

## ***Interactive comment on “The effects of experimental uncertainty in parameterizing air-sea gas exchange using tracer experiment data” by W. E. Asher***

**W. E. Asher**

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Responses to Comments from Anonymous Referee 1 on ACPD-2008-0388

*Review: I think the title is slightly misleading because it isn't clear that it includes environmental variability in the sense of sampling uncertainty or unresolved physical processes. It is principally about experimental precision in chemical concentrations or ocean mixed-layer depth. The title could also include the phase 'tracer experiments', since that is the focus (i.e., it doesn't consider micrometeorological methods).*

**Response:** The title has been changed to "The effects of experimental uncertainty in parameterizing air-sea gas exchange using tracer experiment data" which addresses the above issue.

Specific comments:

*Is it true that 7% was used for the uncertainty in He in the first calculations (Figs. 2, 3, 4) but 3% (top p 8) was used in Fig. 5? I find that irritating because it is harder to compare.*

**Response:** It is unfortunate but true that the experimental uncertainties are different for the laboratory data and the dual-tracer data. Part of the difference is due to a difference in instrumentation (a gas chromatograph with a thermal conductivity detector was used to measure helium for the laboratory measurements while the field data used mass spectrometry) and part is due to differences in analytical technique, but the net result is that it is incorrect to use the same uncertainties for both datasets. We acknowledge this complicates comparison of the two figures, but do not see any way to rectify the problem. There is a short paragraph explaining why this difference exists is found on page 9.

*I am guessing that most of the uncertainty in Fig 6 comes form +-20% BL depth. Yes?*

**Response:** Correct. This has been stated in the text in Section 4. The fraction has now been quantified as well, which is also discussed at the end of Section 4.

*Also, is the error in h precision or sampling or what?*

**Response:** For the open ocean DT measurements, the error in h is mainly due to precision issues in identifying the mixed-layer depth from CTD profiles. For the shallow-water coastal experiments, tidal changes in depth are the largest source of uncertainty. We have added a statement to this effect in Section 4.

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Interactive comment on Atmos. Chem. Phys. Discuss., 8, 16693, 2008.

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