Ocean Sci. Discuss., 6, C366–C368, 2009
www.ocean-sci-discuss.net/6/C366/2009/
© Author(s) 2009. This work is distributed under
the Creative Commons Attribute 3.0 License.

Ocean Science
Discussions

Interactive comment on "Controlling atmospheric forcing parameters of global ocean models: sequential assimilation of sea surface Mercator-Ocean reanalysis data" *by* C. Skandrani et al.

Anonymous Referee #2

Received and published: 20 August 2009

The manuscript presents a novel and useful way to adjust ocean model surface fields to an analysis or observations by changing the parameters controlling the air-sea fluxes rather than the surface fields them selves. This more sophisticated approach allows the model to remain in dynamic balance, and also better preserves the relationship between the atmospheric state, fluxes and the surface ocean state which may prove attractive for future coupled modelling applications.

General comment.

The text seemed somewhat lengthy, and could benefit with a more concise writing style.

Specific comments.

1. Section 2.1 page 1135 line9: The author has neglected to mention that SST, air pressure and water velocity are part of the flux calculation. The later two can probably reasonably be ignored in the body of the work, but should be at least mentioned formally at this stage. SST is critical, and needs to be introduced, before being separated form the analysis of the "flux parameters" due to it's use as the assessment of the technique. It would be nice if the study could use something other than SST (maybe heat content in top 20m?) to validate/evaluate the technique, given the importance of SST to the bulk flux calculations. – This is more of a wish (future work maybe), rather than a recommendation. The authors should acknowledge that the heat flux alters the SST, but that the SST also alters the heat flux (i.e. reality is a 2-way coupled system).

2. Section 21 page 1135 line 16: Need to define the air density.

3. Section 2.1 page 1136 line 10: "sun height" should be "zenith angle"

4. Section 2.3 page 1141 line 7: Where do the assimilated SST maps come from?

5. Section 3.1 page 1142 line 1-3: Can the author be more clear here. In what way are these differences similar to that seen in the "real world"?

6. Section 3.1 page 1142 line28: Can the author please define more precisely the regions that are excluded by the masking. Perhaps with a map, or lat/lon boundaries if that will work? Is the mask fixed in time?

7. Section 3.3 page 144 line 21: I'm a little uncomfortable with the transfer coefficients C_E and C_H being treated in a similar way to the observation type variables. The bulk transfer coefficients and their uncertainty are fairly well known (for moderate wind conditions). Why aren't some of the other variables or so called 'constants" such as air density or latent heat of vaporisation etc. also included? Can the author please explain/justify this a little?

8. Section 3.3 page 1145 line 1: I find the author's reason for neglecting wind speed from the list of control parameters to be unsatisfactory. I understand that the effect of the wind as forcing for the ocean model is input via the momentum flux and therefore modification of the wind may cause some dynamical imbalance, but that doesn't justify ignoring the wind as a control parameter. Formally the wind is just as important as the air-sea temperature and humidity differences as defined in the bulk flux equations 3 and 5. The authors should at a minimum provide a more solid justification, and preferably perform the analysis with the wind included as a control parameter. I'd be keen to see the results of that.

9. Figure 1: The time axis should use units of years and/or months to make it clearer for the viewer to interpret the plot.

Interactive comment on Ocean Sci. Discuss., 6, 1129, 2009.