

Table S1. Concentrations of 2 min averaged absolute WSOC, levoglucosan, mannosan, galactosan, and potassium for each plume directly sampled by the fraction collector system. Also included is the average altitude for each plume as well as estimated time since emission and Modified Combustion Efficiency (MCE) determined from the AFTIR measurements when available. ND = not detected and NA = not applicable

Date and Time (LT)	WSOC ($\mu\text{g C/m}^3$)	Levoglucosan ($\mu\text{g/m}^3$)	Mannosan ($\mu\text{g/m}^3$)	Galactosan ($\mu\text{g/m}^3$)	Potassium ($\mu\text{g/m}^3$)	Altitude (m)	Time Since Emission (h)	MCE (g C/g C)
10/30/11 12:42:18 – 12:44:18	6.08	2.04	0.60	0.20	0.54	590.12		
10/30/11 12:52:18 – 10:54:18	7.36	1.75	0.60	0.22	0.52	304.43		
10/30/11 12:58:18 – 13:00:18	6.32	2.66	0.77	0.27	0.66	321.80		
10/30/11 13:02:18 – 13:04:18	16.71	8.10	1.89	0.62	0.72	308.02		
10/30/11 13:06:18 – 13:08:18	28.27	13.83	3.10	0.96	0.52	249.70		
10/30/11 13:10:18 – 13:12:18	10.30	3.23	0.82	0.31	ND	280.45		0.96
10/30/11 13:14:18 – 13:16:18	24.54	11.21	2.43	0.79	0.44	218.53		
10/30/11 13:18:18 – 13:20:18	32.29	14.57	3.19	1.02	0.46	227.58		
10/30/11 13:22:18 – 13:24:18	13.21	3.80	0.96	0.36	0.34	250.43		
10/30/11 13:26:18 – 13:28:18	8.67	1.89	0.63	0.25	2.34	417.38		
10/30/11 13:30:18 – 13:32:18	13.86	5.18	1.21	0.43	0.12	569.80		
10/30/11 13:42:18 – 13:44:18	22.62	8.40	2.00	0.69	0.20	291.52		0.93
10/30/11 13:44:18 – 13:46:18	43.69	13.60	3.11	1.08	ND	273.89		
10/30/11 13:48:18 – 13:50:18	8.82	3.30	0.84	0.34	0.12	281.85		0.88
10/30/11 16:55:40 – 16:57:40	53.82	26.25	5.49	2.68	NA	240.30		
10/30/11 17:05:40 – 17:07:40	3.51	1.04	0.35	0.22	ND	409.28		

11/1/11 12:10:18 – 12:12:18	40.38	13.85	2.80	0.82	0.86	269.48	0.02	0.93
11/1/11 12:12:18 – 12:14:18	80.85	28.57	5.69	1.56	3.19	307.93	0.02	0.90
11/1/11 12:18:18 – 12:20:18	74.14	24.98	5.42	1.53	1.01	297.43		
11/1/11 12:30:18 – 12:32:18	22.43	5.45	1.08	0.34	0.67	397.02		
11/1/11 12:40:18 – 12:42:18	22.66	8.05	1.56	0.48	0.49	643.72	0.03	0.87
11/1/11 12:42:18 – 12:44:18	45.75	12.07	2.41	0.72	0.70	685.25	0.06	0.90
11/1/11 12:48:18 – 12:50:18	29.83	11.00	2.18	0.67	0.86	958.52	0.13	0.92
11/1/11 12:52:18 – 12:54:18	28.93	8.98	1.76	0.54	0.47	1053.30		
11/1/11 13:02:18 – 13:04:18	5.04	1.16	0.16	0.10	0.61	703.53		
11/1/11 13:14:18 – 13:16:18	15.02	3.64	0.64	0.20	0.38	487.93		
11/1/11 13:16:18 – 13:18:18	14.96	4.31	0.77	0.23	0.40	486.98	0.72	
11/1/11 13:18:18 – 13:20:18	10.86	3.22	0.60	0.18	0.67	478.93	1.22	
11/1/11 13:36:18 – 13:38:18	5.92	1.33	0.19	0.07	0.38	1238.35	1.54	
11/1/11 13:56:18 – 13:58:18	23.22	11.03	2.19	0.72	0.49	494.98	0.09	0.77
11/1/11 14:12:18 – 14:14:18	37.67	16.39	3.18	0.91	0.85	944.40	0.04	0.93
11/1/11 14:20:18 – 14:22:18	5.66	2.73	0.35	ND	0.44	1684.88	0.07	0.93
11/1/11 14:32:18 – 14:34:18	3.48	1.18	0.10	ND	0.32	1183.07		
11/1/11 14:48:18 – 14:50:18	4.23	1.64	0.17	ND	0.67	368.12		0.98
11/1/11 14:50:18 – 14:52:18	1.74	0.42	ND	ND	0.78	294.02		

