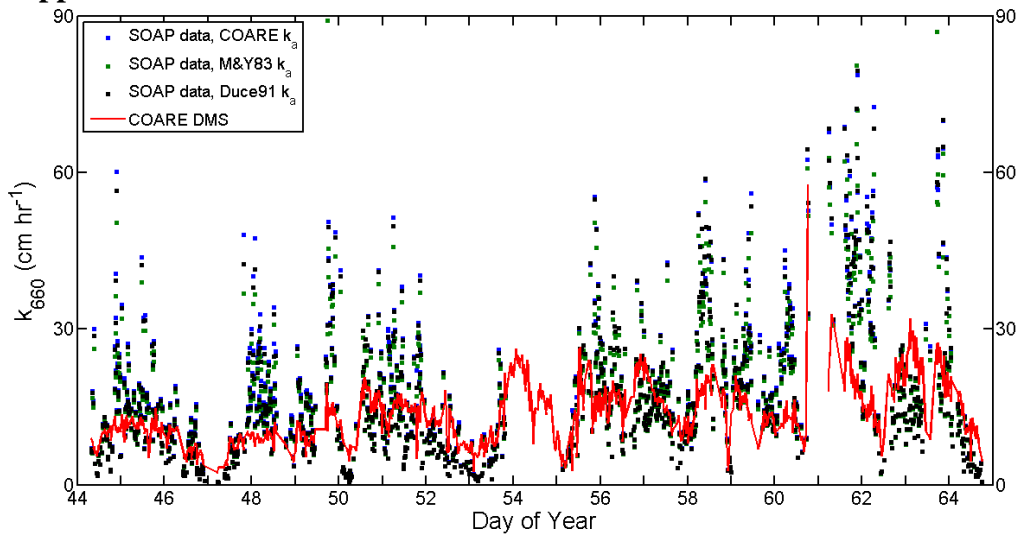Atmospheric
Chemistry
and Physics

Open Access

Supplement of

Dimethylsulfide gas transfer coefficients from algal blooms in the Southern Ocean

T. G. Bell et al.

Correspondence to: T. G. Bell (tbe@pml.ac.uk)

