

***Interactive comment on “Investigation of CO,  
C<sub>2</sub>H<sub>6</sub> and aerosols in a boreal fire plume over eastern Canada during  
and satellite – based observations, and model simulations” by D. Griffinet et al.***

**Anonymous Referee #1**

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This paper describes ground and satellite based spectra measurements of aerosol optical depth and total column amounts of carbon monoxide and ethane during BORTAS 2011.

The measurements show strong enhancements as a result of transported smoke from boreal fires in North West Ontario. The event is simulated reasonably well with the global chemical transport model GEOS-Chem using the FLAMBE fire emissions inventory.

The paper includes a thorough intercomparison of carbon monoxide measurements

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from IASI and two different ground-based spectrometers.

In addition emission ratios are calculated for ethane that are consistent with previous measurements in the literature for this region, confirming strong regional dependence of these emissions.

The paper is generally well presented and its main merit lies in confirmation of the emission ratio for ethane in this region as well as additional evidence for good agreement between IASI and NDACC measurements of carbon monoxide. Additionally, the agreement of the GEOS-Chem /FLAMBE simulations to the observations is pleasing.

I have a few suggestions/ comments:

1. I think that it is somewhat misleading to state in the Abstract that the measurements are used to estimate an emission factor as well as an emission ratio. In reality the measurements yield only an enhancement ratio that is equivalent to the emission ratio. The authors simple calculate the equivalent emission factor assuming the literature average emission factor for carbon monoxide.
2. The second from last sentence of the Abstract needs rephrasing as it currently reads as if the enhancements are only 3% and 8% (not the uncertainties)!
3. Page 11076, line11-12 seems miss-placed or ill-phrased, since a couple of sentences later you start the explanation of how it was determined that the enhancements originated from these fires. Perhaps rephrase or omit.
4. Page 11088, line 23. I suggest that you add a comment regarding the possibly strong dependence of the results on the two higher measurements .
5. Page 11089, I suggest you change heading to “ Estimation of emission ratio and equivalent emission factor”