

Interactive comment on “The chemistry of OH and HO₂ radicals in the boundary layer over the tropical Atlantic Ocean” by L. K. Whalley et al.

Anonymous Referee #2

Received and published: 9 October 2009

The paper is interesting and provides valuable new information about the chemical composition and photochemistry of the tropical marine boundary layer. It demonstrates that the HO_x chemistry in marine background air is more complex than generally assumed and may be significantly influenced by halogen containing species. As pointed out in the paper, the influence on the global budget of methane and ozone would be important if the results are representative for the global marine atmosphere. On page 15963, line 28 the authors note that the measurement site "CVAO is thought to be representative of the open ocean tropical MBL". The authors should provide convincing arguments for that statement and discuss more thoroughly this assumption as it is crucially important for the general conclusions of the paper. In this context, I wonder where acetaldehyde is coming from, making it the second most important sink of OH? If it is produced from alkenes, where do these VOCs come from and would this source

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be representative for global oceans? The PAN concentration of 100 ppt also appears to be quite high indicating the influence of aged anthropogenic emissions. In their discussion the authors should also pay attention to PAN measurements on the open Atlantic by Muller and Rudolph (J. Atmos. Chem. 15, 361, 1992) who report values significantly below 10ppt along 30W at latitudes between 35N and 30S. Another important question is the source of reactive halogen compounds at CVAO. If it is related to algae, it may be enhanced at CVAO due to upwelling ocean water near the African continent.

I agree with the other referee that the paper would benefit from some reorganization of the manuscript. In addition it would be helpful for the reader if some of the figures were newly drawn (see minor comments).

The topic and results of the paper are suitable for publication in ACP, but before publication, some discussion should be added as mentioned above.

Minor comments

All figures and text: specify the time used in the paper (local time?) and the relevant time zone. Tic mark spacings should be changed to give integral rather than fractional hours.

Fig. 1: the figure has a poor graphical quality; lines are too thin and the chemical labels are difficult to read.

Fig.1: what is the meaning of the red arrow going from OH to XO and what does the red label (+X) mean ?

Fig. 3: color code of CO is not correct.

Figs. 4 - 7: the overall size of the figures and the font size should be increased for better readability.

Fig. 5: the color code 'white' has twofold meanings in some of the pie charts; use unambiguous color assignments!

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Fig. 6: typing error: dirunal.

Fig. 8: more intense colors and a legend would greatly help to read the figure!

page 15965, line 8: change "Torr" to SI units.

page 15977, line 3: typing error: photoysis.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 15959, 2009.