Supporting Information for

Effects of sea animal colonization on the coupling between dynamics and activity of soil ammonia-oxidizing bacteria and archaea in maritime Antarctica

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Figure S1. Rarefaction curves of the ammonia oxidizing archaeal (AOA) clone libraries. OTUs are defined at 3 % divergence in nucleotides.

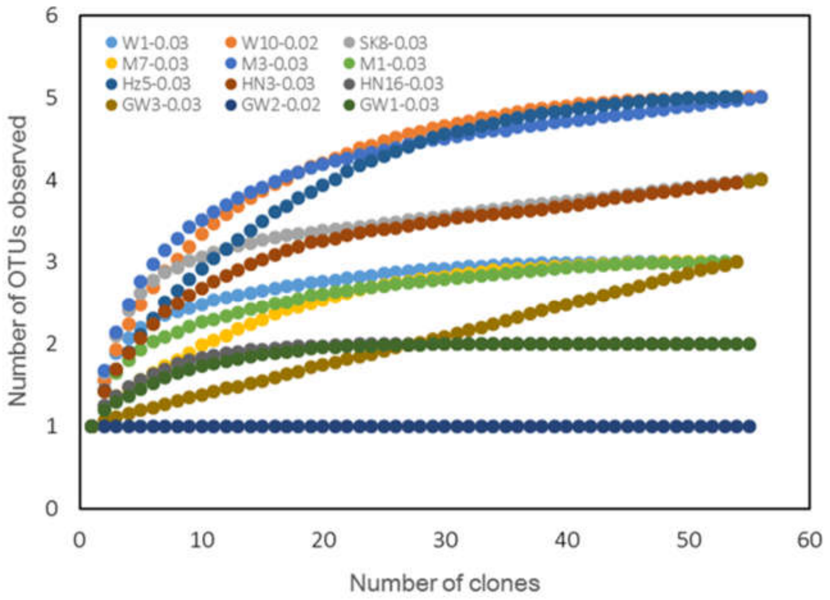

Figure S2. Rarefaction curves of the ammonia oxidizing bacterial (AOB) clone libraries. OTUs are defined at 3 % divergence in nucleotides.

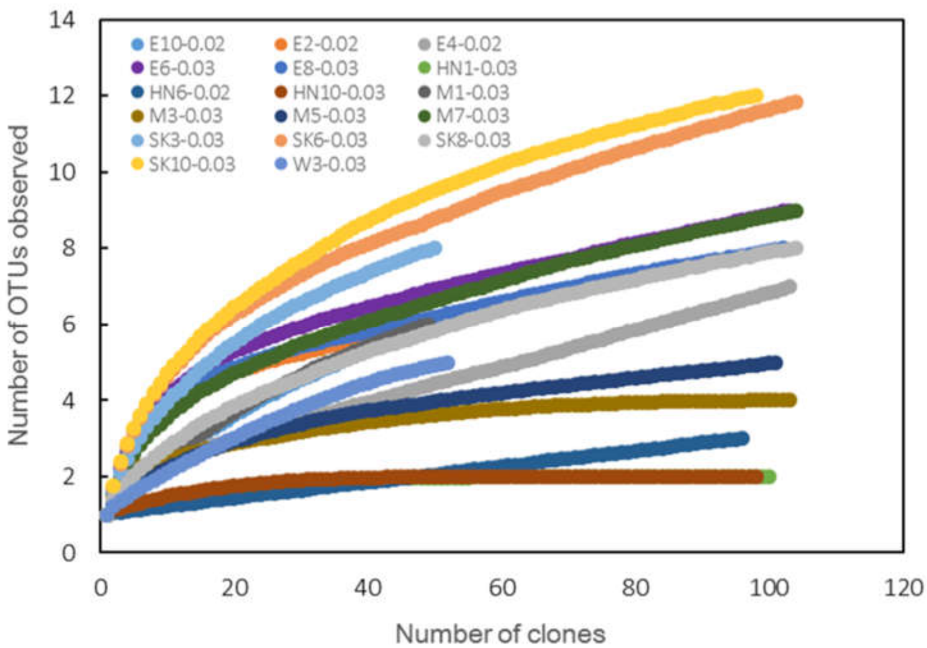

Figure S3. The consistency of the real-time PCR assay with the primers used in this study (Arch-amoAF, and Arch-amoAR for AOA, amoA-1F and amoA-2R for β-AOB) was confirmed by the strong linear inverse relationship between the threshold cycle (CT) and the log value of gene copy number for both primers sets ($r^2 > 0.99$). The amplification efficiencies were 99.83 % for AOA and 90.4 % for β-AOB. Melting curve analysis had only one observable peak at a melting temperature (Tm=84.9 °C for AOA, Tm=89.6 °C for β-AOB), no detectable peaks associated with primer-dimer artifacts or other non-specific PCR amplification products were observed.

