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Comment

## ***Interactive comment on “Optimal adjustment of the atmospheric forcing parameters of ocean models using sea surface temperature data assimilation” by M. Meinvielle et al.***

**Anonymous Referee #2**

Received and published: 7 August 2013

**Recommendation:** The paper can be conditionally accepted, subject for some revisions

This is a useful and important paper targeting an important issue of optimizing atmospheric forcing for the numerical experimentation with ocean general circulation models. Paper should be published in OSD after some revisions.

Comments

1. Introduction. Here you should state somewhere that ocean modelling has many targets and avenues and, thus, approaches to optimizing forcing fields should be also variable. You may like to produce operational 3-day hindcast or you may be focused on

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creating long-term climate variability run. Definitely, the requirements will be different. To which field your insights contribute most?

2. Page 2498, bottom. Be careful here when writing "...All fluxes are calculated for each model grid point from near-surface atmospheric variables (air temperature and humidity, zonal and meridional wind speed 25 and precipitation), downward fluxes (short wave and long wave downward radiation).....". What is downward is ATMOSPHERIC long wave radiation, the other part is LW emitted from the ocean (consistently with your Eq. 2)

3. Eq. 1. It remains unclear whether you indeed use air potential temperature or just air temperature. In the latter case (and this is more accurate) you have to add low level lapse rate to  $T_a$ . For the same Equation, 10 m reference height should be explicitly mentioned. Probably it is better to move this to here from page 2500.

4. You have to specify somehow in Section 2.1 that fluxes in Era-Interim (as in any operational product) are available as instantaneous values and also as forecasts over the time step (integrating values for this time step). Which one is used?

5. Page 2503, bottom. Here is the place to point to the general concept of your study. Your alternative strategy is important for long-term runs, is not it?

6. Page 2504, bottom. The last phrase is very awkward. What is important amount of simulations? Try to give more explicit and elaborate description here.

7. Page 2510, last para. When you specify the reasonable ranges of parameter variations, you need to give a reference or to clearly justify these.

8. Page 2511. The phrase "As mentioned in Sect. 3.1, in these regions, using a coarse resolution model often leads to a shifted positioning of the water masses and fronts", first is grammatically awkward and secondly, is a bit questionable. This effect is frequently observed also in high resolution runs and the discussion of this effect goes far beyond the model resolution.

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9. Page 2515, lines 15/25, fig 9 (also applicable to fig 8). How stable these corrections are? Would be good to add interannual time series for few places. Otherwise you may wish to show the map of std of corrections over time.

10. Pages 2516-2517. The conclusion part is written in hardly accessible and wordy manner. Can you condense the conclusions to 3-4 bullets?

11. Page 2518. Lines across discussion of different reanalyses should be revised, this place is very vague. Are you sure that all these products demonstrate very different patterns of variability? Unlikely..., rather different magnitudes and potentially different long-term trends. Be more specific here.

12. Page 2519, second para. I would recommend to separately write about potentials of the use of OAFlux and NOC products. For OAFlux the main problem is in algorithm of blending and accounting for biases in humidity and winds (to a lesser extent of course). For NOC (as for any VOS-based product, sampling is the most critical problem. For the net flux total sampling error may amount to 80 w/m<sup>2</sup>, see e.g. Gulev et al. 2007, Estimation..... *J. Climate*, 20, 279-301) and the most part comes from the latent heat flux in intertropics and from sensible + latent in extratropics).

13. Page 2519, bottom. The whole para is unclear and lacks the logic. Can you re-write it in a more elaborate and clear manner.

14. Some kind of professional editing of English grammar and style should be provided. Otherwise, it is OK.

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Interactive comment on Ocean Sci. Discuss., 9, 2493, 2012.

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