AGU PUBLICATIONS

Year-round characterization of source and optical properties of Arctic organic carbon aerosols in the North Slope Alaska

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Introduction

Table S1 lists all composites used for radiocarbon analysis, including the samples included and the date range for the composite, the back trajectory source region and the % Contemporary and % Fossil OC for each composite. Table S2 lists details of each individual sample used in the manuscript including dates, OC conc. and unc., WSOC conc. and unc., and MAE, AAE, and the season during which the samples was collected. Figures S1-S3 show regression analysis of EC concentrations vs. OC, WSOC, and WIOC. Figure S4 shows regression analysis of WSOC and OC. Figure S5 shows the WSOC and MAE_{365} trends for the sampling campaign. Figure S6 shows the WSOC absorption spectra for selected samples from each season. Figure S7 shows the plot of ln α/ρ vs. ln λ used in the AAE calculations.

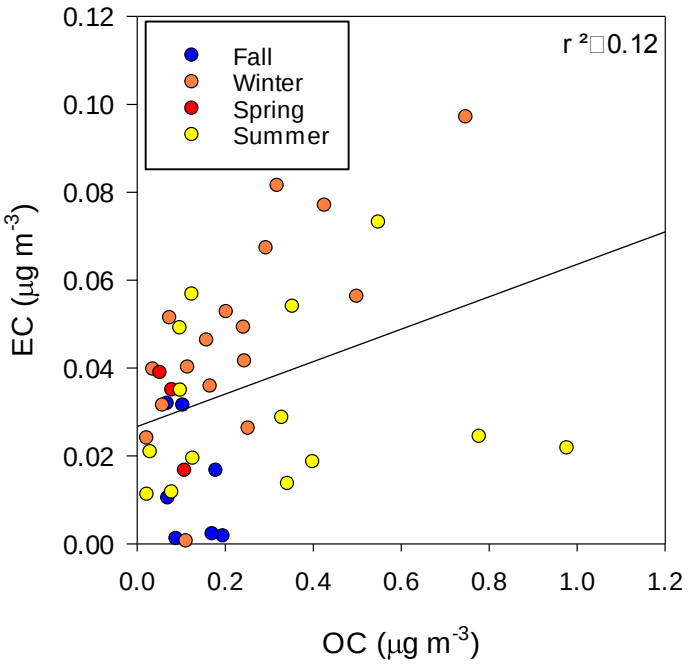

Figure S1: Regression of organic carbon (OC) and elemental carbon (EC) for Barrow, AK.

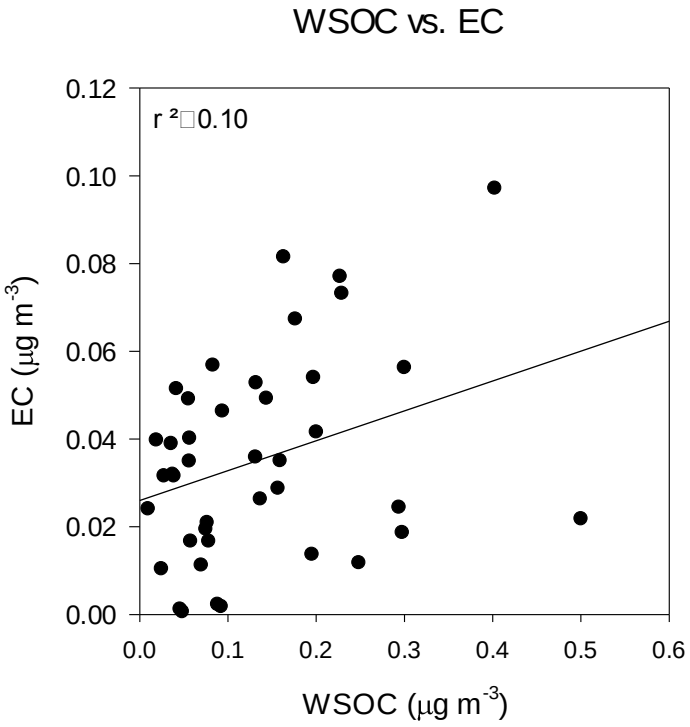

Figure S2: Regression of water-soluble organic carbon (WSOC) and elemental carbon (EC) for Barrow, AK.

