Appendices to

Direct measurements of denitrification in Boston Harbor and Massachusetts Bay sediments

by

John R. Kelly
Barbara L. Nowicki

prepared by:
Battelle Ocean Sciences
397 Washington Street
Duxbury, MA 02332
(508) 934-0571, and

University of Rhode Island
Narragansett Bay Campus
Narragansett, RI 02882

prepared for:
Massachusetts Water Resource Authority
Charlestown Navy Yard
100 First Avenue
Boston, MA, 02129
(617) 242-6000

An MWRA Environmental Quality Department
Miscellaneous Publication

March 1993

1993-ms-09

APPENDIX A

SEDIMENT GRAIN-SIZE ANALYSIS

Table A-1. Sediment Grain-Size Analysis by Station and Month.

Station	Month	% Gravel	% Sand	% Silt	% Clay
R4	August	0.0	55.5	32.3	12.2
T2	August	0.0	45.7	38.4	15.9
T3	August	0.0	49.7	32.8	17.4
T4	August	0.0	37.4	46.4	16.2
T7	August	0.5	56.0	32.7	10.8
T8	August	26.6	54.3	13.8	5.2
11	October	0.0	54.5	36.2	9.3
C3	October	1.6	95.5	1.4	1.5
G6	October	0.0	66.1	28.1	5.8
G8	October	0.6	42.9	44.1	12.4
W1	October	0.0	45.4	42.7	11.9
T3	November	0.6	31.0	45.5	22.9
11	November	0.0	35.9	52.3	11.9
G8	November	1.4	52.8	34.5	11.3
W1	November	0.0	44.4	41.1	14.5
G9	November	0.0	90.3	9.5	0.2

APPENDIX B

FLUX INCUBATION DATA

NOTES FOR APPENDIX B

Note on Calculation of N_2 in Gas phase

N_2 in gas phase (μmoles) = N_2 peak area/50 μl gas sample × F × 1

Note on Calculation of N_2 in Gas phase

N_2 in gas phase (μmoles) = N_2 peak area/50 μl gas sample × F × 100μl/ml × Gas volume (ml)

where

N_2 peak area is in integrator units

F has units of [μmoles/integrator unit] × 10^{-7}

F is the slope of the linear regression of μmoles Standard gas vs integrator units

The volume of the gas sample is 50 μl

The volume of the chamber gas phase is given in ml

N_2 (μmoles) = int. units/50 μl × {[μmoles/int. unit] × 10^{-7}} × 1000 μl/ml × Vol (ml)

Note on April Data

Peak area curves for April are in the raw data notebook. For subsequent months, a spreadsheet was developed and data are given in this Appendix.

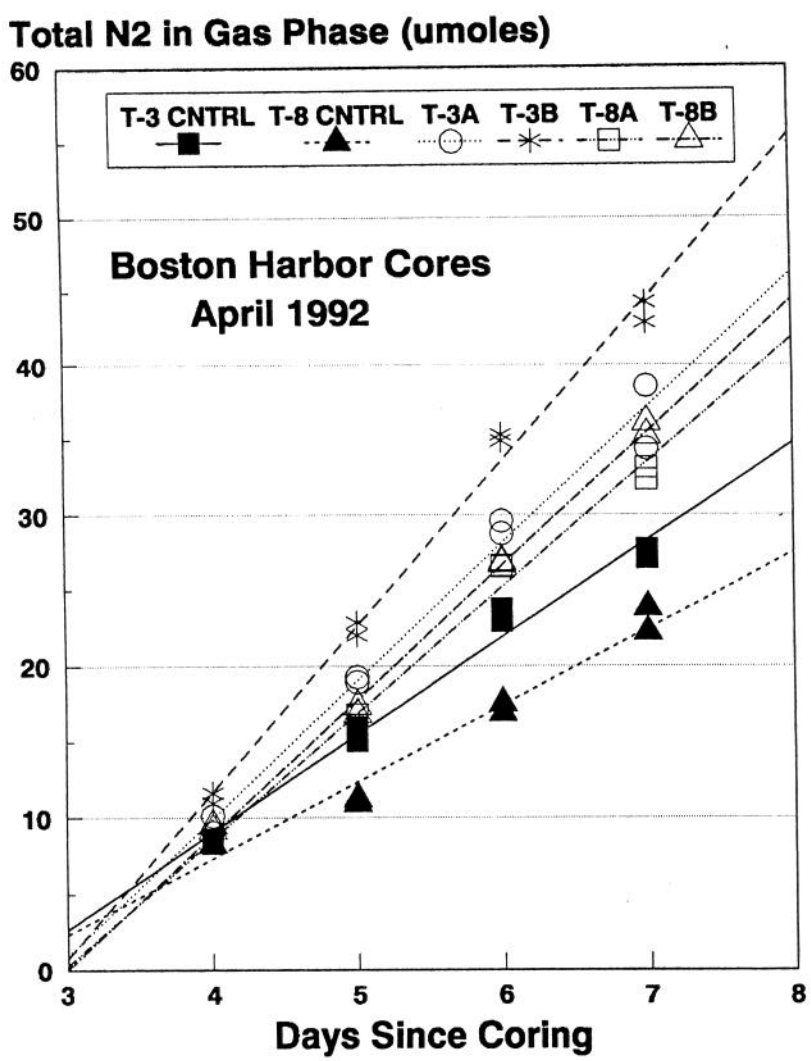
Note on All Data

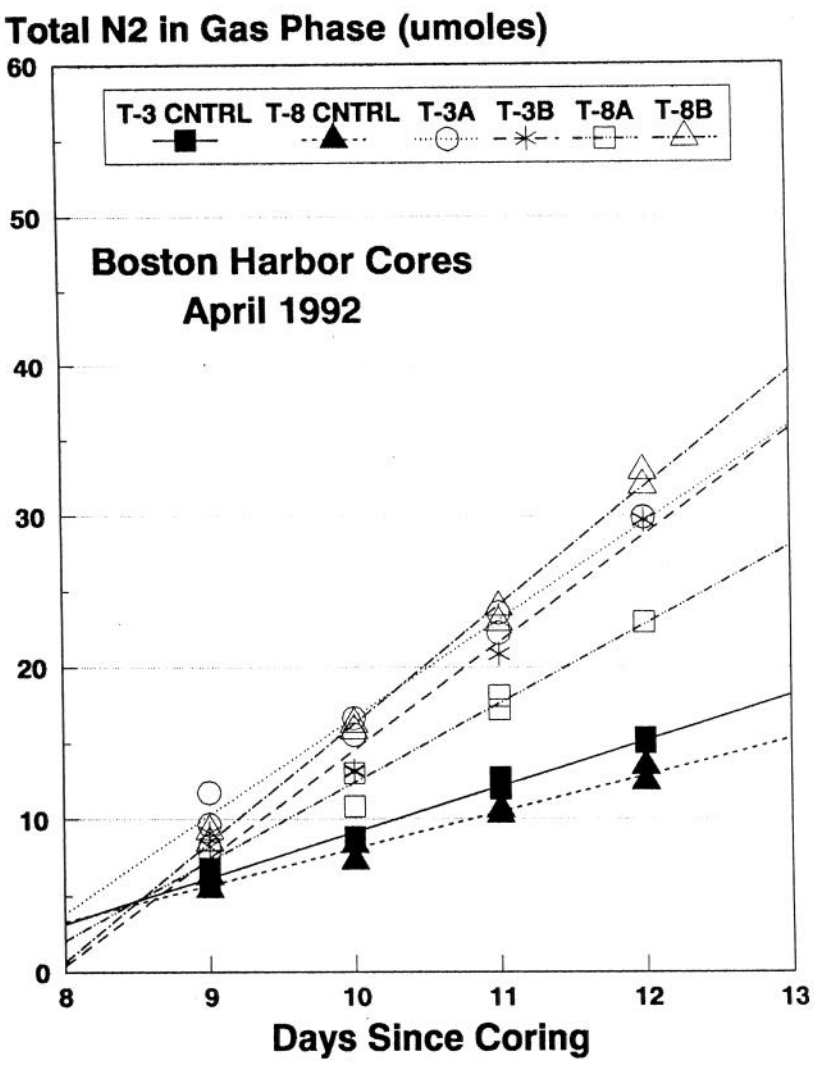
Data points flagged with * are due to clogged needle and have been excluded from the regression. "Contaminated chamber" data, which also were excluded from regressions, are specified beside the data flagged by *.

Denitrification in Boston Harbor: April 1992
9°C

Station	Incubation #	Days	O_2 Flux (mg O_2 m^{-2} h^{-1})	N_2 Flux	Anoxic Control Flux	Corrected N_2 Flux
				(μmol N_2 m^{-2} h^{-1})		
T-3	1	4- 7	24	79±7	56±7	23±10
	2	9-12	25	56±6	26±3	30± 7
T-3	1	4- 7	35	97±8	56±7	41±11
	2	9-12	39	62±9	26±3	36± 9
T-8	1	4- 7	24	74±7	44±8	30±11
	2	9-12	21	46±5	21±4	25± 6
T-8	1	4- 7	29	79±4	44±8	35± 9
	2	9-12	37	69±4	21±4	48± 6

Errors show 95% CIS around slopes of linear regressions of N_2 production versus time.





Aprilplt.drw

DENITRIFICATION CALCULATIONS - NITROGEN REGRESSIONS

BOSTON HARBOR CORES B. NOWICKI

APRIL 1992 FILENAME: APRIL92C1.WK1

CORE #	DAY #	ELAPSE TIME (hrs)	TOTAL N2 IN GAS PHASE (umoles)	(+) = 95% C.I.
				Regression Output:
				Constant 5.237075
ANOXIC	4	14.33	8.58	Std Err of Y Est 1.013322
CONTRL		14.33	8.62	R Squared 0.983289
T-3	5	38.33	15.98	No. of Observations 9
		38.33	15.11	Degrees of Freedom 7
		38.33	15.47	
	6	62.33	23.78	X Coefficient(s) 0.268118
		62.33	22.96	Std Err of Coef. 0.013210
	7	86.3	27.71	
		86.3	27.14	N2 FLUX = 56 um N2/m2/hr
				(± 7)
	9	13.75	6.82	
		13.75	6.04	Regression Output:
	10	37.8	8.86	Constant 4.476219
		37.8	8.56	Std Err of Y Est 0.484709
	11	61.5	12.79	R Squared 0.984591
		61.5	12.02	No. of Observations 8
	12	86	15.37	Degrees of Freedom 6
		86	15.04	
				X Coefficient(s) 0.124818
				Std Err of Coef. 0.006374
				N2 FLUX = 26 um N2/m2/hr
				(± 3)
ANOXIC				
CONTRL	4	14.67	8.24	Regression Output:
T-8		14.67	8.28	Constant 4.246666
	5	38.75	11.27	Std Err of Y Est 1.104631
		38.75	10.97	R Squared 0.972027
	6	62.75	16.92	No. of Observations 8
		62.75	17.55	Degrees of Freedom 6
	7	86.55	23.85	
		86.55	22.23	X Coefficient(s) 0.210479
				Std Err of Coef. 0.014576
				N2 FLUX = 44 um N2/m2/hr
				(± 8)

APRIL 1992 FILENAME: APRIL92C1.WK1

CORE #	DAY #	ELAPSE TIME (hrs)	TOTAL N2 IN GAS PHASE (umoles)
NOXIC	9	14	6.32
ONTROL		14	5.47
T-8	10	37.97	8.38
		37.97	7.3
	11	61.8	10.68
		61.8	10.33
	12	86.25	13.51
		86.25	12.5

Regression Output:

Constant	4.323424
Std Err of Y Est	0.537998
R Squared	0.970726
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.099746
Std Err of Coef.	0.007071

N2 FLUX = 21 um N2/m2/hr
(± 4)

T-3 A	4	15	10.15
		15	9.06
		15	9.49
	5	39.08	18.94
		39.08	19.29
	6	63	29.62
		63	28.77
	7	86.97	34.42
		86.97	38.6
		86.97	35.54

