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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evolution of trace gases and particles emitted by a chaparral fire in California" *by* S. K. Akagi et al.

Anonymous Referee #2

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This manuscript presents analysis of the aircraft measurements of the chaparral fire that took place in California in November 2009. The measurements of chaparral fires are sparse and more research is needed to quantify the resulting emissions and physical and chemical processes in the plumes in order to understand the impact of these fires on atmospheric chemistry and composition. The authors describe pseudo-Lagrangian observations of multiple gaseous and particulate species sampled in the biomass burning plume from the time of emission, near the fire source, and up to 4.5 hours later, in the aged smoke downwind. The fire smoke was sampled in a relatively-unperturbed environment, and therefore this experiment represents a valuable opportunity to study the photochemical processes in the plume as it is aging.

The presented material is relevant to ACP and can be of great interest to its read-

ers. I recommend this manuscript for publication after a few minor suggestions are addressed.

Specific comments.

1. Page 22497, Lines 17-18. How did you decide which samples to include into the derivation of the initial fire ER? What "signs of aging" in the plumes at the distance of more than 1.8 km away you are referring to?

2. 22500, Line 25. In order to estimate the age of a smoke sample, did you use the windspeed that was averaged over the time period characteristic of travelling time from the source? This is currently not clear from the text.

3. Page 22499, Line 4. Currently it is not obvious what the standard error of ER refers to, before it is mentioned later in the text (lines 16-17). Please describe this earlier in the text.

4. Table 2: the ER for NH3 to CO2, and ER for ozone are missing in Table 2.

5. Figures 6-12. Blue dots for ER are poorly seen (e.g. see Fig. 9a). Also, not all captions explain error bars for initial ERs. Explanation for the error bars for measurements downwind are missing in all captions.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 22483, 2011.