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Ocean Science Discussions

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

Anonymous Referee #2

Received and published: 21 May 2015

This study related transport estimates of the Florida Current, obtained from cable data and ship based measurements, and SSH at three tide gauge locations assuming a geostrophic balance between SSH and transport. It investigates non-linear trends as well as possible connections between transport changes and climate indices (NAO, AMO, and ENSO) by applying empirical mode decomposition (EMD).

In general, this paper investigates an interesting topic, which is worthy to be published. However, before I can recommend publication the following major open questions need to be addressed. Also the presentation of some parts of the article should be improved.

Regarding the EMD, some specific information about the different IMFs should be included and why 17 IMFs (+residuals) have been chosen? Here, an overview of the IMFs of the different datasets used (cable, ship, and tide gauge data) as figure or table

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would be helpful. Could it be that there is still some small long term variability left in the EMD residual of the timeseries of the cable data, with the timeseries not long enough for a full cycle? In addition, at least a short discussion on how the found 3Sv transport decline in the last decade is dependent on the method used (EMD) should be included.

As the cable transport estimates are related to absolute sea level, please provide an explanation how the connection is made to relative sea level measured by the tide gauge records, which also includes land movement, e. g. by GIA, sediment compaction, ... How are effects from ocean tides and atmospheric pressure handled?

In general, a little more detailed description of the methods applied would improve readability and help the article to stand for itself, especially for interested readers not familiar with some of the methods, e. g. on how the cable measures ocean transport.

page 553, line 3-6: For readability, please divide this sentence into two.

Page 555, line 10-11: Please provide a more detailed description of the reconstruction to fill large data gabs. And, how does the chosen gap filling method influence the linear and non-linear trends?

page 559, line25: finding that the while → finding that while

page 560, line 2: Please provide a definition of SD

Page 560, line 14-26: This paragraph is quite confusing, maybe it is helpful to include a little table including the different trends and an indication about whether the seasonal cycle is removed. Maybe also include the trends of the linear regression.

Figure 1: It would be good to show also the locations of the ship based measurements

Figure 2: As the scale is quite large in figure a and b, it would be useful to have an additional figure c including the EMD residuals of a and b. For comparison, maybe also the results of the linear regression could be included in figure c.

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