Regression Output:

Constant	4.340423
Std Err of Y Est	1.396457
R Squared	0.986766
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	0.373430
Std Err of Coef.	0.015289

N2 FLUX = 79 um N2/m2/hr
(± 7)

	9	14.25	9.68
		14.25	11.78
	10	38.2	15.59
		38.2	16.68
	11	62.05	22.27
		62.05	23.61
	12	86.5	29.92
		86.5	29.91

Regression Output:

Constant	6.485973
Std Err of Y Est	0.906380
R Squared	0.988244
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.267542
Std Err of Coef.	0.011912

N2 FLUX = 56 um N2/m2/hr
(± 6)

APRIL 1992 FILENAME: APRIL92C1.WK1

CORE #	DAY #	ELAPSE TIME (hrs)	TOTAL N2 IN GAS PHASE (umoles)
T-3 B	4	15.5	10.99
		15.5	11.64
	5	39.42	22.89
		39.42	22.04
	6	63.25	34.95
		63.25	35.36
	7	87.22	42.92
		87.22	44.28

Regression Output:

Constant	4.599609
Std Err of Y Est	1.209119
R Squared	0.992742
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.458330
Std Err of Coef.	0.015998

N2 FLUX = 97 um N2/m2/hr
(± 8)

	9	14.75	9.13
		14.75	8.24
	10	38.47	13.14
		38.47	13.24
	11	62.3	20.86
		62.3	20.9
	12	86.75	29.76
		86.75	29.71

Regression Output:

Constant	3.173786
Std Err of Y Est	1.253026
R Squared	0.981604
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.295618
Std Err of Coef.	0.016521

N2 FLUX = 62 um N2/m2/hr
(± 9)

T-8 A	4	15.83	8.52
		15.83	8.32
	5	39.83	16.17
		39.83	16.84
	6	63.5	26.57
		63.5	26.68
	7	87.47	32.35
		87.47	33.19

Regression Output:

Constant	3.076029
Std Err of Y Est	1.028400
R Squared	0.990906
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.348525
Std Err of Coef.	0.013630

N2 FLUX = 74 um/N2/m2/hr
(± 7)

APRIL 1992 FILENAME: APRIL92C1.WK1

CORE #	DAY #	ELAPSE TIME (hrs)	TOTAL N2 IN GAS PHASE (umoles)
8 A	9	15	7.3
		15	7.86
	10	38.72	13.08
		38.72	10.85
		38.72	11.55
	11	62.6	18.14
		62.6	17.22
	12	87	23
		87	22.99

Regression Output:

Constant	3.865299
Std Err of Y Est	0.790570
R Squared	0.984633
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.218255
Std Err of Coef.	0.010305

N2 FLUX = 46 um N2/m2/hr
(± 5)

T-8 B	4	16.17	9.2
		16.17	9.53
	5	40	16.82
		40	17.36
	6	63.75	26.9
		63.75	26.75
	7	87.72	35.27
		87.72	36.15

Regression Output:

Constant	2.918534
Std Err of Y Est	0.590972
R Squared	0.997347
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.372355
Std Err of Coef.	0.007838

N2 FLUX = 79 um/N2/m2/hr
(± 4)

	9	15.25	9.26
		15.25	8.5
	10	39	16.3
		39	15.85
	11	62.8	22.95
		62.8	23.96
	12	87.25	31.99
		87.25	32.65
		87.25	32.95

Regression Output:

Constant	3.476812
Std Err of Y Est	0.663858
R Squared	0.995893
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.328967
Std Err of Coef.	0.007983

N2 FLUX = 69 um N2/m2/hr
(± 4)

DENITRIFICATION CALCULATIONS - OXYGEN REGRESSIONS

BOSTON HARBOR CORES B. NOWICKI

APRIL 1992 FILENAME: APRIL92B1.WK1

CORE #	DAY #	ELAPSE TIME (hrs)	TOTAL O2 IN GAS PHASE (umoles)
T-3 A	4	15	596
		15	591
		15	597
	5	39.08	489
		39.08	495
	6	63	417
		63	417
	7	86.97	328
		86.97	338
		86.97	332

Regression Output:

Constant	643.9267
Std Err of Y Est	7.230592
R Squared	0.996158
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	-3.60591
Std Err of Coef.	0.079167

O2 FLUX = 24 mg O2/m2/hr

	9	14.25	606
		14.25	626
	10	38.2	482
		38.2	494
	11	62.05	411
		62.05	418
	12	86.5	341
		86.5	344

Regression Output:

Constant	651.8695
Std Err of Y Est	19.27325
R Squared	0.972844
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-3.71382
Std Err of Coef.	0.253310

O2 FLUX = 25 mg O2/m2/hr

T-3 B	4	15.5	562
		15.5	566
	5	39.42	424
		39.42	423
	6	63.25	321
		63.25	320
	7	87.22	186
		87.22	187

Regression Output:

Constant	639.0871
Std Err of Y Est	8.994581
R Squared	0.996830
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-5.16991
Std Err of Coef.	0.119014

O2 FLUX = 35 mg O2/m2/hr

APRIL 1992 FILENAME: APRIL92B1.WK1

CORE #	DAY #	ELAPSE TIME (hrs)	TOTAL O2 IN GAS PHASE (umoles)
T-3 B	9	14.75	573
		14.75	581
	10	38.47	394
		38.47	395
	11	62.3	271
		62.3	273
	12	86.75	160
		86.75	160

Regression Output:

Constant	640.2549
Std Err of Y Est	22.50910
R Squared	0.984118
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-5.72264
Std Err of Coef.	0.296786

O2 FLUX = 39 mg O2/m2/hr

T-8 A	4	15.83	584
		15.83	599
	5	39.83	492
		39.83	498
	6	63.5	422
		63.5	422
	7	87.47	332
		87.47	340

Regression Output:

Constant	642.9074
Std Err of Y Est	7.461631
R Squared	0.995283
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-3.51899
Std Err of Coef.	0.098896

O2 FLUX = 24 mg O2/m2/hr

	9	15	620
		15	622
	10	38.72	509
		38.72	512
		38.72	514
	11	62.6	448
		62.6	451
	12	87	391
		87	381

Regression Output:

Constant	650.6275
Std Err of Y Est	15.86515
R Squared	0.970902
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	-3.16069
Std Err of Coef.	0.206812

O2 FLUX = 21 mg O2/m2/hr

APRIL 1992 FILENAME: APRIL92B1.WK1

CORE #	DAY #	ELAPSE TIME (hrs)	TOTAL O2 IN GAS PHASE (umoles)
T-8 B	4	16.17	619
		16.17	621
	5	40	535
		40	544
	6	63.75	474
		63.75	469
	7	87.72	306
		87.72	306
	9	15.25	553
		15.25	555
	10	39	374
		39	381
	11	62.8	258
		62.8	264
	12	87.25	152
		87.25	155
		87.25	153

Regression Output:

Constant	704.2544
Std Err of Y Est	28.28263
R Squared	0.955098
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-4.23819
Std Err of Coef.	0.375156

O2 FLUX = 29 mg O2/m2/hr

Regression Output:

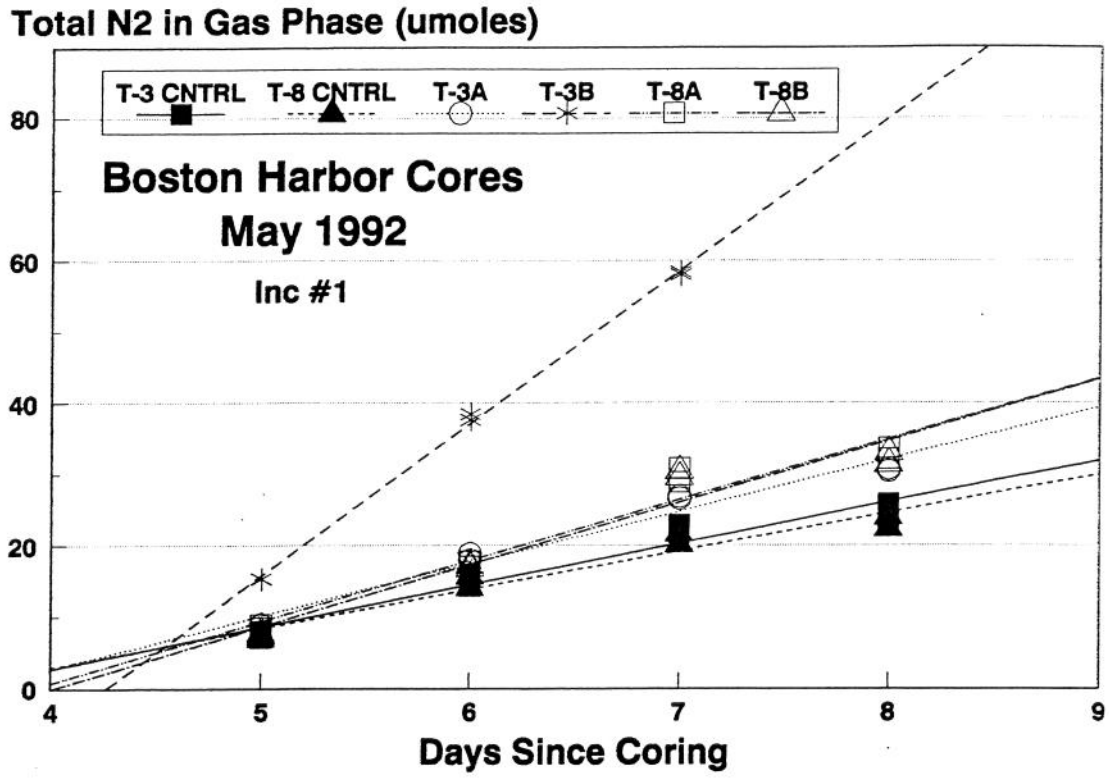
Constant	614.8161
Std Err of Y Est	21.04517
R Squared	0.984974
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	-5.42169
Std Err of Coef.	0.253099

