Electronic Supplementary Material (ESI) for Metallomics.

Supplementary Material
for

Evaluation of Photo-reactive Siderophore Producing Bacteria Before, During and After a Bloom of the Dinoflagellate *Lingulodinium polyedrum*.

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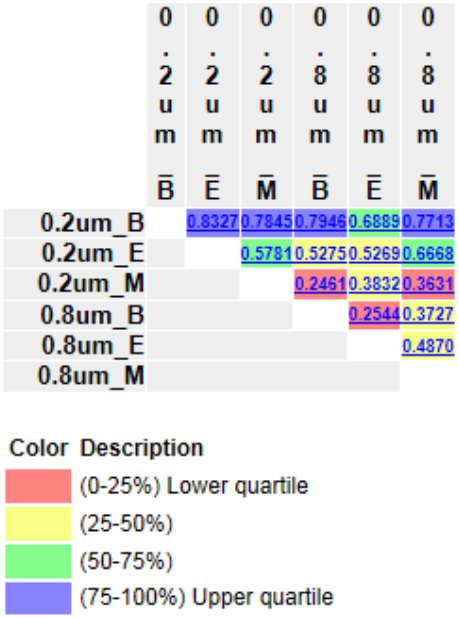
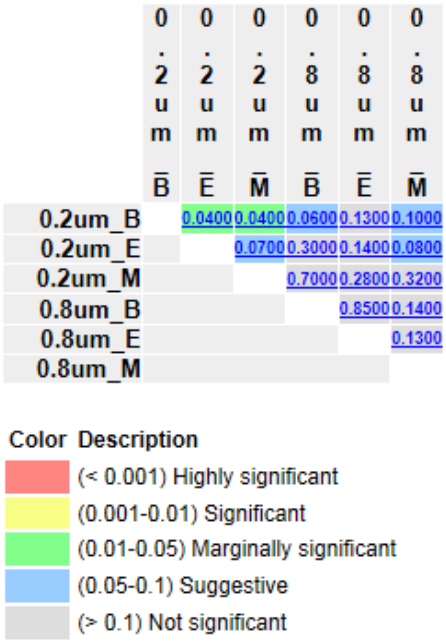
Figure S1. Environment Distance Matrix



	0.2um_B	0.2um_E	0.2um_M	0.8um_B	0.8um_E	0.8um_M
0.2um_B		0.8327	0.7845	0.7946	0.6889	0.7713
0.2um_E			0.5781	0.5275	0.5269	0.6668
0.2um_M				0.2461	0.3832	0.3631
0.8um_B					0.2544	0.3727
0.8um_E						0.4870
0.8um_M						

Color	Description
	(0-25%) Lower quartile
	(25-50%)
	(50-75%)
	(75-100%) Upper quartile

Figure S2. UniFrac Significance Test



	0.2um_B	0.2um_E	0.2um_M	0.8um_B	0.8um_E	0.8um_M
0.2um_B		0.0400	0.0400	0.0600	0.1300	0.1000
0.2um_E			0.0700	0.3000	0.1400	0.0800
0.2um_M				0.7000	0.2800	0.3200
0.8um_B					0.8500	0.1400
0.8um_E						0.1300
0.8um_M						

Color	Description
	(< 0.001) Highly significant
	(0.001-0.01) Significant
	(0.01-0.05) Marginally significant
	(0.05-0.1) Suggestive
	(> 0.1) Not significant

Figure S3. UniFrac Principal Coordinates Analysis (PCA).

