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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Profiling of formaldehyde, glyoxal, methylglyoxal, and CO over the Amazon: Normalised excess mixing ratios and related emission factors in biomass burning plumes" *by* Flora Kluge et al.

Anonymous Referee #2

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The authors report results from a recent aircraft campaign over the Amazon and nearby city of Manaus. Using a mini-DOAS instrument, they measured formaldehyde, glyoxal, and methylglyoxal vertical profiles and emission ratios of glyoxal and methylglyoxal relative to formaldehyde in biomass burning plumes. They compare their results with others in the literature and find them to be well in agreement with previous studies. They also compare the total column densities to those measured by various satellites and also find good agreement.

The paper is well written and clear, the results are robust and will be a useful contribu-

tion to the fields of remote sensing and VOC oxidation in biomass burning plumes. I recommend publication, with only a few minor comments.

Line 10: The authors have not yet introduced RGF or RMF, and unless readers are already familiar with the chemical formulas for glyoxal and methylglyoxal, this may be confusing. I suggest either noting the names of the species in Line 1, or defining RGF and RMF here.

Line 29: The authors state that these compounds are emitted, but much of the paper discusses their formation mechanism, so I would change "emitted" to "emitted or formed"

Line 52: The line "glyoxal and methylglyoxal are formed by 47 % and 79 %, respectively" is slightly confusing. Does that mean 47% of the glyoxal is formed from isoprene? Or 47% of the isoprene that reacts forms glyoxal?

Line 57: Rather than citing "GEOS-Chem model simulations" for the lifetime, I would cite the papers that get that figure, such as Fu 2008

Line 93: No comma needed after "They concluded"

Line 97: If the authors want to mention the A-train, include a brief description of what that is. Otherwise, it does not seem necessary to include that information.

Line 112: German should be capitalized

Table 1: "Temperature" is misspelled

Line 172 or later: It's not clear how the [C2H2O2] and [C3H4O2*] concentrations are derived from the mini-DOAS remote sensing measurement. Are they derived from the ODlimb line-of-sight measurement? Do we interpret that as the instantaneous concentration at the altitude of the aircraft? Particularly later, when the total column measurements are compared to the satellite measurements, it would be helpful to have that distinction made.

Line 175-181: Use the terms ODlimb and ODms instead of b and c for more clarity.

Figures 2 and 3: The various shades of blue are hard to differentiate, and the markers are too small to really see the shapes.

Figure 5: What time are the MODIS satellite images from? Beginning of flight? The panel numbers a-d are missing

Figure 9: It is very difficult to see the “C-shape” curve in the CO data that the authors discuss. Consider putting the x-axis on a log scale.

Line 376: To remain consistent with the rest of the paper, use ppb instead of nmol/mol

Line 357: “leading to their generally correlated vertical profiles”. Later on, the authors state that the formaldehyde vertical profiles is markedly different from the other two. Clarify this?

Figure 11: In the x-axis label, put which satellite(s) were used in each of the other papers.

Line 420: Are the emission ratios from the column integrated value or the concentration value?

Line 440: “Emissions of monoterpenes, like alpha-pinene, on the other hand, are at least one order of magnitude smaller”. This statement is unclear. Smaller than what?

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