

## ***Interactive comment on “Weighing the ocean with bottom-pressure sensors: robustness of the ocean mass annual cycle estimate” by Joanne Williams et al.***

**Anonymous Referee #5**

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The manuscript describes methods to derive the annual cycle in global ocean mass from a suite of in-situ bottom pressure records. The analysis of the data is very detailed and includes a comprehensive description of uncertainties. While the paper is of excellent quality, I have a few minor comments and questions regarding the structure and some of the data used for the analysis:

About self-attraction and loading:

SAL first mentioned on page 459

Acronym used later on page 459

Acronym introduced on page 460

Again introduced on page 466 plus a formal more detailed description is given on the  
C503

same page

Please consider restructuring to begin with a formal description and the introduction of the acronym. SAL could then later be used as a previously defined concept without further explanation.

Introduction of  $p_{ANN}$  on page 461 – could consider mentioning the explicit connection to  $p_m$  by naming it for example  $p_m^{ANN}$ .

Section 4.3 starts with: “The hydrology and atmosphere model thus provides” tying this section to the previous one. To have a more clear divide between 4.3 and 4.2, one could re-state in a few words the conclusions of 4.2 instead of using “thus”.

$p_h$  could be introduced earlier (maybe section 4.2) to make the relationship between  $m_O$ ,  $p_m$  (or  $p_{ANN}$ ) introduced in equation (1) and  $p_h$  more clear.

On page 460 ECMWF data is used to correct the bottom pressure data. Atmospheric data in section 4.2 comes from NCEP. Does the use of different re-analysis products cause any differences in the end results?

Section 5.5: What are the major differences in the model implementation (or data assimilated) between GLDAS-1 and GLDAS-2.0? Why not use GRACE for all of the hydrology instead of using GLDAS that only covers part of the water mass observed?

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Interactive comment on Ocean Sci. Discuss., 11, 453, 2014.