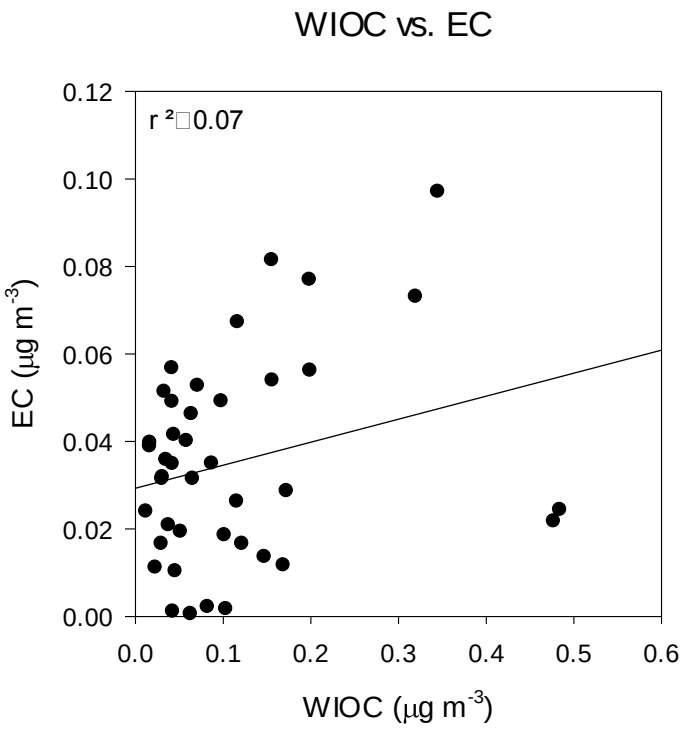

Figure S3: Regression of water-insoluble organic carbon (WIOC) and elemental carbon (EC) for Barrow, AK.

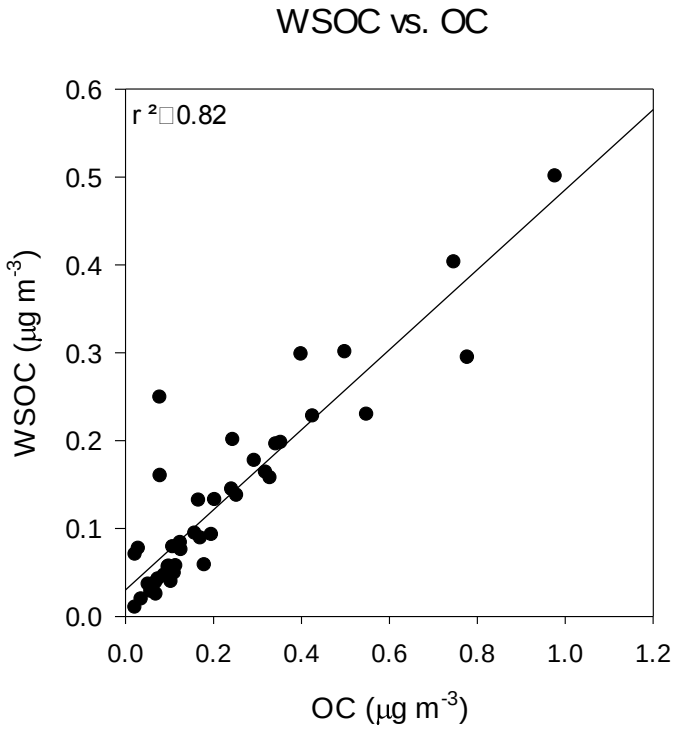

Figure S4: Regression of organic carbon (OC) and water-soluble organic carbon (WSOC) for Barrow, AK.