11/2/11 13:07:46 – 13:09:46	13.14	4.81	1.22	0.49	1.29	618.85		
11/2/11 13:29:46 – 13:31:46	15.30	4.70	1.21	0.47	2.26	349.10		0.92
11/2/11 13:31:46 – 13:33:46	30.08	9.19	2.23	0.73	2.42	264.32		
11/2/11 13:41:46 – 13:43:46	15.87	5.11	1.09	0.46	1.43	595.72		
11/2/11 14:09:46 – 14:11:46	42.08	15.16	3.35	1.12	ND	421.67		
11/2/11 14:15:46 – 14:17:46	27.86	12.77	2.72	0.99	1.43	399.45		0.88
11/2/11 14:39:46 – 14:41:46	19.06	9.40	2.06	0.76	1.55	305.38		
11/2/11 14:41:46 – 14:43:46	35.84	12.20	2.76	1.00	ND	235.32		0.94
11/2/11 15:17:46 – 15:19:46	31.61	9.84	2.03	0.81	ND	1248.65		
11/2/11 15:23:46 – 15:25:46	16.61	4.38	0.93	0.48	ND	1179.45		
11/2/11 15:31:46 – 15:33:46	36.71	9.67	2.16	0.82	1.32	1188.73		0.94
11/2/11 15:33:46 – 15:35:46	24.12	5.50	1.15	0.45	1.37	1162.23		
11/2/11 15:35:46 – 15:37:46	15.37	3.22	0.76	0.33	1.63	1169.90		0.94
11/2/11 15:41:46 – 15:43:46	34.27	14.11	3.04	1.15	1.82	1081.77		0.91
11/2/11 16:41:46 – 16:43:46	27.08	8.07	1.32	0.54	ND	304.35		0.90
11/8/11 12:28:52 – 12:30:52	5.24	1.30	0.14	0.11	1.24	406.93	0.04	0.94
11/8/11 12:30:52 – 12:32:52	6.89	1.20	0.24	0.18	0.66	133.55	0.00	0.93
11/8/11 12:38:52 – 12:40:52	30.22	7.41	1.10	0.72	2.84	130.13	0.03	0.93
11/8/11 12:56:52 – 12:58:52	25.12	5.85	1.05	0.51	1.58	121.62	0.02	0.95

11/8/11 13:02:52 – 13:04:52	14.53	3.44	0.48	0.26	2.17	96.42	0.02	0.94
11/8/11 13:10:52 – 13:12:52	26.85	8.26	1.42	0.75	3.53	139.30		
11/8/11 13:14:52 – 13:16:52	16.12	2.76	0.45	0.30	0.99	129.32	0.01	0.92
11/8/11 13:18:52 – 13:20:52	9.11	1.90	0.28	0.19	1.86	122.83		
11/8/11 13:22:52 – 13:24:52	7.23	1.60	0.25	0.23	0.88	173.30	0.01	0.94
11/8/11 13:24:52 – 13:26:52	26.71	6.13	1.14	0.59	1.19	136.88	0.03	0.94
11/8/11 13:28:52 – 13:30:52	20.29	3.71	0.56	0.32	1.38	138.68		
11/8/11 14:18:52 – 14:20:52	10.93	2.94	0.51	0.47	1.27	737.47	0.83	
11/8/11 14:44:52 – 14:46:52	4.46	1.02	0.19	0.26	1.19	423.23		
11/8/11 14:48:52 – 14:50:52	22.10	6.07	1.11	0.71	1.27	163.37	0.03	0.93
11/8/11 14:50:52 – 14:52:52	14.69	4.84	0.88	0.58	0.77	159.43	0.07	0.90
11/10/11 11:11:56 – 11:13:56	14.07	2.50	0.30	0.33	ND	252.98	0.00	0.96
11/10/11 11:15:56 – 11:17:56	13.68	2.11	0.21	0.29	0.87	256.03	0.26	0.94
11/10/11 11:25:56 – 11:27:56	9.24	1.72	0.23	0.27	0.67	314.86	0.24	0.95
11/10/11 11:31:56 – 11:33:56	10.69	1.51	0.15	0.20	1.07	307.85	0.23	0.98
11/10/11 11:35:56 – 11:37:56 ^a	8.99	0.64	0.02	0.14	0.89	314.86	0.21	0.97
11/10/11 11:45:56 – 11:47:56 ^a	7.26	0.50	ND	ND	0.76	303.89	0.44	0.99
11/10/11 11:49:56 – 11:51:46 ^a	6.70	0.54	0.04	0.17	ND	326.14	0.48	0.98
11/10/11 12:27:56 – 12:29:56 ^a	6.51	0.72	0.21	0.12	0.82	466.95	1.51	

11/10/11 12:31:56 – 12:33:56	12.14	2.21	0.40	0.28	3.09	469.09	0.28	0.80
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^aDenotes plumes from fire B during the RF09 flight.