Supplement of

Marine nitrogen fixation as a possible source of atmospheric water-soluble organic nitrogen aerosols in the subtropical North Pacific

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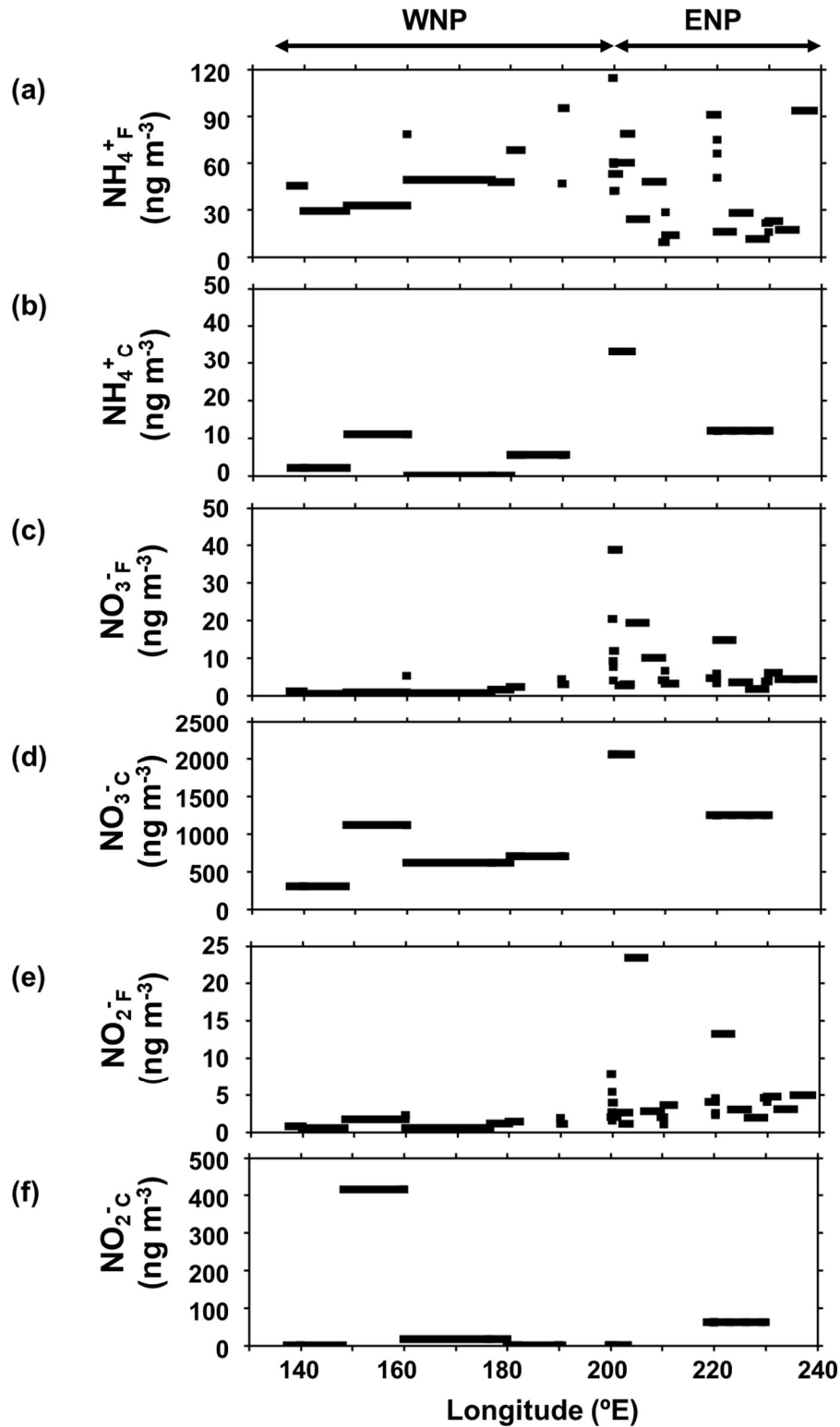
Figure S1: Longitudinal distributions of mass concentrations of (a) $NH_4^+{}_F$, (b) $NH_4^+{}_C$, (c) $NO_3^-{}_F$, (d) $NO_3^-{}_C$, (e) $NO_2^-{}_F$, and (f) $NO_2^-{}_C$ along 23°N.