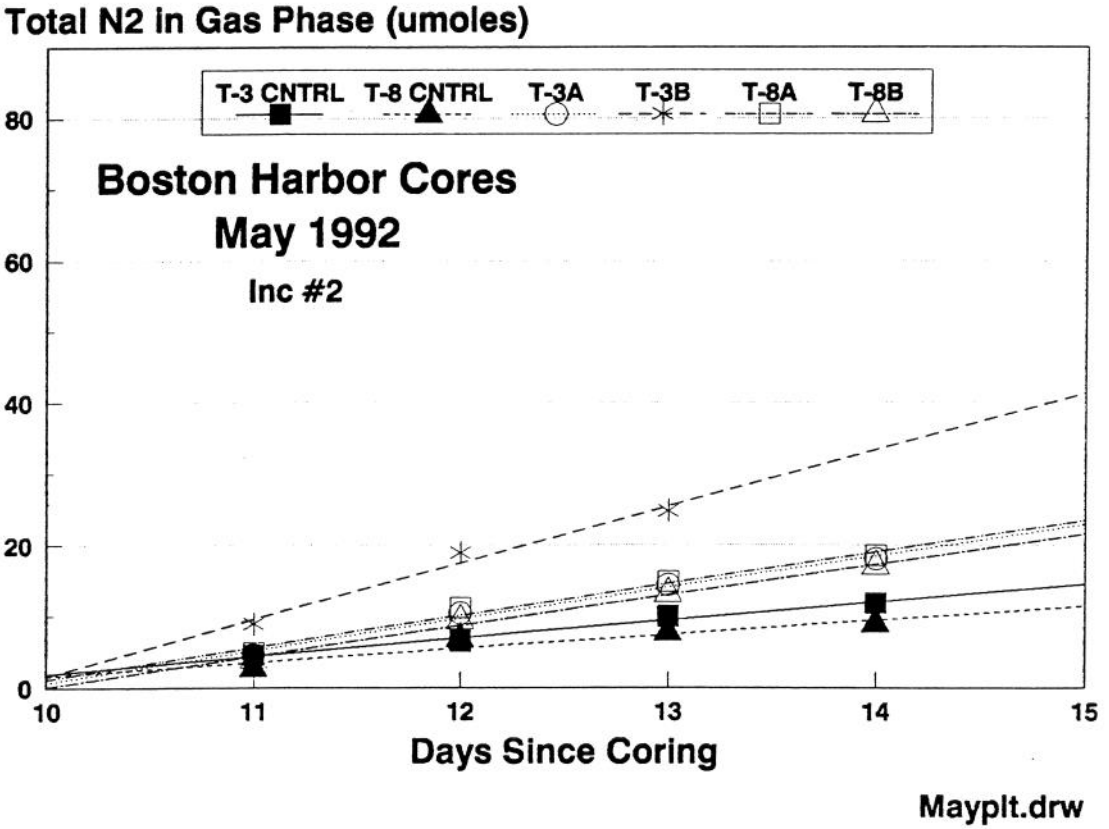
O2 FLUX = 37 mg O2/m2/hr

Denitrification in Boston Harbor: May 1992
10°C

Station	Incubation #	Days	O_2 Flux (mg O_2 m^{-2} h^{-1})	N_2 Flux (μmol N_2 m^{-2} h^{-1})	Anoxic Control Flux (μmol N_2 m^{-2} h^{-1})	Corrected N_2 Flux (μmol N_2 m^{-2} h^{-1})
T-3	1	5- 8	27	65±11	52±13	13±17
	2	11-14	32	39± 3	22± 4	17± 5
	3	19-21	26	34± 3	11± 5	23± 6
T-3*	1	5- 8	60	189± 9	52±13	137±16
	2	11-14	50	69±16	22± 4	47±16
	3	19-21	46	101±44	11± 5	90±44
T-8	1	5- 8	26	77±16	48±12	29±20
	2	11-14	25	41± 4	17± 5	24± 6
	3	19-21	20	24±10	N.D.	24±10
T-8	1	5- 8	33	78±19	48±12	30±22
	2	11-14	23	39± 2	17± 5	22± 5
	3	19-21	25	30±12	N.D.	30±12

Errors show 95% CIS around slopes of linear regressions of N_2 production versus time.
N.D. = Non Detectable
*This core contained a large clam worm (Nereis virens) and its extensive burrows.


Total N2 in Gas Phase (umoles)
T-3 CNTRL
T-8 CNTRL
T-3A
T-3B
T-8A
T-8B
Boston Harbor Cores
May 1992
Inc #1
0
20
40
60
80
4
5
6
7
8
9
Days Since Coring


Total N2 in Gas Phase (umoles)
T-3 CNTRL
T-8 CNTRL
T-3A
T-3B
T-8A
T-8B
Boston Harbor Cores
May 1992
Inc #2
0
20
40
60
80
10
11
12
13
14
15
Days Since Coring

Mayplt.drw

DENITRIFICATION CALCULATIONS - NITROGEN REGRESSIONS

BOSTON HARBOR CORES B. NOWICKI

MAY 1992 FILENAME: MAY92C1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
1	5	13.87	7.05	
T-3		13.87	7.93	
ANOXIC	6	38.25	15.93	
CONTROL		38.25	14.26	
	7	61.83	22.83	
		61.83	21.69	
	8	85.25	25.80	
		85.25	23.40	

Regression Output:

Constant	5.088668
Std Err of Y Est	1.826769
R Squared	0.944882
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.246443
Std Err of Coef.	0.024299

N2 FLUX = 52 um N2/m2/hr
(± 13)

	11	12.75	4.51
		12.75	4.03
	12	37.5	6.51
		37.5	7.49
		37.5	7.86
	13	61.67	9.95
		61.67	10.35
	14	84.84	11.80
		84.84	11.22

Regression Output:

Constant	3.298739
Std Err of Y Est	0.615249
R Squared	0.958781
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.102175
Std Err of Coef.	0.008007

N2 FLUX = 22 um N2/m2/hr
(± 4)

	19	17.5	8.14 *
		17.5	6.24
		17.5	7.11
	20	40.8	8.36
		40.8	8.51
	21	65.3	9.20
		65.3	9.19

Regression Output:

Constant	5.938527
Std Err of Y Est	0.438023
R Squared	0.891427
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.052509
Std Err of Coef.	0.009162

N2 FLUX = 11 um N2/m2/hr
(± 5)

MAY 1992 FILENAME: MAY92C1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
2	5	14.25	7.30
T-8		14.25	6.90
ANOXIC	6	38.5	15.59
CONTROL		38.5	13.98
	7	62.16	21.62
		62.16	20.09
	8	85.58	23.99
		85.58	22.32

Regression Output:

Constant	5.015816
Std Err of Y Est	1.727271
R Squared	0.942818
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.228596
Std Err of Coef.	0.022983

N2 FLUX = 48 um N2/m2/hr
(± 12)

	11	13.08	2.65
		13.08	3.21
	12	37.83	6.82
		37.83	6.41
	13	61.92	7.66
		61.92	7.42
	14	85.09	8.90
		85.09	9.01

Regression Output:

Constant	2.584451
Std Err of Y Est	0.778726
R Squared	0.908931
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.079353
Std Err of Coef.	0.010254

N2 FLUX = 17 um N2/m2/hr
(± 5)

	19	21	5.77
		21	5.47
		21	4.72
	20	42	4.98
		42	5.00
	21	66	5.76
		66	5.99

N2 FLUX = non-detectable

MAY 1992 FILENAME: MAY92C1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
3	5	14.5	8.77
T-3		14.5	8.93
	6	38.75	18.78
		38.75	17.87
	7	62.41	26.55
		62.41	26.85
	8	85.83	30.74
		85.83	30.42

Regression Output:

Constant	5.501952
Std Err of Y Est	1.631636
R Squared	0.971399
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.309928
Std Err of Coef.	0.021710

N2 FLUX = 65 um N2/m2/hr
(± 11)

	11	13.33	4.59
		13.33	4.49
	12	38.17	10.37
		38.17	10.06
	13	62.17	14.37
		62.17	14.29
	14	85.35	18.06
		85.35	18.12

Regression Output:

Constant	2.504612
Std Err of Y Est	0.501190
R Squared	0.992554
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.186695
Std Err of Coef.	0.006601

N2 FLUX = 39 um N2/m2/hr
(± 3)

	19	18	6.58
		18	6.32
	20	41.4	10.68
		41.4	10.28
	21	66.4	14.40
		66.4	14.09

Regression Output:

Constant	3.643839
Std Err of Y Est	0.248918
R Squared	0.995931
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.160899
Std Err of Coef.	0.005141

N2 FLUX = 34 um N2/m2/hr
(± 3)

MAY 1992 FILENAME: MAY92C1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
4	5	14.83	15.19
T-3		14.83	15.26
	6	39.08	38.49
		39.08	37.65
	7	62.74	58.31
		62.74	57.95
	8	* oxygen conc low	
		* He/O2 flush	

Regression Output:

Constant	2.311496
Std Err of Y Est	0.727143
R Squared	0.998853
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.895741
Std Err of Coef.	0.015176

N2 FLUX = 189 um N2/m2/hr
(± 9)

	11	13.5	8.93
		13.5	8.39
	12	38.42	18.89
		38.42	19.13
	13	62.42	24.81
		62.42	24.28
	14	* oxygen conc low	
		* He/O2 flush	

Regression Output:

Constant	5.005390
Std Err of Y Est	1.332122
R Squared	0.972749
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.325365
Std Err of Coef.	0.027229

N2 FLUX = 69 um N2/m2/hr
(± 16)

	19	18.5	10.33
		18.5	9.37
	20	42.5	20.26
		42.5	20.97
	21	66.5	37.83
		66.5	27.69

Regression Output:

Constant	0.784215
Std Err of Y Est	3.632230
R Squared	0.908683
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.477411
Std Err of Coef.	0.075671

N2 FLUX = 101 um N2/m2/hr
(± 44)

** Core #4 contained clamworm Nereis virens and its extensive burrows.

MAY 1992 FILENAME: MAY92C1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
5	5	15.25	8.82
T-8		15.25	8.36
	6	39.42	16.98
		39.42	17.69
	7	63.16	30.81
		63.16	28.82
	8	86.08	32.15
		86.08	33.69

Regression Output:

Constant	3.684885
Std Err of Y Est	2.375486
R Squared	0.955873
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.362503
Std Err of Coef.	0.031797

N2 FLUX = 77 um N2/m2/hr
(± 16)

	11	13.75	4.87
		13.75	4.88
	12	38.75	11.15
		38.75	9.51
		38.75	10.41
	13	62.67	14.84
		62.67	15.19
	14	85.59	18.56
		85.59	18.81

Regression Output:

Constant	2.626652
Std Err of Y Est	0.601829
R Squared	0.988396
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.192109
Std Err of Coef.	0.007867

N2 FLUX = 41 um N2/m2/hr
(± 4)

	19	21.7	11.27
		21.7	10.18
		21.7	10.92
	20	42.45	12.05
		42.45	11.42
	21	66.7	16.28
		66.7	15.67

Regression Output:

Constant	7.970845
Std Err of Y Est	0.894791
R Squared	0.885969
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	0.112885
Std Err of Coef.	0.018111

N2 FLUX = 24 um N2/m2/hr
(± 10)

MAY 1992 FILENAME: MAY92C1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
6	5	15.67	7.74
T-8		15.67	7.29
	6	39.83	17.16
		39.83	16.70
	7	63.49	30.40
		63.49	29.49
	8	86.41	33.01
		86.41	31.42

Regression Output:

Constant	2.644015
Std Err of Y Est	2.728616
R Squared	0.944649
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.370142
Std Err of Coef.	0.036578

N2 FLUX = 78 um N2/m2/hr
(± 19)

	11	14.08	3.90
		14.08	3.68
	12	39.08	9.32
		39.08	8.84
	13	62.92	13.13
		62.92	13.23
	14	85.92	16.99
		85.92	17.44

Regression Output:

Constant	1.445822
Std Err of Y Est	0.352457
R Squared	0.996236
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.185540
Std Err of Coef.	0.004655

N2 FLUX = 39 um N2/m2/hr
(± 2)

	19	22.2	8.87
		22.2	9.01
		22.2	7.31
	20	42.4	9.65
		42.4	9.76
	21	66.9	15.34
		66.9	14.32

Regression Output:

Constant	4.839179
Std Err of Y Est	1.089239
R Squared	0.890513
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	0.141629
Std Err of Coef.	0.022209

N2 FLUX = 30 um N2/m2/hr
(± 12)

DENITRIFICATION CALCULATIONS - OXYGEN REGRESSIONS

BOSTON HARBOR CORES B. NOWICKI

MAY 1992 FILENAME: MAY92B1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
3	5	14.5	589
T-3		14.5	585
	6	38.75	494
		38.75	492
	7	62.41	382
		62.41	389
	8	85.83	308
		85.83	306

Regression Output:

Constant	643.8932
Std Err of Y Est	7.113379
R Squared	0.996629
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-3.98659
Std Err of Coef.	0.094650

O2 FLUX = 27 mg O2/m2/hr

	11	13.33	527
		13.33	531
	12	38.17	424
		38.17	421
	13	62.17	306
		62.17	303
	14	85.35	191
		85.35	191

Regression Output:

Constant	596.3189
Std Err of Y Est	4.772639
R Squared	0.998934
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-4.71453
Std Err of Coef.	0.062861

O2 FLUX = 32 mg O2/m2/hr

	19	18	531
		18	536
	20	41.4	451
		41.4	450
	21	66.4	351
		66.4	345

Regression Output:

Constant	605.0670
Std Err of Y Est	4.789137
R Squared	0.997351
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-3.83938
Std Err of Coef.	0.098931

