

Response to B. Stephens

(review comments are shown in blue, reply comments in black)

One minor complaint: the abstract (and GCP web page) implies that the ocean flux estimates, and by subtraction the land flux estimates, are primarily the product of ocean models, when in fact the ocean models have been adjusted to match 3 different observational constraints, as discussed later in the paper. This misleads as to the quality of the models and the value of historic and ongoing observation programs - please clarify this in the abstract.

Thank you, we clarified the abstract to say that the mean ocean CO₂ sink over the 1990s was based on observations, and the anomalies were estimated using an ensemble of ocean models.

Also, to fully assess the quality of the ocean models used and the relative reliance on models vs observations, it would be very helpful to know what the modeled fluxes were before they were adjusted to match the IPCC estimates. I think this is what is presented in the XLS file, though it is not explicitly stated and many will not dig that far, so please add text to section 2.4 giving the range of unadjusted flux numbers, for example "before adjustment to the observational estimates, the 4 models have a range of 1.04 PgC/yr for the 1990s and a range of 1.5 PgC/yr for 2011." Additional discussion of why they differ and speculation on what uncertainties may be introduced in the adjustment process would also be welcome.

The mean ocean fluxes have been added to Section 2.4 as suggested. The models range between 1.5 and 2.6 PgC/yr (compared to 2.2 for the observations). We also added a short discussion on the factors that account for the model range.

In the ocean tab of the XLS attachment itself, I note that the 2008 mean value in cell H64 does not equal the mean of the 4 models as it does for other years, and that cells H65:H67 present mean values for which there are no model estimates.

The ocean tab has been revised and simplified in response to comments by G. McKinley and M. Heimann.