

## ***Interactive comment on “The importance of ocean transport in the fate of anthropogenic CO<sub>2</sub>” by L. Cao et al.***

### **Anonymous Referee #1**

Received and published: 26 January 2009

This paper analyses the oceanic uptake of a pulse input of CO<sub>2</sub> to the atmosphere as simulated by a random assortment of ocean models. There are two potentially interesting findings in this paper, one a comparison of model simulations with observed CFC and radiocarbon distributions (Figures 2 and 3); the other a comparison of the impact of differences between model transports versus differences between climate feedbacks on the airborne fraction of CO<sub>2</sub> (Figure 6). However, in my opinion, the authors fail to follow through adequately on the consequences of their comparisons with the observations, and as a result, I believe that the analysis in Figure 6 may be misleading.

Specifically, Figure 2 and especially Figure 3 show that some models clearly outperform other models in fitting the observations. Despite this, the authors include all mod-

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



els in estimating the correlations shown in these Figures and used in their analysis of Figure 4 as well as in their analysis of Figure 6. If these incorrect models were eliminated, the correlations in Figure 4 would mostly disappear and the analysis of Figure 6 would likely show that the climate response is the greatest source of uncertainty. In effect, what I would argue is that these authors have not adequately taken into account what we have learned about ocean transport and what constitutes an "acceptable" model .

One other thing that bothered me about this paper: the title asserts, in effect, that ocean transport is important in the fate of anthropogenic CO<sub>2</sub>, as if perhaps this were an original finding. The authors, who are mostly long-standing experts in the field, are obviously well aware that there has been plenty of research done on this problem in the past, but the treatment in this paper is rather shallow. I can think of several model comparison studies and parameter sensitivity studies that could usefully be referred to in this paper. Given how much progress has been made on this problem, for example in the model comparison studies of Orr et al. (2001) and Matsumoto et al. (2004) and in parameter sensitivity studies such as that by Mignone et al. (GRL, 2006), it seems to me that this study could have done a lot more.

The vertical scale in Figure 6 should be expanded.

---

Interactive comment on Biogeosciences Discuss., 5, 4521, 2008.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)