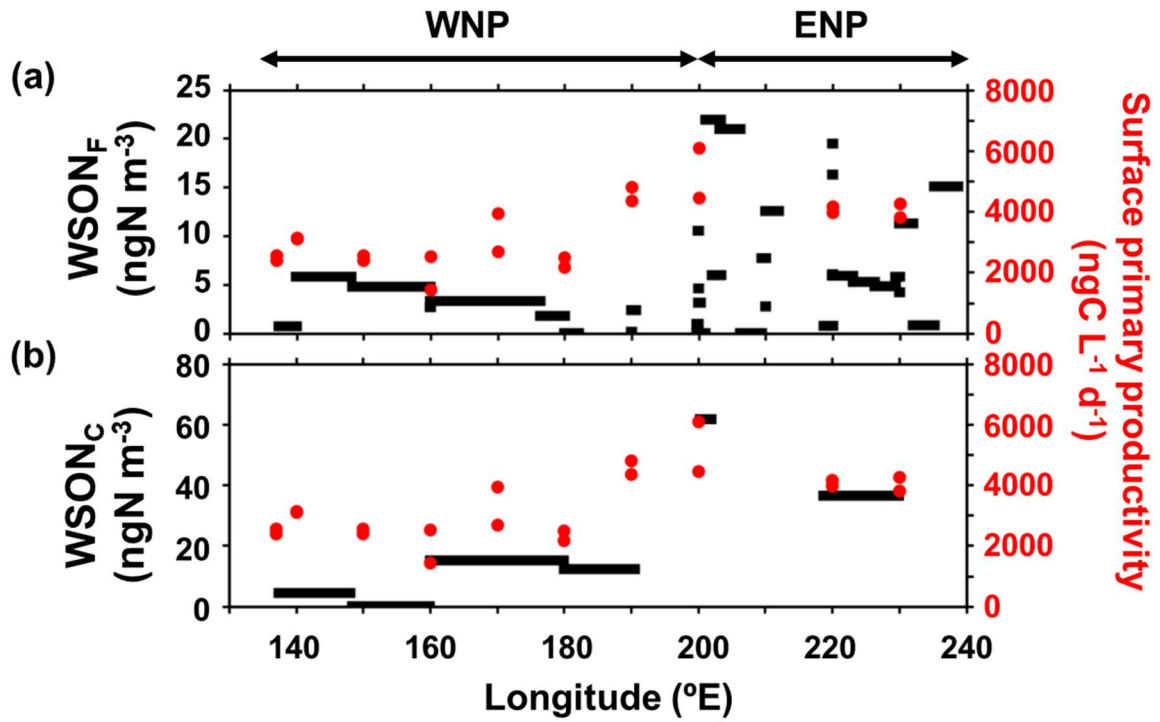
Figure S2: Longitudinal distributions of mass concentrations of (a) WSON$_F$ and (b) WSON$_C$, together with primary productivity in the SSW samples during the entire cruise.
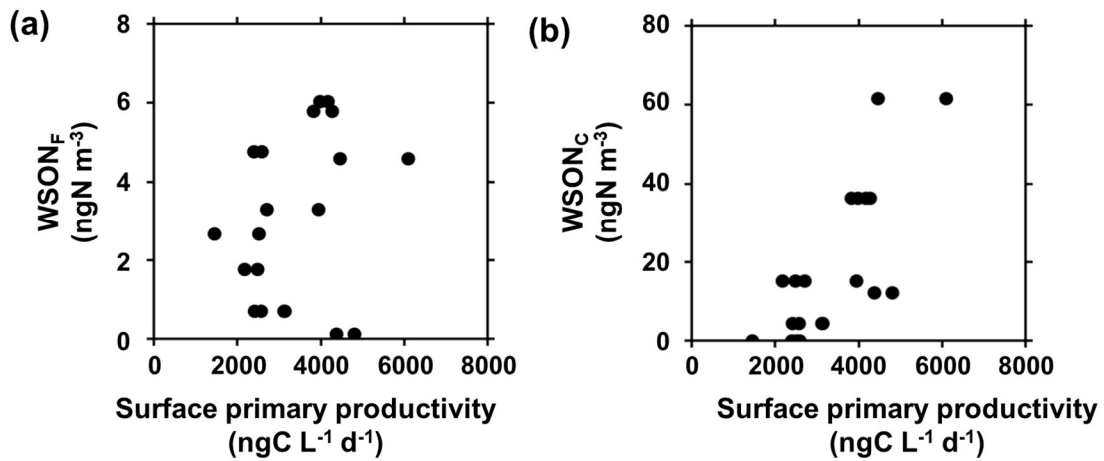
Figure S3: The mass concentrations of (a) WSON$_F$ and (b) WSON$_C$ as a function of primary productivity in SSW.