O2 FLUX = 26 mg O2/m2/hr

MAY 1992 FILENAME: MAY92B1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
4	5	14.83	501
T-3		14.83	495
	6	39.08	219
		39.08	219
	7	62.74	76
		62.74	75
	8	* O2 conc low	
		*He/O2 flush	

Regression Output:

Constant	607.4123
Std Err of Y Est	37.75581
R Squared	0.969120
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-8.82944
Std Err of Coef.	0.788037

O2 FLUX = 60 mg O2/m2/hr

	11	13.5	420
		13.5	432
	12	38.42	193
		38.42	196
	13	62.42	68
		62.42	66
	14	* oxygen conc low	
		* He/O2 flush	

Regression Output:

Constant	509.6373
Std Err of Y Est	28.26639
R Squared	0.975897
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-7.35291
Std Err of Coef.	0.577774

O2 FLUX = 50 mg O2/m2/hr

	19	18.5	444
		18.5	444
	20	42.5	253
		42.5	259
	21	66.5	122
		66.5	119

Regression Output:

Constant	560.2774
Std Err of Y Est	15.58605
R Squared	0.990827
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-6.74946
Std Err of Coef.	0.324709

O2 FLUX = 46 mg O2/m2/hr

** large Nereis virens worm in core #4
extensive burrows

MAY 1992 FILENAME: MAY92B1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
5	5	15.25	622
T-8		15.25	608
	6	39.42	515
		39.42	513
	7	63.16	433
		63.16	429
	8	86.08	334
		86.08	338

Regression Output:

Constant	672.4143
Std Err of Y Est	6.196020
R Squared	0.997286
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-3.89481
Std Err of Coef.	0.082936

O2 FLUX = 26 mg O2/m2/hr

	11	13.75	570
		13.75	566
	12	38.75	478
		38.75	478
		38.75	472
	13	62.67	397
		62.67	396
	14	85.59	296
		85.59	306

Regression Output:

Constant	619.5174
Std Err of Y Est	5.885271
R Squared	0.996935
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	-3.67122
Std Err of Coef.	0.076935

O2 FLUX = 25 mg O2/m2/hr

	19	21.7	546
		21.7	551
		21.7	553
	20	42.45	485
		42.45	488
	21	66.7	414
		66.7	414

Regression Output:

Constant	615.2095
Std Err of Y Est	2.300691
R Squared	0.998812
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	-3.02010
Std Err of Coef.	0.046568

O2 FLUX = 20 mg O2/m2/hr

MAY 1992 FILENAME: MAY92B1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
6	5	15.67	610
T-8		15.67	597
	6	39.83	473
		39.83	475
	7	63.49	359
		63.49	363
	8	86.41	254
		86.41	251

Regression Output:

Constant	676.8131
Std Err of Y Est	6.146111
R Squared	0.998337
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-4.94492
Std Err of Coef.	0.082390

O2 FLUX = 33 mg O2/m2/hr

11	14.08	567
	14.08	566
12	39.08	478
	39.08	471
13	62.92	422
	62.92	418
14	85.92	316
	85.92	321

Regression Output:

Constant	613.2001
Std Err of Y Est	12.07850
R Squared	0.986425
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-3.33140
Std Err of Coef.	0.159545

O2 FLUX = 23 mg O2/m2/hr

19	22.2	552
	22.2	561
	22.2	552
20	42.4	475
	42.4	482
21	66.9	389
	66.9	395

Regression Output:

Constant	635.3335
Std Err of Y Est	4.712211
R Squared	0.996551
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	-3.65225
Std Err of Coef.	0.096079

O2 FLUX = 25 mg O2/m2/hr

DENITRIFICATION CALCULATIONS - PEAK AREA DATA

BOSTON HARBOR CORES B. NOWICKI

MAY 1992 FILENAME: MAY92A1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
1	5	13.87		27391	2.230	2.01	64	0	7.05
T-3		13.87		30823	2.230	2.01	64	0	7.93
ANOXIC	6	38.25		62701	2.248	1.985	64	0	15.93
CONTROL		38.25		56143	2.248	1.985	64	0	14.26
	7	61.83		88176	2.242	2.023	64	0	22.83
		61.83		83752	2.242	2.023	64	0	21.69
	8	85.25		102409	2.295	1.968	64	0	25.80
		85.25		92901	2.295	1.968	64	0	23.40
	11	12.75		18130	2.261	2.006	62	0	4.51
		12.75		16208	2.261	2.006	62	0	4.03
	12	37.5		25729	2.318	2.04	62	0	6.51
		37.5		29614	2.318	2.04	62	0	7.49
		37.5		31067	2.318	2.04	62	0	7.86
	13	61.67		37388	2.451	2.147	62	0	9.95
		61.67		38875	2.451	2.147	62	0	10.35
	14	84.84		48024	2.246	1.982	62	0	11.80
		84.84		45663	2.246	1.982	62	0	11.22
	19	17.5		27979	2.270	1.8	62	0	6.24
		17.5		36483	2.27	1.8	62	0	8.14
		17.5		31863	2.27	1.8	62	0	7.11
	20	40.8		32356	2.347	2.084	62	0	8.36
		40.8		32927	2.347	2.084	62	0	8.51
	21	65.3		35009	2.312	2.12	62	0	9.20
		65.3		34945	2.312	2.12	62	0	9.19
2	5	14.25		29294	2.230	2.01	62	0	7.30
T-8		14.25		27674	2.230	2.01	62	0	6.90
ANOXIC	6	38.5		63322	2.248	1.985	62	0	15.59
CONTROL		38.5		56816	2.248	1.985	62	0	13.98
	7	62.16		86179	2.242	2.023	62	0	21.62
		62.16		80085	2.242	2.023	62	0	20.09
	8	85.58		98296	2.295	1.968	62	0	23.99
		85.58		91483	2.295	1.968	62	0	22.32
	11	13.08		10665	2.261	2.006	62	0	2.65
		13.08		12924	2.261	2.006	62	0	3.21
	12	37.83		26974	2.318	2.04	62	0	6.82
		37.83		25330	2.318	2.04	62	0	6.41
	13	61.92		28765	2.451	2.147	62	0	7.66
		61.92		27872	2.451	2.147	62	0	7.42
	14	85.09		36229	2.246	1.982	62	0	8.90
		85.09		36645	2.246	1.982	62	0	9.01

MAY 1992 FILENAME: MAY92A1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
2	19	21		21658	2.325	2.15	62	0	5.77
T-8		21		20526	2.325	2.15	62	0	5.47
ANOXIC		21		17717	2.325	2.15	62	0	4.72
CONTROL	20	42		19290	2.347	2.084	62	0	4.98
		42		19362	2.347	2.084	62	0	5.00
	21	66		21928	2.312	2.12	62	0	5.76
		66		22775	2.312	2.12	62	0	5.99
3	5	14.5	2128453	35189	2.230	2.01	62	589	8.77
T-3		14.5	2116149	35827	2.230	2.01	62	585	8.93
	6	38.75	1773173	76296	2.248	1.985	62	494	18.78
		38.75	1764615	72610	2.248	1.985	62	492	17.87
	7	62.41	1374470	105825	2.242	2.023	62	382	26.55
		62.41	1397844	107033	2.242	2.023	62	389	26.85
	8	85.83	1080789	125971	2.295	1.968	62	308	30.74
		85.83	1076838	124664	2.295	1.968	62	306	30.42
	11	13.33	1881141	18442	2.261	2.006	62	527	4.59
		13.33	1894396	18042	2.261	2.006	62	531	4.49
	12	38.17	1473856	41003	2.318	2.04	62	424	10.37
		38.17	1464507	39788	2.318	2.04	62	421	10.06
	13	62.17	1005289	53979	2.451	2.147	62	306	14.37
		62.17	996820	53681	2.451	2.147	62	303	14.29
	14	85.35	686921	73464	2.246	1.982	62	191	18.06
		85.35	686081	73727	2.246	1.982	62	191	18.12
	19	18	1887749	29475	2.270	1.8	62	531	6.58
		18	1904462	28324	2.27	1.8	62	536	6.32
	20	41.4	1548870	41311	2.347	2.084	62	451	10.68
		41.4	1546762	39788	2.347	2.084	62	450	10.28
	21	66.4	1226044	54766	2.312	2.12	62	351	14.40
		66.4	1201913	53600	2.312	2.12	62	345	14.09
4	5	14.83	1810617	60941	2.230	2.01	62	501	15.19
T-3		14.83	1791099	61224	2.230	2.01	62	495	15.26
	6	39.08	785777	156369	2.248	1.985	62	219	38.49
		39.08	784207	152956	2.248	1.985	62	219	37.65
	7	62.74	271856	232449	2.242	2.023	62	76	58.31
		62.74	271226	231011	2.242	2.023	62	75	57.95
	8	* oxygen conc low - flush with He/O2					62		
		*					62		

MAY 1992 FILENAME: MAY92A1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
4 T-3	11	13.5	1499164	35888	2.261	2.006	62	420	8.93
		13.5	1541132	33742	2.261	2.006	62	432	8.39
	12	38.42	672684	74662	2.318	2.04	62	193	18.89
		38.42	683382	75637	2.318	2.04	62	196	19.13
	13	62.42	223569	93201	2.451	2.147	62	68	24.81
		62.42	217967	91217	2.451	2.147	62	66	24.28
	14	* oxygen conc low - flush with He/O2					62		
		*					62		
4 T-3	19	18.5	1578754	46265	2.270	1.8	62	444	10.33
		18.5	1578072	41959	2.27	1.8	62	444	9.37
	20	42.5	867747	78387	2.347	2.084	62	253	20.26
		42.5	889240	81164	2.347	2.084	62	259	20.97
	21	66.5	425717	143914	2.312	2.12	62	122	37.83
		66.5	413643	105337	2.312	2.12	62	119	27.69

** Core #4 (T-3) contained clamworm Nereis virens and its extensive burrows. wet wt. = 0.57 gms

5 T-8	5	15.25	2250053	35387	2.230	2.01	62	622	8.82
		15.25	2197749	33525	2.230	2.01	62	608	8.36
	6	39.42	1846382	68970	2.248	1.985	62	515	16.98
		39.42	1839428	71879	2.248	1.985	62	513	17.69
	7	63.16	1558519	122833	2.242	2.023	62	433	30.81
		63.16	1541808	114891	2.242	2.023	62	429	28.82
	8	86.08	1173300	131726	2.295	1.968	62	334	32.15
		86.08	1186954	138065	2.295	1.968	62	338	33.69
	11	13.75	2032899	19595	2.261	2.006	62	570	4.87
		13.75	2019035	19626	2.261	2.006	62	566	4.88
	12	38.75	1664523	44096	2.318	2.04	62	478	11.15
		38.75	1661875	37590	2.318	2.04	62	478	9.51
		38.75	1640575	41149	2.318	2.04	62	472	10.41
	13	62.67	1307758	55726	2.451	2.147	62	397	14.84
		62.67	1303845	57040	2.451	2.147	62	396	15.19
	14	85.59	1062648	75509	2.246	1.982	62	296	18.56
		85.59	1098591	76546	2.246	1.982	62	306	18.81
	19	21.7	1894969	42288	2.325	2.15	62	546	11.27
		21.7	1909961	38166	2.325	2.15	62	551	10.18
		21.7	1916849	40969	2.325	2.15	62	553	10.92
	20	42.45	1666247	46628	2.347	2.084	62	485	12.05
		42.45	1676922	44179	2.347	2.084	62	488	11.42
	21	66.7	1443566	61943	2.312	2.12	62	414	16.28
		66.7	1444674	59597	2.312	2.12	62	414	15.67