1   **Supplemental Material**

2
3   **Figure A**
4   Time series of SOAP waterside gas transfer velocities (k_w) normalised to Schmidt number = 660.
5   NOAA COARE model output (red line) shown for reference. Airside gas transfer velocity (k_a) estimates
6   were used to calculate k_w from measured K_w using three different models/parameterisations:
7   - **COARE** (Fairall, C. W. et al. Implementation of the Coupled Ocean-Atmosphere Response Experiment flux algorithm with
8   CO_2, dimethyl sulfide, and O_3, J. Geophys. Res.-Oceans, 116, C00F09, 10.1029/2010jc006884, 2011.).
9   - **M&Y83** (Mackay, D., and Yeun, A. T. K.: Mass transfer coefficient correlations for volatilization of organic solutes from
10   water, Environ. Sci. Technol., 17, 4, 211-217, Doi 10.1021/Es00110a006, 1983).
11 - **Duce91** (Duce, R. A., et al. The atmospheric input of trace species to the world ocean, Global Biogeochemical Cycles, 5, 3,
12   193-259, 1991.).
13
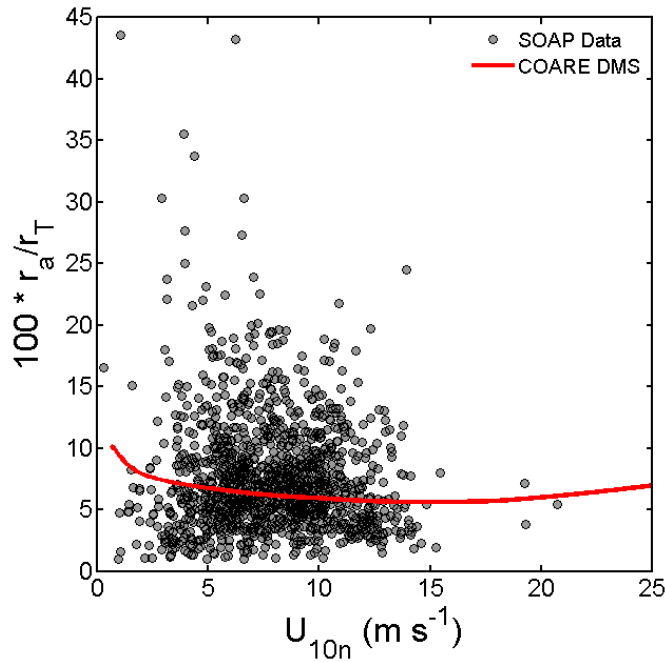
14
15 **Figure B**
16 Percentage contribution of airside resistance (r_a) to total resistance ($R_T = 1/K_w$). Grey points = r_a
17 (COARE estimate) / R_T (SOAP data). Red line = NOAA COARE estimates of r_a and R_T.
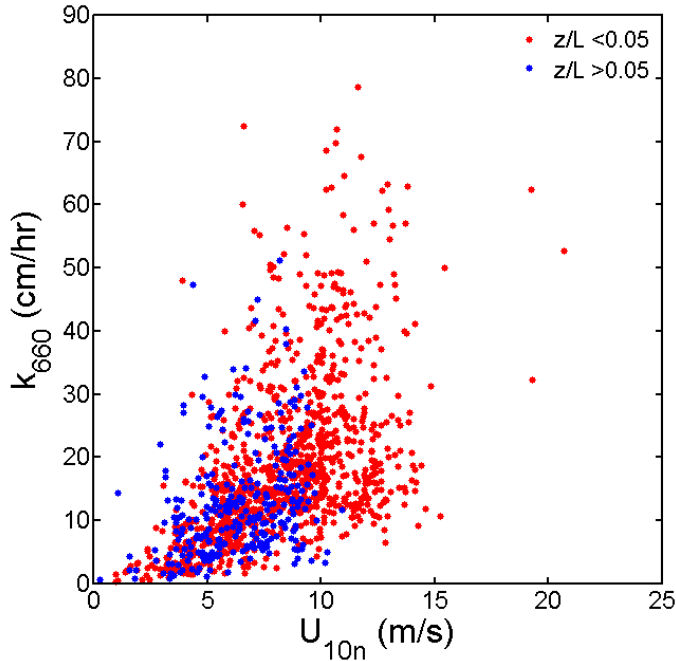
18
19 **Figure C**
20 SOAP gas transfer coefficients plotted as a function of wind speed, with symbol color used to
21 distinguish data above (blue) or below (red) a stability (z/L) threshold of 0.05 (see main text).
22
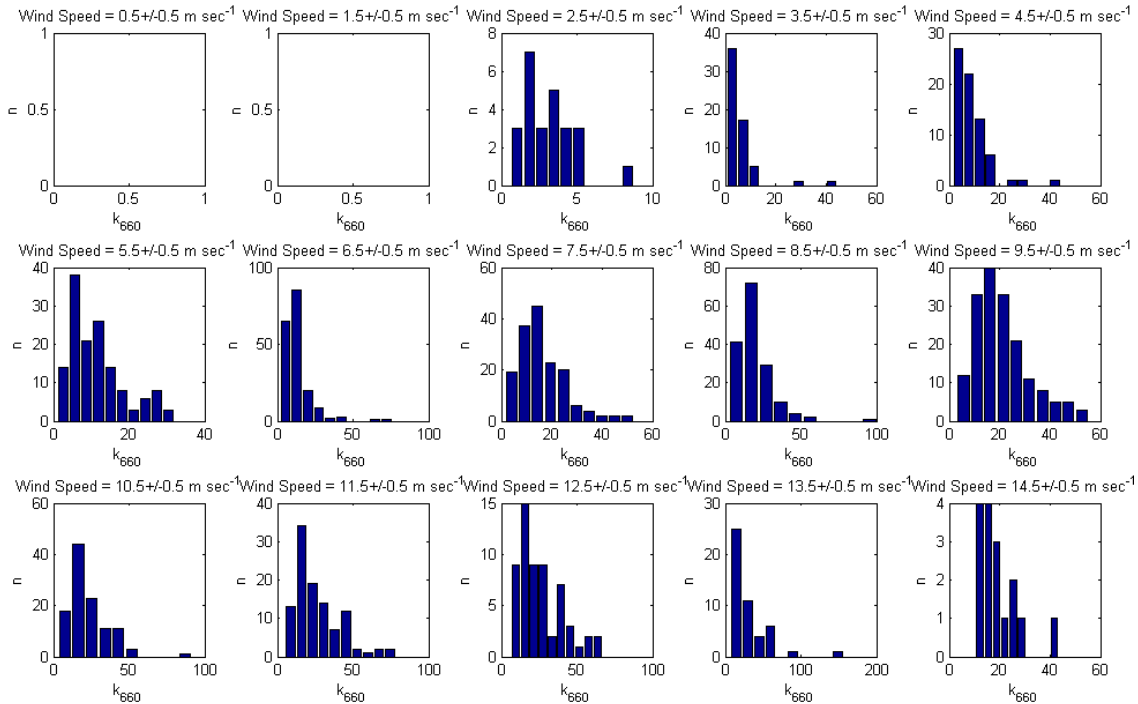
23
24 **Figure D**
25 Wind speed binned frequency distributions of k_{660} during the SOAP cruise illustrating log-normal
26 behavior.

