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High summertime aerosol organic functional group concentrations from marine and seabird sources at Ross Island, Antarctica, during AWARE

Jun Liu et al.

Correspondence to: Lynn M. Russell (lmrussell@ucsd.edu)

Figures

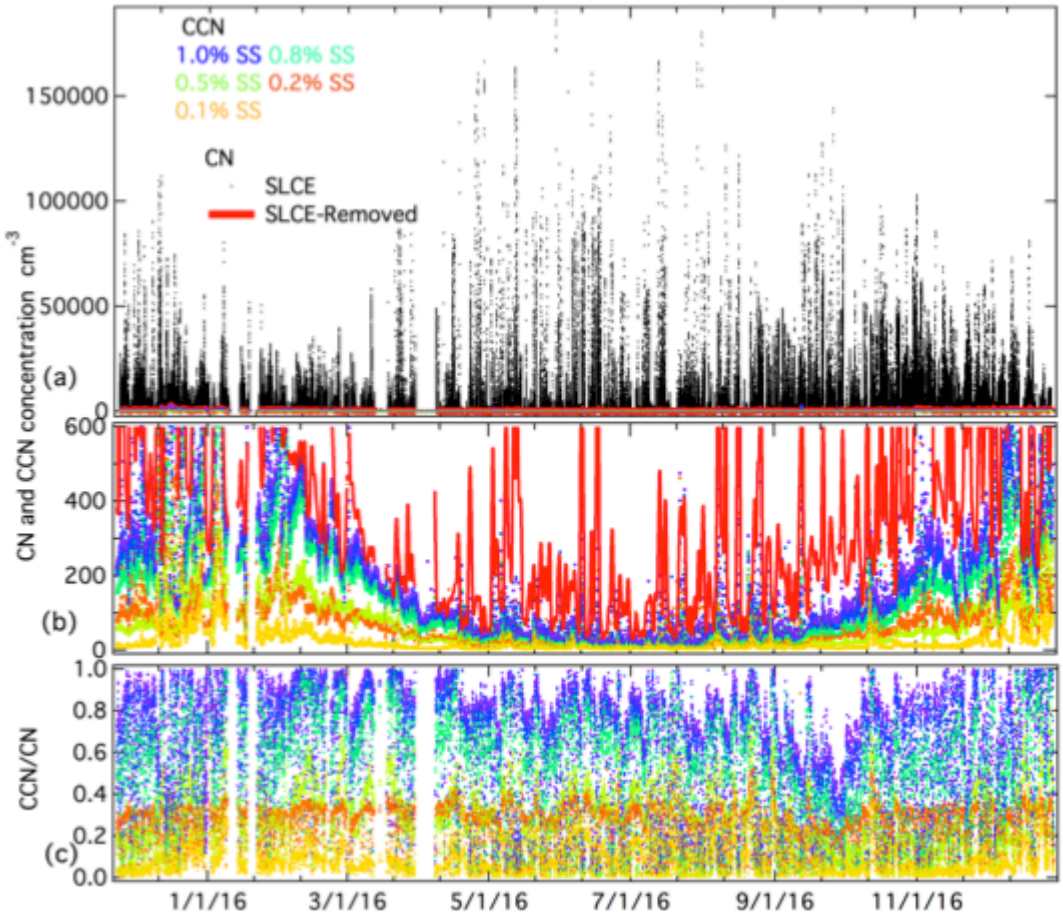

Figure S1. Concentrations of: (a) measured CN, (b) SLCE-removed CN and measured CCN, and (c) ratio of CCN to SLCE-removed CN.