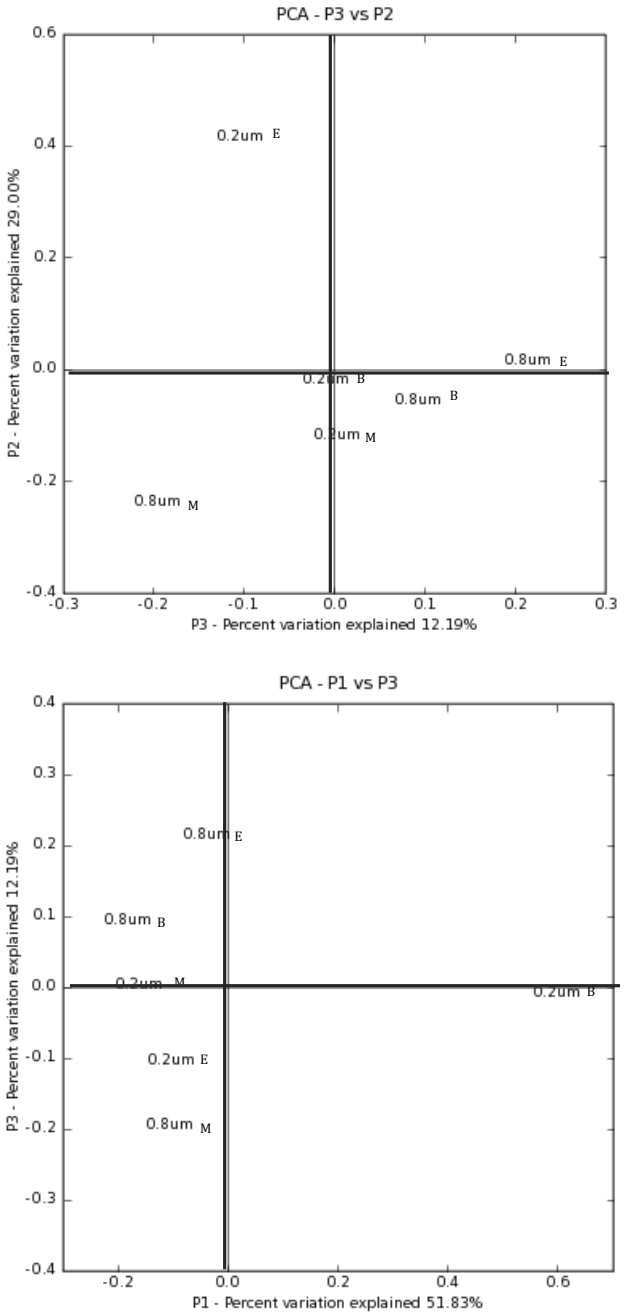


Table S1. Free-Living (0.2 μm membrane) *16S* Containing Bacteria Gene Copy Number

Time Point	Ct	SQ	Dilution Factor	SQ x Dilution Factor	SQ (filtration correction)	Gene Copy/ L	Mean Gene Copy /L*
2011/7/28	37.05	0.0062	500	3.11	5.31	1.7E+09	1.8E+09
	36.95	0.0067	500	3.33	5.69	1.8E+09	
2011/9/23	35.87	0.0134	500	6.70	17.77	5.7E+09	5.6E+09
	35.92	0.0130	500	6.50	17.24	5.5E+09	
2011/10/2	33.50	0.0620	500	31.00	65.96	2.1E+10	2.2E+10
	33.40	0.0661	500	33.05	70.32	2.3E+10	
2011/10/5	38.31	0.0028	500	1.38	2.22	7.1E+08	8.5E+08
	37.82	0.0038	500	1.90	3.05	9.8E+08	
2011/10/9	32.46	0.1220	20	2.44	4.98	1.6E+09	1.6E+09
	32.37	0.1290	20	2.58	5.27	1.7E+09	
2011/10/12	30.14	0.5470	20	10.94	17.50	5.6E+09	5.2E+09
	30.41	0.4590	20	9.18	14.69	4.7E+09	
2011/10/19	40.20	0.0008	20	0.02	0.03	8.9E+06	1.2E+07
	39.36	0.0014	20	0.03	0.05	1.5E+07	
2011/10/30	36.74	0.0076	20	0.15	0.21	6.9E+07	7.1E+07
	36.65	0.0081	20	0.16	0.23	7.3E+07	

The average dsDNA MW is assumed here to be 650 for marine bacteria. The genome size of free-living bacteria is assumed to be 1.6MB. The average genome mass of free living bacteria is thus 650 x 1.6 MB / (6.022×10^{-23}) = 1.727×10^{-6} ng/genome. For the free living fraction, there are average of 1.8 x 16S rRNA copies per genome. Thus, the gene copy number /mL sample = SQ in ng/mL / (1.727×10^{-6}) /1.8. The Gene copy number was then converted to per L (x1000).