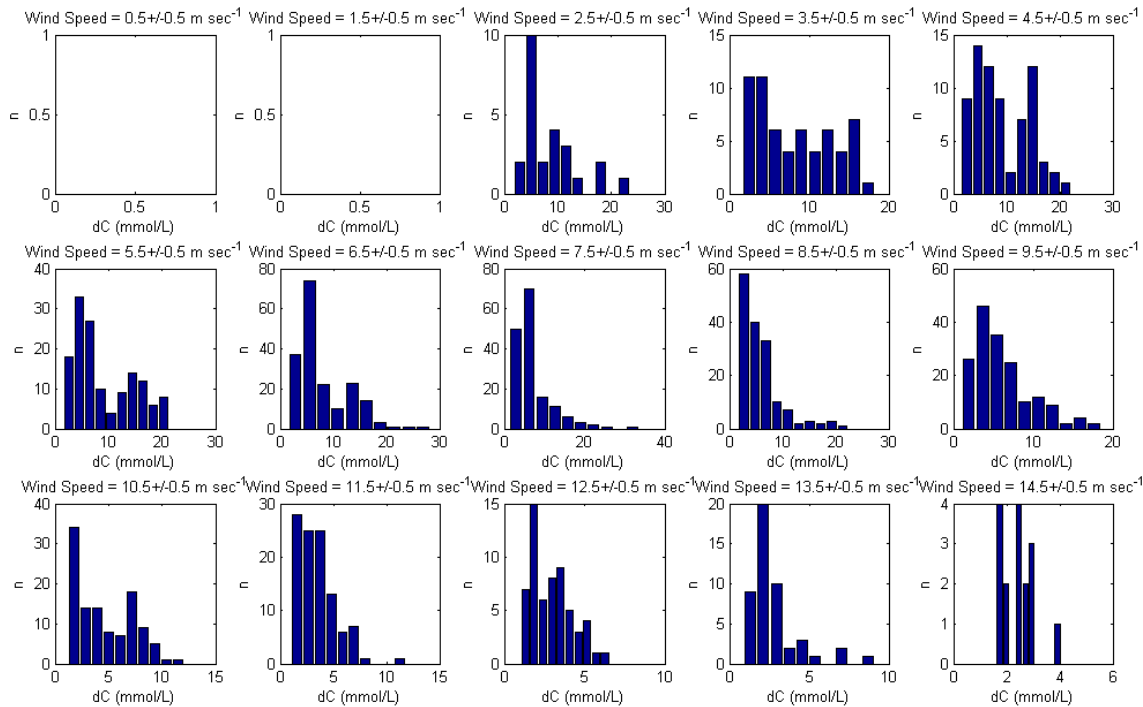**Figure E**
Wind speed binned frequency distributions of ΔC during the SOAP cruise illustrating log-normal behavior.

