

## ***Interactive comment on “Aerosols in the tropical and subtropical UT/LS: in-situ measurements of submicron particle abundance and volatility” by S. Borrmann et al.***

**S. Borrmann et al.**

stephan.borrmann@mpic.de

Received and published: 30 April 2010

Reply-letter to Reviews for the manuscript:

Aerosols in the tropical and subtropical UT/LS: In-situ measurements of submicron particle abundance and volatility, by S. Borrmann, D. Kunkel, R. Weigel, A. Minikin, T. Deshler, J. C. Wilson, J. Curtius, C. M. Volk, C. Homan, A. Ulanovsky, F. Ravegnani, S. Viciani, G. N. Shur, G. V. Belyaev, K. S. Law, and F. Cairo.

General remarks: We prepared a major revision of the manuscript. The main changes are enumerated below and in our reply to the individual reviewers we refer to these items:

(0.) We very much thank all three referees for their extraordinarily constructive comments, which caused us to very thoroughly revise the manuscript.

(1.) A new section (2.1) is included on the connection between the aerosol measurements and atmospheric dynamics. One additional figure with correlations between submicron particle data and trace gas (CO, N<sub>2</sub>O, O<sub>3</sub>) measurements is added and discussed (Figure 8 of the revised manuscript). For this we included four new co-authors and text/references on their instruments. (2.) In the meantime a number of relevant publications appeared or was submitted and we included 29 new references. (3.) In addition to the parameterization for the tropical profiles we supply now a second parameterization from the Figure 9 (of the revised ms) for the profiles in mid-latitudes. However this parameterization is given in terms of particle number concentrations instead of mixing ratios because of lack of adequate temperature data for several flights. (4.) In order to demonstrate the particle concentration maximum is indeed a maximum with decreases below and above we integrated the data from the DLR Falcon-20 into Figure 6 for altitude levels below 350 K.

Response to the Referee N. Larsen:

Comment “page 21400 line 27 and page 24601 line 23-24”; The QBO: We added a paragraph in the new section 2.1 on the QBO phases of the three campaigns.

Comment “page 24604 line 5 and line 18”: The Khaykin et al paper is referenced now.

Comment “page 24606, line 25, page 24607, line 10-13, page 24608, line 4-5”: From the COPAS data size distributions cannot be inferred except for nucleation events, where  $n_6$  exceeds  $n_{10}$  or  $n_{14}$ . Unfortunately the IR channel of MAS was not working during SCOUT-AMMA. And a coarse look at the size distributions in the balloon data did not reveal any striking differences. The “tracks” for “ $r > 0.15$ ”, “ $r > 0.25$ ”, “ $r > 0.50$ ” etc. in Terry Deshler’s plot trace each other quite well. Also more detailed analyses in terms of counting statistics are needed in order to be able to really isolate significant differences. This is an interesting suggestion though.

Comment “page 24607, line 17”: Unfortunately the “f-COPAS” box was not on board during this southbound flight from Darwin. This flight was dedicated to remote-sensing instruments and the COPAS bay was occupied by one of these.

Comment “page 24600, line 8”: No, the potential contrail crossings are among the red points with > 10000 per mg at 360 K. We added a remark in the text pointing this out. The points between 410-420 K are “outliers” for some reason. For outliers SB likes to keep points which cannot be removed based on indications from instrument-house-keeping data (like out-of-range flow rates). In my opinion readers should see such outliers.

Comments “Figure 10 and page 24591, line 1-5”: Figure 10 is now Figure 11 in the revised ms and we wait for the editorial decision before changing the layout. We have both options and use what suits ACP best. The TTL we do not like to mark because it was not actually measured.

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/9/C12310/2010/acpd-9-C12310-2010-supplement.pdf>

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 24587, 2009.

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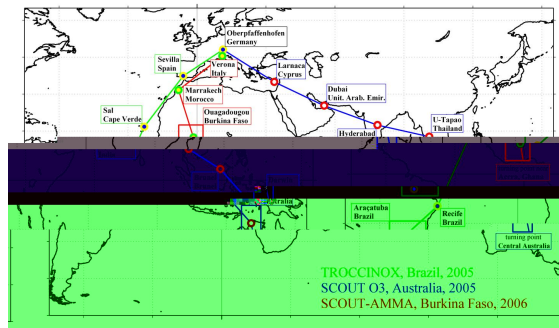
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Comment

1 **Figure 1** (FIGURES-100430)  
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Fig. 1.

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