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Ocean Science Discussions

Interactive comment on "Seasonal variability of radiation tide in Gulf of Riga" *by* Vilnis Frishfelds et al.

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> Causes for diurnal oscillations in the water level in the Gulf of Riga are investigated, and a prominent role of tides and sea breezes is postulated.

OK

> In its current form I have to advise that this paper is rejected by Ocean Science. The primary reasons for this is that it is very hard to follow the logic of the paper, to understand how the experiments were carried out and to understand what the figures show.

Text of the paper is reworked. The task of the paper is expressed more clearly in abstract, introduction and analysis. Resonance of the Gulf of Riga is moved to Appendix

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Discussion paper

as its is less substantial part for the main task of finding characteristics of daily pattern of oscillations of water level for every season. Then, there remain three pricipal sections: a) observations of daily water level oscillations, b) case with astronomical tides only, c) inclusion of sea and land breeze and analysis.

> Some examples are that at times it appears that the authors argue that atmospheric forcing makes tides (or perhaps diurnal oscillations in general) weaker, and at other times stronger.

The language is improved, now. Yes, it depends on the context. Astronomical tides are of course stronger, but presence of sea breeze is essential in daily phase of water level oscillations in spring and summer.

> Tidal amplitudes are calculated from a model (at times), and it says that in the model tidal stress is implemented through unresolved bottom shear, see Canuto. I have no ideas what that means.

Canuto divided tidal influence as 3 constituents: tidal drag in shallow seas, internal baroclinic tides and unresolved bottom shear. The last one is component of tidal field not aligned with the mean velocity and cannot be modeled as a tidal drag. It is principal constituent (according to tests) because of weak flow field with only tidal forcing. Description added in the text.

> Moreover, the usage of citations like in the aforementioned example where things are said to be this or that according to him/her without giving a proper explanations is problematic throughout the paper.

Problematic citations have been explained better.

> Lastly, several figs are said to show daily variations of sea level, and they are often negative. I would have expected that a variation to be a positive quantity (e.g. a standard deviation), I don't find the definition of variation in the paper.

Yes, "variation" was not a proper expression. Oscillation or deviation of water level was

intended. Corrected in text.

> I also can't follow why the authors believe S1 to be more important than K1 and O1.

Yes, O1 and K1 are stronger. Figure with spectral distribution of diurnal components from observations (1961-2019) is added (attached). But since we would like to find an hour of the day of particular month of unspecified year with either maximum or minimum water level, then lunar tides should be disregarded and S1 becomes essential component in spring-summer. The task and motivation of the paper is expressed better in abstract, introduction and discussion. Basically, the task is to get the observed daily pattern of water level oscillations at each month (Figure 5 in version 1), and test whether it can be explained only with astronomical tides and sea breeze; and find the proportions of their contribution (Figure 13 in version 1).

> To a large degree the problems of the paper may be owing to linguistic shortcomings, and the paper requires substantial work to improve both readability and traceability.

Yes. The structure of the text of paper is reworked, simplified and unnecessary phrases less related to the subject are removed.

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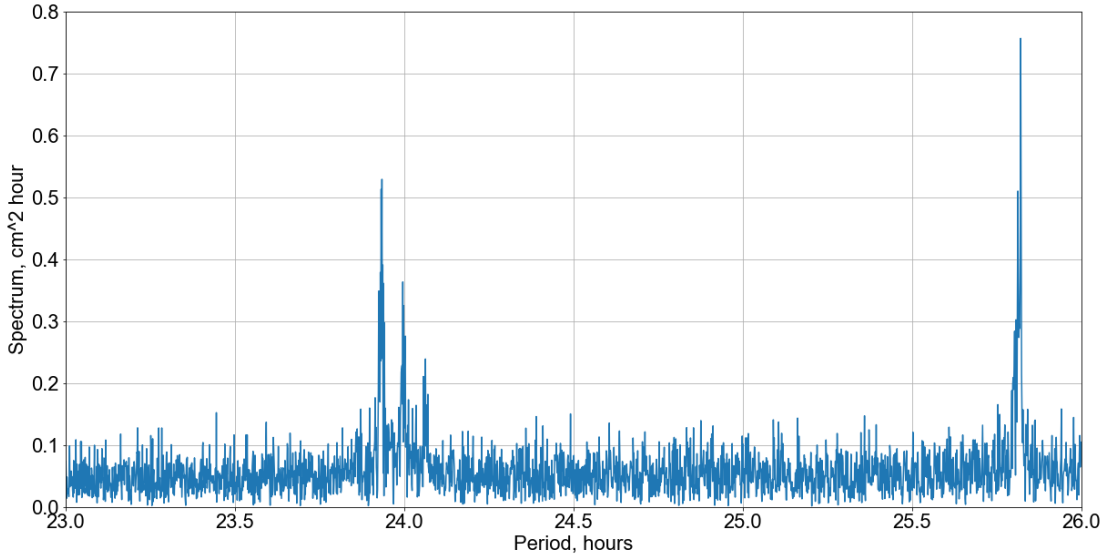

Fig. 1.

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