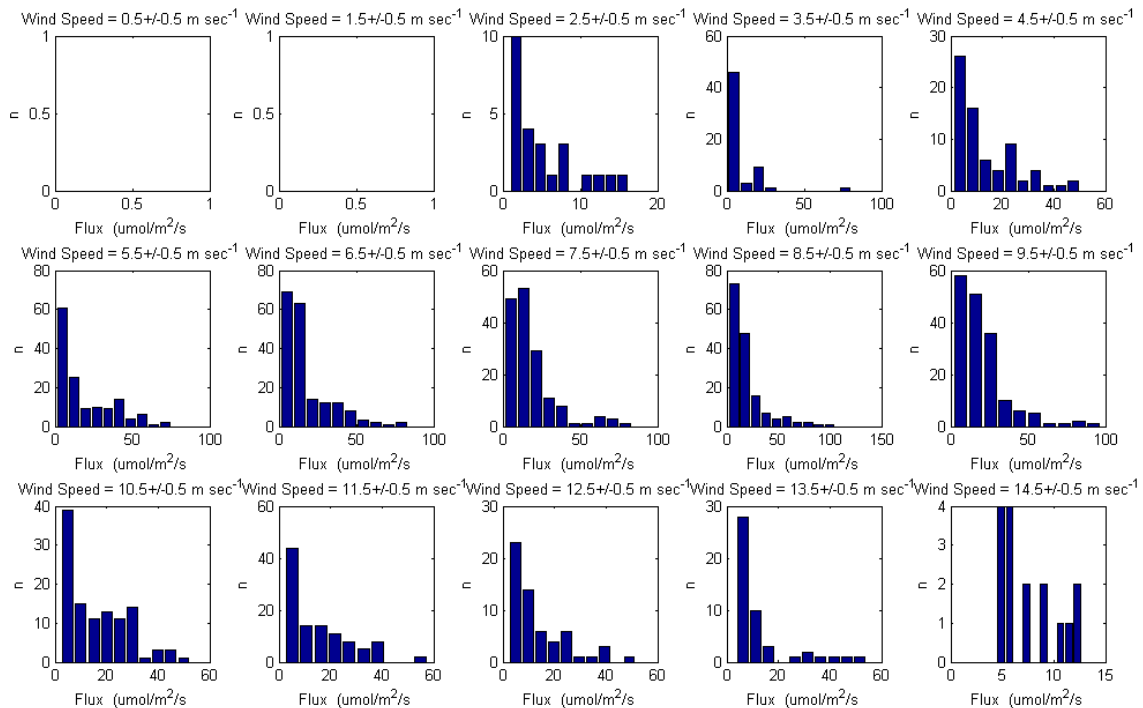**Figure F**
Wind speed binned frequency distributions of F_{DMS} during the SOAP cruise illustrating log-normal behavior.
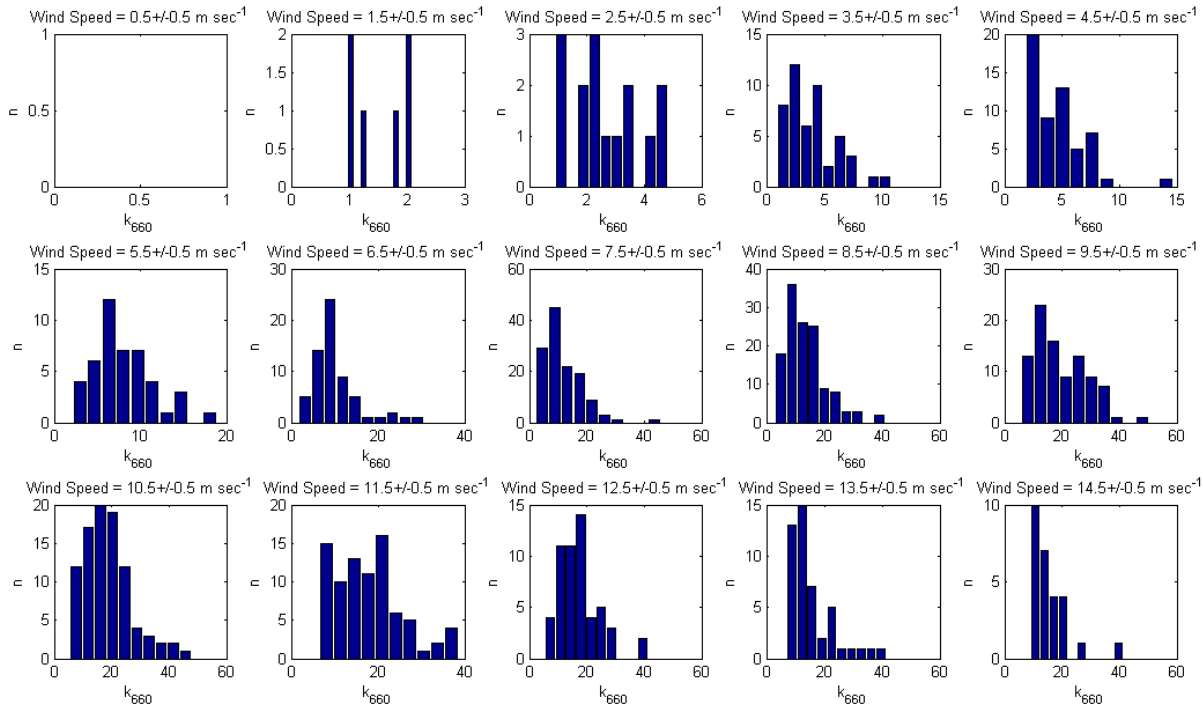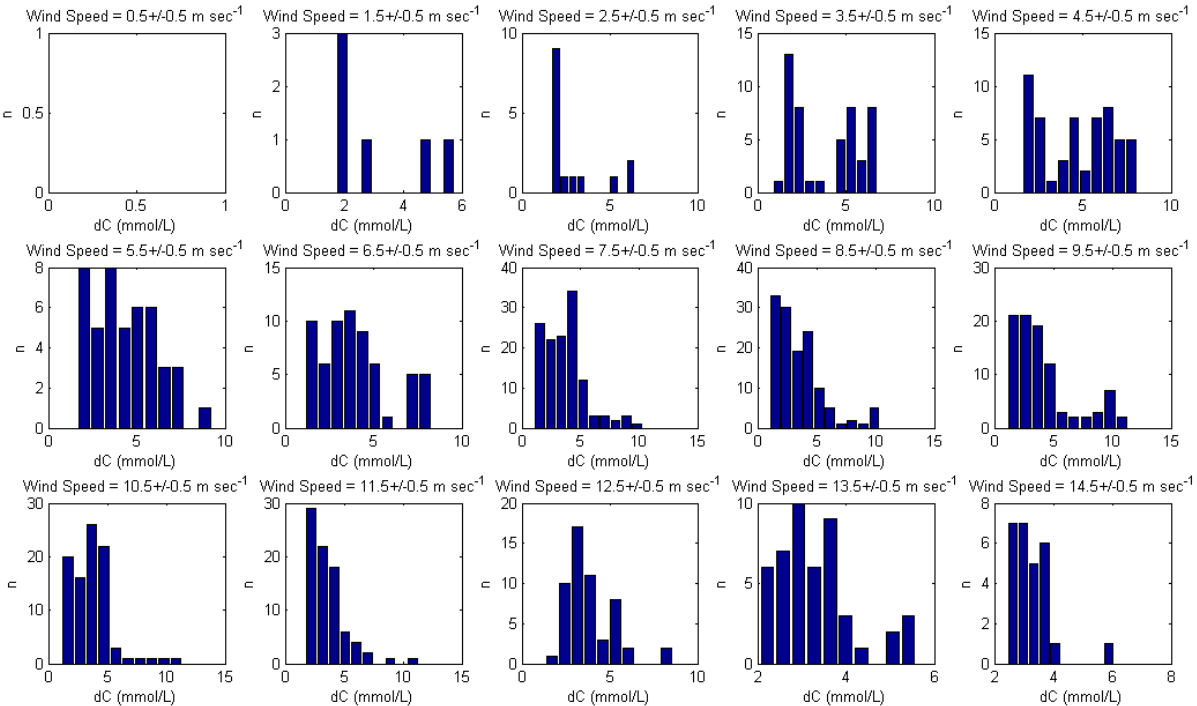
3

