**Atmospheric
Chemistry
and Physics
Discussions**

Interactive
Comment

Interactive comment on "Long-term observations of aerosol size distributions in semi-clean and polluted savannah in South Africa" *by* V. Vakkari et al.

Anonymous Referee #2

Received and published: 2 December 2012

The paper by Vakkari et al. presents an interesting data set of aerosol size distributions from South African savannahs, a region where there were only few reported measurements. As such this represents a valuable set of measurements that would be very useful for the global aerosol community. The data analysis and discussions are of a very high quality and overall the manuscript is very well written. I would recommend that it is publish after some minor revisions.

Introduction: In the introduction part where the authors give an overview of the measurements in the southern hemisphere I think that they are overlooking some of the work done by the group at QUT in Brisbane. Maybe it is worth looking at some of the

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

papers by Mejía, J. F. and Morawska, L. from ACP or at some recetn work from the same group by Cheung et al 2011 (also published in ACP).

Figure 6. At the Marikana site there are 2 maxima for the CO concentration during the day and one maxima for SO2. The SO2 one is attributed to the change in the boundary layer height. What are the 2 CO maxima attributed to?

p. 24057, l.27: "...The night-time nucleation mode originates from the evening household combustion peak, although most of these emissions are in Aitken mode." I do not agree with this statement. The household combustion will produce much larger particles than the ones in the nucleation mode. Maybe there is some other source of the nucleation mode particles in this region. Is there any extensive gas (CNG, LPG or LNG) burning in the region?

p. 24059, l 1: "The diurnal variation in Rondonia, Brazil has a resemblance to the Marikana diurnal variation in that the highest concentrations from biomass burning are had during evening and night-time, however, there is no or little new particle formation during daytime in Rondonia (Rissler et al., 2006)." Rewrite the sentence as it does not make sense.

Figure 10. y-axis labels are not clear in this figure. Explain them in more detail in the caption. Also define in the caption what is on the top and what is on the bottom 2 figures.

Section 3.4 Spatial variation of the size distribution

I find the findings in this section very interesting, unfortunately I have had some problems in understanding the methodology of determining the size distribution within the source regions. What do the authors mean by: "The calculated times were then linearly interpolated to the DMPS time stamps, ..." (p. 24062, l.11). Can the whole procedure be explained in more detail.

You use 10 minutes tie intervals. Does the algorithm for calculating back-trajectories

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

have a resolution of 10 minutes? If not maybe it would have been better to calculate the average of the size distributions over the time period that the back-trajectories could have been meaningfully calculated.

p.24064, 2nd paragraph. One of the reasons that you did not see any nucleation modes from the Kalahari region and in general a very low concentration of particles smaller than 100nm could be due to the scavenging of the small particles by dust particles. Kalahari is a desert region with a high concentrations of dust (sand). A similar effect has been observed in regions under the influence of dust storms (see Jayaratne, Rohan, Johnson, Graham R., McGarry, Peter D., Cheung, Hing Cho, & Morawska, Lidia (2011) Characteristics of airborne ultrafine and coarse particles during the Australian dust storm of 23 September 2009. Atmospheric Environment, 45(24), pp. 3996-4001.). This would be worth discussing in the paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 24043, 2012.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper