Atmos. Chem. Phys. Discuss., 8, S11039–S11041, 2009
www.atmos-chem-phys-discuss.net/8/S11039/2009/


Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Evidence for Asian dust effects from aerosol plume measurements during INTEX-B 2006 near Whistler, BC" *by* W. R. Leaitch et al.

**Anonymous Referee #2**

Received and published: 9 February 2009

The manuscript by Leaitch et al. presents results from the INTEX campaign, in which the authors flew a suite of instruments near Whistler peak in Canada and also operated some instruments at a fixed site at the peak. The topic of the paper is appropriate for Atmos. Chem. Phys., and the experimental work appears to be of high quality. I recommend the paper for eventual publication but only after one major problem is addressed.

The one major problem with this paper is the very strong statements that are made about the fate of secondary organic species and their preferential formation onto dust particles and lack of formation onto fine particles. I would rate this as an interesting,



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whilst very speculative, hypothesis, but one that is almost completely unsupported by any data at this point.

The evidence advanced for this hypothesis includes the presence of some organic species on an extremely low number of individual particles that have been analysed in some detail with an spectroscopic technique (for example on page 18555 we read about 19 northern particles which are classified between 10 possible groups). First, it is possible that dust particles already contain some organics at the source and evidence against this hypothesis is not given. For example African Dust sampled over the Caribbean does contain some organic material, although it presumably was not mixed with pollution during transport (Mayol-Bracero, 2008). Second and more importantly, the statistics with so few particles are worrisome. In the absence of quantitative OC measurements from coarse particles, very little can be concluded about their organic content. The other piece of evidence is Fig 17, but I would rate the correlation there as poor, and it would likely completely go away if the lowermost point was removed.

Finally, no chemical mechanism is proposed for SOA to react exclusively with dust particles, even though sulphate forms some fine mode aerosol. Is the reaction of SOA species even more irreversible and fast than those of the inorganic acids with dust? How could this be the case, given the diversity of species and functional groups in SOA? What would prevent some of the SOA from forming on the fine mode? Why is there no oxalic acid in the dust, even though this species is often strongly associated with SOA? The idea that some SOA forms on coarse particles is likely right, but there is just no plausible mechanism or evidence for this to be the exclusive formation mechanism.

This topic should perhaps be removed or else dealt with much more tentatively in the revised paper and labeled as a speculative hypothesis to be the focus of future studies.

Other points

Section 2,2, the speed of the aircraft needs to be given to allow an estimation of ram



**ACPD**

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heating. Precision and accuracy of the ozone analyser should be given. I believe the Allen et al. papers were written by James Allan of NCAS, and the spelling of his last name should be corrected.

Section 2,3, subscripts in Si3N4

Section 3,1, the first paragraph should be moved to the measurements section

Line 18 of page 18542, that figure is on the right not the left hand

Reference

O.L. Mayol-Bracero, Carbonaceous Aerosols in African Dust Over the Caribbean. Fall AGU Meeting 2008, abstract A11C-0122.

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Interactive comment on Atmos. Chem. Phys. Discuss., 8, 18531, 2008.



**ACPD**

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Interactive Comment