36
37 **Figure G**
38 Wind speed binned frequency distributions of k_{660} during the Knorr_11 cruise illustrating log-normal
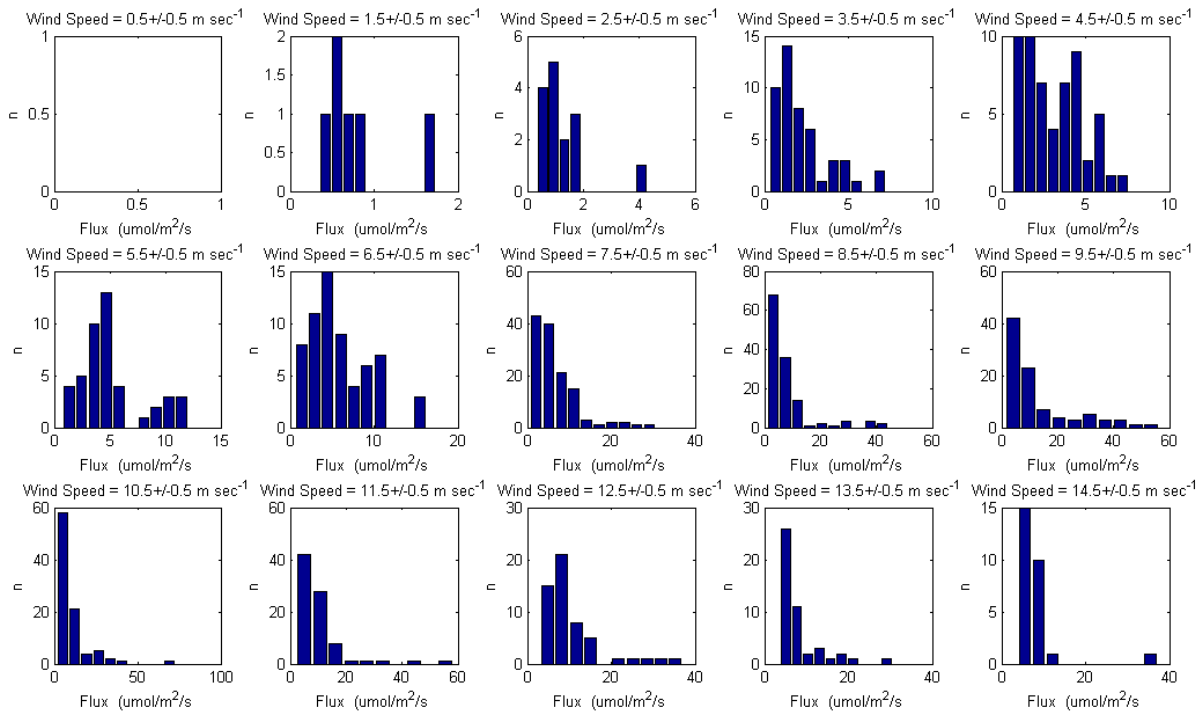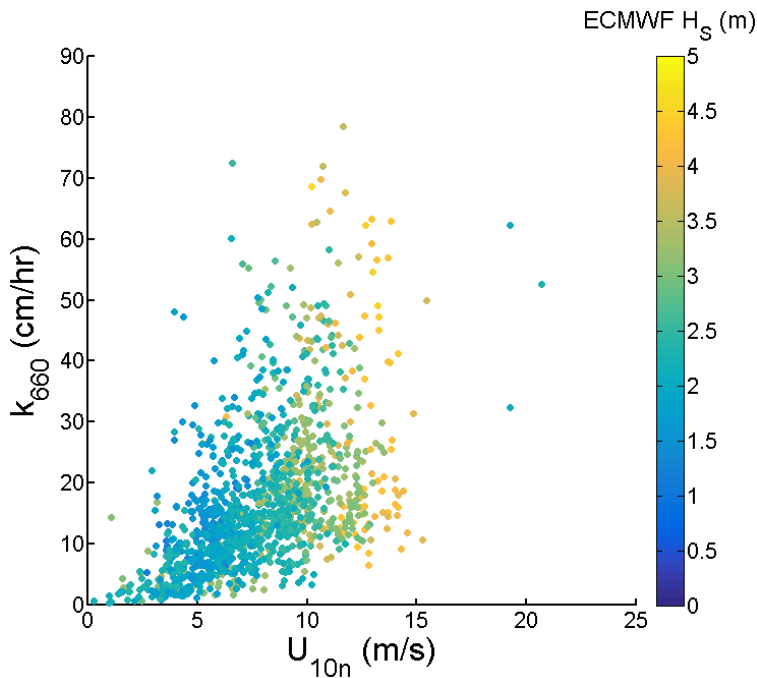39 behavior.
40

