

Supplementary Table 2.] Volumetric N-cycling rates at various depths and stations in the ETSP OMZ onboard Meteor M77/3-4.

	Cruise	Station	Lat [°N]	Lon [°E]	Depth [m]	Inc. depth [m]	O2 § [µM]	NH4+ [µM]	NO2- [µM]	NO3- [µM]	N* [µM] †	NH4+ ox. to NO2- [*] [nmol N L ⁻¹ d ⁻¹]	SE	NO2- ox. to NO3- [*] [nmol N L ⁻¹ d ⁻¹]	SE	NO3- red. to NO2- [*] [nmol N L ⁻¹ d ⁻¹]	SE	anammox [*] [nmol N L ⁻¹ d ⁻¹]	SE	exp‡	DNRA [*] [nmol N L ⁻¹ d ⁻¹]	SE	autotr. denitr. [*] [nmol N L ⁻¹ d ⁻¹]	SE	heterotr. denitr. [*] [nmol N L ⁻¹ d ⁻¹]	SE	
Coastal OMZ (≤800 m)	M77-3	807	-10.00	-78.38	115	15		0.58	0.51	3.74	20.62	-9.03	48.75	6.23	927.95	271.01	1010.22	429.07	112.32	19.94	2	1.10	0.19	0.00	0.00	4.94	3.39
	M77-3	807	-10.00	-78.38	115	20	0.58	0.05	3.52	20.96	-7.96	24.60	1.72	723.27	179.25	0.00	0.00	17.15	1.37	5	0.00	0.00	0.00	0.00	5.42	1.39	
	M77-3	807	-10.00	-78.38	115	40	0.00	0.06	0.69	30.54	-1.78	5.23	0.34	0.00	0.00	895.06	304.11	17.30	1.54	5	0.76	0.18	0.00	0.00	0.00	0.00	
	M77-3	807	-10.00	-78.38	115	60	0.00	0.04	10.70	15.03	-8.42	3.40	0.61	0.00	0.00	0.00	0.00	106.07	15.09	1	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	807	-10.00	-78.38	115	80	0.00	0.03	10.29	3.36	-21.82	3.43	0.39	0.00	0.00	0.00	0.00	182.11	17.65	1	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	807	-10.00	-78.38	115	113	0.00	11.09	3.00	23.68	1.35	0.12	0.00	0.00	0.00	828.70	93.31	226.62	27.16	1	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	811	-10.00	-78.97	145	45		0.05	0.46	30.83	0.08	22.82	0.63	39.85	7.48	0.00	0.00	4.41	0.51	4	0.48	0.10	0.00	0.00	0.00	0.00	
	M77-3	811	-10.00	-78.97	145	54	4.91	0.04	0.11	30.09	-0.63	12.76	1.42	69.61	7.77	0.00	0.00	9.64	1.62	5	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	811	-10.00	-78.97	145	80	0.00	0.09	0.54	29.61	-0.74	3.61	0.53	65.38	5.05	93.28	6.61	6.96	1.93	5	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	811	-10.00	-78.97	145	100	0.00	0.05	0.32	28.88	-0.52	1.77	0.47	0.00	0.00	0.00	0.00	4.81	1.80	5	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	811	-10.00	-78.97	145	120	0.00	0.07	0.23	30.85	-1.56	1.59	0.18	24.58	0.70	0.00	0.00	4.81	0.90	5	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	811	-10.00	-78.97	145	140	0.00	0.04	6.93	13.32	-13.89	1.85	0.25	140.24	9.91	256.83	61.36	63.96	8.24	4	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	19	-12.36	-77.00	105	15	6.07	1.84	2.52	4.24	-34.95	89.33	6.94	46.35	9.78	248.53	7.07	44.79	5.49	2	16.34	1.40	179.57	32.30	0.00	0.00	
	M77-3	19	-12.36	-77.00	105	30	0.05	1.47	2.31	0.00	-42.23	9.35	0.67	129.18	21.60	150.51	18.22	249.51	16.33	2	3.86	0.65	126.16	23.31	0.00	0.00	
	M77-3	19	-12.36	-77.00	105	40	0.00	3.15	0.00	0.00	-49.70	no data	no data	no data	no data	2542.43	265.55	no data	no data		no data	no data	no data	0.00	0.00		
	M77-3	19	-12.36	-77.00	105	80	0.00	2.86	0.02	0.00	-45.58	0.00	0.00	0.00	0.00	164.60	25.34	151.88	6.97	2	41.03	3.05	927.76	153.93	0.00	0.00	
	M77-3	19	-12.36	-77.00	105	99	0.00	3.36	0.00	0.00	-48.01	0.00	0.00	0.00	0.00	8533.22	494.91	118.18	2.60	2	396.17	17.30	2068.45	211.36	0.00	0.00	
	M77-3	13	-12.03	-77.79	356	38	3.40	0.10	0.13	28.32	-3.96	14.09	1.11	28.99	1.13	0.00	0.00	3.62	0.55	2	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	13	-12.03	-77.79	356	75	0.01	0.05	0.00	28.51	-2.80	2.45	0.24	14.28	4.41	0.00	0.00	3.79	1.01	2	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	13	-12.03	-77.79	356	100	0.00	0.05	0.07	26.24	-2.89	1.71	0.32	24.87	8.22	4.56	0.82	8.43	1.81	2	0.00	0.00	0.00	0.00	0.00	0.00	
