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Atmospheric Measurement Techniques Discussions

Interactive comment on "Measurements of diurnal variations and Eddy Covariance (EC) fluxes of glyoxal in the tropical marine boundary layer: description of the Fast LED-CE-DOAS instrument" *by* S. Coburn et al.

Anonymous Referee #2

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Overview and General Comments: Coburn et al., present the first measurements of glyoxal air-sea exchange. The results indicate bi-directional flux of glyoxal between the atmosphere and the ocean, where the surface is a net source for glyoxal during night and a sink during day. The emission rates are large enough that air-sea exchange likely plays an important role in setting glyoxal mixing ratios in the atmosphere. The discussion is clearly written and the results are of interest to the community. I suggests publication with the author's attention to the following points.

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General Comment: The measurement of the vertical flux is essentially a measure of the concentration gradient of glyoxal. As such, a discussion of how elevated concentrations in the residual layer or in the lower free troposphere may impact these results would be of interest. Further, can the authors comment on whether known gas-phase chemistry occurring several meters above the ocean surface could explain these results (i.e. do we need to invoke a reaction at the air-sea interface?)

Specific Comments:

Page 6245, title: Why is Fast capitalized?

Page 6255, line 7: While the motivation to not degrade the wind data is understandable, I would have expected interpolation of data from 2-10Hz to be more problematic. What type of interpolation was used and how does this potentially impact the result?

Page 6255: How did the determination of the phase correction by the N2 pulse agree with a lag time determined by autocorrelation analysis, as is often done in these types of measurements?

Page 6256: The drop in the O4 signal is a measure of the gas exchange time of the inlet (and response time of the instrument to O4). This technique has been used by others to compare inlet/instrument response for different molecules (those with high and low Henry's law constants for example). As such, it would be very interesting to show the decay in glyoxal in addition to O4. I would expect glyoxal to be best fit by two exponentials (one for gas exchange in the inlet and the second for gas/wall interactions).

Page 6260, line 8: Was any attempt made at computing an O4, NO2, or H2O flux? I would expect this to nicely show no net flux for O4, but perhaps the H2O flux could be of use?

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 6245, 2014.