

Interactive comment on “ENSO-correlated fluctuations in ocean bottom pressure and wind-stress curl in the North Pacific” by D. P. Chambers

Anonymous Referee #2

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Ocean Bottom pressure (OBP) fluctuations in the North Pacific are among the most prominent signals detectable in the observations of the satellite gravity Mission GRACE, which is currently in its 10th year of operation. Besides seasonal variations, substantial inter-annual fluctuations and apparent trends have been found in the data, calling for further analysis in order to reliably relate those signals to low-frequency dynamics of the coupled atmosphere-ocean system.

By relating GRACE ocean bottom pressure variability to satellite wind observations and a multivariate ENSO index, the presented paper demonstrates that trends in OBP between 2003 and 2008 are consistent with both steric-corrected satellite altimetry

C584

and satellite winds, further underlining the reliability of GRACE observations over the oceans even on time-scales beyond the seasonal cycle. Correlations to ENSO, however, remain relatively modest (which is in some way disappointing in view of the title chosen for the paper), indicating that ENSO is one, but not the only contributor to inter-annual OBP variability in the North Pacific. Thus, the authors should consider to discuss additional physical processes that might lead to low-frequency variability in the area.

Nevertheless, the paper is concisely written and I recommend it for publication in Ocean Science. Specific comments given below are relatively minor and should be easily addressed in the final version.

1632-15: Since ECMWF winds that force the ocean model do not contain a trend (as it has been deduced from Fig. 11), the OMCT model cannot be expected to show a corresponding drop in OBP. The notion of the last sentence of the abstract should be therefore modified in order to make clear that forcing errors instead of model errors are responsible for this failure.

1633-11: The rather technical term 'f/H contours' might be avoided by referring to the potential vorticity conservation requirement.

1636-2: It should be made explicit that OBP data considered at this stage of analysis are model based.

1636-7: Please justify explicitly your choice of a multivariate ENSO index, which is rather seldomly used compared to, e.g., SOI or Nino 3.4, which are based on one single parameter.

Figure 4: Colors for 'El Nino' and 'WSC high' are not discriminable. Moreover, columns are referred to four different fraction of the year, making it difficult to read the figure. I suggest using only two timesteps for the two pairs 'El Nino' & 'La Nina' and 'WSC high' & 'low', respectively.

C585

1639-20: should certainly read 'A_2 Mei(t)'?

1641-6: should read 'ENSO'.

1641-7: The conclusions might benefit from adding some thoughts on potential processes that might cause inter-annual wind variability in the North Pacific area besides processes related to ENSO. Since westerly winds primarily originate from the continental landmasses in Eurasia, WSC changes will certainly reflect atmospheric variability there

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