

## ***Interactive comment on “Peroxy radicals and ozone photochemistry in air masses undergoing long-range transport” by A. E. Parker et al.***

**Anonymous Referee #2**

Received and published: 5 November 2009

The manuscript by Parker et al. examines peroxy radical concentrations and the related photochemical activities observed during the ITOP campaign based at Azores in July/August 2004. In addition to the questions raised by the first reviewer, I feel this paper is also weak in wording and structure in several sections. Here are the specifics:

1. In many places there are lengthy and wordy sentences. This impairs the clarity of the text and makes it difficult for readers to follow. For example, page 18796, line 6-13. These two are long sentences with many folds of meaning. Each can be easily broken into two or more short sentences.
2. Section 2. Since the PERCA instrument has been previously introduced (Green et al. 2003, 2006, as referenced in the paper) and the details of the PERCA measurements is of minor importance to this study, this section can be significantly reduced.

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3. Section 3.1, page 18804-18808. Does the steady state analysis of the production and loss of peroxy radicals basically follow the method introduced in Mihele and Hastie (2003)? If this is the case, it seems to me using  $\sim 1/4$  of the paper to elaborate on the details of a method that has been published is way too much. Are there any details original in this study (it is not clear from the text)? If not, similar to section 2, this part should also be significantly condensed.

4. Air mass identification. On page 18802, line 5-10, the authors mentioned that they classified air masses into marine background air, Alaskan fire plumes and all others using the observed mixing ratios of CO and O<sub>3</sub>. Later in the text, the authors referred to various long-range transport air-masses from N. America and Asia, e.g. page 18810, line 22-23, “long-range transport air-masses with young east-coast North American air masses, biomass burning, and aged Asian emission signatures”. How do you determine it is a mixture of east-coast North American emission or aged Asian emission, or a mixture? Even with the help of back trajectories, it is difficult to pin-point the origin of air mass. Does any information come from the FLEXPART model? Please clarify in the text. In addition, using CO > 250 ppbv to identify biomass burning plumes is rather crude. I would encourage the authors to explore additional observed species for better identification of fire plumes. For example, HCN, CH<sub>3</sub>CN, and fine aerosols are commonly used as biomass burning markers in addition to CO. Are these available during ITOP?

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 18793, 2009.