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SUPPLEMENTARY INFORMATION

Table S1. N₂O isotope and isotopomers signatures and concentration of N₂O, NH₄⁺, NO₃⁻, NO₂⁻ measured at the stations S1, E1 and K2 (for more information see Breider et al. 2015).

Station	Depth m	$\delta^{15}\text{N}$ ‰ vs. N _{2,air}	$\delta^{18}\text{O}$ ‰ vs. SMOW	SP ‰ vs. N _{2,air}	ϕ_{ND} %	N ₂ O nmol kg ⁻¹	NH ₄ ⁺ μmol kg ⁻¹	NO ₃ ⁻ μmol kg ⁻¹	NO ₂ ⁻ μmol kg ⁻¹
S1	175	6.95	43.74	22.17	38	8.82	0.06	2.44	0.05
S1	200	6.28	43.92	17.74	51	10.42	0.03	4.37	0.02
S2	150	-	-	-	-	-	-	1.13	0.18
S2	200	-	-	-	-	-	-	2.82	0.02
E1	100	6.39	45.11	25.30	30	16.07	0.06	15.11	0.02
E1	140	6.88	45.52	21.83	39	14.24	0.05	17.50	0.02
K2	100	6.67	44.85	17.82	51	12.91	0.03	24.45	0.77
K2	175	8.13	53.55	25.78	28	25.25	<0.01	38.72	0.02
KNOT	100	-	-	-	-	-	0.01	27.73	0.01
KNOT	200	-	-	-	-	-	0.01	37.47	0.01

Table S2. Compilation of pH values, tracer concentration, depth, incubation time and temperature, nitrification and N₂O production rates for all experiments conducted in WNP in 2013 and 2016.

Station/ Experiment	Date	Depth (m)	¹⁵ N tracer conc. (nmol/L)	Incub. time (h)	Incub. temp. (°C)	natural pH	ΔpH for V _{NO_x}	V NO _x (nmol/L/day)	ΔpH for V _{N₂O}	V N ₂ O total (pmol/L/day)
S1_A	15/07/13	175	185	12	18	7.97	0.00	8.4	0.00	<LOQ
							0.00	7.1	0.01	<LOQ
							0.16	11.2	0.31	<LOQ
									0.46	0.2
S1_B		200	185	12	18	7.96	0.00	10.7	0.00	0.6
							0.00	8.3	0.03	0.2
							0.18	10.7	0.29	0.5
							0.20	11.3		
K2_A	23/07/13	100	185	24	4	7.62	0.00	36.1	0.00	5.7
							0.00	37.7	0.02	5.7
							0.03	37.5	0.11	6.0
							0.14	35.2	0.13	8.9
							0.14	34.2	0.24	12.0
							0.14	35.1	0.25	16.2
K2_B		175	185	24	4	7.30	0.00	17.0	0.00	9.4
							0.02	20.5	0.03	2.3
							0.18	17.3	0.13	4.3
							0.20	15.9	0.17	6.0
E1_A	27/07/13	100	185	25	7	7.75	0.00	49.0	0.00	1.8
							0.00	50.9	0.00	1.9
							0.08	32.8	0.51	3.6
							0.10	31.6	0.55	2.7
							0.26	27.9	0.57	2.7
							0.27	27.7	0.57	4.2
E1_B		140	185	25	7	7.67	0.00	42.3	0.00	1.6
							0.02	37.1	0.00	1.8
							0.14	49.9	0.03	2.6
							0.15	50.8	0.08	2.6
							0.26	44.0	0.11	4.1

