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Interactive comment on “Accelerated sea level rise and Florida Current transport” by J. Park and W. Sweet

Anonymous Referee #1

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Comments on 'Accelerated Sea Level Rise and Florida Current Transport' by Park and Sweet (OSD).

This paper compares transport estimates through the Florida Straits, as obtained from cable data, to sea level measurements at 3 coastal tide gauges to investigate the reasons for (possibly) observed sea level trend changes in the last decade. The comparison assumes a geostrophic relationship between transport and sea level.

The paper is a short one, in fact it is a bit thin I would say, and has a couple of deficiencies that, if I am correct, would require the analysis and paper to be revised before it is reviewed again.

page 552, lines 1-5 and equation (1) on page 559:

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A first comment is that the relationship will not just be geostrophic. There is a discussion of the possible dynamical terms in an area of strong current, bottom friction, and wind stress on a narrow shelf in Higginson et al. (2015, GRL) and also in text books. All terms may not be important but they could at least be mentioned.

Figures 4 and 5:

A second is that the MSL data is not IB-corrected, as far as I understand the paper, which it should be for comparison to transport variations.

A third relates to the trends shown for 3 stations in Figure 4 which are compared, via the residual EMD, to trends in transport in Figure 5. What is the role of vertical land movements in these tide gauge trends? They should at least be mentioned even if they are thought to be small.

Other things:

page 553, lines 12-25: Some more relevant papers that could be mentioned here for the MAB are Woodworth et al. (2014, JGR), Thompson and Mitchum (2014, JGR), Goddard et al. (2015, Nature Comm).

page 555 and caption for Figure 2 - what does the 'data reconstruction' for the missing data in effect mean? You take the climatological averages?

line 14 - .. of the ship data with time ...

line 19 - .. 0.002) is obtained.

line 20 - +/- 1 Sv (reference?)

line 21 - .. in mean transport over the last decade.

My point here is that you have said in the Abstract that the trend in the last decade was not significantly different, but it is not flagged very strongly in the text here.

Doesn't it worry you a little that there is no significant difference in trend using regression

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but there is with the EMD method? It makes you wonder how real the effect is.

There is a problem in this section as the reader doesn't easily know what timescales the IMFs for each analysis relate to. Could a table be provided which shows the period bands in each case? I take it (line 9) that IMF 17 is the lowest frequency (apart from the residual). And then the analyses for NAO etc. uses a different number of IMFs. Needs a decent table.

p. 556, line 9 - longest? You mean lowest frequency?

line 19 - 'with a reduction in AMOC since 2004'. Does this refer to Ezer et al. (2013) or something else? If so, give reference. It is unclear at the moment.

page 558, line 21 - '4 through 7' means what? See above.

p560, line 2 - define SD

line 4 - subscript T

line 5 - straits

lines 14 on - see above regarding land movements and IB correction

Fig 2 caption - I would define EMD and IMF again and say what the order of IMFs is with 17 the lowest frequency.

Fig 3 caption - the reader will again not easily follow why you have pick and mixed NAO IMF 6 for example out of 10 possible without knowing what periods they correspond to.

Fig 4 caption - how many IMFs were used?

Figure 5(b) - the dashed labels should all be 'minus Florida Current'. Or explain in the caption.

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