41
42 **Figure H**
43 Wind speed binned frequency distributions of ΔC during the Knorr_11 cruise illustrating log-normal
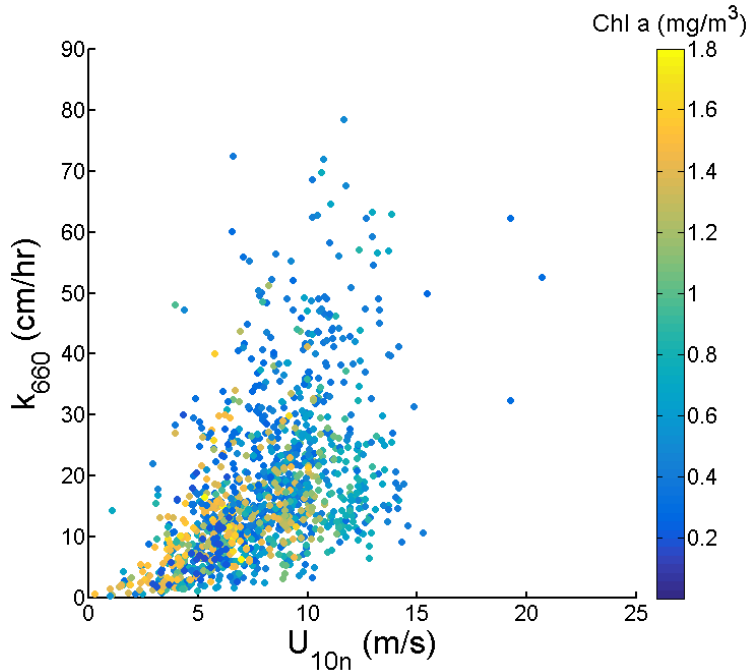44 behavior.
45