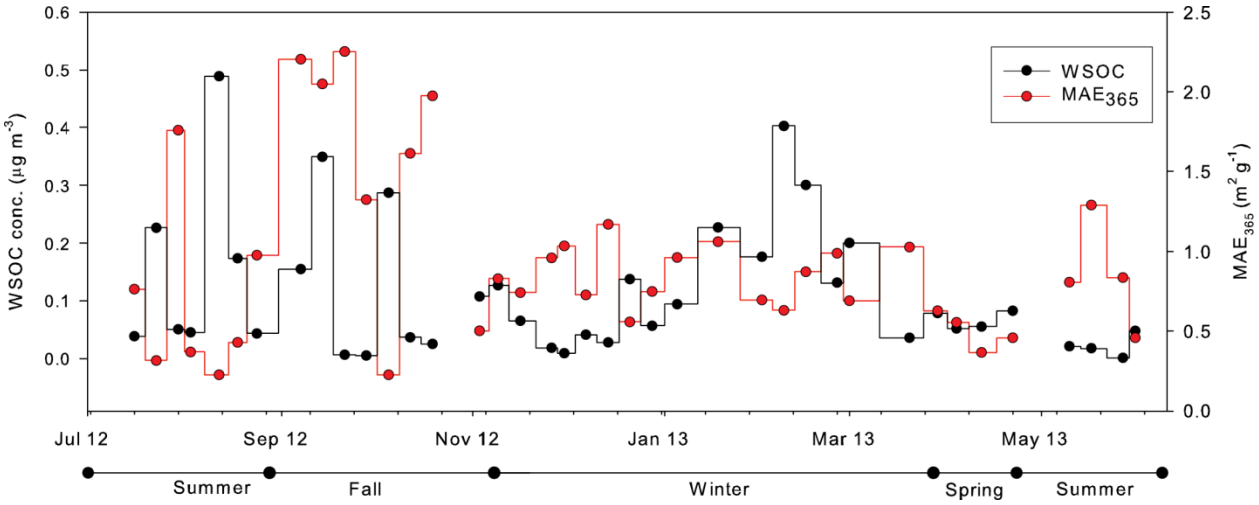

Figure S5: Water-soluble organic carbon (WSOC) and mass absorption efficiency at 365 nm (MAE_{365}) timeline for the duration of the sampling campaign.

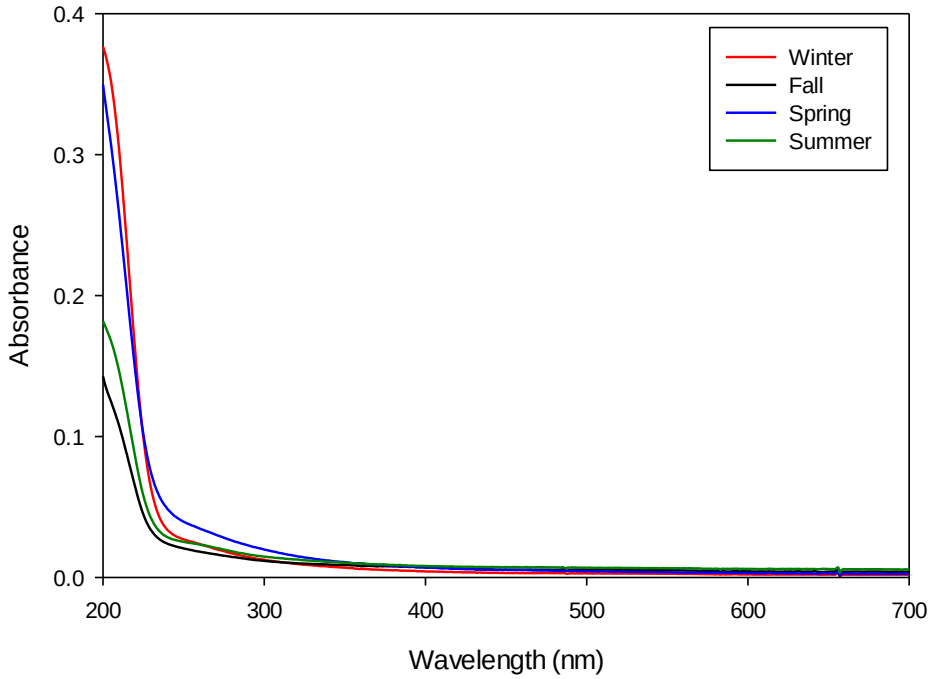

Figure S6: Example absorption spectra for WSOC extracts from each season.

