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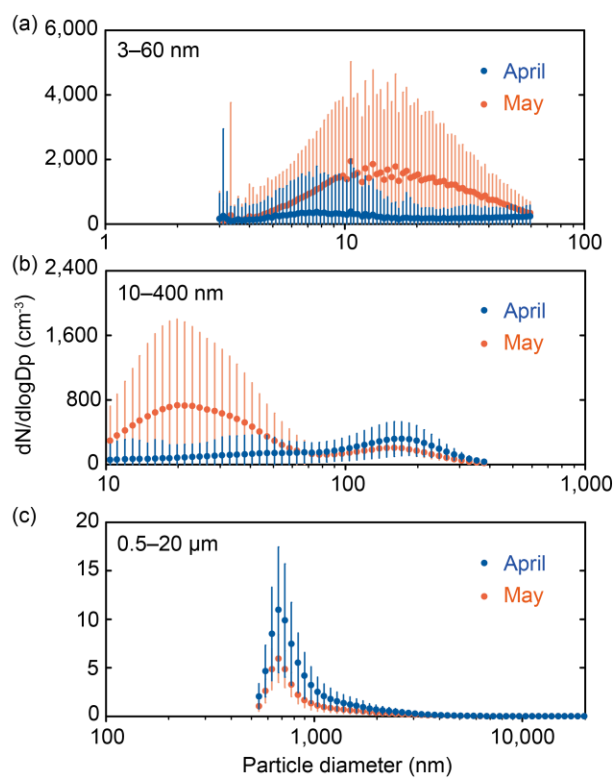
*Supplement of*

## **Observational evidence for the formation of DMS-derived aerosols during Arctic phytoplankton blooms**

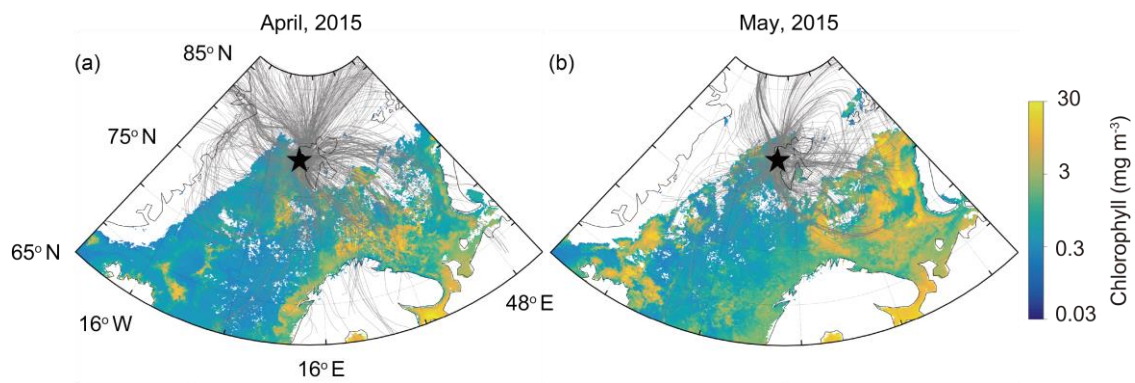
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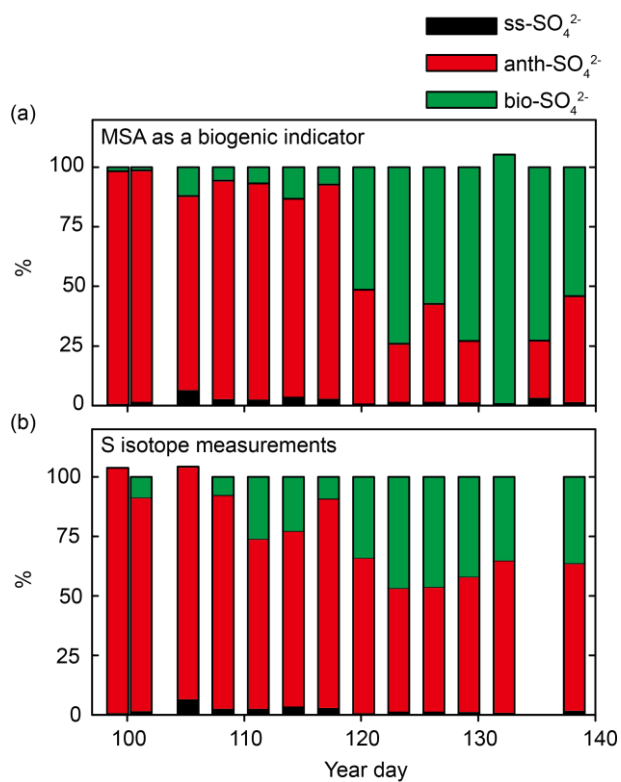
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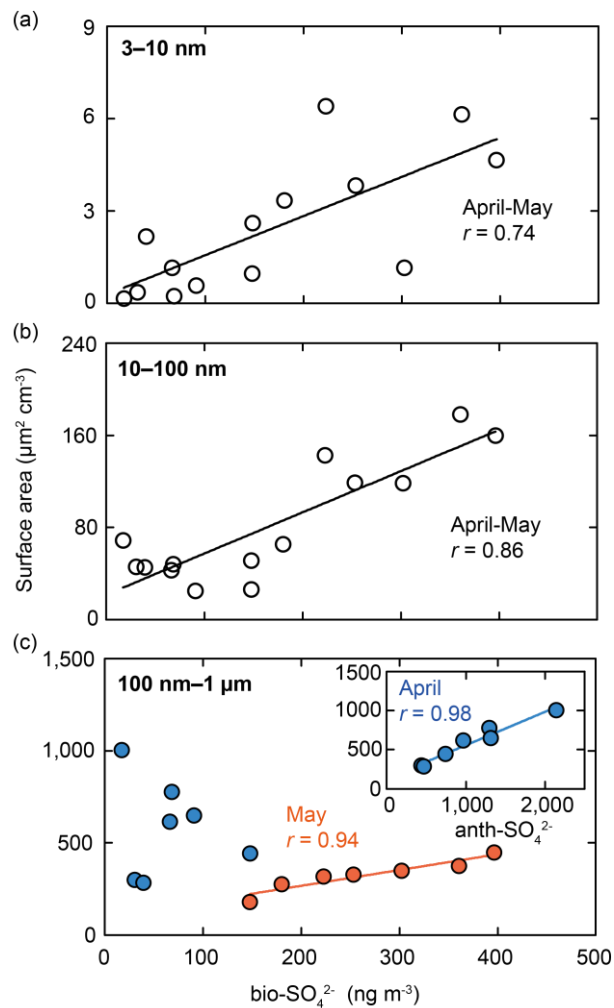
**Figure S1:** Monthly mean size distribution of particles measured at the Gruebadet observatory in April (blue circles) and May (red circles) 2015. (a) Particles 3–60 nm, (b) particles 10–500 nm, and (c) particles 0.5–20  $\mu\text{m}$ .



