

Interactive comment on “Transports and budgets in a 1/4° global ocean reanalysis 1989–2010” by K. Haines et al.

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Reviewer 1 described the work on interpretation as highly commendable and setting an excellent example for which we thank the reviewer. A separate response to the main comments of Reviewer 1 has already been posted. We agree with their comments that interpretation of assimilation increments regionally depends very much on the reliability of the ocean transports. Ocean transports can be wrong because of the wrong winds (and certainly the Ekman component will be susceptible), although with sufficient hydrography assimilation the model may compensate for the wrong winds to some extent by constraining the geostrophic transports more directly. More minor comments of reviewer 1 will be dealt with in a new manuscript

Reviewer 2 also liked the paper “interesting and illustrating well how ocean reanal-
C165

ysis can be used to improve understanding”. The second reviewer also mainly comments that local assimilation increments, particularly those at depth or near the western boundary current, cannot represent surface flux errors. This is really the same comment as reviewer 1 and we agree. Locally the interpretation of assimilation increments rely on having good transports which is why transports are the other main subject of the paper. The issue of the depth of the increments can be dealt with however because assimilation increments at depth can only be compensating for errors in redistribution of heat or freshwater (the reviewers terms “model shortcomings, lack of resolution” amount to the same thing), probably in the vertical. Therefore when the increments are integrated with depth what remains can be linked to surface fluxes or to horizontal redistribution errors i.e. horizontal transports which are discussed in the paper. The reviewer also asks about how sea ice was included in the FW budgets. The sea ice is part of the ocean budget and therefore exchanges between FW in ice and in the liquid water need not be included. The global domain does include the sea ice areas and the actual boundaries of the basin domains will be shown in a new figure in the revised paper. Also sea surface salinity relaxation is included in the surface forcing component of the Table 1 budgets. More explanations of these issues and of how the budgets were calculated will be included in a revised manuscript which we are now ready to prepare with the editors approval.

Interactive comment on Ocean Sci. Discuss., 9, 261, 2012.