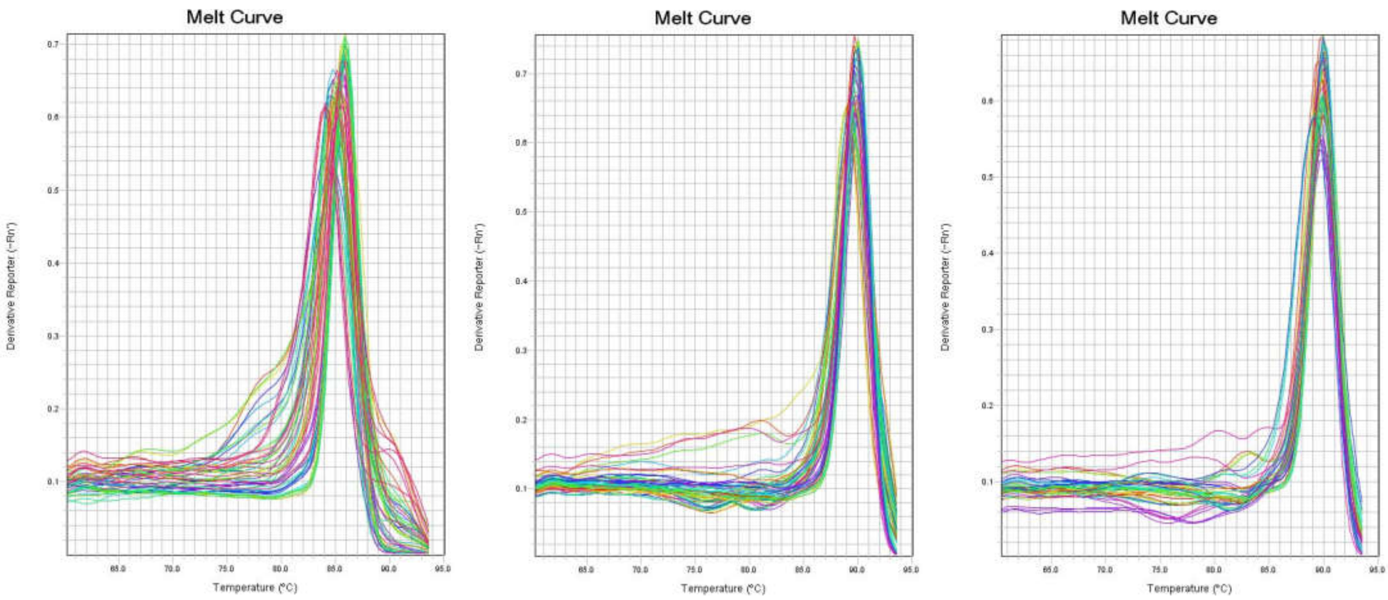

Table S1. Diversity characteristics of clone libraries of AOB and AOA.

sample	No. of clones	OTUs	Chao1	Shannon	1/Simpson	Coverage (%)
AOA						
SS4	55	5	6	1.16	2.89	83.3%
SS6	54	6	6	0.91	1.71	100.0%
PL1	54	4	4	0.75	1.67	100.0%
PL2	57	5	5	1.25	3.05	100.0%
PL4	51	3	3	0.44	1.28	100.0%
MS1	53	5	6	1.02	2.44	83.3%
MS5	56	5	5	1.10	2.32	100.0%
BS1	55	4	5	0.48	1.30	80.0%
BS2	55	1	1.00	0.00	1.00	100.0%
BS3	54	4	5	0.28	1.12	80.0%
AOB						
SS1	50	8	9.5	1.59	4.31	84.2%
SS3	107	15	25	1.82	4.23	60.0%
SS4	104	8	9	0.64	1.33	88.9%
SS5	98	15	18	2.17	6.97	83.3%
PS1	49	7	8	1.10	4.69	87.5%
PS2	103	7	9	0.77	1.68	77.8%
PS3	103	13	18	1.73	3.92	72.2%
PS4	102	13	16.3	1.77	3.89	79.6%
PS5	50	6	7.5	0.68	1.42	80.0%
PL1	49	9	11	1.55	3.69	81.8%
PL2	103	7	7	1.14	2.52	100.0%
PL3	101	7	7.5	0.78	1.51	93.3%
PL4	104	11	14	1.84	5.24	78.6%
MS2	52	7	10	1.10	2.32	70.0%

a. OTUs are defined at 3% nucleotide acid divergence.

b. Nonparametric statistical predictions of total richness of OTUs based on distribution of singletons and doubles.

c. Shannon diversity index. A higher number represents more diversity.

d. Reciprocal of Simpson's diversity index. A higher number represents more diversity.

e. Percentage of coverage: percentage of observed number of OTUs divided by Chao1 estimate.

Table S2. Correlation between soil AOA abundance and diversity and environmental factors in five tundra patches.

	AOA abundance and diversity		
	explain	F	P
C/N	**0.446**	**16.120**	**0.002**
NH_4^+-N	**0.286**	**8.013**	**0.002**
S	0.124	2.818	0.106
TOC	0.093	2.052	0.164
N	0.060	1.277	0.278
TP	0.057	1.206	0.284
NO_2^--N	0.042	0.870	0.372
pH	0.022	0.452	0.604
NO_3^--N	0.016	0.332	0.652
Moisture	0.009	0.178	0.778

Table S3. Correlation between soil AOB abundance and diversity and environmental factors in five tundra patches.

	AOB abundance and diversity		
	explain	F	P
C/N	**0.333**	**9.994**	**0.002**
TOC	**0.321**	**9.444**	**0.002**
NH_4^+-N	**0.144**	**3.366**	**0.050**
TP	0.128	2.946	**0.080**
N	0.070	1.509	0.208
NO_3^--N	0.069	1.485	0.234
Moisture	0.067	1.435	0.228
NO_2^--N	0.064	1.372	0.224
pH	0.028	0.566	0.464
S	0.023	0.469	0.552

Table S4. Correlation between soil potential nitrification rates and environmental factors in five tundra patches.

PNR and AOB/AOA			
	explain	F	P
C/N	**0.371**	**11.799**	**0.002**
NH_4^+-N	**0.297**	**8.442**	**0.002**
S	**0.237**	**6.210**	**0.018**
TOC	**0.183**	**4.467**	**0.030**
TP	**0.147**	**3.447**	**0.046**
Moisture	0.062	1.331	0.282
pH	0.017	0.350	0.658
N	0.009	0.174	0.824
NO_3^--N	0.006	0.119	0.866
NO_2^--N	0.001	0.023	0.978