Table S1: The data of fine particles analysed in this study.

Sample ID	Start Date (UTC)	Start Time (UTC)	End Date (UTC)	End Time (UTC)	WSON (ngN m⁻³)	WSOC (ngC m⁻³)	$\delta^{13}C_{WSOC}$ (‰)	NH_4^+ (ng m⁻³)	NO_3^- (ng m⁻³)	NO_2^- (ng m⁻³)	Na^+ (ng m⁻³)	MSA (ng m⁻³)
HV3	2017/8/13	04:29	2017/8/13	15:07	19.1	16.7	LOD	98.6	35.9	3.6	58.4	94.3
HV4	2017/8/13	15:18	2017/8/14	03:04	37.1	LOD	LOD	113.6	10.8	1.7	185.2	205.3
HV5	2017/8/14	03:21	2017/8/14	15:02	22.7	25.7	LOD	124.1	0.8	1.2	141.8	202.2
HV7	2017/8/15	03:08	2017/8/15	14:53	15.6	25.0	LOD	67.9	1.1	1.5	88.7	160.4
HV8	2017/8/15	15:08	2017/8/16	02:52	18.5	11.8	LOD	62.3	5.1	0.7	63.9	176.5
HV11	2017/8/16	15:16	2017/8/17	02:56	34.5	72.1	-22.2	118.6	6.7	2.4	83.9	184.2
HV12	2017/8/17	03:39	2017/8/17	14:53	95.1	1160.3	-23.1	371.9	6.2	1.7	151.0	249.9
HV14	2017/8/17	15:10	2017/8/18	02:53	95.0	1739.7	-22.5	365.3	5.7	1.6	166.3	179.1
HV15	2017/8/18	03:07	2017/8/18	15:53	28.6	117.0	LOD	192.1	6.1	3.5	62.4	106.3
HV16	2017/8/18	16:10	2017/8/19	03:52	28.5	111.5	LOD	127.8	2.3	1.3	39.7	74.6
HV17	2017/8/19	04:16	2017/8/19	15:54	44.8	551.5	-21.6	256.4	2.9	1.6	55.0	94.1
HV18	2017/8/19	16:04	2017/8/20	03:52	12.1	311.3	-20.4	192.1	4.9	1.6	68.2	73.6
HV19	2017/8/20	04:08	2017/8/20	15:55	17.7	LOD	LOD	164.4	5.4	1.3	34.9	63.0
HV2	2017/8/20	16:10	2017/8/21	03:51	74.7	116.0	LOD	257.3	13.0	1.9	10.7	49.7
HV22	2017/8/21	16:04	2017/8/22	03:50	18.5	LOD	LOD	258.1	13.2	2.2	59.7	54.6