46
47 **Figure I**
48 Wind speed binned frequency distributions of F_{DMS} during the Knorr_11 cruise illustrating log-normal
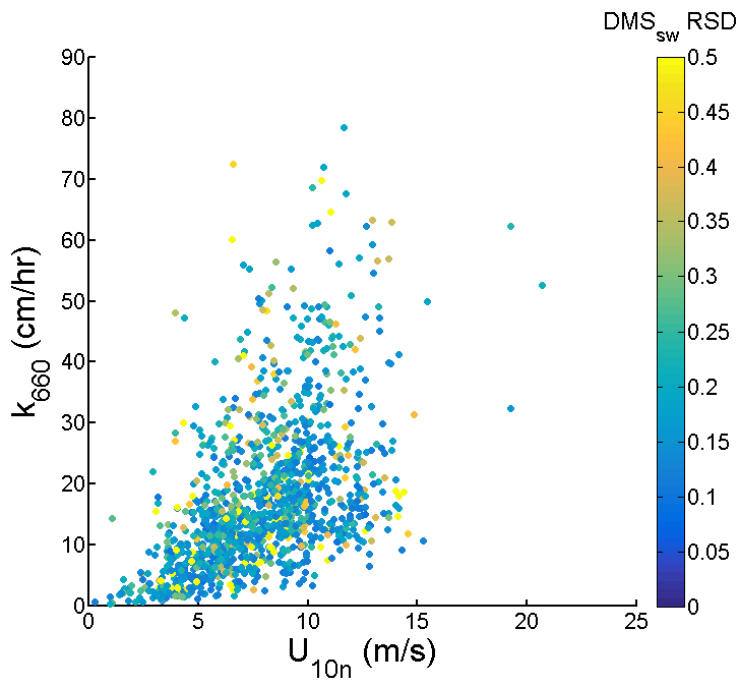49 behavior.
50

51

52 **Figure J**
53 SOAP gas transfer coefficients plotted as a function of wind speed, with symbol color indicating
54 ECMWF-retrieved significant wave height.
55

56
57 **Figure K**
58 SOAP gas transfer coefficient residuals plotted as a function of wind speed, with symbol color
59 indicating Chl a-from the ship's fluorometer.
60

61
62 **Figure L**
63 SOAP gas transfer coefficients plotted as a function of wind speed, with symbol color indicating DMS_{sw}
64 RSD (see main text). Colourbar axis restricted to 0.5 to highlight larger RSD values. Maximum value =
65 2.77.
66