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Ocean Science
Discussions

Interactive comment on "Impact of model resolution on sea-level variability characteristics at various space and time scales: insights from four DRAKKAR global simulations and the AVISO altimeter data" *by* T. Penduff et al.

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We would like to thank the reviewers for their thorough reading and very interesting suggestions. Many parts of the paper have been rewritten to improve it and satisfy the reviewers' remarks.

New material and main changes.

- we agree that mean SSH fields are of interest: new figure 2, and new section 3. These are compared with Niiler et al (2003)'s "observational" reference.

- significance of temporal correlations have been computed: modification of fig 4 (now numbered 6).

- reshaping of this fig 6 to match the organization of std(SLA) panels in the now-labeled fig 4.

- the "old" figure 5 about near-coast changes in temporal correlations was not very clear nor statistically significant, and also quite restricted in scope. We now present and comment more generally on local changes in (significant) temporal correlations at global scale (new fig 5)

- Suppression of the confusing fig 6 and section 6 from the old manuscript. The new fig 7 is, we hope, much clearer and helps discussing the links beween increases in std(SLA) and changes in correlations (now discussed within the other sections); new material in the conclusion on this subject.

- We tried to clarify the discussion about resolution-induced decreases in interannual temporal correlations (in the conclusion)

Please find below our detailed answers to the reviewers' remarks. Note that, unless specified otherwise, we use the new figure and section indexes in our answers.

========== REVIEWER 2 ==========

*** 1) Pages 1518-9: A few words could be provided comparing this forcing dataset to the commonly used CORE forcing.

We agree. The reader is now referred to the paper by Brodeau et al (2009, in press) where our forcing is thoroughly compared to CORE.v2 in terms of design, calibration, and ocean response.

*** 2) Section 2.2: Some discussion of the scales that are accurately captured within Aviso, and of the limitations of the scatterometer-derived data, would be appropriate.

Scatterometer fields are not used in our forcing: we propose not to address this issue in the paper. We now give in a footnote the exact reference of the AVISO products we used, and the shortest spatial scales they resolve (about 100km at mid-latitudes, according to AVISO: http://www.aviso.oceanobs.com/en/altimetry/multi-satellites/index.html).

*** Subsection 2.2.2 could use a little bit of clarification: 3) The notation used in eqn 4 is problematic. In order to be consistent with the clearer notation used in the closely related eqn 3, I believe that the "Lambdas" associated with time-averaging overbars should be replaced with "l", the index of the cell within a particular latitudinal band denoted by Lambda.

Yes, we agree. Corrected.

*** 4) I would prefer to see eqn 2 presented, without the mostly redundant eqn 1, but just followed immediately by the explanation that the temporal standard deviation of the Aviso data is denoted as sigmaËĘA.

We agree. Fixed

*** 5) I would like to see an eqn presented for alphaËĘm(Lambda).

Yes, it is now provided.

*** 6) page 1521, line 22: "The 1-D and 2-D filtering techniques are described in Duchon (1979)." Would it be possible to very briefly describe the filtering technique, while still referring to the paper for detail?

The main advantages of this technique are mentioned at the end of section 2.2.1: " it was chosen for its relative simplicity, its ability to provide “clean” signals devoid of Gibbs oscillations, in one and two dimensions"

*** 7) page 1533, line 25: "With respect to sigmaËĘm(Lambda) and C_sËĘm(Lambda)...". Here, and elsewhere throughout the paper, I would prefer to

see these measures referred to by name, with the eqn given parenthetically, in order to reduce the reader’s need to translate.

OK, we have tried to remove symbols when possible.

*** 8) Captions of figs 3-5: Generally speaking, I would like to see the layout of the figure described more briefly, freeing up some space to comment more on what it is that the reader should understand from the figure.

We have tried to clarify and condense most captions.

*** 9) Caption, fig 6: Each circle concern a latitude band Lambda -> Each circle corresponds to a single band of latitude Lambda *** 10) located at abcissae... and at ordinates... -> located on the abscissa at point... and on the ordinate at...

Figure 6 has been removed.

*** 11) page 1518, line 22: "250 unitm" – just a missing control character here?

OK fixed.

*** 12) page 1520, line 13: All simulation outputs are started -> All simulations are started

OK fixed

**** 13) page 1523, line 15: reach their maxima -> reach high values

OK fixed

*** 14) page 1533, line 17: are maximum in -> are greatest in

OK fixed

*** 15) page 1533, lines 22, 23: does thus not -> thus does not

This sentence has been removed

*** 16) of the model skills -> of model skill

OK, thanks for correcting. This sentence has been removed, but we corrected another occurence.

*** 17) page 1534, line 9: These (beneficial) impacts of -> The beneficial impact of

This sentence has been removed

Interactive comment on Ocean Sci. Discuss., 6, 1513, 2009.