Atmos. Chem. Phys. Discuss., 9, C406–C408, 2009
www.atmos-chem-phys-discuss.net/9/C406/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Direct estimates of emissions from the megacity of Lagos" *by* J. R. Hopkins et al.

Anonymous Referee #1

Received and published: 28 April 2009

Hopkins et al. have used trace gas measurements taken on board an aircraft during a circumnavigation of the city of Lagos, Nigeria to estimate the emissions of CO, NO_x, and VOC. Estimates based on this single flight, made during mid-afternoon on a Tuesday (the precise date of this Tuesday is not mentioned anywhere in the manuscript), are extrapolated to arrive at an annual emission for the city of Lagos. Although the uncertainties in this approach are obviously very high, they are comparable to inventory-based approaches for estimating emissions. Given the scarcity of information about emissions from Lagos in the scientific literature, this paper makes a useful contribution to the understanding of emissions from this important megacity. I recommend that this paper be published subject to certain minor revisions.

Concentration and mixing ratio: These two quantities are both referred to simply as

"concentration" in the manuscript. Please use the correct term in the correct place. For example, the last paragraph of Section 2 incorrectly uses the term "concentration" three times (it should be mixing ratio).

p 8668, l 6: Please mention the uncertainties for these emissions estimates in the abstract. Elsewhere in the paper these uncertainties are quoted as -66% – +100%.

Section 2, final paragraph: Please mention the date of the flight.

p 8674, l 1: The units for the NOx emissions are given here are Tg(NO_2)yr^{-1}, although they are quoted as Tg(N)yr^{-1} in the caption to Table 1. Which are the correct units?

p 8674, l 4: Please elaborate on why the study of Oketola et al. (2007) is inconsistent with your understanding of urban NO_x sources.

p 8674, l 21: Gas-fired power plants can be important point sources of NO_x, and plumes from such power plants can remain intact some distance downwind of the emission location. Can you comment on how well you think your sampling methodology is capturing NO_x emissions from this power station?

Table 1 (a): The presence of the second column of numbers in this table is confusing. It is not explained well in the table caption, but it seems to me that the first column is the mass of chemical compound in each class, and the second column is the mass of carbon or nitrogen in that class of compounds. If this is indeed the case, then it seems to me that the claim made in the caption (NO_x species reported in Tg(N)yr^{-1}) is in fact false, because it is obviously reported in two different units in the first two columns. In which units are the subsequent literature-based columns reported? As far as I can tell, there is no need for the results of this study to be reported in both mass of compound and mass of element. I suggest that the results of this study be reported in a single column in whichever units are most appropriate for comparison with the numbers from the literature. At the very least, the table caption should be edited to clarify explicitly which units apply to which numbers.

Table 1 (b): There are numbers missing from the final column of this table. Why is this so? I find it odd that the population of London is not reported, but the per capita emissions of CO *are* reported. How is it possible to report both the total and per capita emissions without knowing the population? And if the population of London, along with the total emissions of NO_x and VOC are known, why are the per capita emissions of these other classes *not* reported?

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 8667, 2009.