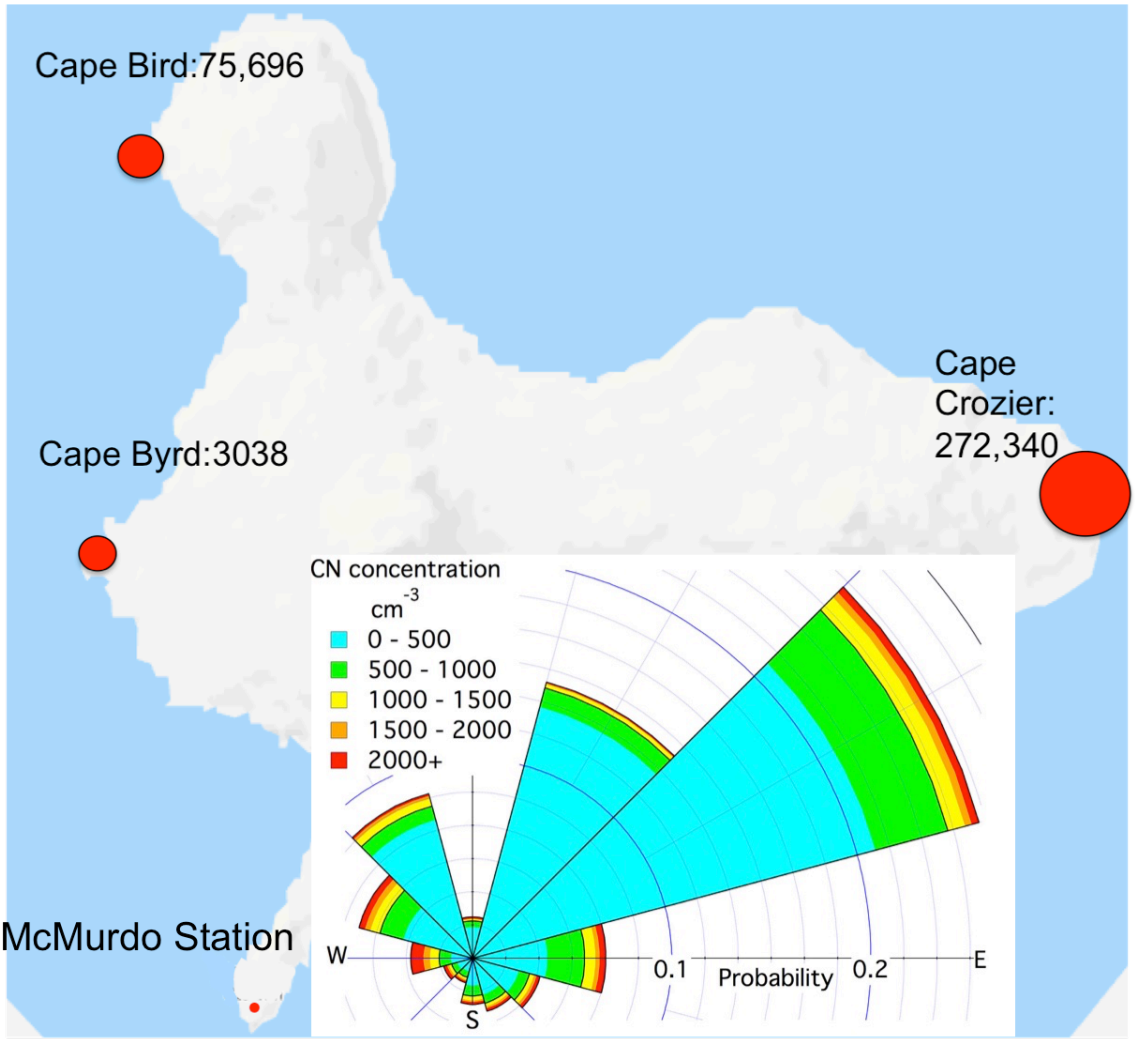

Figure S2. Map of Ross Island with McMurdo Station and penguin colonies (penguin numbers from Lyver et al., (2014)) marked on the map. Windrose of CN concentration at the Cosray site is shown on the map.

