

2006

Correction to "Oceanic Uptake and the Global Atmospheric Acetone Budget"

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Recommended Citation

Marandino, C. A., W. J. De Bruyn, S. D. Miller, M. J. Prather, and E. S. Saltzman (2006), Correction to "Oceanic uptake and the global atmospheric acetone budget," *Geophys. Res. Lett.*, 33, L24801, doi:10.1029/2006GL028225.

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Comments

This article was originally published in *Geophysical Research Letters*, volume 33, , in 2006. DOI: [10.1029/2006GL028225](https://doi.org/10.1029/2006GL028225)

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Correction to “Oceanic uptake and the global atmospheric acetone budget”

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Received 19 September 2006; published 16 December 2006.

Citation: Marandino, C. A., W. J. De Bruyn, S. D. Miller, M. J. Prather, and E. S. Saltzman (2006), Correction to “Oceanic uptake and the global atmospheric acetone budget,” *Geophys. Res. Lett.*, 33, L24801, doi:10.1029/2006GL028225.

[1] In the paper “Oceanic uptake and the global atmospheric acetone budget” by C. A. Marandino et al. (*Geophys. Res. Lett.*, 32, L15806, doi:10.1029/2005GL023285) it was recently determined that a calculation error was made during flux data processing. The flux data has been reprocessed and all the values in both the text and figures have been recomputed. The qualitative discussion and conclusions remain the same. After the data was reprocessed, it was determined that the low frequency correction could be modified. Instead of eliminating the power at frequencies lower than 5E-3 Hz in all of the records, a low frequency diagnostic was created to assess whether the record should be retained at all. This diagnostic was the ratio between the flux at the 5E-3 Hz cutoff and the full flux (i.e. no cutoff). If the ratio indicated a difference greater than 30%, the record was not included in the final dataset. The entire data processing procedure will be published in the *Journal of Geophysical Research* [Marandino et al., 2006]. A second calculation error was found in the uncertainty analysis for the global acetone sink budget. Corrected versions of Table 1 and Figures 1–3 from the original paper are given. An additional table (Table 2) has been included listing the recomputed values of several quantities discussed in the original paper.

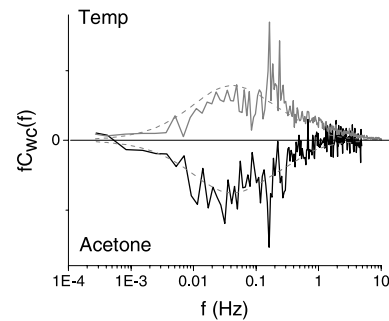


Figure 1. Frequency-weighted cospectra of scalar and vertical wind ($w'c'$) for an hour long record of temperature and acetone at 29°N, 154°W on June 24, 2004. Dashed lines are scalar cospectra from Kaimal et al. [1972]. The w-temperature cospectrum and Kaimal cospectra were scaled for comparison.

Table 1. Tropospheric Acetone Losses

	Jacob et al. [2002]	This Work
Burden (Tg)	3.8	3.9
Sinks (Tg yr ⁻¹)		
Ocean Deposition	14	62 ± 25 ^a
Land Deposition	9	9
Photolysis	46	22 ± 8 ^b
OH Reaction	27	18 ± 7
Total (Tg yr ⁻¹)	96	111 ± 27 ^c

^aUncertainties include OH, k_{OH} , σ_{acet} , Φ_{acet} , acetone distribution, U , and F/UC_a .

^bQuantum yields from Blitz et al. [2004]. Using Gierczak et al. [1998] quantum yields, the photolysis sink term is 48 Tg yr⁻¹.

^cThe acetone tropospheric lifetime is 0.035 yr (burden/total sinks).

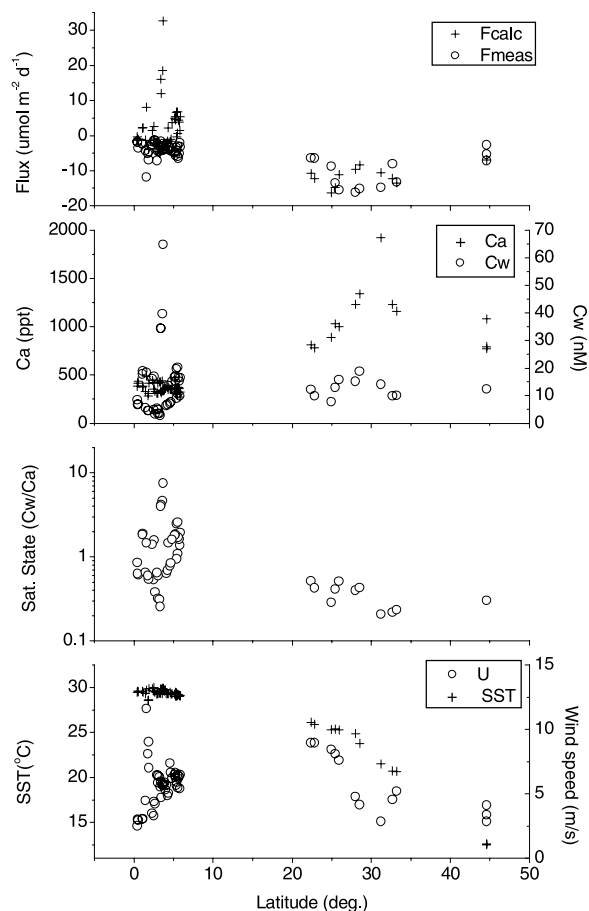


Figure 2. Shipboard measurements of acetone from the equatorial and North Pacific. From top: 1) Measured and calculated air/sea fluxes. 2) Air and seawater acetone levels. 3) Saturation state, expressed as C_w/C_a , where C_w is the measured seawater concentrations at 5m depth divided by the Henry's Law solubility [Zhou and Mopper, 1990]. 4) Sea surface temperature and mean wind speeds.

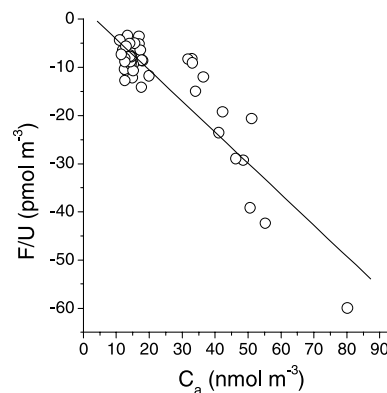


Figure 3. Relationship between air/sea flux of acetone, wind speed, and the atmospheric acetone. The flux is scaled by wind speed (F/U) because wind speed based parameterizations [Kondo, 1975] suggest a linear relationship over the wind speed range encountered during this cruise.

Table 2. Recomputed Values of Various Quantities Discussed in Text of Original Manuscript

Value	Equatorial Region	Mid-latitude Region
C_a	0.398 ± 0.130	1.16 ± 0.33 ppb
C_w	0.52 ± 0.44 ppb (13.9 ± 11.7 nM)	0.37 ± 0.11 ppb (13.6 ± 3.0 nM)
Gradient Flux ^a	$1.6 \pm 8.2 \mu\text{mol m}^{-2} \text{day}^{-1}$	$-11.0 \pm 2.8 \mu\text{mol m}^{-2} \text{day}^{-1}$
Measured Flux ^b	$-4.1 \pm 2.0 \mu\text{mol m}^{-2} \text{day}^{-1}$	$-15.1 \pm 1.13 \mu\text{mol m}^{-2} \text{day}^{-1}$
Saturation State		0.21 to 7.5 ^c
Global Ocean Sink ^d (using simple extrapolation)		32.6 Tg yr ⁻¹
Slope of F/U vs C_a ^e		6.44×10^{-4} ^c

^aAir/sea flux based on the observed concentration gradient.

^bAir/sea flux based on eddy correlation measurements.

^cApplies to entire cruise data set.

^dGlobal ocean acetone sink computed as the mean eddy correlation flux from this study multiplied by the area of the oceans.

^eLinear regression slope from Figure 3.

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