

Interactive comment on “Processing of water level derived from water pressure data at the Time Series Station Spiekeroog” by L. Holinde et al.

Anonymous Referee #2

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General comments :

This is solid work, and giving access to this data is of great value for a number of purposes. The illustrations are good, providing great examples of the processing steps without detailing the whole series which would have been too much.

That being said, I think the whole paper would be better if both the TSS Spiekeroog and its environment were more detailed. We want to know more on how the station fits together with other water level stations (there is one in Neuharlingersiel of which data is used, but aren't there more? And is Neuharlingersiel a similar TSS station?) We also would want to know what instrument is used in TSS Spiekeroog. What kind of maintenance operations are conducted are also of major interest. And on the general

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environment, what is the tidal regime in this spot (tide range?). We have some indication on storm surges in the region, but no info on the frequency, severity and impact on the coast (and on the TSS station itself!)

On the whole, the purpose of processing this time series that way is not so clear. . . In my opinion, having access to a long time series of water level has 3 main goals :

- one is the identification of storm surges : that's the only point that is addressed in the paper, but for that you don't need to fill gaps, and you probably want to be extra careful with the removal of outliers. . .
- another one would be to better know the tide in order to make tidal predictions, but for that, you wouldn't EVER want to fill gaps with interpolated data!
- last but not least would be to identify trends, such as Sea Level rise, but that is justly crossed out because trends are subtracted to the series. . .

So basically, the point of all this should be explained.

Specific comments :

Abstract:

It should be clarified that the result of the processing of the 10 year-time series leads to a final time series of “only” 7 years. As it is written, you expect to get 10 years of data, and you don't.

2 - Methods :

It seems to me that steps 3 and 4 are basically the interpolation of missing data. Step 3 should in fact be a sub-step of Step 4.

2.1. Subtraction of a trend :

Sensor drift is presented at the end of the first paragraph as a long term trend, and the next line says that “. . .in this work the long term trend is not addressed”. This is a bit

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confusing because the whole purpose of this step is to correct the data from sensor drift.

2.2 Removal of outliers :

The method used seems to be robust. All the more so that a “visual check” is made in the data in order to make sure no outlier has been missed. This is basic control but it should always be done (and is so rarely done. . .), so congrats on that!

I failed to see though why sensor maintenance would account for outliers. Maintenance could result in “steps” in the data of course, but Step 1 (subtraction of a trend for each section) would have gotten rid of those, wouldn't they?

The 0.25m/10min threshold could have been compared to the tidal rate at Spring Tides in order to get an idea.

2.3 Calculation of supporting points :

I imagine no other measurements station was available apart from Neuharlingersiel?

2.5. Quality control.

Storm surge magnitudes are given by the BSH, but there is no mention on how far off the coast these values are still valid. I couldn't find anything on the BSH website, but I don't speak German, that's maybe why.

4.1 Discussion on subtraction of a trend.

Is the comparison between a trend observed in 8 months and the fact that “the water level is increasing” relevant? I don't think so. . .

4.3 Calculating of supporting points

The only hypothesis given for the 20 min time lag compared to the 5 min “official” tidal time lag (i.e. the one given by the BSH) only accounts for a maximum of 5 minutes. It is one of the point given in the conclusion (and rightly so!), but the interrogation should

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be present in this paragraph as well. Even if there is no other obvious reason, it should be noted that this point needs further investigation.

5. Conclusion

The conclusion is very good. Some points raised here should have been developed in the above paragraphs.

I agree with the last sentence : yes a radar tide gauge would probably be much more efficient on this particular station. And it would probably be less expensive to maintain, as no part is under the water.

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