Table S1. Basic information of samples.

Sample ID	Deployment	Sampling date	Depth (m)	Longitude	Latitude
NISKIN	FH14-1	2018/7/14	1152	110°10.39′E	17°11.43′N
ISMIFF-1	FH12-1	2018/7/12	1150	110°10.44′E	17°11.53′N
ISMIFF-2	FH14-2	2018/7/14	1152	110°10.39′E	17°11.43′N
ISMIFF-N	FH13-1	2018/7/14	1150	110°10.39′E	17°11.42′N
M-IN-M1	FH12-1	2018/7/12	1150	110°10.44′E	17°11.53′N
M-IN-M2	FH14-1	2018/7/14	1152	110°10.39′E	17°11.43′N
M-IN-M3	FH14-2	2018/7/14	1152	110°10.39′E	17°11.43′N
M-IN-M4	FH60-3	2022/3/21	591	110°39.987′E	17°53.374′N
M-IN-M5	FH60-4	2022/3/21	591	110°39.987′E	17°53.374′N
M-IN-M6	FH60-5	2022/3/21	591	110°39.987′E	17°53.374′N
M-IN-M7	FH60-6	2022/3/21	591	110°39.987′E	17°53.374′N
M-IN-M8	FH60-7	2022/3/21	591	110°39.987′E	17°53.374′N
M-IN-M9	FH60-8	2022/3/21	591	110°39.987′E	17°53.374′N
M-IN-M10	FH61-3	2022/3/22	598	110°39.888′E	17°53.216′N
M-IN-M11	FH61-4	2022/3/22	598	110°39.888′E	17°53.216′N
M-IN-M12	FH61-5	2022/3/22	598	110°39.888′E	17°53.216′N
M-IN-M13	FH61-6	2022/3/22	598	110°39.888′E	17°53.216′N
M-IN-M14	FH61-7	2022/3/22	598	110°39.888′E	17°53.216′N
M-IN-M15	FH62-1	2022/3/23	1130	110°48.345′E	17°50.580′N
M-IN-M16	FH62-2	2022/3/23	1130	110°48.345′E	17°50.580′N
M-IN-M17	FH62-3	2022/3/23	1130	110°48.345′E	17°50.580′N
M-IN-M18	FH62-4	2022/3/23	1130	110°48.345′E	17°50.580′N
M-IN-M19	FH62-5	2022/3/23	1130	110°48.345′E	17°50.580′N
M-IN-M20	FH63-3	2022/3/26	3102	112°59.442′E	15°20.224′N
M-IN-M21	FH63-4	2022/3/26	3102	112°59.442′E	15°20.224′N

M-IN-M22	FH63-5	2022/3/26	3102	112°59.442′E	15°20.224′N
M-IN-M23	FH63-6	2022/3/26	3102	112°59.442′E	15°20.224′N
M-IN-M24	FH63-7	2022/3/26	3102	112°59.442′E	15°20.224′N
M-IN-M25	FH63-8	2022/3/26	3102	112°59.442′E	15°20.224′N
M-IN-C1	FH12-1	2018/7/12	1150	110°10.44′E	17°11.53′N
M-IN-C2	FH14-1	2018/7/14	1152	110°10.39′E	17°11.43′N
M-IN-C3	FH60-3	2022/3/21	591	110°39.987′E	17°53.374′N
M-IN-C4	FH60-4	2022/3/21	591	110°39.987′E	17°53.374′N
M-IN-C5	FH60-5	2022/3/21	591	110°39.987′E	17°53.374′N
M-IN-C6	FH60-6	2022/3/21	591	110°39.987′E	17°53.374′N
M-IN-C7	FH61-3	2022/3/22	598	110°39.888′E	17°53.216′N
M-IN-C8	FH61-4	2022/3/22	598	110°39.888′E	17°53.216′N
M-IN-C9	FH61-5	2022/3/22	598	110°39.888′E	17°53.216′N
M-IN-C10	FH61-6	2022/3/22	598	110°39.888′E	17°53.216′N
M-IN-C11	FH63-3	2022/3/26	3102	112°59.442′E	16°20.224′N
M-IN-C12	FH63-4	2022/3/26	3102	112°59.442′E	16°20.224′N
M-IN-C13	FH63-5	2022/3/26	3102	112°59.442′E	16°20.224′N
M-IN-C14	FH63-6	2022/3/26	3102	112°59.442′E	16°20.224′N
M-IN-C15	FH63-7	2022/3/26	3102	112°59.442′E	16°20.224′N
M-IN-C16	FH63-8	2022/3/26	3102	112°59.442′E	16°20.224′N

