

Interactive comment on “African biomass burning plumes over the Atlantic: aircraft based measurements and implications for H₂SO₄ and HNO₃ mediated smoke particle activation” by V. Fiedler et al.

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Authors response, acp-2010-130, Ref#1

We thank referee #1 for the very instructive comments, which we all considered. All Figures have been revised, combined or changed, as well as major revisions were made to the text. We hope, that the paper is now compelling and conclusive.

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We moreover noticed that the method section of the manuscript did not include at least a brief explanation of the aerosol instruments onboard the DLR Falcon aircraft. Data of these instruments are shown and discussed later in the paper. Although the reviewers haven't made a comment on this, we felt it's necessary to add a new paragraph at the end of Section 2, which very briefly explains the aerosol measurement methods (including three new references).

Furthermore, we added one author, Thomas Hamburger, who contributed to the aerosol measurements and data analysis and who was accidentally omitted in the first version of the manuscript.

Following the changes according to the comments of reviewer #1 in detail:

1. The referee is right, that the description of some parts in the first version was confusing and not conclusive, especially in chapter 5. In the new version, we reordered the chapters and the sections. Therefore the whole text has been revised. The new order of chapters is: 1 introduction, 2 experiment, 3 plume localization and trajectories, 4 measured species, 5 aerosol model simulations, 6 smoke particle activation, 7 summary and conclusions. The referees questions regarding particle activation etc. are now addressed in chapter 6.
2. We revised the English grammar.
3. We reduced the number of figures and combined or changed them according to the referees recommendations:
 - (a) Fig. 1a has been removed
 - (b) The former Fig. 3 (Flightpath) has been added to the new Fig. 1
 - (c) The photos (former Fig.4) have been removed

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- (d) Former Figures 5 and 6 are combined to the new Fig. 3
- (e) Former Fig. 7 has been removed, as both parts are already part of the former Figure 9, which is now Fig. 5 and 6
- (f) Former Fig. 8 has been changed to get a better resolution, it is now Fig. 4
- (g) We did not eliminate the former Fig. 9a, as we completely removed Fig. 7 instead. It is now Figure 5.
- (h) Former Figure 9b is now Figure 6: Aerosol profiles are now presented as averaged profiles combining descend and ascend data using the median concentration of data in 100 m altitude bins. This makes the graphs easier to read and avoids unnecessary noise. The size ranges of the integral concentrations presented in the right hand graph were corrected.
- (i) Former Fig. 10 is now Figure 7: We corrected here also the size ranges of the integral particle concentrations (for consistency with new Figure 6).
- (j) Former Fig. 11 is now Figure 8: We choose a different representation of the essentially same data set. We present now only two aerosol size distributions (in two different panels), one outside, the other one inside the plume, but now present more clearly the instrument origin of data points as well as the variability over the integration period.
- (k) The former Fig. 13 in our opinion is not redundant with Fig. 8, as Fig. 8 shows T and RH during the measurement flight, whereas Fig. 13 shows T, RH and pressure during the modeling period of 20 days. It is the new Fig. 9.
- (l) Parts a and b of the former Fig. 15 and Fig. 16 have been combined each and are now the new Figures 11 and 12.

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