Table S2. Particle Associated (0.8 μm membrane) *16S* Containing Bacteria Gene Copy Number

Time Point	Ct	SQ	Dilution Factor	SQ x Dilution Factor	SQ (filtration correction)	Gene Copy/ L	Mean Gene Copy /L*
2011/7/28	35.24	0.0202	500	10.10	17.25	3.0E+09	2.7E+09
	35.49	0.0171	500	8.55	14.60	2.5E+09	
2011/9/23	33.29	0.0712	500	35.60	94.40	1.6E+10	1.5E+10
	33.46	0.0638	500	31.90	84.59	1.5E+10	
2011/10/2	31.10	0.2930	500	146.50	294.68	5.1E+10	5.2E+10
	31.02	0.3080	500	154.00	309.77	5.3E+10	
2011/10/5	33.92	0.0472	500	23.60	37.96	6.5E+09	7.3E+09
	33.58	0.0591	500	29.55	47.53	8.2E+09	
2011/10/9	27.44	3.1500	50	157.50	306.25	5.3E+10	5.5E+10
	27.28	3.4900	50	174.50	339.31	5.8E+10	
2011/10/12	34.58	0.0308	50	1.54	2.46	4.2E+08	4.0E+08
	34.80	0.0268	50	1.34	2.14	3.7E+08	
2011/10/19	34.24	0.0384	50	1.92	3.27	5.6E+08	5.4E+08
	34.39	0.0349	50	1.75	2.97	5.1E+08	
2011/10/30	26.45	5.9700	50	298.50	409.47	7.0E+10	6.8E+10
	26.54	5.6100	50	280.50	384.77	6.6E+10	

The average dsDNA MW is assumed to be 650 for marine bacteria. The genome size of particle associated bacteria is 3.0 MB. The average genome mass of particle associated bacteria is thus 650 x 3.0 MB / (6.022×10^{-23}) = 3.238×10^{-6} ng/genome. For the particle associated fraction, there are average of 1.8 x 16SrRNA copies per genome. Thus, the gene copy number /mL sample = SQ in ng/mL / (3.238×10^{-6}) /1.8. The Gene copy number was then converted to per L (x1000).

Table S3. Free-Living (0.2 μm membrane) *pvsB* Containing Bacteria Gene Copy Number

Time Point	Ct	SQ	SQ (filtration correction)	Gene Copy /L	Mean Gene Copy /L*
2011/7/28	28.47	0.0281	0.0480	9.9E+06	1.0E+07
	28.43	0.0285	0.0487	1.0E+07	
	28.30	0.0299	0.0511	1.1E+07	
2011/9/23	30.43	0.0135	0.0358	7.4E+06	7.2E+06
	30.56	0.0129	0.0342	7.1E+06	
	30.53	0.0130	0.0345	7.1E+06	
2011/10/2	25.22	0.0940	0.2000	4.1E+07	4.3E+07
	25.07	0.0997	0.2121	4.4E+07	
	25.11	0.0982	0.2089	4.3E+07	
2011/10/5	29.67	0.0180	0.0290	6.0E+06	4.2E+06
	31.22	0.0101	0.0162	3.4E+06	
	31.42	0.0094	0.0151	3.1E+06	
2011/10/9	29.77	0.0173	0.0353	7.3E+06	7.1E+06
	30.15	0.0150	0.0306	6.3E+06	
	29.64	0.0181	0.0369	7.6E+06	
2011/10/12	28.34	0.0294	0.0470	9.7E+06	8.7E+06
	28.82	0.0246	0.0394	8.1E+06	
	28.79	0.0249	0.0398	8.2E+06	
2011/10/19	35.43	0.0021	0.0036	7.4E+05	4.3E+05
	38.39	0.0007	0.0012	2.5E+05	
	37.72	0.0009	0.0015	3.2E+05	
2011/10/30	36.56	0.0014	0.0019	4.0E+05	8.5E+05
	34.11	0.0034	0.0048	1.0E+06	
	33.69	0.0040	0.0056	1.2E+06	