The sampling sites are shown in Figure 1. ISMIFF-1-2 refer to RNALater preserved samples collected by MISNAC; ISMIFF-N refers to an untreated sample collected by MISNAC membrane; M-IN-M1-25 are lysed samples on the MISNAC membranes; M-IN-C1-16 represent in situ collected DNA samples on the absorption column.

Table S2. Statistics of metagenomic sequencing data and 18S miTags.

Sample ID	Total bases (Gbp)		No. 18S all regions	No. 18S V9 region	Shannon	Chao1
	Raw data	Clean data				
NISKIN	1.02	0.88	7145	785	3.59	281
ISMIFF-1	1.85	1.62	3752	403	4.01	68
ISMIFF-2	2.28	2.01	4732	582	3.97	60
ISMIFF-N	2.87	2.45	3321	802	4.54	116
M-IN-M1	5.14	4.97	17465	2553	3.63	57
M-IN-M2	3.31	3.01	18142	2728	4.81	154
M-IN-M3	2.91	2.78	10183	1874	4.79	144
M-IN-M4	7.15	6.55	15471	3081	4.54	116
M-IN-M5	3.78	3.45	17895	3432	3.59	62
M-IN-M6	2.49	2.07	39541	6701	4.95	175
M-IN-M7	2.18	1.97	3157	320	3.54	37
M-IN-M8	3.97	3.54	16523	2132	4.32	147
M-IN-M9	1.86	1.45	12549	1868	4.60	153
M-IN-M10	5.18	4.85	84973	11270	3.96	128
M-IN-M11	4.87	4.54	22536	3948	4.87	240
M-IN-M12	3.59	3.22	1187	89	3.97	72
M-IN-M13	4.76	4.39	5897	733	4.16	144
M-IN-M14	4.41	4.03	16572	1907	3.01	23
M-IN-M15	2.64	2.34	25169	3096	4.05	99
M-IN-M16	3.78	3.48	16308	2582	4.18	101
M-IN-M17	4.08	3.74	18452	2190	4.61	128
M-IN-M18	6.03	5.48	5569	642	4.30	157
M-IN-M19	3.81	3.60	6694	785	4.14	86
M-IN-M20	5.89	5.48	1854	161	4.51	135
M-IN-M21	8.18	7.68	4980	619	4.53	126
M-IN-M22	7.08	6.82	2263	329	3.90	68
M-IN-M23	4.29	3.83	7569	747	4.05	99
M-IN-M24	5.18	4.86	2815	334	3.46	133
M-IN-M25	6.13	5.72	2593	308	4.53	122
M-IN-C1	8.11	7.83	1396584	143382	4.53	190

M-IN-C2	9.65	9.05	1224876	130751	4.61	251
M-IN-C3	7.45	7.02	1548632	164833	5.07	330
M-IN-C4	6.98	6.58	187534	19405	4.04	268
M-IN-C5	6.25	5.91	142180	13818	4.44	242
M-IN-C6	6.13	5.62	21286	2742	4.41	298
M-IN-C7	3.45	3.09	37485	4000	4.45	301
M-IN-C8	5.16	4.76	462085	44487	4.21	235
M-IN-C9	6.07	5.70	325448	25971	4.74	299
M-IN-C10	5.03	4.65	41596	4089	4.12	226
M-IN-C11	9.80	9.15	1682047	165277	4.45	292
M-IN-C12	9.09	8.57	1487402	143382	4.58	255
M-IN-C13	4.18	3.75	210547	22597	4.76	183
M-IN-C14	7.64	7.20	485293	58407	4.05	180
M-IN-C15	9.18	8.71	24150	2315	4.35	224
M-IN-C16	8.41	8.02	38596	6363	4.01	172

The 18S miTags were identified and extracted from the clean reads of the metagenomes. The sample IDs are referred to Table S1.