

## ***Interactive comment on “Average molecular weight of surfactants in aerosols” by M. T. Latif and P. Brimblecombe***

**G. McFiggans (Editor)**

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Whilst it appears that the results are largely novel and important, the manuscript is quite disorganised and it is frequently unclear what the authors are trying to achieve. I therefore find that the paper will be acceptable for publication only after significant modification. It is my recommendation that the authors refocus the manuscript with respect to well-defined aims paying particular regard to ensuring that whole is a coherent standalone study. It should be emphasised that the manuscript modifications need to address the lack of clarity and the organisational difficulties which apply to the paper as a whole. The authors should address the points of the referees 1, 2 and 3 in the rewritten manuscript. Below are particular guidelines with respect to referees 1 and 3.

Responses to Referee 1

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## Interactive Comment

The referee finds that the paper is fragmented and that it is difficult to find common rationale. The paper is not standalone and relies heavily on (and seems like a follow-on study to) the EST paper such that the reader needs to be familiar with this prior to reading the current manuscript. I agree with the referee that the authors should refocus, removing all unnecessary material and including that which is necessary for standalone comprehension of the manuscript. I concur with the referee that the introduction could benefit from rationalisation and focussing and that the methodology section needs tightening, with a clearer description of the techniques employed. In particular, the goals and specific objectives of the study should be clearly stated before the materials and methods section both to i) provide a focus for inclusion of material the methodology description and ii) provide a frame of reference for the introduction which should lean towards the objectives of the work.

Since the technique provides nominal and relative molecular weight determination such that they may only be compared under the same experimental conditions, referee 1 contends that it is not possible to arrive at absolute values for the molecular weight of atmospheric surfactants and hence the title does not reflect what can be achieved and should be changed. The authors should make a convincing rebuttal of this argument or follow this advice, changing the title to reflect what is achievable within the study. There are impacts on the abstract, which referee 3 thinks needs to better reflect the main message - relating to surfactant molecular weight. This needs to be carefully worded and balanced. Whilst it appears that the results are largely novel and important, the manuscript is quite disorganised and it is frequently unclear what the authors are trying to achieve. I therefore find that the paper will be acceptable for publication only after significant modification. It is my recommendation that the authors refocus the manuscript with respect to well-defined aims paying particular regard to ensuring that whole is a coherent standalone study. It should be emphasised that the manuscript modifications need to address the lack of clarity and the organisational difficulties which apply to the paper as a whole. The authors should address the points of the referees 1, 2 and 3 in the rewritten manuscript. Below are particular guidelines with respect to

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## Responses to Referee 1

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Referee 1 outlines the requirements for the ion balance. This includes accounting for  $\text{NH}_4^+$  in the fine fraction and both  $\text{NH}_4^+$  and  $\text{Cl}^-$  in the coarser particles. This should be done as a minimum, since the pH only follows from the ion balance for a given aerosol liquid water content - however, as a relative measure of acidity, such an ion balance

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should suffice. The referee provides a valuable reference for describing aerosol acidity.

### Responses to Referee 3

In addition to the many technical corrections, referee 3 has provided significant helpful advice about the wording and structuring of the various sections which should be taken up. The many questions in the referee's comments should usefully be addressed in the revised manuscript, not just in the responses. This should add significantly to the clarity of the manuscript.

I look forward to the authors' revised manuscript

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 13805, 2007.

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