Atmos. Chem. Phys. Discuss., 9, C1364–C1366, 2009
www.atmos-chem-phys-discuss.net/9/C1364/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Temporal and spatial variability of glyoxal as observed from space" *by* M. Vrekoussis et al.

Anonymous Referee #1

Received and published: 1 June 2009

General Comments:

This is an excellent paper. It's a well-written overview of their 5 and a half year data set. Satellite observations of glyoxal are a promising expansion of VOCs observable from space. Of the three principal evaluation criteria, I would give it an excellent in all three categories.

Specific Comments:

As mentioned above, it is hoped that satellite observations of glyoxal will be able to shed further light on VOC photooxidation processes on a global scale. One of the most intriguing aspects of the data set is the prevalence of glyoxal over the tropical ocean, particularly given its short lifetime with respect to photooxidation ($\approx$ 3 h). The authors

discuss this lifetime in section 1.3 and describe it as an average derived from global modeling studies. It would be helpful if the authors could comment on the difference in the lifetime of glyoxal that might be expected in the boundary layer versus the upper troposphere. In the ITCZ, one might expect glyoxal of marine origin to be rapidly convected to the UT (as discussed in section 3.5.7). If glyoxal has a longer lifetime at higher altitude might that help explain its distribution over the tropical oceans?

Page 9011, lines 7-9. You state that there is a 6 month shift in the seasonality of CHO.CHO between box 4 and 6. This is not obvious to me. The minima appear to be offset by only 3 months April (6) v. July (4), while the maxima are both in December with local maxima in August (6) and September (4). Although the fire counts are offset, so are the EVI in a way that appears to me to mitigate the seasonality of CHO.CHO. You go on to discuss this further, but this sentence doesn't match the figure and I would recommend dropping it.

Page 9011, the paragraph beginning at line 10 is written in such a way that it implies the differences between boxes 4, 5, and 6 are due to a north-south gradient. Is this correct? All three boxes are near the equator, might the differences simply be attributable to differences in vegetative cover and fire statistics?

Section 3.5.6. The fire season ends in December, but the maximum VCD persists through February. This is puzzling given the short lifetime of glyoxal and the relatively minor variation in EVI. Can the authors comment further on the two month lag between the end of the fire season and the decrease in VCD?

Technical Comments:

Pg. 8997, line 8, delete "the" from "are the ethylene"

Pg. 8998, line 24, "yields" should be "yield"

Pg. 9000, line 8, "wavelenght" should be "wavelength"

Pg. 9002, line 23, "in the order" should be "on the order"

Pg. 9007, line 19, "devision" should be "division"

Pg. 9013, line 1, I would recommend not describing the agricultural burning contribution in N. Asia as "large", given the other values for the fire counts in Table 2 and the fact that VCD appears to follow ECI quite closely.

Pg. 9015, line 13, "reach" should be "rich"

Table 1. 1) Capitalize second "rural" 2) Fix the spacing for #9 such that "Summer/Autumn" does not obscure the following number.

Table 2: 1) To be consistent with the text and figures, I would recommend changing "USA" to "N. America". 2) RGF = 0.045 for USA, but the text (pg. 9009, line 8) says 0.044, 3) RGF = 0.043 for box 2 and 0.048 for box 3, but the text (pg. 9010, lines 8-10) says 0.045 and 0.049, respectively, ... I'll stop here, box 4 RGF is also inconsistent between the table and text, please double check all values to ensure they match.

Figure 2b caption, "tranfer" should be "transfer"

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 8993, 2009.