MAY 1992 FILENAME: MAY92A1.WK1

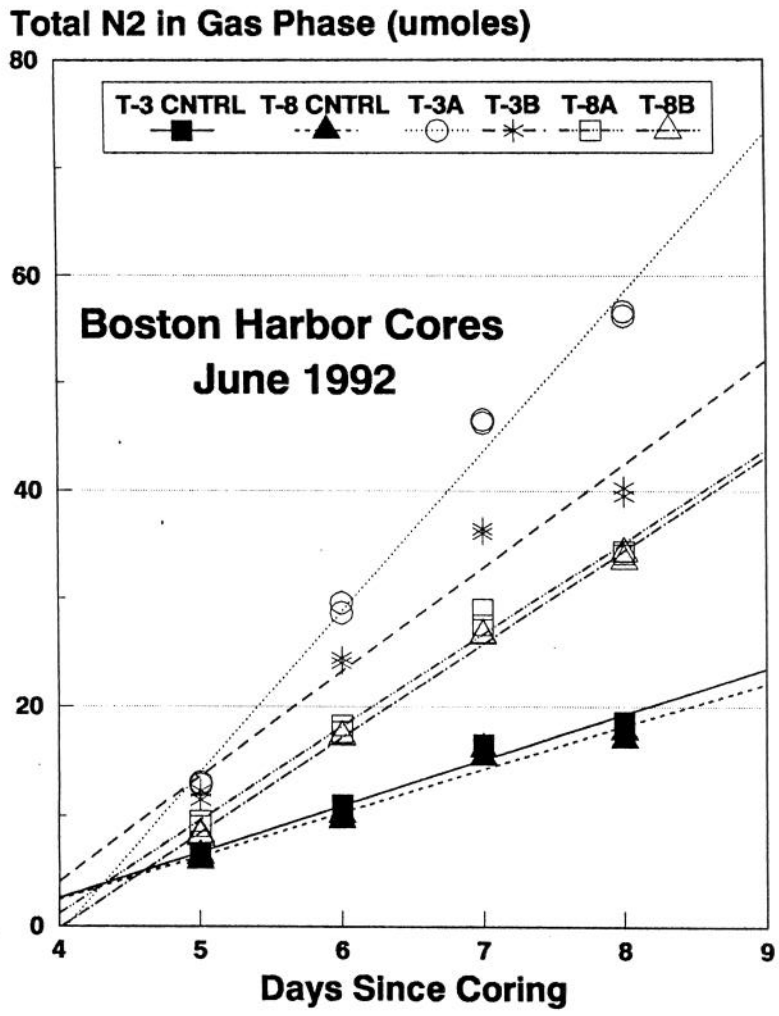
CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
6	5	15.67	2206471	31036	2.230	2.01	62	610	7.74
T-8		15.67	2159535	29242	2.230	2.01	62	597	7.29
	6	39.83	1698457	69720	2.248	1.985	62	473	17.16
		39.83	1704658	67848	2.248	1.985	62	475	16.70
	7	63.49	1291075	121205	2.242	2.023	62	359	30.40
		63.49	1304546	117575	2.242	2.023	62	363	29.49
	8	86.41	893961	135260	2.295	1.968	62	254	33.01
		86.41	882746	128737	2.295	1.968	62	251	31.42
	11	14.08	2023962	15675	2.261	2.006	62	567	3.90
		14.08	2018244	14800	2.261	2.006	62	566	3.68
	12	39.08	1662454	36842	2.318	2.04	62	478	9.32
		39.08	1638454	34939	2.318	2.04	62	471	8.84
	13	62.92	1390046	49304	2.451	2.147	62	422	13.13
		62.92	1374054	49701	2.451	2.147	62	418	13.23
	14	85.92	1134938	69144	2.246	1.982	62	316	16.99
		85.92	1154293	70943	2.246	1.982	62	321	17.44
	19	22.2	1914552	33289	2.325	2.15	62	552	8.87
		22.2	1946443	33793	2.325	2.15	62	561	9.01
		22.2	1914694	27421	2.325	2.15	62	552	7.31
	20	42.4	1631087	37356	2.347	2.084	62	475	9.65
		42.4	1655988	37787	2.347	2.084	62	482	9.76
	21	66.9	1357535	58347	2.312	2.12	62	389	15.34
		66.9	1376971	54459	2.312	2.12	62	395	14.32

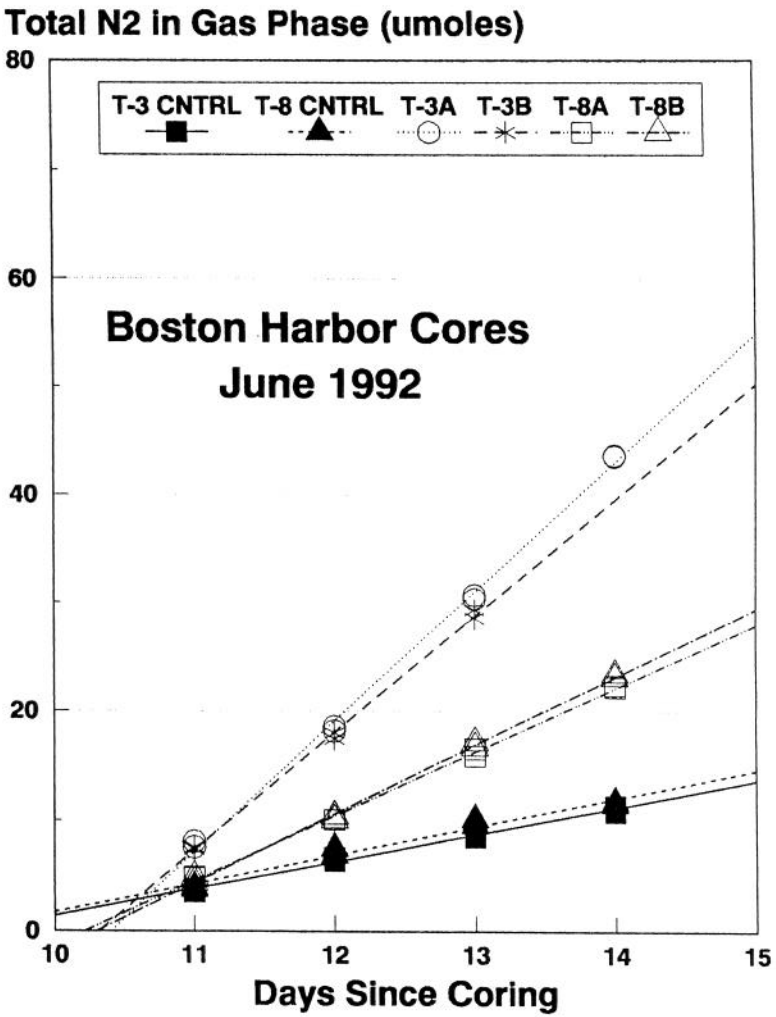
Denitrification in Boston Harbor: June 1992
15°C

Station	Incubation #	Days	O_2 Flux (mg O_2 m^{-2} h^{-1})	N_2 Flux (µmol N_2 m^{-2} h^{-1})	Anoxic Control Flux (µmol N_2 m^{-2} h^{-1})	Corrected N_2 Flux (µmol N_2 m^{-2} h^{-1})
T-3	1	5- 8	39	132±15	37±6	95±16
	2	11-14	39	97± 2	20±2	77± 3
T-3	1	5- 8	55	83±17	37±6	46±18
	2	11-14	55	91± 5	20±2	71± 5
T-8	1	5- 8	40	76± 8	35±7	41±11
	2	11-14	33	47± 2	21±4	26± 5
T-8	1	5- 8	32	77± 5	35±7	42± 9
	2	11-14	25	51± 2	21±4	30± 5

Errors show 95% CIS around slopes of linear regressions of N_2 production versus time.

B28





Juneplt.drw

B29

DENITRIFICATION CALCULATIONS - NITROGEN REGRESSIONS

BOSTON HARBOR CORES B. NOWICKI

JUNE 1992 FILENAME: JUNE92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
1	5	13.83	6.60
T-3		13.83	6.65
ANOXIC	6	37.25	10.79
		37.25	9.94
CONTROL		37.25	11.02
	7	61.33	16.48
		61.33	16.54
	8	85	18.62
		85	18.64

(±) = 95% C.I.

Regression Output:

Constant	4.300854
Std Err of Y Est	0.899883
R Squared	0.969692
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.177211
Std Err of Coef.	0.011841

N2 FLUX = 37 um N2/m2/hr
(± 6)

	11	12.33	3.54
		12.33	3.82
	12	36.75	6.40
		36.75	6.69
	13	61.75	9.05
		61.75	8.51
	14	90.92	11.38
		90.92	10.84

Regression Output:

Constant	2.802066
Std Err of Y Est	0.379301
R Squared	0.985786
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.093744
Std Err of Coef.	0.004595

N2 FLUX = 20 um N2/m2/hr
(± 2)

2	5	14.25	6.02
T-8		14.25	6.40
ANOXIC	6	37.5	10.15
CONTROL		37.5	9.66
	7	61.66	16.17
		61.66	15.42
	8	85.25	17.76
		85.25	17.04

Regression Output:

Constant	4.058046
Std Err of Y Est	1.072776
R Squared	0.957584
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.166478
Std Err of Coef.	0.014303

N2 FLUX = 35 um N2/m2/hr
(± 7)

JUNE 1992 FILENAME: JUNE92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
2	11	12.58	3.80
T-8		12.58	3.99
ANOXIC	12	37	7.54
CONTROL		37	6.92
	13	62	8.77
		62	10.13
		62	9.63
	14	91.17	11.73
		91.17	11.50

(±) = 95% C.I.

Regression Output:

Constant	3.157170
Std Err of Y Est	0.628300
R Squared	0.959733
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.097514
Std Err of Coef.	0.007549

N2 FLUX = 21 um N2/m2/hr
(± 4)

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
3	5	14.75	12.84
T-3		14.75	13.05
	6	37.83	28.71
		37.83	29.63
	7	61.99	46.62
		61.99	46.32
	8	85.5	56.73
		85.5	56.30

Regression Output:

Constant	4.964803
Std Err of Y Est	2.105282
R Squared	0.988004
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.625998
Std Err of Coef.	0.028159

N2 FLUX = 132 um N2/m2/hr
(± 15)

	11	12.83	8.10
		12.83	7.61
	12	37.25	18.19
		37.25	18.58
	13	62.5	30.77
		62.5	30.40
	14	91.5	43.61
		91.5	43.72

Regression Output:

Constant	1.757863
Std Err of Y Est	0.370335
R Squared	0.999426
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.457943
Std Err of Coef.	0.004478

N2 FLUX = 97 um N2/m2/hr
(± 2)

JUNE 1992

FILENAME: JUNE92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
4	5	15.08	12.30
T-3		15.08	11.49
	6	38.08	24.06
		38.08	24.54
	7	62.24	36.08
		62.24	36.50
	8	85.92	40.03
		85.92	40.31
		85.92	39.57
	11	13.08	7.61
		13.08	7.45
	12	37.5	18.02
		37.5	17.48
	13	62.75	28.64
		62.75	29.39
	14	91.75	
		91.75	
5	5	15.33	9.53
T-8		15.33	9.07
	6	38.41	18.26
		38.41	17.70
	7	62.49	27.59
		62.49	29.05
	8	86.25	34.43
		86.25	34.18
	11	13.33	4.92
		13.33	4.80
	12	37.75	10.09
		37.75	10.10
	13	63	16.58
		63	15.94
	14	92.08	22.43
		92.08	22.24

(±) = 95% C.I.

Regression Output:

Constant	8.048056
Std Err of Y Est	2.712060
R Squared	0.953004
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.393930
Std Err of Coef.	0.033063

N2 FLUX = 83 um N2/m2/hr
(± 17)

Regression Output:

Constant	1.756642
Std Err of Y Est	0.385774
R Squared	0.998712
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.432561
Std Err of Coef.	0.007766

N2 FLUX = 91 um N2/m2/hr
(± 5)

Regression Output:

Constant	4.232235
Std Err of Y Est	1.208059
R Squared	0.988125
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.360408
Std Err of Coef.	0.016129

N2 FLUX = 76 um N2/m2/hr
(± 8)

Regression Output:

Constant	1.850892
Std Err of Y Est	0.299691
R Squared	0.998432
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.223831
Std Err of Coef.	0.003621

N2 FLUX = 47 um N2/m2/hr
(± 2)

JUNE 1992 FILENAME: JUNE92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
6	5	15.66	8.08
T-8		15.66	8.35
	6	38.74	17.28
		38.74	17.25
	7	62.74	26.73
		62.74	26.62
	8	86.58	33.61
		86.58	34.31

(±) = 95% C.I.