HV23	2017/8/22	04:08	2017/8/22	16:25	18.6	38.2	LOD	275.2	11.8	1.6	10.6	40.5
HV24	2017/8/22	16:43	2017/8/23	03:51	19.2	364.0	-18.8	292.4	9.4	4.2	22.1	62.6
HV25	2017/8/23	04:11	2017/8/23	17:09	15.1	178.4	-20.1	93.4	4.3	4.9	14.3	19.0
HV26	2017/8/23	17:20	2017/8/24	04:54	0.8	LOD	LOD	17.2	4.3	3.0	LOD	5.6
HV27	2017/8/24	05:14	2017/8/24	17:01	11.3	LOD	LOD	22.8	6.0	4.7	LOD	5.7
HV29	2017/8/24	17:18	2017/8/25	05:03	4.2	LOD	-20.2	15.8	5.1	4.0	7.3	5.1
HV31	2017/8/25	06:08	2017/8/25	16:57	5.8	51.0	-20.8	21.6	3.7	4.6	0.4	6.2
HV32	2017/8/25	17:10	2017/8/26	04:56	4.8	2.4	-21.8	11.4	1.7	1.9	LOD	5.2
HV33	2017/8/26	05:15	2017/8/26	16:59	5.3	LOD	LOD	28.0	3.5	3.0	4.9	18.4
HV34	2017/8/26	17:18	2017/8/27	05:34	5.9	LOD	LOD	16.0	14.7	13.2	9.4	10.3
HV35	2017/8/27	05:55	2017/8/27	16:53	16.3	186.9	-25.5	50.5	4.4	4.5	20.9	11.9
HV36	2017/8/27	17:05	2017/8/28	04:57	19.5	151.3	-21.6	66.0	5.8	2.2	26.4	14.3
HV37	2017/8/28	05:13	2017/8/28	17:19	6.0	99.5	-22.3	74.8	3.2	2.5	13.3	12.3
HV38	2017/8/28	17:33	2017/8/29	04:58	0.7	142.3	-21.7	90.8	4.6	4.0	4.2	26.2
HV41	2017/8/30	06:18	2017/8/30	17:53	12.5	LOD	LOD	13.8	3.1	3.6	24.6	23.9
HV42	2017/8/30	18:03	2017/8/31	05:57	2.7	LOD	LOD	28.5	6.5	1.0	62.0	19.1
HV43	2017/8/31	06:20	2017/8/31	18:00	7.7	LOD	LOD	9.3	4.0	2.0	38.8	12.0
HV44	2017/8/31	18:11	2017/9/1	06:02	LOD	LOD	-22.4	48.0	10.0	2.8	36.9	21.4
HV45	2017/9/1	06:16	2017/9/1	17:55	21.0	LOD	LOD	24.0	19.3	23.4	31.8	55.5