M77-3	13	-12.03	-77.79	356	150	0.00	0.04	5.38	18.13	-12.28	1.03	0.10	8.48	1.69	57.76	4.83	46.29	5.77	1	0.00	0.00	0.00	0.00	0.00	0.00		
M77-3	13	-12.03	-77.79	356	250	0.06	0.04	2.51	25.29	-9.02	0.00	0.00	12.73	1.19	48.81	4.13	11.06	1.73	1	0.00	0.00	0.00	0.00	0.00	0.00		
M77-3	13	-12.03	-77.79	356	353	0.00	0.06	3.02	29.75	-6.71	0.00	0.00	17.81	9.59	157.84	9.96	3.16	0.08	4	0.00	0.00	0.00	0.00	0.00	0.00		
Offshore OMZ (>800 m)	M77-3	62	-13.35	-76.75	160	40	9.97	0.40	0.57	15.31	-12.94	0.22	0.06	399.38	8.87	108.24	16.30	32.51	1.77	4	1.18	0.40	0.00	0.40	0.00	0.00	
	M77-3	62	-13.35	-76.75	160	50	2.56	0.08	2.30	13.45	-14.36	15.14	2.23	442.52	6.48	82.96	1.56	52.39	1.54	4	1.74	0.43	0.00	0.43	0.00	0.00	
	M77-3	62	-13.35	-76.75	160	70	0.07	0.05	5.44	27.07	-4.64	0.11	166.20	15.09	89.04	14.74	78.33	4.26	4	0.00	0.00	0.00	0.00	0.00	0.00		
	M77-3	62	-13.35	-76.75	160	100	0.00	0.04	1.34	1.94	-31.02	2.02	0.25	166.27	8.70	81.11	8.06	39.39	1.78	4	1.00	0.21	0.00	0.21	0.00	0.00	
	M77-3	62	-13.35	-76.75	160	130	0.00	0.05	3.45	10.31	-19.29	1.66	0.19	97.49	7.28	215.53	6.31	55.44	10.16	1	1.70	0.50	0.00	0.50	0.00	0.00	
	M77-3	62	-13.35	-76.75	160	160	0.00	0.05	4.10	19.40	-8.55	0.00	0.00	65.40	12.29	117.20	7.92	107.75	11.11	4	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	65	-13.35	-76.50	109	15	4.80	-0.06	4.22	15.31	-20.08	no data	no data	no data	no data	no data	59.48	1.85	4	0.00	0.00	0.00	0.00	0.00	0.00		
	M77-3	65	-13.35	-76.50	109	20	0.00	-0.03	2.96	15.73	-18.68	no data	no data	117.57	9.04	282.84	21.08	73.96	14.85	4	1.83	0.33	0.00	0.00	0.00	0.00	
	M77-3	65	-13.35	-76.50	109	30	1.80	0.00	0.16	-50.14	no data	no data	0.00	273.50	61.64	0.00	0.00	all	all		402.62	181.63	0.00	0.00	0.00	0.00	
	M77-3	65	-13.35	-76.50	109	80	0.00	4.96	0.00	0.03	-50.24	no data	no data	0.00	0.00	3505.52	87.00	13.70	2.07	6	1029.20	231.43	317.13	0.00	0.00		
	M77-3	38	-16.00	-74.25	258	65	0.29	0.09	0.58	17.94	-19.74	1.13	0.06	687.37	62.98	91.88	8.91	37.56	2.20	3	0.00	0.00	0.00	0.00	2.21	0.22	
	M77-3	38	-16.00	-74.25	258	175	0.07	0.08	6.03	11.96	-22.28	8.02	1.70	125.42	28.06	109.47	7.94	38.98	2.87	4	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	38	-16.00	-74.25	258	255	0.00	0.16	6.42	11.59	-20.42	1.85	0.24	203.13	39.73	85.07	7.02	78.40	6.33	3	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	44	-17.34	-71.94	281	75	0.73	0.14	0.01	18.66	-18.42	19.21	4.49	no data	no data	no data	no data	6.14	1.47	3	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	44	-17.34	-71.94	281	87	0.01	0.00	0.01	17.67	-20.01	21.06	2.36	140.30	14.92	166.23	15.29	21.20	3.28	4	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	44	-17.34	-71.94	281	125	0.02	0.07	0.28	13.36	-18.94	0.82	0.14	22.73	0.82	125.73	7.51	14.26	2.18	3	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	44	-17.34	-71.94	281	150	0.01	0.06	0.30	15.48	-17.90	0.00	0.00	17.96	1.73	86.55	17.22	8.99	0.95	4	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	44	-17.34	-71.94	281	200	0.02	0.07	0.33	15.72	-15.44	0.00	0.00	11.95	0.45	19.44	4.64	23.35	1.50	3	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	44	-17.34	-71.94	281	280	0.01	0.07	5.50	20.90	-12.06	0.00	0.00	20.63	4.23	145.16	32.36	7.93	0.75	4	0.00	0.00	0.00	0.00	0.00	0.00	
	M77-3	805	-6.00	-81.36	999	62	7.46	0.27	0.20	29.46	-9.87	88.84	8.98	38.21	10.42	17.59	1.45	0.00	0.00								

