

Interactive comment on “Dissolved organic matter in sea spray: a transfer study from marine surface water to aerosols” by P. Schmitt-Kopplin et al.

Anonymous Referee #2

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Ultrahigh resolution techniques and a nice and simple generation and sampling method for burst enable the authors to describe the transfer of surface active substances from the marine surface layer via bubble bursting to the aerosol in great detail. Elemental compositions and functional groups are characterized and quantified. It is not clear to me whether other relevant work on organic composition and fate of this major global source of marine and coastal aerosol has been considered sufficiently. This topic might be extended for comparison and discussion of long-range transport and transformation. On the other hand, the expertise of the authors leads to an extremely convincing work that meets the scope of Biogeosciences Discussions, and I feel that it can be accepted for publication, answering a few questions and considering minor corrections/suggestions.

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Question: On page 11777 in line 1-4 the authors wrote that the ratio of methyl to polymethylene, an indicator of “pure” aliphatic branching ($\text{H}_3\text{C}-\text{C}-\text{C}-\text{Z}$, with any heteroatom Z at least four bonds away from methyl), grows in the order surface water < aerosol < burst. This does not agree with the integrals in Table 1, where the order is aerosol < surface water < burst.

Page 11777, line 4-5: Also for the range of functionalized aliphatics ($\delta_H = 1.9 - 1.35$ ppm), a different order results for these three samples (aerosol < burst < surface water). The table appears too small and needs to be printed with a larger font.

The captions of Figures 7 and 8 are partially unclear and could be improved:

Change the first line of caption of Figure 7 from “aerosol samples” to “samples of surface water, burst, and aerosol”.

Furthermore, “expansions ofproton chemical environments” is not clear and might be misunderstood as spectra on an expanded ppm scale. Shown are sections of spectra (slightly compressed in comparison to the panels in the middle row) in the chemical shift ranges of aliphatic and olefinic/aromatic protons with individual intensity adjustment (scaling).

Figure 8 appears too small by far, and it is not immediately clear which spectra belong to Panel A and which to Panel B (as the olefinic signals of acrylic acid in the surface water and the burst water samples are compared, both spectra could also belong to panel B). Maybe it would be helpful to separate the panels by frames. Moreover, the caption for panel A does not mention from which sample the spectra are.

Question: if the signals between 7.6 and 7.8 ppm originate from exchangeable protons, why were they not exchanged in CD_3OD ? Could that be an indication of compounds with intramolecular H-bridges?

The references Koch et al. should be placed into alphabetical order.

Some minor corrections and suggestions: Page 11768 line 3 adsorption => absorption

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line 6 => atmosphere, was studied. We present.. line 7 => using the high resolution
 analytical tools of Fourier.. line 8 => (FT-ICR MS) and nuclear magnetic resonance
 (NMR). Our experimental data confirm the line 10 => water, into line 14 concentrated
 => enriched (?) line 15 => content, and line 17 hydroxyl- => hydroxy- (?) Page 11769
 line 10 Adsorption => Enrichment (by adsorption?) Page 11770 line 12=> drops and
 line 15 surface, and Page 11771 line 4 => Germany, and Cape Town, South Africa,
 line 10 non diluted => undiluted Page 11772 line 8 with => by line 11 conditioning, and
 line 15 out of => from line 17 Aerosols => Aerosol line 18 dp => d_p , line 20 SCHULZE,
 21271 Asendorf => Schulze, Asendorf line 21 in Piel => by Piel Page 11773 line 1 Text
 fragment SPE-C18. (?) line 15 ?) and accuracy => ?), and accuracy.... (or do you
 mean precision/ reproducibility (?) line 20 => signal to noise ratio Page 11774 line1
 Out of => using line 9 => molecules in Figures 3-6 described and discussed below.
 Page 11776 line 4 with => using (or: by) line 16 => materials, probably line 19-21
 The sentence is incomplete, and possibly inadvertently there is a remark ?This is not
 written in caption of Fig. 6.? line 24 with => by Page 11777 line 6 were => was line 27
 into => in line 29: oxydized => oxidized Page 11778 line 14 hydroxyl- => hydroxy- line
 18 in => into line 19 out of => from line 18 partitioning in the => partitioning into the line
 26 variations as found also in => variations, found in the....1998), line 27 consequent
 aerosols => aerosols released (?)

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