							0.293	46.5	0.162	3.7
S2	08/07/16	150	52	15	18	8.07	0.00	7.5	0.00	<LOQ
							0.01	6.6	0.01	<LOQ
							0.027	6.9	0.02	<LOQ
							0.027	7.7		
S2	08/07/16	200	52	15	18	8.07	0.00	4.1	0.10	<LOQ
							0.04	4.4	0.16	<LOQ
							0.16	4.4	0.20	<LOQ
							0.18	3.7		
							0.19	4.7		
							0.20	5.4		
KNOT_A	19/11/16	100	51	14	5	7.87	0.00	26.9	0.00	6.3
							0.01	25.0	0.01	5.9
							0.10	23.9	0.10	6.9
							0.17	24.6	0.17	7.2
							0.21	23.5	0.21	13.2
							0.22	22.8	0.22	10.6
KNOT_B				28	5	7.87	0.00	24.9	0.00	5.5
							0.23	23.4	0.23	6.3
							0.29	20.0	0.29	6.4
							0.30	21.9	0.30	9.0
KNOT_C		259		28	5	7.87	0.00	21.9	0.00	4.7
							0.05	20.5	0.05	4.8
							0.07	21.2	0.07	4.6
							0.21	20.9	0.21	5.9
							0.25	19.6	0.25	7.8
							0.25	19.8	0.25	8.0
KNOT_D		150	51	13	5	7.67	0.00	24.8	0.00	31.9
							0.05	23.5	0.05	33.4
							0.09	22.5	0.09	34.8
							0.14	22.5	0.14	37.3
KNOT_E				26	5	7.67	0.01	22.0	0.01	22.1
							0.03	22.0	0.03	23.4
							0.17	19.2	0.17	29.9
							0.18	18.3	0.18	28.5
KNOT_F		259		26	5	7.67	0.00	21.0	0.00	24.0
							0.05	19.2	0.05	22.0