The average dsDNA MW for DG893 is 660.. The genome size of DG893 is 4.41MB. The genome mass of DG893 is thus 660 x 4.41 MB / (6.022 x 10^{-23}) = 4.833 x 10^{-6} ng/genome. The gene copy number /mL sample = SQ in ng/mL / (4.833 x 10^{-6}). The Gene copy number was then converted to per L (x1000).

Table S4. Particle Associated (0.8 μm membrane) *pvsB* Containing Bacteria Gene Copy Number

Time Point	Ct	SQ	SQ (filtration correction)	Gene Copy/ L	Mean Gene Copy /L*
2011/7/28	24.72	0.1130	0.1930	4.0E+07	3.9E+07
	24.78	0.1110	0.1895	3.9E+07	
	24.82	0.1090	0.1861	3.9E+07	
2011/9/23	26.21	0.0651	0.1726	3.6E+07	3.5E+07
	26.26	0.0639	0.1694	3.5E+07	
	26.21	0.0650	0.1724	3.6E+07	
2011/10/2	20.99	0.4550	0.9152	1.9E+08	1.8E+08
	21.17	0.4250	0.8549	1.8E+08	
	21.21	0.4190	0.8428	1.7E+08	
2011/10/5	25.47	0.0857	0.1379	2.9E+07	2.8E+07
	25.66	0.0798	0.1284	2.7E+07	
	25.45	0.0865	0.1391	2.9E+07	
2011/10/9	22.01	0.3120	0.6067	1.3E+08	1.2E+08
	N/A	0.0000	0.0000	0.0E+00	
	22.47	0.2620	0.5094	1.1E+08	
2011/10/12	27.13	0.0463	0.0741	1.5E+07	1.2E+07
	29.58	0.0185	0.0296	6.1E+06	
	27.36	0.0424	0.0678	1.4E+07	
2011/10/19	25.62	0.0810	0.1380	2.9E+07	2.7E+07
	25.89	0.0735	0.1252	2.6E+07	
	25.89	0.0734	0.1250	2.6E+07	
2011/10/30	21.32	0.4020	0.5514	1.1E+08	1.1E+08
	21.39	0.3920	0.5377	1.1E+08	
	21.33	0.4000	0.5487	1.1E+08	

The average dsDNA MW of *DG893* is 660. The genome size of *DG893* 4.41MB. The genome mass of *DG893* is thus 660 x 4.41 MB / (6.022 x 10^{23}) = 4.833 x 10^{-6} ng/genome. The gene copy number /mL sample = SQ in ng/mL / (4.833 x 10^{-6}).The Gene copy number was then converted to per L (x1000). The red highlight is apparent outlier and eliminated from analysis. The red highlight is apparent outlier and eliminated from analysis.

Table S5. Free-Living (0.2 µm membrane) *vibXII* Containing Bacteria Gene Copy Number

Time Point	Ct	SQ	SQ (filtration correction)	Gene Copy/L	Mean Gene Copy /L*
2011/7/28	35.58	0.1210	0.2066	1.2E+08	1.2E+08
	35.31	0.1420	0.2425	1.4E+08	
	36.08	0.0893	0.1525	8.8E+07	
2011/9/23	38.65	0.0189	0.0501	2.9E+07	3.1E+07
	38.39	0.0220	0.0583	3.4E+07	
	38.54	0.0202	0.0536	3.1E+07	
2011/10/2	33.26	0.4880	1.0383	6.0E+08	6.5E+08
	33.22	0.5000	1.0638	6.2E+08	
	32.93	0.5990	1.2745	7.4E+08	
2011/10/5	38.12	0.0260	0.0418	2.4E+07	1.5E+07
	39.25	0.0131	0.0211	1.2E+07	
	39.64	0.0104	0.0167	9.7E+06	
2011/10/9	37.71	0.0333	0.0680	3.9E+07	4.4E+07
	37.39	0.0405	0.0827	4.8E+07	
	37.48	0.0382	0.0780	4.5E+07	
2011/10/12	35.28	0.1440	0.2304	1.3E+08	1.2E+08
	35.47	0.1290	0.2064	1.2E+08	
	35.64	0.1160	0.1856	1.1E+08	
2011/10/19	N/A	0.0000	0.0000	0.0E+00	0.0E+00
	N/A	0.0000	0.0000	0.0E+00	
	N/A	0.0000	0.0000	0.0E+00	
2011/10/30	39.69	0.0100	0.0140	8.1E+06	4.6E+06
	41.76	0.0029	0.0040	2.3E+06	
	41.13	0.0042	0.0059	3.4E+06	