HV47	2017/9/2	05:42	2017/9/2	18:41	3.1	LOD	-24.2	42.2	11.8	3.9	22.3	13.0
HV48	2017/9/2	18:52	2017/9/3	05:48	LOD	LOD	-23.2	59.4	7.5	5.4	38.6	71.0
HV49	2017/9/3	06:04	2017/9/3	17:52	4.6	0.9	LOD	42.1	4.0	1.5	12.1	14.1
HV5	2017/9/3	18:04	2017/9/4	06:03	10.5	LOD	LOD	60.5	9.1	2.6	7.2	25.1
HV51	2017/9/4	06:18	2017/9/4	18:32	0.9	LOD	LOD	114.3	20.4	7.9	24.5	42.0
HV52	2017/9/4	18:42	2017/9/5	07:19	LOD	LOD	LOD	53.0	38.8	2.0	17.5	22.9
HV53	2017/9/5	07:48	2017/9/5	17:02	21.9	LOD	LOD	60.1	2.6	2.6	3.7	13.0
HV54	2017/9/5	17:22	2017/9/6	04:00	6.0	LOD	LOD	78.6	2.9	1.1	7.4	20.7
HV57	2017/9/12	20:22	2017/9/13	20:21	2.4	LOD	LOD	95.0	2.9	1.1	13.7	15.8
HV58	2017/9/13	20:41	2017/9/15	00:29	0.1	LOD	-24.2	46.8	4.3	1.9	44.4	11.6
HV6	2017/9/16	6:47	2017/9/17	08:05	LOD	9.5	-22.6	68.2	2.2	1.4	59.2	12.8
HV61	2017/9/17	09:15	2017/9/18	7:39	1.8	LOD	-24.2	47.7	1.5	1.1	33.6	16.3
HV63	2017/9/18	7:55	2017/9/22	9:57	3.3	18.3	-22.6	49.2	0.6	0.5	30.5	10.4
HV64	2017/9/22	10:48	2017/9/24	7:34	2.7	LOD	LOD	78.3	5.2	2.3	25.9	31.1
HV65	2017/9/24	7:58	2017/9/28	2:08	4.8	8.8	-23.3	32.8	0.8	1.7	13.0	6.6
HV66	2017/9/28	3:09	2017/9/29	21:08	5.8	LOD	-26.7	29.3	0.4	0.5	8.7	6.5
HV67	2017/9/29	21:20	2017/10/2	15:50	0.7	10.9	LOD	45.4	1.1	0.8	13.3	9.4
HV68	2017/10/2	16:12	2017/10/4	21:12	61.3	537.9	-23.0	424.4	92.8	3.2	558.0	22.1

Table S2: The data of coarse particles.

Sample ID	Start Date (UTC)	Start Time (UTC)	End Date (UTC)	End Time (UTC)	WSON (ngNm^{-3})	NH$_4^+$ (ng m^{-3})	NO$_3^-$ (ng m^{-3})	NO$_2^-$ (ng m^{-3})	Na$^+$ (ng m^{-3})	MSA (ng m^{-3})
HVS 9-12	2017/8/13	04:29	2017/8/17	02:56	LOD	58.8	4987.3	341.2	53950.1	1073.6
HVS 13-16	2017/8/17	03:39	2017/8/21	03:51	LOD	27.5	5938.1	58.1	16308.0	236.4
HVS 21-24	2017/8/25	06:08	2017/8/29	04:58	36.4	11.9	1249.4	61.6	5380.0	32.2
HVS 33-36	2017/9/12	20:22	2017/9/17	08:05	12.2	5.5	701.5	LOD	8372.2	25.9
HVS 37-40	2017/9/17	09:15	2017/9/22	9:57	15.1	LOD	616.0	16.5	6271.5	23.9
HVS 41-44	2017/9/22	10:48	20179/28	2:08	LOD	11.0	1118.6	415.3	7810.3	36.7
HVS 45-48	2017/9/28	3:09	2017/10/2	15:50	4.4	2.0	302.0	LOD	917.7	6.6
HVS 49-52	2017/10/2	16:12	2017/10/4	21:12	7.9	31.0	1040.7	LOD	12990.7	LOD

Table S3: The surface seawater data.

Station No.	Sampling Date and Time	Longitude (°E)	Latitude (°N)	N$_2$-fixation rate (ngN L^{-1} day^{-1})	Primary Production (ngC L^{-1} day^{-1})
7	2017/8/25 14:06	230.0	23.0	41.75	4040
8	2017/8/28 14:03	220.0	23.0	31.47	4068
10	2017/9/3 15:02	200.0	21.5	42.60	5270
11	2017/9/14 15:59	190.0	21.5	26.50	4580
12	2017/9/17 17:03	180.0	23.0	11.18	2326
13	2017/9/20 17:03	170.0	23.0	16.17	3314
14	2017/9/23 18:00	160.0	23.0	5.16	1983
15	2017/9/27 19:00	150.0	23.0	10.26	2485
16	2017/9/30 18:58	140.0	23.0	8.59	3119
17	2017/10/1 19:38	137.0	23.0	2.86	2493