Supplementary Table 2. Volumetric N-cycling rates at various depths and stations in the ETSP OMZ onboard Meteor M77/3-4.

Cruise	Station	Lat [°N]	Lon [°E]	Depth [m]	Inc. depth [m]	O ₂ § [µM]	NH ₄ ⁺ [µM]	NO ₂ [µM]	NO ₃ [µM]	N* [µM] †	NH ₄ ⁺ ox. to NO ₂ ⁻ [nmol N L ⁻¹ d ⁻¹]	SE	NO ₂ - ox. to NO ₃ ⁻ [nmol N L ⁻¹ d ⁻¹]	SE	NO ₃ - red. to NO ₂ ⁻ [nmol N L ⁻¹ d ⁻¹]	SE	anammox* [nmol N L ⁻¹ d ⁻¹]	SE	exp‡	DNRA* [nmol N L ⁻¹ d ⁻¹]	SE	autotr. denitr.* [nmol N L ⁻¹ d ⁻¹]	SE	heterotr. denitr.* [nmol N L ⁻¹ d ⁻¹]	SE
M77-4	84	-14.00	-81.00	4813	150	1.38	0.00	0.82	20.31	-19.69	2.05	0.07	25.50	2.99	22.64	2.32	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	84	-14.00	-81.00	4813	200	1.12	0.07	2.00	21.04	-17.91	0.00	0.00	25.57	3.10	38.87	11.06	5.37	1.09	6	0.00	0.00	0.00	0.00	1.85	0.43
M77-4	84	-14.00	-81.00	4813	299	1.24	0.02	4.90	26.55	-10.36	0.00	0.00	0.00	0.00	43.38	6.45	1.62	0.19	1	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	84	-14.00	-81.00	4813	371	1.85	0.01	0.10	33.76	-8.43	0.00	0.00	0.00	0.00	12.07	0.68	3.06	0.28	4	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	84	-14.00	-81.00	4813	445	5.52	0.02	0.02	38.70	-6.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	93	-14.00	-85.83	4573	160	1.01	0.03	0.00	0.00	-20.90	0.00	0.00	0.00	0.00	11.32	1.01	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	93	-14.00	-85.83	4573	170	1.01	0.02	1.47	19.13	-20.72	0.00	0.00	0.00	0.00	24.96	3.03	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	93	-14.00	-85.83	4573	200	1.08	0.07	1.64	22.45	-17.18	0.00	0.00	0.00	0.00	29.89	3.05	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	93	-14.00	-85.83	4573	300	1.18	0.04	0.27	33.69	-8.95	0.00	0.00	0.00	0.00	15.83	1.26	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	93	-14.00	-85.83	4573	375	3.46	0.03	0.02	38.47	-6.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	101	-10.00	-85.83	4407	125	5.23	0.14	0.02	29.96	-9.06	0.00	0.00	0.00	0.00	12.90	2.75	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	101	-10.00	-85.83	4407	200	9.34	0.01	0.02	33.83	-5.80	0.00	0.00	0.00	0.00	7.64	0.44	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	101	-10.00	-85.83	4407	300	2.16	0.09	0.01	35.57	-5.82	0.00	0.00	0.00	0.00	9.37	0.34	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	101	-10.00	-85.83	4407	400	1.71	0.03	0.02	39.11	-4.84	0.00	0.00	17.44	1.27	12.13	1.43	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	101	-10.00	-85.83	4407	525	4.74	0.00	0.01	45.83	-1.85	0.00	0.00	0.00	0.00	4.07	0.46	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	109	-3.58	-85.83	3266	200	8.67	0.00	0.00	31.81	-3.67	0.00	0.00	14.94	5.67	8.28	1.18	2.08	0.57	4	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	