We thank the reviewers for their constructive comments and have made changes, where deemed appropriate. Specific responses to each of the comments are provided below (reviewers' comments in black and our responses in red).

**Anonymous Reviewer #1:**

General comments:

This paper shows data of biomass burning aerosols from above the USA, with the optical properties measured using two complementary techniques, optical analysis of liquid filter extracts and in situ PSAP measurements. The authors attempt to achieve closure between these and estimate the instantaneous direct radiative forcing using a radiative transfer model. This is a highly relevant field, as the exact effect that brown carbon (BrC) has on the earth's radiative budget is currently a hot topic of debate, with estimates varying by a large amount. In situ data such as this is vital to constraining models and improving our understanding.

The methods used seem to be both sound and state-of-the-art. The fact that the two techniques were able to agree to such an extent I regard as a highly significant achievement in its own right. The article was well put together and I'm pleased to say that I found it a joy to read. I've only a few comments, but these are of a technical nature and won't affect the conclusions. Other than that, I wholeheartedly recommend publication.

Technical comments:

P5965, L12: 'Fisherbrand' is asterisked but it is not clear why.

The asterisk has been changed to "TM" (superscript), in accordance with the manufacture page.

P5966, L8: What is meant by 'N'?

"N" means the number of samples used in the comparison between methanol extraction and sequential extraction results. The text has been changed from "N=18" to "sample number = 18".

P5967, L12: The AMS uncertainty seems a little high. Is this capturing any collection efficiency uncertainty? How was the collection efficiency estimated anyway? Also, was a pressure-controlled inlet used?

The AMS was operated with a setup similar to that described in Dunlea et al. (2009) and using a pressure-controlled inlet (Bahreini et al., 2008). The AMS collection efficiency was estimated using the composition-dependent formulation of Middlebrook et al. (2011) as implemented in the standard AMS data analysis software (Sueper, 2015, http://cires1.colorado.edu/jimenez-group/wiki/index.php/ToF-AMS_Analysis_Software), and applied with a 1-min time resolution to reduce the effect of high-frequency noise. The AMS uncertainty for OA (2 sigma = 38%) is estimated as described in Bahreini et al. (2009) and Middlebrook et al. (2011) and is dominated by the uncertainty in collection efficiency and relative ionization efficiency of OA.

*Refs:*

*E.J. Dunlea, P.F. DeCarlo, A.C. Aiken, J.R. Kimmel, R.E. Peltier, R.J. Weber, J. Tomlison, D.R. Collins, Y. Shinozuka, C.S. McNaughton, S.G. Howell, A.D. Clarke, L.K. Emmons, E.C. Apel, G.G. Pfister, A. van Donkelaar, R.V. Martin, D.B. Millet, C.L. Heald, and J.L. Jimenez. Evolution of Asian Aerosols during Transpacific Transport in INTEX-B. Atmospheric Chemistry and Physics, 9, 7257-7287, 2009.*

*R. Bahreini, E.J. Dunlea, B.M. Matthew, C. Simons, K.S. Docherty, P.F. DeCarlo, J.L. Jimenez, C.A. Brock, and A.M. Middlebrook. Design and Operation of a Pressure Controlled Inlet for Airborne Sampling with an Aerodynamic Aerosol Lens. Aerosol Science and Technology, 42: 465–471, 2008.*

*A.M. Middlebrook, R. Bahreini, J.L. Jimenez, and M.R. Canagaratna. Evaluation of Composition-Dependent Collection Efficiencies for the Aerodyne Aerosol Mass Spectrometer using Field Data. Aerosol Science and Technology, 46, 258–271, DOI:10.1080/02786826.2011.620041, 2011.*

*R. Bahreini, B. Ervens, A.M. Middlebrook, C. Warneke, J.A. de Gouw, P.F. DeCarlo, J.L. Jimenez, E. Atlas, J. Brioude, C.A. Brock, A. Fried, J.S. Holloway, J. Peischl, D. Richter, T.B. Ryerson, H. Stark, J. Walega, P. Weibring, A.G. Wollny, F.C. Fehsenfeld. Organic Aerosol Formation in Urban and Industrial plumes near Houston and Dallas, TX. Journal of Geophysical Research-Atmospheres 114, D00F16, doi:10.1029/2008JD011493, 2009.*

P5977, L6: A recent paper by Liu et al. (doi: 10.1002/2014GL062443) found an even bigger potential range than this by invoking a Rayleigh-Debeye-Gans approximation.

The authors thank the reviewer for this comment, and have modified the text to include the result in this recent-published paper.

P5977, L8: I'm a little confused by this line of discussion. The previous sentences discuss the effect of morphology on AAE, which can cause both negative and positive discrepancies from unity, but then an 'enhancement' is discussed. The main focus of the Cappa et al. (2012) is the enhancement of bulk absorption, not AAE.

The authors thank the reviewer for this comment. The text has been modified for clarification, as below:

*More random mixtures, or mixtures containing absorbing material, such as BrC, can significantly alter the range of $AAE_{BC}$ (Lack and Cappa, 2010). Recent ambient data do not show significant enhancement of aerosol light absorption at lower wavelengths that would be indicated by deviation of an $AAE_{BC}$ from 1 (Cappa et al., 2012).*

P5985, L13: For consistency with the rest of the text, use '1' rather than 'one'.

The text has been modified.

Table 3: Please be consistent in the unit notations for the denominator; having μg/m3 rather than μg m-3 looks odd next to Mm-1.

The text has been modified.

Figures 8 and 9: I would not denote the 1:1 lines with 'y=x' because y and x do not refer to variables used here. I think '1:1' would suffice.

The annotation in figures 8 and 9 has been changed.