0.05	18.9	0.05	18.9
0.09	18.1	0.09	22.6
0.20	18.6	0.20	25.5
0.20	18.4	0.20	41.3

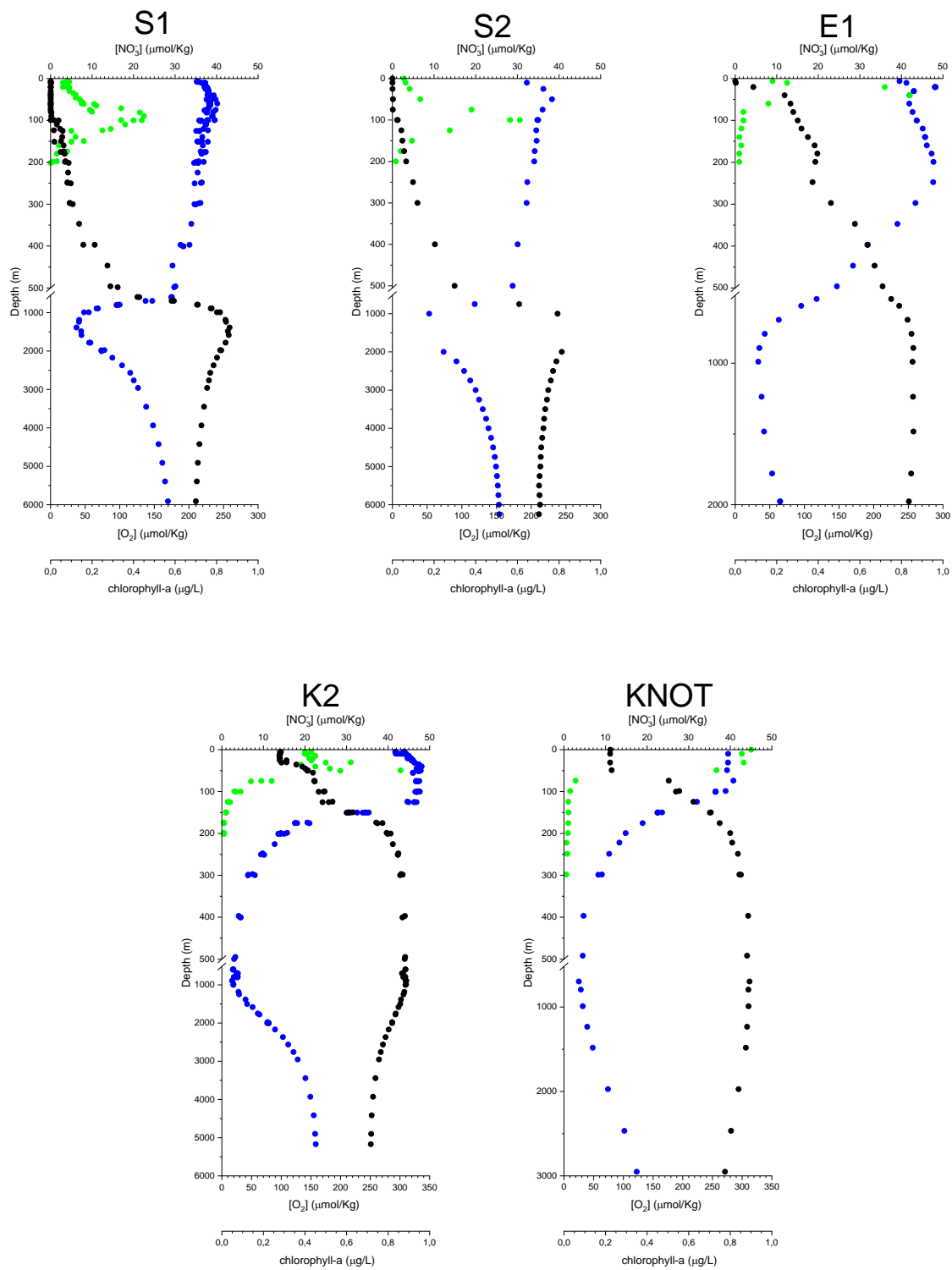


Figure S1. Oxygen (blue), chlorophyll-*a* (green) and nitrate (black) concentrations measured at the stations S1, S2, E1, K2 and KNOT.