Regression Output:

Constant	2.893224
Std Err of Y Est	0.685208
R Squared	0.996260
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.365902
Std Err of Coef.	0.009151

N2 FLUX = 77 um N2/m2/hr
(± 5)

	11	13.58	4.93
		13.58	4.41
	12	38	10.11
		38	10.42
	13	63.33	17.19
		63.33	16.73
	14	92.33	23.17
		92.33	23.53

Regression Output:

Constant	1.397641
Std Err of Y Est	0.373572
R Squared	0.997876
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.239617
Std Err of Coef.	0.004512

N2 FLUX = 51 um N2/m2/hr
(± 2)

DENITRIFICATION CALCULATIONS - OXYGEN REGRESSIONS

BOSTON HARBOR CORES B. NOWICKI

JUNE 1992 FILENAME: JUNE92B.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
3	5	14.75	507
T-3		14.75	504
	6	37.83	353
		37.83	363
	7	61.99	210
		61.99	210
	8	85.5	105
		85.5	105

Regression Output:

Constant	580.0537
Std Err of Y Est	13.84531
R Squared	0.993715
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-5.70407
Std Err of Coef.	0.185191

O2 FLUX = 39 mg O2/m2/hr

	11	12.83	531
		12.83	533
	12	37.25	360
		37.25	356
	13	62.5	211
		62.5	214
	14	91.5	77
		91.5	78

Regression Output:

Constant	588.8511
Std Err of Y Est	19.13232
R Squared	0.990394
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-5.75525
Std Err of Coef.	0.231384

O2 FLUX = 39 mg O2/m2/hr

4	5	15.08	428
T-3		15.08	431
	6	38.08	209
		38.08	206
	7	62.24	44
		62.24	44
	8	85.92	4
		85.92	4
		85.92	4

Regression Output:**

Constant	540.7185
Std Err of Y Est	19.56063
R Squared	0.989773
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-8.16000
Std Err of Coef.	0.414729

O2 FLUX = 55 mg O2/m2/hr

** first 3 points only
O2 decline is not linear at low O2 concs.

JUNE 1992 FILENAME: JUNE92B.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
4	11	13.08	474
T-3		13.08	474
	12	37.5	231
		37.5	231
	13	62.75	67
		62.75	68
	14	91.75	34
		91.75	34

Regression Output:**

Constant	566.0778
Std Err of Y Est	24.60000
R Squared	0.985501
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-8.16627
Std Err of Coef.	0.495245

O2 FLUX = 55 mg O2/m2/hr

** first 3 points only
O2 decline is not linear at low concs

5	5	15.33	501
T-8		15.33	512
	6	38.41	351
		38.41	354
	7	62.49	210
		62.49	214
	8	86.25	90
		86.25	90

Regression Output:

Constant	587.0098
Std Err of Y Est	11.02335
R Squared	0.996233
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-5.86302
Std Err of Coef.	0.147177

O2 FLUX = 40 mg O2/m2/hr

	11	13.33	545
		13.33	534
	12	37.75	413
		37.75	408
	13	63	283
		63	283
	14	92.08	150
		92.08	149

Regression Output:

Constant	600.8903
Std Err of Y Est	6.447470
R Squared	0.998516
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-4.95014
Std Err of Coef.	0.077901

O2 FLUX = 33 mg O2/m2/hr

JUNE 1992 FILENAME: JUNE92B.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
6	5	15.66	529
T-8		15.66	545
	6	38.74	423
		38.74	420
	7	62.74	304
		62.74	304
	8	86.58	192
		86.58	201

Regression Output:

Constant	609.5873
Std Err of Y Est	6.507482
R Squared	0.998040
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-4.80513
Std Err of Coef.	0.086913

O2 FLUX = 32 mg O2/m2/hr

	11	13.58	559
		13.58	576
	12	38	473
		38	463
	13	63.33	374
		63.33	368
	14	92.33	271
		92.33	272

Regression Output:

Constant	614.4515
Std Err of Y Est	7.757874
R Squared	0.996296
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-3.76489
Std Err of Coef.	0.093709

O2 FLUX = 25 mg O2/m2/hr

DENITRIFICATION CALCULATIONS - PEAK AREA DATA

BOSTON HARBOR CORES B. NOWICKI

JUNE 1992 FILENAME: JUNE92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
1	5	13.83		26479	2.178	2.011	62	0	6.60
T-3		13.83		26674	2.178	2.011	62	0	6.65
ANOXIC	6	37.25		44051	2.171	1.975	62	0	10.79
		37.25		40600	2.171	1.975	62	0	9.94
CONTROL		37.25		44981	2.171	1.975	62	0	11.02
	7	61.33		66241	2.162	2.006	62	0	16.48
		61.33		66513	2.162	2.006	62	0	16.54
	8	85		78934	2.171	1.902	62	0	18.62
		85		79017	2.171	1.902	62	0	18.64
	11	12.33		14122	2.305	2.022	62	0	3.54
		12.33		15245	2.305	2.022	62	0	3.82
	12	36.75		26081	2.277	1.98	62	0	6.40
		36.75		27256	2.277	1.98	62	0	6.69
	13	61.75		34641	2.296	2.106	62	0	9.05
		61.75		32582	2.296	2.106	62	0	8.51
	14	90.92		45905	2.199	2	62	0	11.38
		90.92		43729	2.199	2	62	0	10.84
2	5	14.25		24158	2.178	2.011	62	0	6.02
T-8		14.25		25649	2.178	2.011	62	0	6.40
ANOXIC	6	37.5		41442	2.171	1.975	62	0	10.15
CONTROL		37.5		39429	2.171	1.975	62	0	9.66
	7	61.66		64995	2.162	2.006	62	0	16.17
		61.66		61983	2.162	2.006	62	0	15.42
	8	85.25		75284	2.171	1.902	62	0	17.76
		85.25		72265	2.171	1.902	62	0	17.04
	11	12.58		15148	2.305	2.022	62	0	3.80
		12.58		15899	2.305	2.022	62	0	3.99
	12	37		30721	2.277	1.98	62	0	7.54
		37		28170	2.277	1.98	62	0	6.92
	13	62		33591	2.296	2.106	62	0	8.77
		62		38788	2.296	2.106	62	0	10.13
		62		36888	2.296	2.106	62	0	9.63
	14	91.17		47297	2.199	2	62	0	11.73
		91.17		46351	2.199	2	62	0	11.50
3	5	14.75	1876759	51508	2.178	2.011	62	507	12.84
T-3		14.75	1866075	52349	2.178	2.011	62	504	13.05
	6	37.83	1311382	117223	2.171	1.975	62	353	28.71
		37.83	1348887	120994	2.171	1.975	62	363	29.63
	7	61.99	784912	187429	2.162	2.006	62	210	46.62
		61.99	784912	186196	2.162	2.006	62	210	46.32
	8	85.5	390737	240530	2.171	1.902	62	105	56.73
		85.5	389930	238723	2.171	1.902	62	105	56.30

JUNE 1992 FILENAME: JUNE92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
3	11	12.83	1858722	32323	2.305	2.022	62	531	8.10
T-3		12.83	1866063	30332	2.305	2.022	62	533	7.61
	12	37.25	1276659	74088	2.277	1.98	62	360	18.19
		37.25	1262555	75695	2.277	1.98	62	356	18.58
	13	62.5	739840	117809	2.296	2.106	62	211	30.77
		62.5	750468	116400	2.296	2.106	62	214	30.40
	14	91.5	284053	175863	2.199	2	62	77	43.61
		91.5	287644	176278	2.199	2	62	78	43.72
4	5	15.08	1584269	49342	2.178	2.011	62	428	12.30
T-3		15.08	1594115	46084	2.178	2.011	62	431	11.49
	6	38.08	777602	98260	2.171	1.975	62	209	24.06
		38.08	763819	100211	2.171	1.975	62	206	24.54
	7	62.24	163334	145038	2.162	2.006	62	44	36.08
		62.24	163551	146727	2.162	2.006	62	44	36.50
	8	85.92	13660	169734	2.171	1.902	62	4	40.03
		85.92	13660	170934	2.171	1.902	62	4	40.31
		85.92	13928	167774	2.171	1.902	62	4	39.57
	11	13.08	1656668	30354	2.305	2.022	62	474	7.61
		13.08	1658012	29725	2.305	2.022	62	474	7.45
	12	37.5	819534	73378	2.277	1.98	62	231	18.02
		37.5	819873	71190	2.277	1.98	62	231	17.48
	13	62.75	235764	109670	2.296	2.106	62	67	28.64
		62.75	239169	112531	2.296	2.106	62	68	29.39
	14	91.75	124987		2.199	2	62	34	
		91.75	123359		2.199	2	62	34	
5	5	15.33	1826529	37594	2.178	2.011	63	501	9.53
T-8		15.33	1864134	35784	2.178	2.011	63	512	9.07
	6	38.41	1282763	73395	2.171	1.975	63	351	18.26
		38.41	1293869	71114	2.171	1.975	63	354	17.70
	7	62.49	769575	109166	2.162	2.006	63	210	27.59
		62.49	785777	114931	2.162	2.006	63	214	29.05
	8	86.25	329287	143682	2.171	1.902	63	90	34.43
		86.25	330356	142621	2.171	1.902	63	90	34.18
	11	13.33	1907197	19630	2.305	2.022	62	545	4.92
		13.33	1866812	19155	2.305	2.022	62	534	4.80
	12	37.75	1463547	41104	2.277	1.98	62	413	10.09
		37.75	1444910	41136	2.277	1.98	62	408	10.10
	13	63	995214	63490	2.296	2.106	62	283	16.58
		63	995682	61038	2.296	2.106	62	283	15.94
	14	92.08	550560	90427	2.199	2	62	150	22.43
		92.08	547370	89660	2.199	2	62	149	22.24

