

Interactive comment on “Hydroxyl radicals in the tropical troposphere over the Suriname rainforest: airborne measurements” by M. Martinez et al.

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We have marked questions by the reviewer with “R:” and our answers with “A:”.

R: The flux is determined in both nitrogen and helium bath gases and Figure 5 shows a difference in behaviour for both gases. The flux measured in nitrogen shows a dependence on gas flow and %N₂O added, while the flux measured in He does not. Has the NO_x analyser response to the nitrogen and helium carrier gases been quantified? With a chemiluminescence TECO NO_x analyser (as used here) the NO signal will be quenched by N₂O in the gas flow. For 20% N₂O in nitrogen, the NO signal is reduced by almost 20%, an effect comparable to that seen in Figure 6. This effect becomes non-linear with higher concentrations of N₂O. Has this reduction been corrected for in the flux calculation?

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A: The NO_x analyser has been calibrated both in N₂ and He and the different sensitivities taken into account. The apparent trend in the flux measured in nitrogen is within the uncertainties of the measurements. The NO_x analyser was also calibrated with different amounts of N₂O added to the calibration gas, and reduction of the signal due to quenching with N₂O was taken into account. We propose to add the following sentence in p15500 line 2: “The TECO analyser was calibrated with both N₂ and He as carrier gases, as well as with addition of different amounts of N₂O to each carrier gas, to account for quenching of the NO signal. ”

R: Other comments: 1) In Table 1 the sum in quadrature of these parameters is over 17% - not the 12% quoted in the text. Why are the dimensions of the photolysis chamber known to within only 10%? Is there a mistake in the errors quoted or in the calculation of the total error?

A: The table caption is misleading: The errors listed in table 1 are not the effect of each uncertainty on the lamp flux error, but the errors of the variables involved in the calculation of the sensitivity. We propose to change the table caption to: “Uncertainties leading to systematic errors for the lamp flux calibration. ” There is also a typo in the table: The uncertainty for the photolysis chamber height is 3%, or 0.1 mm. The relative uncertainties for the other dimensions are negligible. We propose to correct this in the table.

R: 2) Contamination of optics by pump oil is suggested as a reason for C₀ variation. If so, is there any reason the C₀ for OH and HO₂ would not follow the same trends?

A: Contamination of the optics with oil from the pumps cannot be expected to be equal in both measurement cells. Depending on where exactly how much oil deposits, the effect on sensitivity will vary. If we had never cleaned the optics during the campaign, a continuous decrease would be expected in C₀ for both measurement cells. But we did, and this may also not have been equally successful for both measurement cells each time.

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