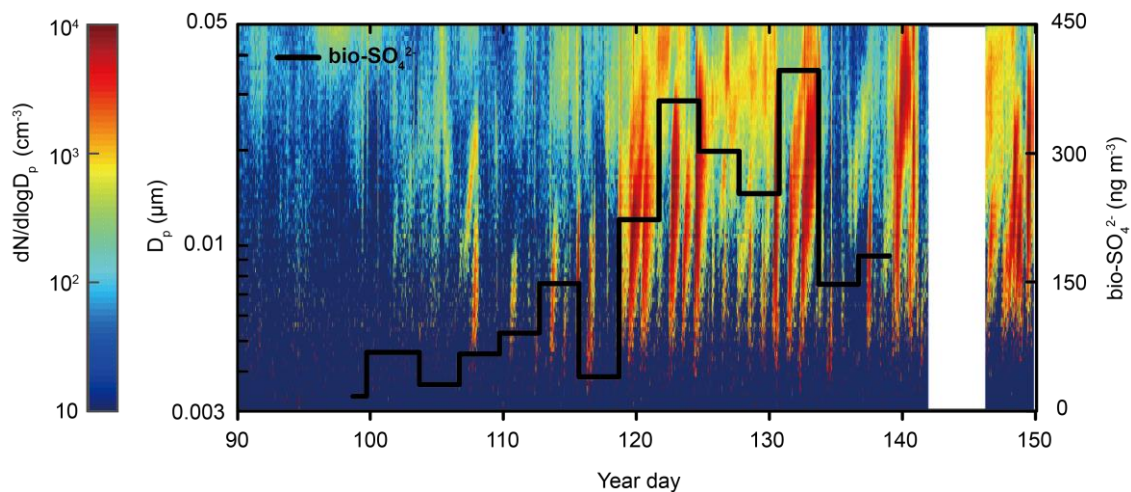
**Figure S2:** Monthly mean chlorophyll concentration during (a) April and (b) May 2015, overlaid with the 2-day air mass back trajectories collected at hourly intervals. The star symbol indicates the location of Ny-Ålesund (78.5° N, 11.8° E), Svalbard.



**Figure S3:**  $\text{SO}_4^{2-}$  aerosol sources including sea salt (ss)  $\text{SO}_4^{2-}$ , anthropogenic (anth)  $\text{SO}_4^{2-}$  and DMS-derived (bio)  $\text{SO}_4^{2-}$ , estimated using (a) MSA as a biogenic indicator, and (b) stable S isotope techniques.



**Figure S4:** Relationships between the concentration of biogenic (bio)  $\text{SO}_4^{2-}$  and the surface area of particles of various sizes in April and May. (a) Particles 3–10 nm, (b) particles 10–100 nm, and (c) particles 100 nm–1  $\mu\text{m}$ . The black solid lines in Fig. S4a and S4b indicate the best fit between biogenic  $\text{SO}_4^{2-}$  and the surface area of particles during April and May 2015. Blue and red circles in Fig. S4c indicate data obtained in April (Arctic haze period) and May (phytoplankton bloom period), respectively. The red solid line in Fig. S4c indicates the best fit between biogenic  $\text{SO}_4^{2-}$  and the surface area of particles in May 2015, and the blue solid line in the inset of Fig. S4c indicates the best fit between anthropogenic (anth)  $\text{SO}_4^{2-}$  and the surface area of particles in April 2015.



**Figure S5:** Spectral plot of number size distribution ( $dN/d\log D_p$ ) as a function of particle diameter ( $D_p$ , 3–50 nm) and year day during April and May 2015. The solid line represents the concentrations of biogenic  $\text{SO}_4^{2-}$ .