

Interactive comment on “Fluxes of microbes, organic aerosols, dust, and methanesulfonate onto Greenland and Antarctic ice” by P. B. Price et al.

P. B. Price et al.

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I appreciate the helpful remarks of referee 1. We have taken into account the referee’s comments in my revised text, which we expect to submit very soon.

1. We augmented Table 1 with data on ratios of concentrations of non-sea-salt Ca ions and of sea-salt Na ions and references for those data at the bottom of the table. The addition of those data showed that microbes and non-microbial aerosols trapped in both Greenland and Antarctic ice correlate both with dust and non-salt Ca ions, from which we concluded that microbes and non-microbial aerosols in the ice came predominantly from terrestrial sources and that sea-salt Na ions correlate with MSA, indicative of marine sources. 2. At the referee’s suggestion, we have arranged

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with Joe McConnell at Desert Research Institute to compare his time series of Na and Ca ions, as well as of Al and Ce ions, with our time series of microbial and non-microbial aerosol data, which we will be acquiring in the next one to two years. 3. We gave the emission wavelength range for our laser. 4. The typesetter had omitted the symbol vs, which we added to the text. 5. At the request of the referee, we reworded several sentences to make it clearer what we meant. 6. The referee was of the opinion that haptophytes are not the main contributor to DMS emissions. We expanded our discussion of the various contributors, and added a reference to Keller et al, who carried out a comprehensive study of the various microorganisms that produced DMS. They found, as we expected, that the contribution of diatoms to MSA is very small. 7. We agreed with the comments about overlap of source regions and transport patterns, and revised that part of the abstract. 8. We removed the last sentence of the abstract. 9. In the introduction, we explained MSA. 10. We changed the expression – our group; but we continued to use the active voice instead of passive voice, in order to make it clear who did what. 11. We made the various revisions suggested by the referee. It will be clear from the revisions that the paper now reads better. 12. We explicitly gave the emission wavelength bands for the laser-induced fluorescence. 13. We clarified that some of the fluorescence spectra for non-microbial aerosols are similar to those found by other authors. We pointed out that the published spectra were obtained either by analyzing bulk samples or single particles an order of magnitude larger in size than those we typically examined in glacial ice. 14. We agree that our spectra of non-microbial aerosols are not dominantly of marine DOM. 15. There do not exist sufficiently detailed data on dust vs depth from West Antarctica. Instead we used West Antarctic data on non-sea-salt Ca, a proxy for dust. 16. We omitted the sentence; swept up with similar efficiency. 17. We capitalized West. 18. We revised the sentence; to minimize the role of climate; we followed the referee's suggestion of a clearer wording. 19. We expanded the discussion of the origin of DMS and of MSA to justify the statement that MSA comes mainly from sea ice perimeters. A key point is that the short residence time in the lower troposphere

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(~2.3 d), likely reflects nearby production and that MSA emissions from phytoplankton blooms lower latitudes in the open ocean contributes little to MSA in ice cores.

Interactive comment on Biogeosciences Discuss., 5, 4681, 2008.

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