We would like to thank Dr. Imasu for the useful comments on our manuscript. Below we provide details on how we have revised the paper.

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 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.

A new figure has been prepared to show the precipitation encountered by the two airmasses on route to the DGS. Data was gathered along the trajectories from the NCEP Global Data Assimilation System (GDAS) model.

New Figure Caption:

"Precipitation rates along the HYSPLIT trajectory shown in Fig. 6 for the upper, potentially scavenged, airmass. The rainfall information was derived using the NCEP GDAS reanalysis. Time on the horizontal axis is measured in hours prior to detection of the airmass at the DGS. Numbers correspond to HYSPLIT positions marked in Fig. 6. The same analysis applied to the trajectories for the lower particle-rich plume does not show any significant precipitation along the path (not shown)."

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.

Original:

"The BAe-146 ARA in-situ measurements gathered during flight \# B622 on 20 July show that there were indeed two distinct plumes (in terms of gas and aerosol concentrations) moving toward Halifax."

New:

"The BAe-146 ARA in-situ measurements gathered 800 km upwind of the DGS during flight \# B622 on 20 July show that there were indeed two distinct plumes (in terms of gas and aerosol concentrations) moving toward Halifax."

Original:

"The contrast of elevated CO concentrations and elevated organic aerosol mass in the lower plume vs. elevated CO concentrations and low organic aerosol mass in the upper plume support the theory that the two plumes followed different paths with different histories to the DGS, and that the upper plume may have experienced a~lofting event coupled with removal of the aerosol mass."

New text:

"The contrast of elevated CO concentrations and elevated organic aerosol mass in the lower plume vs. elevated CO concentrations and low organic aerosol mass in the upper plume support the theory that the two plumes followed different paths with different histories, and that the upper plume may have experienced a~lofting event coupled with removal of the aerosol mass. The ARA measurements are geographically and temporaly separated from the DGS observations, yet reflect the regional presence of vertically separated biomass burning plumes."

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

The title has been changed to:

"A case study of aerosol scavenging in a biomass burning plume over Eastern Canada during the 2011 BORTAS field experiment"

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

The text has been reviewed for any inconsistent / improper use of these terms.

6. 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).

Original:

"The upper-troposphere particle-poor plume was initialized at 15:00\,UTC on 20 July with an even distribution of particles between 7.0 and 9.0\,\unit{km}. This altitude range matches the center of the CO sensitivity of the DAO-DA8's upper partial column."

New text:

"The backwards trajectory of the upper-troposphere particle-poor plume was more sensitive to starting times and so a series of runs were performed with releases ranging from 14:00 to 19:00\,UTC. Although the best timing with DAO-DA8 measurements did not show strong vertical motions, backwards trajectories with small changes in start time exhibited rapid lofting of the airmass ~ 24 hours before detection at the DGS. Considering the coarse grid of the NCEP GDAS meteorology used to advect the particles, we believe that 15:00\,UTC on 20 July is an acceptable initialization time for modeling the upper-troposphere plume. An even distribution of particles between 7.0 and 9.0 km was used to match the center of the CO sensitivity of the DAO-DA8's upper partial column."

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

All of the station location symbols have been increased in size.

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

Added:

"The extreme optical depth of this event interfered with the star photometer's ability to properly focus on stars, and therefore permitted only a handful of star photometer measurements during the night."

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

Original:

Sensitivity of PARIS-IR and DAO-DA8 instruments to the total column of CO as a~function of altitude.

New text:

Sensitivity, as a function of altitude, of the PARIS-IR and DAO-DA8 retreivals of CO to the true profile rather than the a priori profile.

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

Added:

"Level 3 Daily standard physical retrieval V005" to the figure 4 caption.

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

Latitude and longitude values have been added to this figure.

12. 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.

Although the starting location is different, the HYSPLIT single particle trajectory passes through the footprint of the dispersion model west of The Pas at the proper time. A new point was marked in Figure 6 and a sentence added to the caption of Figure 8.

We would like to thank reviewer #2 for the helpful comments on our manuscript. We have revised the paper in the following ways:

1. I would really like to see more evidence of the "scavenging" that the authors claim. I think an additional figure showing this, augmented by a few sentences of explanations would improve the manuscript.

We have created an additional figure. Please see response to Reviewer #1.

2. Page 3401, chapter 3.1.1: Please explain what is meant by "dynamically aligned"

Original:

"The heart of the DAO-DA8 is a~dynamically aligned Michelson Interferometer with a~maximum optical path length of 250 cm providing an unapodized resolution of 0.004 cm^-1.

New text:

"The heart of the DAO-DA8 is a Michelson Interferometer with a maximum optical path length of 250 cm providing an unapodized resolution of 0.004 cm^-1. Alignment is maintained over the full optical path by monitoring the modulated signal of an internal HeNe laser."

3. Page 3404: second to last paragraph: Please briefly mention the altitude ranges of the radiosondes used.

Original:

"These profiles were calculated from radiosondes released every 12 h from Yarmouth, NS."

New text:

"The lowest 20 km of the WACCM V6 water vapour VMR profile was replaced with profiles calculated from radiosondes released every 12 h from Yarmouth, NS."

4. Page 3409, chapter 4.3. It is not immediately clear why the backward trajectories were initialized at different times.

The backward trajectories were initialized at different times to reflect the delay between arrival of the two airmasses at the DGS. Please see more detailed discussion and changes listed in response to Reviewer #1

5. Page 3410, second to last and last paragraphs: The authors claim: "However, there is a general agreement between the models that the airmass west of 25 The Pas, Manitoba (53.8 N, 101.2 W) underwent #18 h of moderate to strong vertical ascent associated with a significant convective weather event." It is not clear to me as to where or how this was shown in the paper.

Removed: "associated with a significant convective weather event" from this sentence as you are correct that we do not discuss the nature of the vertical motion until the following section.