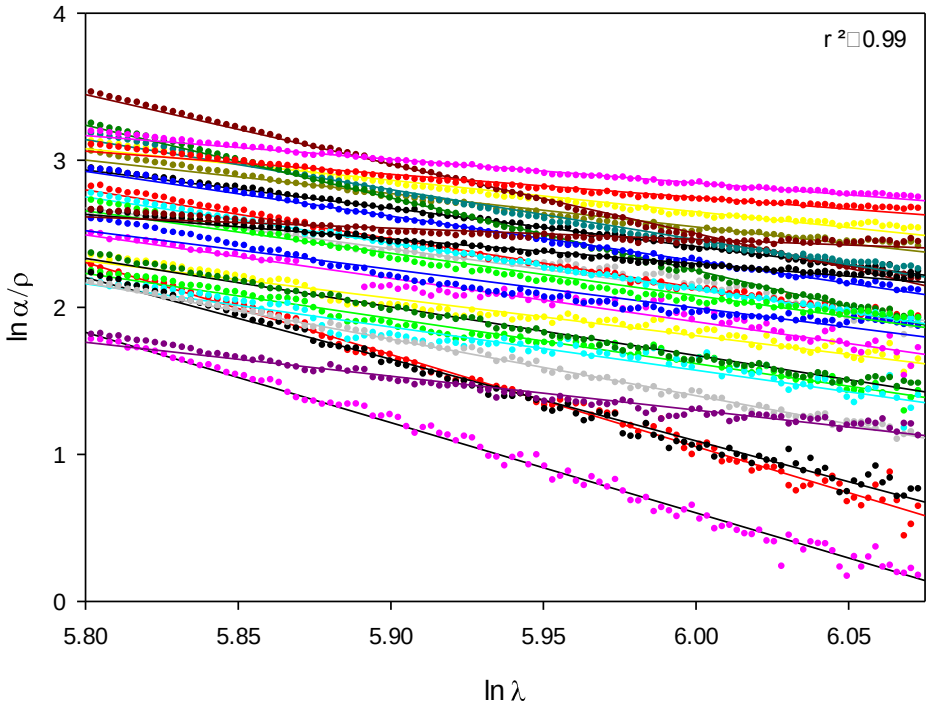

Figure S7: plot of ln α/ρ vs. ln λ used in AAE calculation.

Table S1: Composites, samples included, date ranges, back trajectory source regions and contemporary and fossil contributions to OC for each composite.

Composite	Samples Included	Date Range	Back Trajectory Source Regions	% Contemporary OC	% Fossil OC
Summer 1	PM10-005 PM10-008	7/16-7/23/12, 8/3-8/12/12	Russian Arctic, Western Alaska	66.7 ± 9.8%	33.3 ± 9.8%
Summer 2	PM10-006 PM10-007 PM10-009 PM10-010 PM10-011	7/23-8/3/12, 8/12-8/31/12	Russian Arctic, Western Alaska, Arctic Ocean, Canadian Arctic	78.8 ± 9.8%	21.2 ± 9.8%
Fall 1	PM10-014#2 PM10-015 PM10-017 PM10-018	9/21-10/5/12, 10/12-10/26/12	Russian Arctic, Western Alaska, Arctic Ocean, Canadian Arctic	38.6 ± 9.8%	61.4 ± 9.8%
Winter 1	PM10-020 PM10-021 PM10-022	11/3-11/26/12	Russian Arctic, Alaskan Arctic, Arctic Ocean	59.5 ± 9.8%	40.5 ± 9.8%
Winter 2	PM10-023 PM10-024 PM10-025 PM10-026	11/26-12/21/12	Russian Arctic, Alaskan Arctic, Arctic Ocean, Canadian Arctic	55.6 ± 9.8%	44.4 ± 9.8%
Spring 1	PM10-038 PM10-040	3/20-3/29/13, 4/4-4/12/13	Russian Arctic, Canadian Arctic, Arctic Ocean	68.9 ± 9.8%	31.1 ± 9.8%
Summer 3	PM10-041 PM10-042	4/12/-4/26/13	Russian Arctic, Western Alaska, Arctic Ocean	60.1 ± 9.8%	39.9 ± 9.8%
Summer 4	PM10-045 PM-046	5/10-5/24/13	Russian Arctic, Western Alaska, Arctic Ocean, Canadian Arctic	78.3 ± 9.8%	21.7 ± 9.8%
Summer 5	PM10-048 PM10-049	5/27-6/4/13	Western Alaska, Alaskan Arctic	60.4 ± 9.8%	39.6 ± 9.8%

Table S2: Organic Carbon, water-soluble organic carbon concentrations, mass absorption efficiency (MAE_{365}), and absorbing Angstrom exponents (AAE) for samples collected during the sampling campaign. * indicates data not available for this sample. Comp. indicates the composite in which the sample is included.