The average dsDNA MW used here was 650 . The genome size of free-living bacteria was assumed to be 1.6MB. The average genome mass of free living bacteria is thus 650 x 1.6 MB / (6.022 x 10-23) = 1.727 x 10^{-6} ng/genome. The gene copy number /mL sample = SQ in ng/mL / (1.727 x 10^{-6}). The Gene copy number was then converted to per L (x1000). The red highlight is apparent outlier and eliminated from analysis.

Table S6. Particle Associated (0.8 µm membrane) *vibXII* Containing Bacteria Gene Copy Number

Time Point	Ct	SQ	SQ (filtration correction)	Gene Copy/ L	Mean Gene Copy /L*
2011/7/28	32.19	0.9360	1.5984	4.9E+08	4.7E+08
	32.23	0.9130	1.5591	4.8E+08	
	32.37	0.8390	1.4327	4.4E+08	
2011/9/23	32.79	0.6490	1.7209	5.3E+08	4.8E+08
	33.25	0.4940	1.3099	4.0E+08	
	32.91	0.6050	1.6042	5.0E+08	
2011/10/2	30.82	2.1300	4.2845	1.3E+09	1.4E+09
	30.71	2.2800	4.5862	1.4E+09	
	30.64	2.3800	4.7874	1.5E+09	
2011/10/5	31.58	1.3500	2.1716	6.7E+08	6.9E+08
	31.63	1.3100	2.1072	6.5E+08	
	31.42	1.4800	2.3807	7.4E+08	
2011/10/9	34.13	0.2890	0.5619	1.7E+08	1.4E+08
	34.45	0.2380	0.4628	1.4E+08	
	34.91	0.1810	0.3519	1.1E+08	
2011/10/12	34.61	0.2160	0.3456	1.1E+08	7.1E+07
	37.46	0.0386	0.0618	1.9E+07	
	34.96	0.1750	0.2800	8.6E+07	
2011/10/19	34.14	0.2870	0.4888	1.5E+08	1.4E+08
	34.39	0.2480	0.4224	1.3E+08	
	34.41	0.2450	0.4173	1.3E+08	
2011/10/30	32.23	0.9110	1.2497	3.9E+08	3.6E+08
	32.07	1.0000	1.3717	4.2E+08	
	32.76	0.6610	0.9067	2.8E+08	

The average dsDNA MW used here was 650. The genome size of particle associated bacteria was assumed to be 3MB. The average genome mass of particle associated bacteria is thus 650 x 3 MB / (6.022 x 10-23) = 3.238 x 10^{-6} ng/genome. The gene copy number /mL sample = SQ in ng/mL / (3.537 x 10^{-6}). The Gene copy number was then converted to per L (x1000).