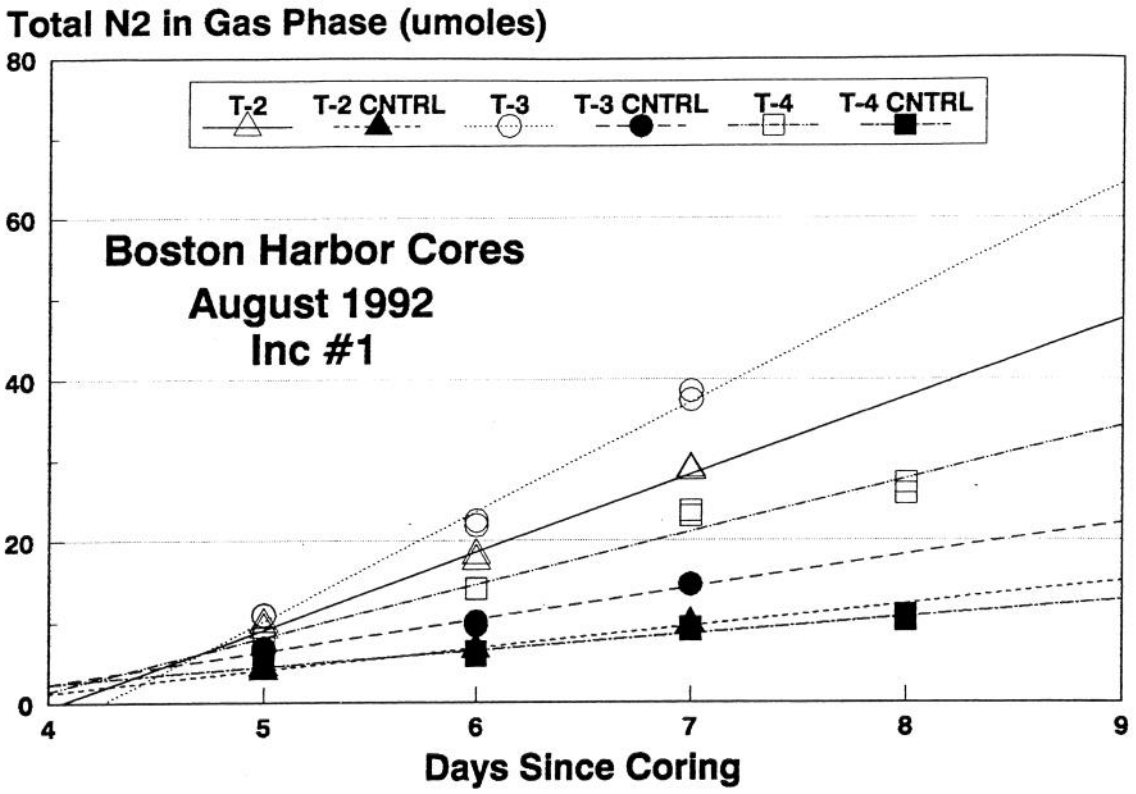
JUNE 1992 FILENAME: JUNE92A.WK1

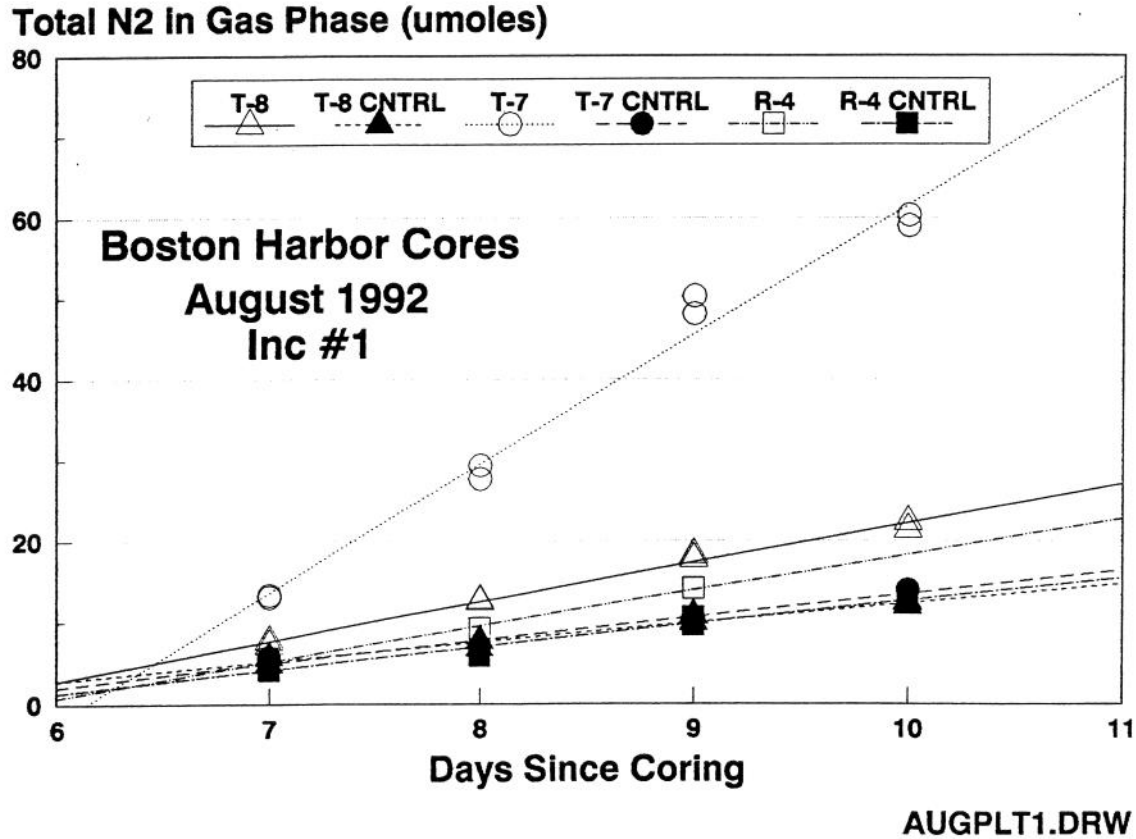
CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
6	5	15.66	1958615	32390	2.178	2.011	62	529	8.08
T-8		15.66	2018806	33479	2.178	2.011	62	545	8.35
	6	38.74	1569976	70557	2.171	1.975	62	423	17.28
		38.74	1560022	70438	2.171	1.975	62	420	17.25
	7	62.74	1135233	107459	2.162	2.006	62	304	26.73
		62.74	1134120	107034	2.162	2.006	62	304	26.62
	8	86.58	714312	142521	2.171	1.902	62	192	33.61
		86.58	748184	145462	2.171	1.902	62	201	34.31
	11	13.58	1957365	19680	2.305	2.022	62	559	4.93
		13.58	2015247	17590	2.305	2.022	62	576	4.41
	12	38	1674468	41159	2.277	1.98	62	473	10.11
		38	1639236	42460	2.277	1.98	62	463	10.42
	13	63.33	1312052	65832	2.296	2.106	62	374	17.19
		63.33	1292541	64077	2.296	2.106	62	368	16.73
	14	92.33	992730	93415	2.199	2	62	271	23.17
		92.33	996928	94884	2.199	2	62	272	23.53

Denitrification in Boston Harbor: August 1992
17.5°C

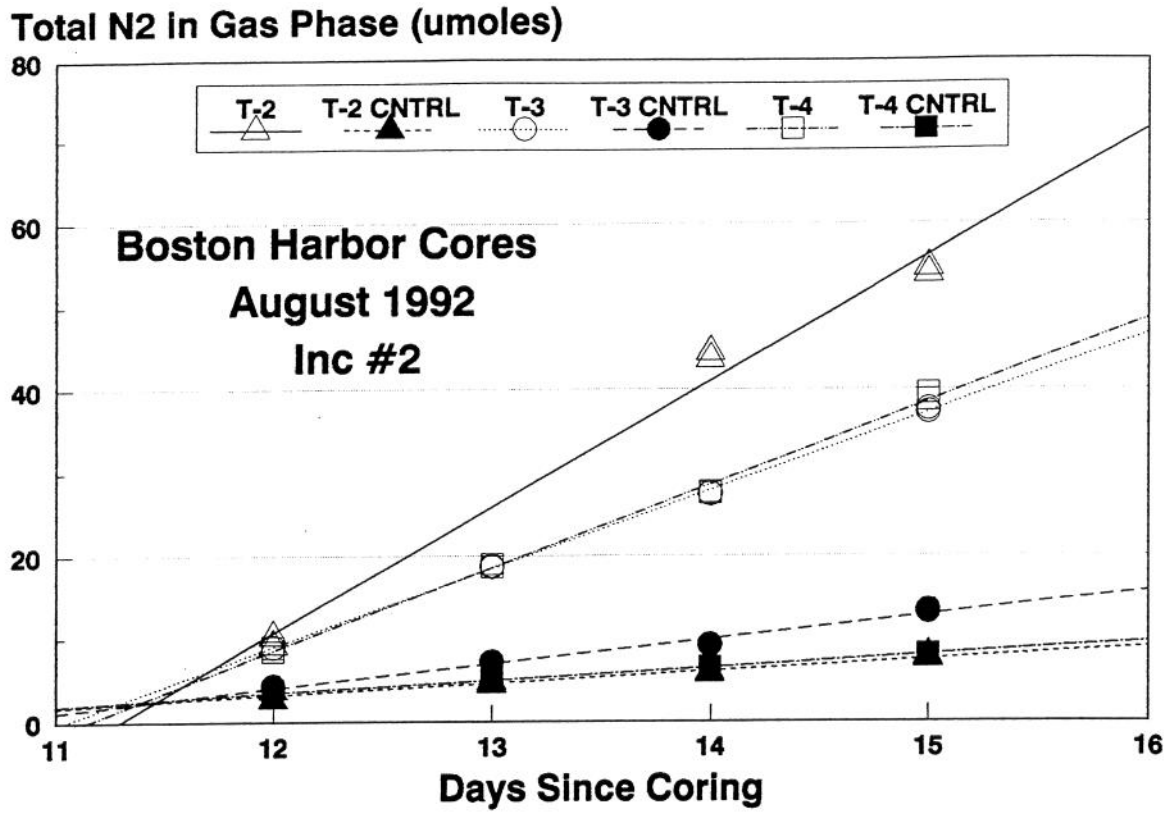
Station	Incubation #	Days	O_2 Flux (mg O_2 m^{-2} h^{-1})	N_2 Flux (μmol N_2 m^{-2} h^{-1})	Anoxic Control Flux (μmol N_2 m^{-2} h^{-1})	Corrected N_2 Flux (μmol N_2 m^{-2} h^{-1})
T-8	1	7-10	20	43± 4	21±4	22± 6
	2	14-17	15	-	24±5	-
T-7	1	7-10	43	141±16	25±5	116±17
	2	14-17	30	96±14	22±3	74±14
R-4	1	7-10	30	38± 5	25±5	13± 7
	2	14-17	35	–	17±6	–
T-2	1	5- 8	42	85±10	24±3	61±10
	2	12-15	39	133±17	12±3	121±17
T-3	1	5- 8	42	120±16	35±6	85±17
	2	12-15	24	82± 3	25±3	57± 4
T-4	1	5- 8	40	58±11	18±3	40±11
	2	12-15	39	87± 5	13±2	74± 5

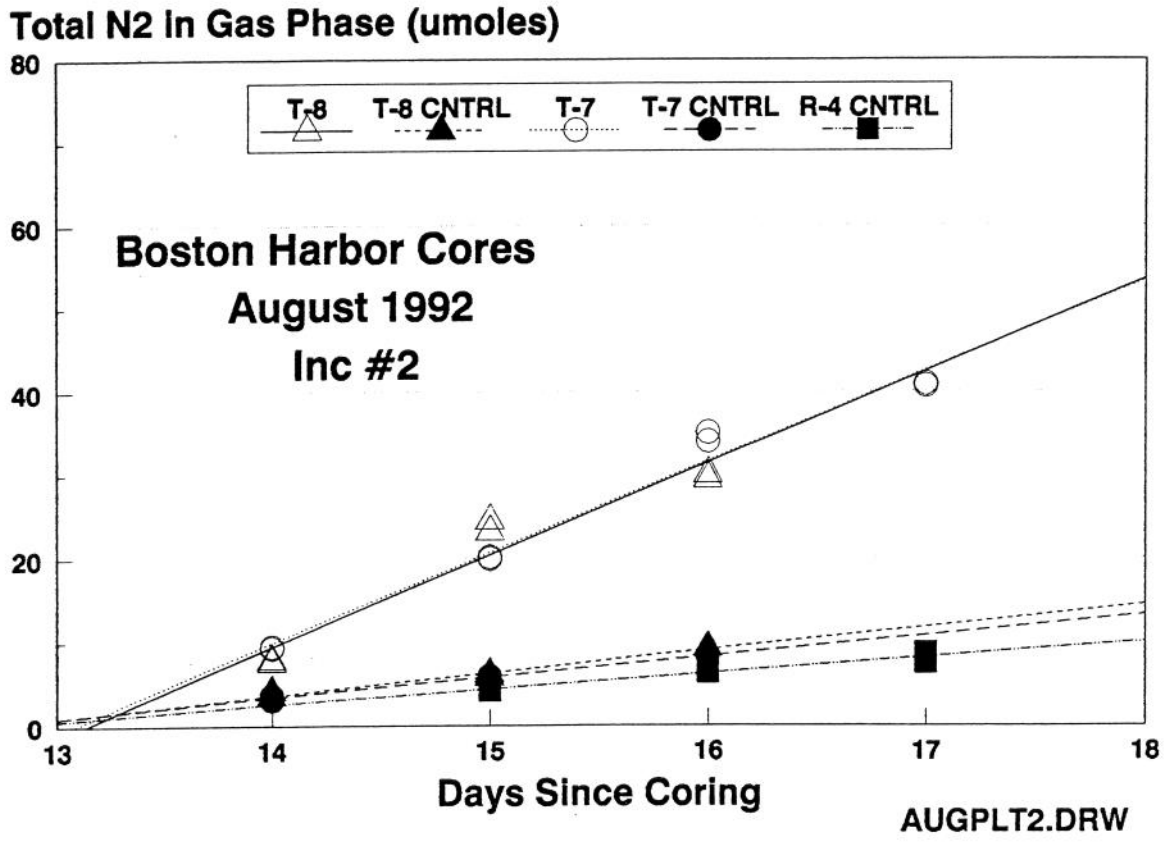
Errors show 95% CIS around slopes of linear regressions of N_2 production versus time.