Sample ID	Start Date	End Date	OC (ug/m^3)	OC unc.	WSOC (ug/m^3)	WSOC unc.	MAE ($m2\ g^{-1}$)	AAE	Season	Comp.
BRW-PM10-003	6/29/12	7/6/12	0.29	0.027	0.22	0.022	*	*	Summer	N/A
BRW-PM10-005	7/16/12	7/23/12	0.091	0.037	0.04	0.004	0.76	2.67	Summer	Summer 1
BRW-PM10-006	7/23/12	7/30/12	0.392	0.021	0.23	0.023	0.31	6.16	Summer	Summer 2
BRW-PM10-007	7/30/12	8/3/12	0.081	0.014	0.05	0.005	1.76	3.14	Summer	Summer 2
BRW-PM10-008	8/3/12	8/12/12	0.081	0.024	0.05	0.005	0.37	2.73	Summer	Summer 1
BRW-PM10-009	8/12/12	8/18/12	0.949	0.056	0.49	0.049	0.22	6.37	Summer	Summer 2
BRW-PM10-010	8/18/12	8/24/12	0.453	0.050	0.17	0.017	0.43	4.17	Summer	Summer 2
BRW-PM10-011	8/24/12	8/31/12	0.089	0.026	0.04	0.004	0.97	5.18	Summer	Summer 2
BRW-PM10-013	9/7/12	9/14/12	0.275	0.012	0.16	0.016	2.20	2.97	Fall	N/A
BRW-PM10-014	9/14/12	9/21/12	0.703	0.020	0.35	0.035	2.05	2.39	Fall	N/A
BRW-PM10-014#2	9/21/12	9/28/12	0.018	0.008	0.01	0.001	2.25	3.26	Fall	Fall 1
BRW-PM10-015	9/28/12	10/5/12	0.008	0.010	0.01	0.001	1.32	4.73	Fall	Fall 1
BRW-PM10-016	10/5/12	10/12/12	0.527	0.017	0.29	0.029	0.23	3.74	Fall	N/A
BRW-PM10-017	10/12/12	10/19/12	0.109	0.018	0.04	0.004	1.61	2.61	Fall	Fall 1
BRW-PM10-018	10/19/12	10/26/12	0.066	0.010	0.03	0.003	1.97	1.43	Fall	Fall 1
BRW-PM10-020	11/3/12	11/9/12	0.161	0.016	0.11	0.011	0.50	3.6	Winter	Winter 1
BRW-PM10-021	11/9/12	11/16/12	0.207	0.020	0.13	0.013	0.83	9.59	Winter	Winter 1
BRW-PM10-022	11/16/12	11/26/12	0.125	0.024	0.07	0.007	0.74	2.7	Winter	Winter 1
BRW-PM10-023	11/26/12	11/30/12	0.036	0.004	0.02	0.002	0.96	6.2	Winter	Winter 2
BRW-PM10-024	11/30/12	12/7/12	0.022	0.002	0.01	0.001	1.03	6.63	Winter	Winter 2
BRW-PM10-025	12/7/12	12/14/12	0.075	0.006	0.04	0.004	0.73	6.06	Winter	Winter 2
BRW-PM10-026	12/14/12	12/21/12	0.058	0.005	0.03	0.003	1.17	3.62	Winter	Winter 2
BRW-PM10-027	12/21/12	12/28/12	0.253	0.021	0.14	0.014	0.56	3.46	Winter	N/A
BRW-PM10-028	12/28/12	1/5/13	0.115	0.008	0.06	0.006	0.75	2.6	Winter	Individual
BRW-PM10-029	1/5/13	1/18/13	0.158	0.016	0.09	0.009	0.96	9.22	Winter	N/A
BRW-PM10-030	1/18/13	1/25/13	0.426	0.027	0.23	0.023	1.06	5.01	Winter	Individual
BRW-PM10-032	2/1/13	2/8/13	0.293	0.018	0.18	0.018	0.69	3.87	Winter	Individual
BRW-PM10-033	2/8/13	2/15/13	0.748	0.045	0.40	0.040	0.63	5.21	Winter	Individual
BRW-PM10-034	2/15/13	2/25/13	0.499	0.038	0.30	0.030	0.87	3.3	Winter	N/A
BRW-PM10-035	2/25/13	3/1/13	0.166	0.015	0.13	0.013	0.99	1.83	Winter	Individual
BRW-PM10-036	3/1/13	3/11/13	0.244	0.018	0.20	0.020	0.69	3.3	Winter	Individual
BRW-PM10-038	3/20/13	3/29/13	0.052	0.005	0.04	0.004	1.03	3.96	Spring	Spring 1
BRW-PM10-039	3/29/13	4/4/13	0.108	0.011	0.08	0.008	0.63	2.84	Spring	N/A
BRW-PM10-040	4/4/13	4/12/13	0.079	0.018	0.05	0.005	0.55	1.92	Spring	Spring 1
BRW-PM10-041	4/12/13	4/22/13	0.097	0.006	0.06	0.006	0.37	3.54	Summer	Summer 3
BRW-PM10-042	4/22/13	4/26/13	0.125	0.011	0.08	0.008	0.46	1.62	Summer	Summer 3
BRW-PM10-045	5/10/13	5/17/13	0.030	0.012	0.02	0.002	0.80	1.35	Summer	Summer 4

BRW-PM10-046	5/17/13	5/24/13	0.022	0.011	0.02	0.002	1.29	1.94	Summer	Summer 4
BRW-PM10-049	5/31/13	6/4/13	0.079	0.032	0.05	0.005	0.46	1.39	Summer	Summer 5