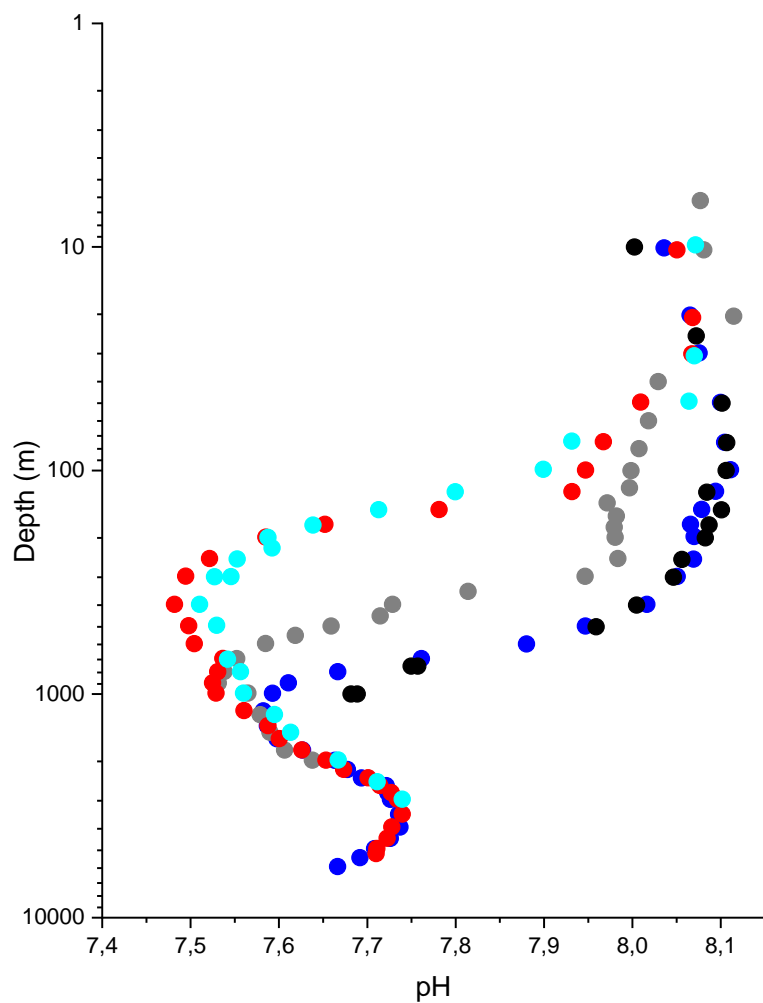


Figure S2. pH profiles measured at the stations K2 (red circles), KNOT (cyan circles), E1 (grey circles), S1 (blue circles) and S2 (black circles). The pH values were calculated using the CO2SYS program developed by Lewis and Wallace (1998).¹ The carbonate dissociation constants of Mehrbach et al. (1973) refitted by Dickson and Millero (1987), temperature, salinity, DIC, total alkalinity, phosphate, and silicate were used to calculate the pH (total scale) at the in situ temperature.^{2,3}

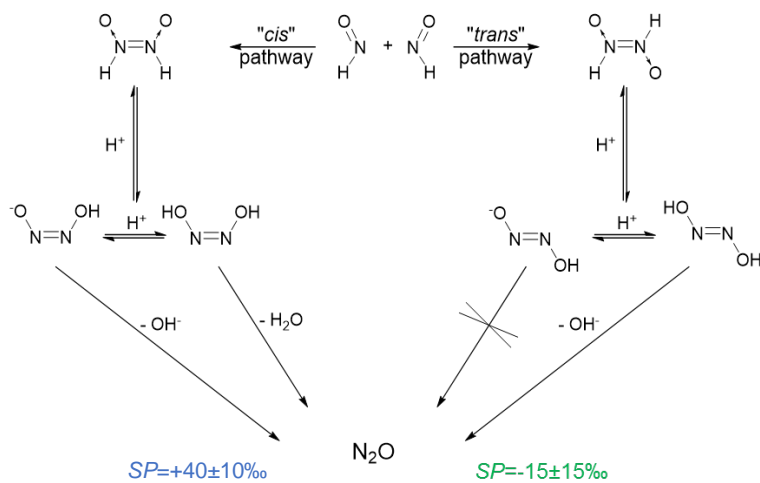


Figure S3. Acid-base equilibria model for the HNO dimerization mechanism. SP values corresponds to ¹⁵N site-preference values for *cis* (blue: nitrification) and *trans*-pathways (green: nitrifier-denitrification). More details on the reaction mechanisms are available in Fehling and Friedrichs (2011) and Fehling (2012).

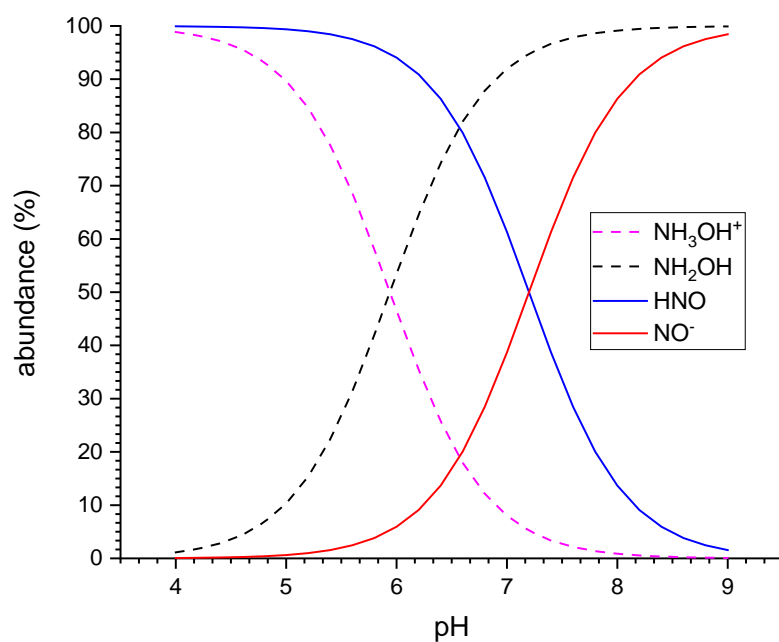


Figure S4. Speciation of HNO and NH₂OH as function of pH.