cities and I personally have no clue to where the cities are located. This would make reading easier.

Of interest I am very puzzled about the  $>21$  cm tides in the TB described in Figure 3 because it does not relate very well to the amplitudes of the two major constituents in Figure 2 and the 4 major constituents in Table 2. the major semi+diurnal constituents explains a maximum of 7 cm or 1/3 of the tidal range in TB and the Maximum tidal range (R) for the 4 major explains less than 1/2 of the signal. Consequently there must be other major constituents not mentioned in this paper that is responsible and likely dominating?. Again the fact that I do not know the location of the cities in Table 2 makes it hard to determine the location of maximum amplitudes. The paper deserves an detailed explanation of this phaenomenas (is it astronomical constituents, overtides???)

The paper briefly mentions the form factor F in Table 2 and later in the paper gives one sentence about it. The form factor is detailed in previous publications by Medvedev, and I would leave it out of describe it much more detailed in this publication.

When discussing numerical experiments with different MSL more information on the accuracy of the bathymetry used must be provided. The discussion on Page 13 following Figure 6 is interesting but again I question on the Turkmen Bay.

Figure 4 could benefit from names on the regional features

Figure 5 6 and 7 should be reconsidered an redrawn for consistency. Figure 5 used 26 28 and 29 meters, Figure 6 25, 27 and 29 meters and Figure 7 25-30 meters. so they all are consistent.

Figure 5 also needs a bit of "regional" explanation for the reader. How can two cities 300 km apart. Exhibit sea level changes differing by 0.5 meters from 1900 until now.

C2

Since 1980 the sea level curve matches but before it differs up to 0.5 meters?-

Figure 8 is interesting in attempting to explain the spectral density at different MSL regimes. I guess this is the key to the large tides in the Turkmen Bay, and the key to which constituents are responsible for the large tides. This deserved more attention and investigation and explanation in my opinion.

In the discussion there is a bit of uncertainty to the discussion of the large tides in the Turkmen Bay. The height of the island is in the paper claimed to be 3-5 meters by the author and 5-8 meters from the SRTM. SRTM was measured in the Early 2000's where sea level was -27.5 meters, so there is inconsistency here.

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Interactive comment on Ocean Sci. Discuss., <https://doi.org/10.5194/os-2019-88>, 2019.