

Interactive comment on “A case study of aerosol depletion in a biomass burning plume over Eastern Canada during the 2011 BORTAS field experiment” by J. E. Franklin et al.

R. Imasu (Referee)

imasu@aori.u-tokyo.ac.jp

Received and published: 23 March 2014

This is the only paper among the special issue papers which describes the detection of air plume from which biomass burning aerosols have been removed by scavenging during its transport to the observation site. I think this paper should be published after the revision addressing comments below.

[Specific comments]

1. The existence of “particle-poor” plume is, I think, appropriately presented based on the data from ground-based and aircraft measurements. However, I am not fully

C651

satisfied with the explanation that the airmass have surely encountered precipitation during its transport. Although I understand that there is no ground station and radar site just over the trajectory, it may be possible to show the precipitation area along the airmass trajectory based on the NCEP data. One possible way to describe it is to show rainfall rate at each nearest grid point of NCEP data along the trajectory as a function of traveling time (84h) of the airmass (requesting an additional figure).

2. Although the possibility of precipitation along the trajectory of “particle-poor airmass” is discussed in the text, none of similar discussions have been made on the precipitation for “particle-rich airmass”. I think the best way to support your conclusion is to show that “particle-poor airmass” have encountered much more amount of precipitation than “particle-rich airmass” using the additional figure I recommended above plotting the data for both airmasses.

3. Judging from the observational time and location of the aircraft measurement, the airmasses described in Fig.3 and Fig.5 are different. This point should be mentioned in the text even if this fact does not affect to the conclusion.

[Minor comments]

Page 3395 title: A word, “depletion”, is not used in the text of this paper. “Scavenging” may be better for the title.

Throughout the text: Three similar words, “biomass burning”, “forest fire”, and “wildland fire”, are not properly used considering their exact meanings in the text.

Page 3409 lines 26: Why was the initialization time of trajectory calculation set to be 15:00 ? It seems to be too early because it is mentioned that the increase of CO started at 17:30 (page 3407 line 24).

Figure 1: Blue stars are difficult to be found. Their color or size should be changed.

Figure 3 (b): Explanation for the absence of star photometer data for a long period is necessary in the text.

C652

Figure 3 (d): Definition of “sensitivity to CO” should be made because its feature is different from that expected from averaging kernel of retrieval.

Figure 4 (a): Brief explanation for AIRS data (ver.) should be made in the text (Section 3).

Figure 6: Labeling of latitude and longitude value would be helpful for readers to identify the location of aircraft data used in Fig.5.

Figure 10: Location of footprint of the trajectory is somewhat different from that used in Fig. 6 as the start point of FLEXPART calculation. The influence of the difference should be discussed in the text.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 3395, 2014.