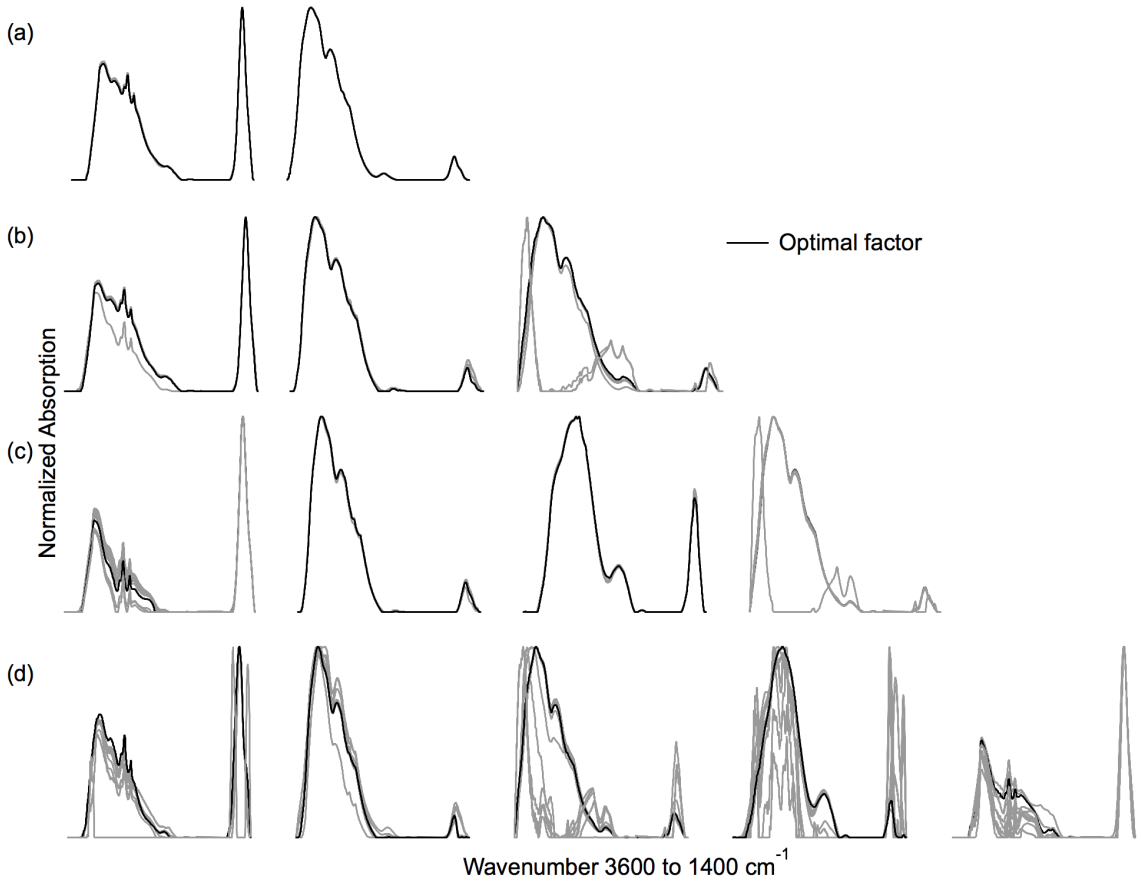

Figure S3. FTIR PMF factors in 2 to 5 factor and -2 to 2 fpeak spaces

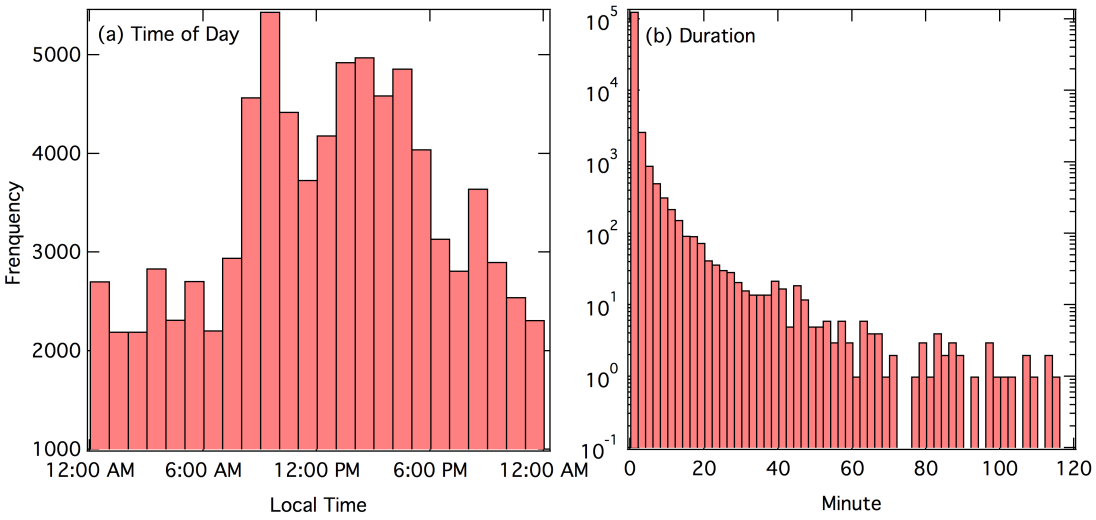

Figure S4. Frequency distribution of SLCE with (a) Time of day, and (b) Duration.