109	-3.58	-85.83	3266	218	2.93	0.00	0.00	32.62	-4.09	0.00	0.00	0.00	0.00	9.51	3.64	1.80	0.21	4	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	109	-3.58	-85.83	3266	299	3.22	0.00	0.01	33.29	-6.15	0.00	0.00	5.92	1.55	27.66	3.75	1.91	0.43	4	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	109	-3.58	-85.83	3266	398	3.29	0.00	0.01	38.08	-6.55	0.00	0.00	0.00	0.00	17.70	1.74	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	119	-3.58	-81.34	1216	227	5.57	0.00	0.01	31.52	-3.73	7.46	0.26	27.89	0.82	28.72	2.16	3.40	0.87	1	1.14	0.29	0.00	0.00	0.00	0.00
M77-4	119	-3.58	-81.34	1216	346	4.24	0.00	0.00	35.94	-5.24	0.00	0.00	12.56	1.59	15.49	1.06	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	119	-3.58	-81.34	1216	498	8.35	0.00	0.03	40.24	-5.28	0.00	0.00	6.02	0.59	11.94	0.60	5.87	1.56	4	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	123	-6.00	-81.50	2426	41	4.11	0.00	0.26	30.35	-3.05	70.10	2.20	33.42	7.92	59.44	19.12	18.05	0.66	3	1.30	0.19	0.00	0.00	0.00	0.00
M77-4	123	-6.00	-81.50	2426	199	2.54	0.00	0.00	31.73	-4.85	0.00	0.00	20.13	7.37	8.17	0.39	4.43	0.69	4	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	123	-6.00	-81.50	2426	299	1.36	0.00	0.72	31.71	-7.47	0.00	0.00	0.00	0.00	54.34	5.37	6.68	1.11	3	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	123	-6.00	-81.50	2426	432	3.31	0.00	0.01	39.99	-5.66	0.00	0.00	0.00	0.00	6.77	1.78	1.98	0.15	1	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	134	-6.00	-85.83	4110	74	15.95	0.00	0.06	32.27	-1.68	0.00	0.00	14.07	0.89	6.71	0.42	2.20	0.63	4	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	134	-6.00	-85.83	4110	200	5.54	0.00	0.15	26.63	-2.03	0.00	0.00	0.00	0.00	3.26	0.28	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	134	-6.00	-85.83	4110	258	2.06	0.00	0.00	33.78	-2.83	0.00	0.00	17.40	1.11	8.71	0.41	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	134	-6.00	-85.83	4110	360	1.30	0.00	1.06	34.12	-3.79	0.00	0.00	12.37	2.52	29.19	1.90	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00
M77-4	134	-6.00	-85.83	4110	466	2.34	0.00	0.02	44.19	-8.51	0.00	0.00	0.00	0.00	8.70	0.99	0.00	0.00	all	0.00	0.00	0.00	0.00	0.00	0.00

*all rates are net potential rates corrected for the labeling percentage of the respective N pool; SE=standard error

† N* = DIN - 16x PO₄³⁻ + 2.9 µmol kg⁻¹ x density

§ M77-3: St. 805 → CTD data; St. 807-811 & St. 3-8 → µ-sensor data (downcast); St. 13-65 → STOX - M77-4: CTD data

‡ Shown here are maximum potential anammox rates calculated from the respective ¹⁵N-labeling experiments indicated: 1="NH₄⁺", 2="NO₂⁻", 3="NH₄⁺"/"NO₂⁻", 4="NO₂⁻"/"NH₄⁺", 5="NO₂⁻", 6="NO₂⁻"/"NH₄⁺"

CTD oxygen data were corrected for an offset of ~2µM.