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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evaluation of the carbon content of aerosols from the burning of biomass in the Brazilian Amazon using thermal, optical and thermal-optical analysis methods" *by* L. L. Soto-García et al.

Anonymous Referee #2

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The manuscript deals with the size-resolved analysis of EC/BC/OC in ambient aerosols strongly impacted by biomass burning. In aerosol chemistry, this is probably one of the most controversial methodological issues. The work is a combination of routine analytical techniques with size-resolved sample collection, which further complicates the case. The sampling campaign defines a natural laboratory in which there is no room for discussion of aerosol sources, it is clearly biomass burning which dominates (as confirmed by several previous studies). The methods used by the authors are largely correct, yet the reviewer is not convinced that this paper would add much to our un-

derstanding on aerosol carbon chemistry or methodology. In particular, the collection of particles on quartz filters in the Dekati impactor is questionable, since these sampling devices are originally not designed for that (despite some efforts to apply filter substrates in impactors). I understand that the application of TOR/TOT analyses and LTM would require quartz instead of quartz filters, but are the results really meaningful? There are so many problems with filter substrates in themselves (artefacts), why add other potential errors to the already problematic aerosol sampling? It must be acknowledged that the authors devote a sub-chapter to the discussion of the sampling problems, and make comparisons with other methods in an attempt to resolve these problems. The most valuable part of the work is to demonstrate to what extent apparent black carbon (charring of organic compounds and partly brown carbon) contributes to measured BC concentrations. The need for water extraction prior to TOR/TOT analyses is a must in the case of biomass burning aerosols; otherwise the results are meaningless. It was interesting to see how the Angstrom exponent was reduced after water extraction: it was an indication that brown carbon absorption was also significant in the UV range of spectrum, and not only extensive charring distorted the light absorption signal. Perhaps some estimates may have been given on the relative importance of the two as a function of wavelength.

Minor comment: Page 12881 Line 2: In biomass smoke, cloud processing may also happen in a persistent smoke layer, which is in itself a type of cloud. So there is no need to assume extensive ageing to explain the occurrence of the droplet mode biomass burning aerosol.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 12859, 2010.