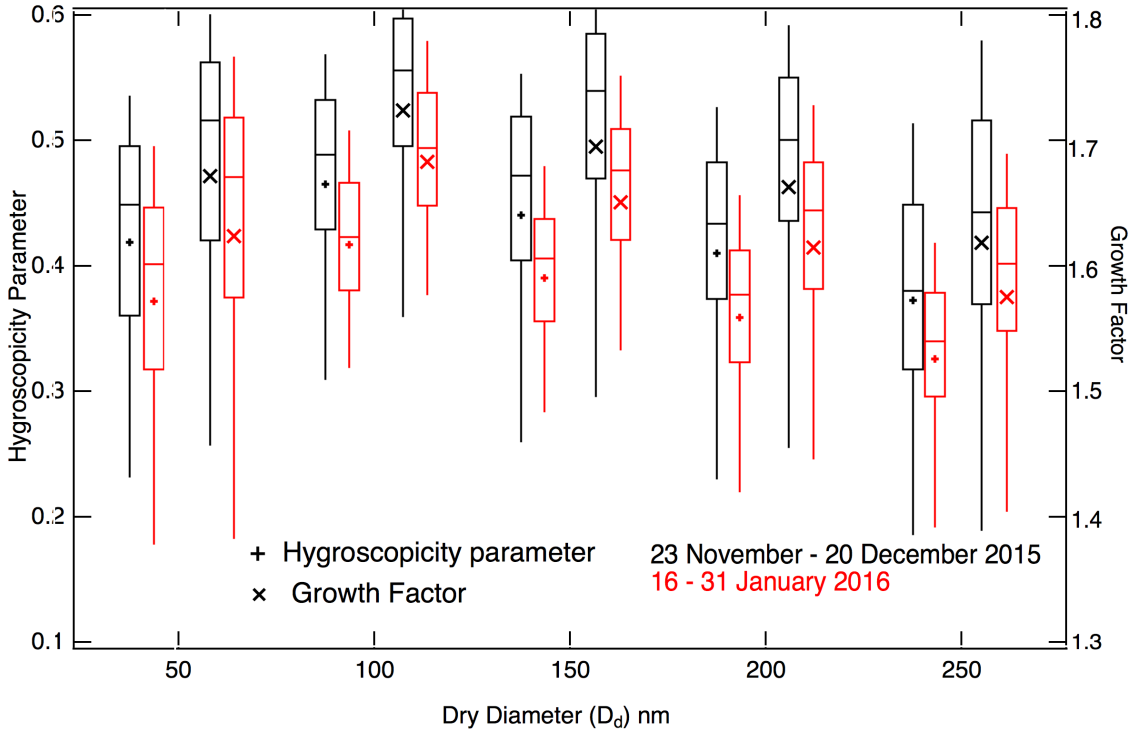

Figure S5. Distribution of growth factor and hygroscopcity parameter κ in the two measurement periods from HTDMA. 5th, 25th, 50th, 75th and 90th percentiles are shown by the boxes and whiskers. Means are shown by the markers.