Table S7. Free-Living (0.2 µm membrane) *asbEII* Containing Bacteria Gene Copy Number

Time Point	Ct	SQ	SQ (filtration correction)	Gene Copy /L	Mean Gene Copy /L*
2011/7/28	34.68	0.0035	0.0060	3.5E+06	3.6E+06
	34.57	0.0037	0.0064	3.7E+06	
	36.02	0.0019	0.0032	1.8E+06	
2011/9/23	39.78	0.0003	0.0008	4.7E+05	5.6E+05
	39.52	0.0003	0.0009	5.3E+05	
	38.95	0.0005	0.0012	6.9E+05	
2011/10/2	36.87	0.0012	0.0026	1.5E+06	1.6E+06
	36.78	0.0013	0.0027	1.6E+06	
	36.79	0.0013	0.0027	1.6E+06	
2011/10/5	40.96	0.0002	0.0003	1.6E+05	1.9E+05
	40.85	0.0002	0.0003	1.7E+05	
	40.19	0.0002	0.0004	2.3E+05	
2011/10/9	40.03	0.0003	0.0005	3.2E+05	4.4E+05
	39.15	0.0004	0.0008	4.9E+05	
	39.04	0.0004	0.0009	5.1E+05	
2011/10/12	39.10	0.0004	0.0007	3.9E+05	5.0E+05
	38.37	0.0006	0.0010	5.5E+05	
	38.32	0.0006	0.0010	5.7E+05	
2011/10/19	42.24	0.0001	0.0002	9.1E+04	1.2E+05
	41.54	0.0001	0.0002	1.3E+05	
	41.40	0.0001	0.0002	1.4E+05	
2011/10/30	41.00	0.0002	0.0002	1.4E+05	1.7E+05
	40.62	0.0002	0.0003	1.6E+05	
	40.07	0.0003	0.0004	2.1E+05	

The average dsDNA MW used here was 650 . The genome size of free-living bacteria was assumed to be 1.6MB. The average genome mass of free living bacteria is thus 650 x 1.6 MB / (6.022 x 10-23) = 1.727 x 10^{-6} ng/genome. The gene copy number /mL sample = SQ in ng/mL / (1.727 x 10^{-6}). The Gene copy number was then converted to per L (x1000). The red highlight is apparent outlier and eliminated from analysis.

Table S8. Particle Associated (0.8 μm membrane) *asbEII* Containing Bacteria Gene Copy Number.

Time Point	Ct	SQ	SQ (filtration correction)	Gene Copy/ L	Mean Gene Copy /L*
2011/7/28	35.44	0.0025	0.0042	1.3E+06	1.1E+06
	36.33	0.0016	0.0027	8.4E+05	
	35.59	0.0023	0.0039	1.2E+06	
2011/9/23	37.57	0.0009	0.0023	7.2E+05	9.4E+05
	35.96	0.0019	0.0051	1.6E+06	
	38.14	0.0007	0.0018	5.5E+05	
2011/10/2	36.78	0.0013	0.0026	8.0E+05	9.8E+05
	36.13	0.0018	0.0036	1.1E+06	
	36.26	0.0017	0.0033	1.0E+06	
2011/10/5	37.69	0.0008	0.0013	4.1E+05	3.9E+05
	37.80	0.0008	0.0013	3.9E+05	
	37.95	0.0007	0.0012	3.6E+05	
2011/10/9	36.81	0.0013	0.0025	7.6E+05	7.0E+05
	37.05	0.0011	0.0022	6.8E+05	
	37.07	0.0011	0.0022	6.7E+05	
2011/10/12	38.83	0.0005	0.0008	2.4E+05	1.5E+05
	43.40	0.0001	0.0001	2.6E+04	
	39.47	0.0004	0.0006	1.7E+05	
2011/10/19	38.12	0.0007	0.0011	3.6E+05	3.0E+05
	38.50	0.0006	0.0010	2.9E+05	
	38.75	0.0005	0.0008	2.6E+05	
2011/10/30	33.24	0.0071	0.0098	3.0E+06	2.6E+06
	33.73	0.0056	0.0077	2.4E+06	
	33.59	0.0060	0.0083	2.6E+06	

The average dsDNA MW used here was 650. The genome size of particle associated bacteria was assumed to be 3MB. The average genome mass of particle associated bacteria is thus 650 x 3 MB / (6.022 x 10-23) = 3.238 x 10^{-6} ng/genome. The gene copy number /mL sample = SQ in ng/mL / (3.537 x 10^{-6}). The Gene copy number was then converted to per L (x1000).