**Atmospheric
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Comment

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

Anonymous Referee #1

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This paper describes the effects of laboratory and field observational precision on estimates of gas transfer velocity for tracer approaches. Basic expressions for transfer velocity are processed with mean experimental parameters and the 'noise' is added to the nominal parameters to asses the uncertainty associated with that aspect of the experimental uncertainty. Two different wind tunnel and one oceanic dual-tracer experiments are analyzed. For the wind tunnel work, the scatter of the transfer points is consistent with the envelope of uncertainty generated by the noise. The author also shows that it is difficult to experimentally determine the Schmidt number dependence exponent unless two gases are chosen with greatly different Schmidt numbers. From the oceanic dual tracer analysis, the author concludes that 60% of the scatter obtained

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in recent experiments is due to observational accuracy as opposed to real variations in transfer associated with truly physical aspects of the transfer process not captured by mean wind speed. The 60% is considerably greater than conventional thinking on this aspect.

This paper is straightforward, very narrowly focused, and provides good food for thought. 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).

Here are a few other 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.

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

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

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