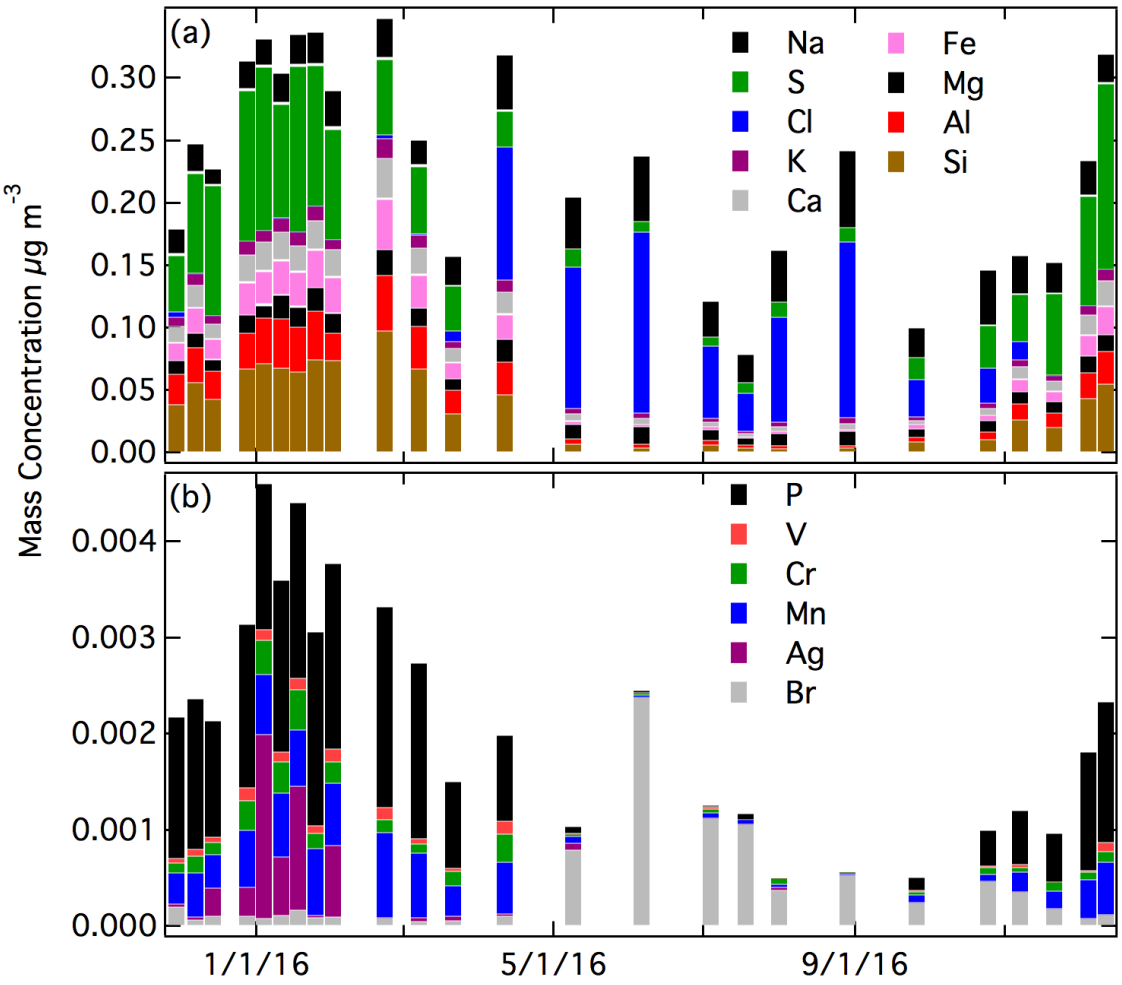

Figure S6. Elemental mass concentration from XRF.

Tables

Table S1. Marine amino acid measurements

Study	Year	Location	Season	Type	Particle Size	Amino Acid Concentration		
						Free dissolved ng m^{-3}	Combined ng m^{-3}	Total ng m^{-3}
Mace et al. 2003b	2000	Erdemli (Mediterranean coast), Turkey	Spring	Marine	TSP	33.8 (3.65–102)	–	–
Wedyan and Preston, 2008	2003	Atlantic Ocean (cruise)	Spring	Marine	TSP	1.83 (0.27–9.13)	9.13 (1.83–36.5)	–
Kuznetsova et al. 2005	2003	Ligurian Sea (NW Mediterranean Sea)	Spring	Marine	TSP	–	–	225.88
Shi et al. 2010	2006	Qingdao (Coastal China)	Spring	Marine	TSP	214	–	–
	2005	outh China Sea (cruise)	Spring			44.5	–	–
	2005 -2006	Yellow Sea (cruise)	Spring			131	–	–
Matsumoto et al. 2005	2000	Western Pacific Ocean (cruise)	Spring Summer	Marine	TSP	0.98 (0.14–2.81)	–	–
Mace et al. 2003a	2000	Cape Grim, Tasmania, Australia	Spring	Marine	TSP	8.74 (1.83–20.0)	–	–
Mandalakis et al. 2011	2007	Finokalia, Crete island, Greece	Summer	Marine	TSP	23.6 (0.82–88.7)	98.4 (34.8–215)	–
Violaki et al. 2010	2007	Finokalia, Crete island, Greece	Summer Autumn	Marine	PM_1	45.6 –	–	–
Scalabrin et al. 2012	2010	Svalbard Islands, Norway	Summer	Polar (Arctic)	PM_{10}	0.23 (0.02–0.52)	–	–
					$PM_{0.5}$	0.15 (0.02–0.43)	–	–
Barbaro et al. 2015	2010 2011	Faraglione Camp, Antarctica	Summer	Polar (Antarctica)	PM_{10}	1.51	–	–
					PM_1	1.55		
	2010 -2011	Ross Sea (cruise)			TSP	0.48 (0.27–1.64)	–	–
	2011 2012	Dome C Station, Antarctic plateau			PM_{10}	0.11	–	–
	2012 2013	Dome C Station, Antarctic plateau				0.1		

Assuming an average amino acid molecular weight of 136.9 $g.mol^{-1}$

Assuming an average amino acid nitrogen number of 1.

Table S2. Parameters for FTIR PMF factor and K-means clustering evaluation.

Number of Factors / Criteria	2	3	4	5	6
Q/Q_{exp}	7.06	6.02	4.75	3.90	3.25
Absolute residual	23.6%	21.7%	17.4%	14.2%	12.0%
Temporal correlation factor strength (r>0.8)	None	None	None	None	None
Number of similar factor spectra (Cosine similarity>0.8)	None	1 pair	1 pair	2 pairs	4 pairs
Factors with less than 10% OM	None	None	None	1	1
Number of similar cluster centroids (Cosine similarity>0.95)	None	1 pair	3 pairs	4 pairs	6 pairs