

Interactive comment on “Polar organic marker compounds in atmospheric aerosols during the LBA-SMOCC 2002 biomass burning experiment in Rondônia, Brazil: sources and source processes, time series, diel variations and size distributions” by M. Claeys et al.

Anonymous Referee #2

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Review of “Polar organic marker compounds in atmospheric aerosols during the SBA-SMOCC 2002 biomass burning experiment in Rondonia, Brazil. ...” by M. Claeys et al.

Reviewer’s Summary: The present paper is a continuation of a set of papers which has been written to describe air samples measured for organic tracers in particulate matter (PM) during the LBA-SMOCC 2002 biomass burning experiment in Rondonia Brazil.

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The earlier papers include Andreae et al., 2003, Science; Decesari et al., 2006, ACP; Falkovich et al. 2005, ACP; Fuzzi et al., 2007, JGR; among others. The present paper focuses on tracer compounds indicative of biomass burning, fungal spores, carboxylic acid oxidation, and secondary organic aerosol (SOA) from isoprene photooxidation. Size segregated samples were taken using (1) a dichotomous sampler to separate fine PM (2.5 μm cut) and coarse PM (2.5-10 μm) and (2) a ten-stage MOUDI sampler with cuts between 0.053 and 18 μm . Samples were taken over dry, transitional, and wet seasons. As might be anticipated, the largest aerosol loadings occur during the dry season when deforestation fires produce considerable PM. This is seen in the time series of the major bulk parameters (PM_{2.5}, OC, EC, etc.). During tracer compounds also show less distinct features particularly during the dry and transitional seasons. During the dry season, levoglucosan concentrations indicative of biomass burning are extremely high, weaken during the transitional period, and then decrease substantially during the wet season. However, the fraction of levoglucosan in organic carbon (OC) during all periods is approximately the same (2-5%; Fig 3). Discussion of other tracer compounds is generally very straightforward.

General Comments: The paper represents the next in a comprehensive examination of the Rondonia air heavily impacted by deforestation burning. By and large, the consideration of tracer compounds on the composition of the OC in PM_{2.5} follow expected interpretations. The technical analysis of the samples is very good as indicated by the chromatography in Fig 1. The description of the data in terms of size cuts of the MOUDI and the high volume dichot are adequate. The discussion of the three classes of tracers is also acceptable. While it might be argued, that the work is a bit too prosaic, the importance of tracers for confirming the origin of primary and secondary aerosol justifies the work and publication.

Specific Comments:

ABSTRACT: The abstract is far too detailed and the important findings from the paper are lost in the sheer length of this section.

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EXPERIMENTAL: Note explicitly the ionization mode use.

RESULTS AND DISCUSSION: Figure 1 might be more useful, if representative chromatograms from each of the three seasons were to be shown.

What stages of the MOUDI showed the largest PM masses? How much PM mass was typically required to be above the level of detection for the tracers for each stage of the MOUDI.

Additional environmental information including average atmospheric levels of NO_x, SO₂, and temperature would be useful or a reference to these values, if available.

On p.10900, line 29, replace the “intense” with “dominant”.

From the field data, is there any way to test the supposition of Hoffmann et al. 2010 regarding heterogeneous reactions of levoglucosan?

As a guide to the reader, provide approximate carbon numbers or vapor pressures in referring to semivolatile carboxylic acids.

In the Decesari et al., 2006 reference, Rondonia is misspelled.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 10889, 2010.