

Interactive comment on “A comprehensive estimate for loss of atmospheric carbon tetrachloride (CCl₄) to the ocean” by J. H. Butler et al.

Anonymous Referee #1

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General comments This is a high quality, well written manuscript on the important topic of how much atmospheric CCl₄ is taken up by the oceans. CCl₄ is an important ozone depleting compound that currently has an unbalanced atmospheric budget and any refinement of source of sink strengths will help in balancing the budget. This paper uses more data and a better estimate of air-sea exchange rates to refine the estimate the ocean sink for CCl₄ and should be published. Specific comments 1) Page 2, lines 6 and 7. While the data supports the statement that the soil sink for CCl₄ is less than the ocean sink the data does not support the statement that the soil sink strength is less certain. This paper states that the ocean partial lifetime is 209 (157–313) y or in percent terms 209 (-23.4%, +49.8%), while the most recent estimate of the soil sink

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strength is 375 (288–536) y or 375 (-23.2% +42.9%). I suggest rewording this sentence to remove any statement on relative uncertainties between these two sinks, because they are about the same. 2) Page 2, Lines 24-25. I suggest changing “we resorted to sampling daily” to “we sampled daily” 3) Page 5, line 19, I suggest changing, “imperfectly represented” to “estimated”. 4) Page 6, lines 30-32. While there is no direct evidence for the mechanism of CCl₄ removal in well oxygenated surface water, there is evidence for microbial removal in well oxygenated soils. I suggest working in a statement to this would be beneficial to this paper. Use the following citation: Mendoza, Y., K.D. Goodwin, J.D. Happell, Microbial removal of atmospheric carbon tetrachloride in bulk aerobic soils, *Appl. Environ. Microbiol.*, 77, 5835-5841, 2011.

Technical corrections 1) Page 7 line 10, “bomband” should be “bomb and”. 2) Page 7 line 14, “(“ should be “(“. 3) Page 11 line 25, “SF 6” should be “SF6” 4) I do not think that Table 1 is needed. Most of the information given in Table 1 is in the caption of figure 4. A small expansion of the caption of Figure 4 could be made to include all information given in Table 1.

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