Total N2 in Gas Phase (umoles)
T-2
T-2 CNTRL
T-3
T-3 CNTRL
T-4
T-4 CNTRL
Boston Harbor Cores
August 1992
Inc #1
80
60
40
20
0
4
5
6
7
8
9
Days Since Coring


Total N2 in Gas Phase (umoles)
T-8
T-8 CNTRL
T-7
T-7 CNTRL
R-4
R-4 CNTRL
Boston Harbor Cores
August 1992
Inc #1
80
60
40
20
0
6
7
8
9
10
11
Days Since Coring

AUGPLT1.DRW


Total N2 in Gas Phase (umoles)
T-2
T-2 CNTRL
T-3
T-3 CNTRL
T-4
T-4 CNTRL
Boston Harbor Cores
August 1992
Inc #2
80
60
40
20
0
11
12
13
14
15
16
Days Since Coring


Total N2 in Gas Phase (umoles)
T-8
T-8 CNTRL
T-7
T-7 CNTRL
R-4 CNTRL
Boston Harbor Cores
August 1992
Inc #2
80
60
40
20
0
13
14
15
16
17
18
Days Since Coring
AUGPLT2.DRW

DENITRIFICATION CALCULATIONS - NITROGEN REGRESSIONS

BOSTON HARBOR CORES B. NOWICKI

AUGUST 1992 - INC #1 FILENAME; AUG92B1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
1	7	13	7.14	
		13	7.68	
	8	36.75	12.67	
T-8		36.75	12.47	
	9	61.25	18.20	
		61.25	17.70	
	10	85	21.34	
		85	22.29	
?	7	14	13.32	
		14	13.05	
	8	38.17	29.35	
T-7		38.17	27.67	
	9	62.5	48.02	
		62.5	50.24	
	10	85.5	58.93	
		85.5	60.22	
3	7	14.75	5.58	
		14.75	5.06	
	8	39.67	9.16	
R-4		39.67	9.26	
	9	63	14.17	
		63	14.06	
	10	86.16	271.31	*
		86.16	267.91	*

(±) = 95% Confidence Interval

Regression Output:

Constant	5.034212
Std Err of Y Est	0.545714
R Squared	0.992492
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.202090
Std Err of Coef.	0.007175

N2 FLUX = 43 umoles N2/m2/hr
(± 4)

Regression Output:

Constant	4.077812
Std Err of Y Est	2.382171
R Squared	0.986873
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.669866
Std Err of Coef.	0.031539

N2 FLUX = 141 umoles N2/m2/hr
(± 16)

Regression Output:

Constant	2.425062
Std Err of Y Est	0.422608
R Squared	0.990819
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.181956
Std Err of Coef.	0.008757

N2 FLUX = 38 umoles N2/m2/hr
(± 5)

* = Contaminated Chamber

AUGUST 1992 - INC #1 FILENAME; AUG92B1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
4	5	16	9.75	
		16	9.13	
	6	39.95	18.19	
T-2		39.95	17.46	
	7	63.75	28.53	
		63.75	28.80	
	8	87.75	25.56	*
		87.75	24.86	*

Regression Output:

Constant	2.578643
Std Err of Y Est	0.806976
R Squared	0.993002
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.402641
Std Err of Coef.	0.016900

N2 FLUX = 85 umoles N2/m2/hr
(± 10)

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
5	5	16.55	10.82	
		16.55	10.93	
	6	40.33	22.49	
T-3		40.33	21.92	
	7	64.25	37.44	
		64.25	38.55	
	8	88.25	32.59	*
		88.25	34.47	*

Regression Output:

Constant	0.733045
Std Err of Y Est	1.337724
R Squared	0.990364
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.568634
Std Err of Coef.	0.028044

N2 FLUX = 120 umoles N2/m2/hr
(± 16)

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
6	5	17.1	7.53
		17.1	7.99
	6	40.65	14.08
T-4		40.65	14.02
	7	64.67	23.01
		64.67	23.69
	8	89	27.16
		89	25.77

Regression Output:

Constant	3.496907
Std Err of Y Est	1.602941
R Squared	0.965164
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.272625
Std Err of Coef.	0.021144

N2 FLUX = 58 umoles N2/m2/hr
(± 11)

* = needle clogged during sampling

DENITRIFICATION CALCULATIONS - NITROGEN REGRESSIONS FOR ANOXIC CORES

BOSTON HARBOR CORES B. NOWICKI

AUGUST 1992 - INC #1 FILENAME: AUG92C1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
1C	7	13.67	5.70
		13.67	4.80
	8	37.5	7.66
T-8		37.5	6.82
	9	62.33	9.88
		62.33	10.72
	10	85.17	11.92
		85.17	12.45
2C	7	14.42	5.41
		14.42	5.68
	8	39	6.74
T-7		39	7.04
	9	62.75	10.52
		62.75	10.50
	10	85.83	13.86
		85.83	13.95
3C	7	15	5.08
		15	4.10
	8	40.15	5.86
R-4		40.15	6.43
	9	63.25	9.52
		63.25	10.60
	10	86.41	12.45
		86.41	13.03

(±) = 95% Confidence Interval

Regression Output:

Constant	3.785332
Std Err of Y Est	0.522578
R Squared	0.972113
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.099848
Std Err of Coef.	0.006904

N2 FLUX = 21 umoles N2/m2/hr (±4)

Regression Output:

Constant	3.137215
Std Err of Y Est	0.729073
R Squared	0.962546
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.120290
Std Err of Coef.	0.009686

N2 FLUX = 25 umoles N2/m2/hr (±5)

Regression Output:

Constant	2.284149
Std Err of Y Est	0.795226
R Squared	0.954720
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.119154
Std Err of Coef.	0.010593

N2 FLUX = 25 umoles N2/m2/hr (±5)

AUGUST 1992 - INC #1 FILENAME: AUG92C1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
4C	5	16.25	3.93	
		16.25	4.37	
	6	40	6.60	
T-2		40	6.58	
	7	64	9.55	
		64	9.70	
	8	88	9.16	*
		88	8.48	*

Regression Output:

Constant	2.188315
Std Err of Y Est	0.232260
R Squared	0.992865
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.114757
Std Err of Coef.	0.004864

N2 FLUX = 24 umoles N2/m2/hr (±3)

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
5C	5	16.75	6.37	
		16.75	6.82	
	6	40.48	9.54	
T-3		40.48	10.02	
	7	64.42	14.51	
		64.42	14.58	
	8	88.67	13.26	*
		88.67	13.20	*

Regression Output:

Constant	3.540575
Std Err of Y Est	0.501547
R Squared	0.984342
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.166841
Std Err of Coef.	0.010521

N2 FLUX = 35 umoles N2/m2/hr (±6)

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
6C	5	17.3	4.81
		17.3	4.28
	6	40.98	6.35
		40.98	5.74
T-4		40.98	6.08
	7	64.92	9.27
		64.92	8.92
	8	89.15	10.84
		89.15	10.06
		89.15	10.38

Regression Output:

Constant	2.893987
Std Err of Y Est	0.494409
R Squared	0.964354
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	0.086167
Std Err of Coef.	0.005857

N2 FLUX = 18 umoles N2/m2/hr (±3)

DENITRIFICATION CALCULATIONS - NITROGEN REGRESSIONS

BOSTON HARBOR CORES B. NOWICKI

AUGUST 1992 - INC #2 FILENAME: AUG92D2.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
1	14	14	7.87	
		14	7.56	
	15	38	24.55	
T-8		38	23.22	
	16	62.08	29.44	
		62.08	30.06	
	17	86	29.70	*
		86	28.53	*

(± 95% C.I.)

Regression Output:

Constant	3.024904
Std Err of Y Est	3.031103
R Squared	0.929616
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.458230
Std Err of Coef.	0.063042

N2 FLUX = 97 umoles N2/m2/hr
(±37)

2	14	14.75	9.46	
		14.75	9.29	
	15	38.58	20.24	
T-7		38.58	19.99	
	16	62.74	34.02	
		62.74	35.09	
	17	86.58	40.95	
		86.58	40.69	

Regression Output:

Constant	3.210241
Std Err of Y Est	2.002959
R Squared	0.980080
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.454108
Std Err of Coef.	0.026429

N2 FLUX = 96 umoles N2/m2/hr
(±14)

3	14	15.5	7.05	
		15.5	5.15	
	15	39.33	119.87	*
R-4		39.33	120.05	*
		------	---------	
	15	41.91	9.87	
		41.91	9.50	
	16	63.32	88.59	*
		63.32	88.69	*
	17	87.24	185.23	*
		87.24	183.59	*

contaminated chamber

AUGUST 1992 - INC #2

FILENAME: AUG92D2.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
4	12	16.83	9.18
		16.83	9.70
		16.83	10.25
T-2	14	64.83	44.44
		64.83	43.62
	15	90	53.85
		90	54.62
5	12	17.5	8.99
		17.5	8.99
	13	40.91	18.81
T-3		40.91	18.66
	14	65.33	27.37
		65.33	27.48
	15	90.25	37.65
		90.25	37.26
6	12	18.17	8.97
		18.17	8.45
	13	41.41	19.00
T-4		41.41	18.65
	14	65.83	27.53
		65.83	27.64
	15	90.83	39.52
		90.83	38.71

(± 95% C.I.)

Regression Output:

Constant	-0.08740
Std Err of Y Est	2.675503
R Squared	0.987076
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	0.628257
Std Err of Coef.	0.032149

N2 FLUX = 133 umoles N2/m2/hr
(±17)

Regression Output:

Constant	2.412468
Std Err of Y Est	0.366626
R Squared	0.999089
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.387641
Std Err of Coef.	0.004777

N2 FLUX = 82 umoles N2/m2/hr
(±3)

Regression Output:

Constant	1.259662
Std Err of Y Est	0.668537
R Squared	0.997325
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.412470
Std Err of Coef.	0.008720

N2 FLUX = 87 umoles N2/m2/hr
(±5)

DENITRIFICATION CALCULATIONS - NITROGEN REGRESSIONS FOR ANOXIC CORES

BOSTON HARBOR CORES B. NOWICKI

AUGUST 1992 - INC #2 FILENAME: AUG92C2.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
1C	14	14.37	4.04	
		14.37	3.46	
	15	38.25	5.78	
T-8		38.25	6.11	
	16	62.41	9.23	
		62.41	9.22	
	17	86.25	9.91	*
		86.25	9.98	*

Regression Output:

Constant	1.934043
Std Err of Y Est	0.386623
R Squared	0.980463
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.114025
Std Err of Coef.	0.008047

N2 FLUX = 24 umoles N2/m2/hr
(±5)

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
2C	14	15.13	3.02	
		15.13	3.62	
	15	39	5.81	
T-7		39	5.98	
	16	62.99	8.42	
		62.99	8.12	
	17	86.96	8.74	*
		86.96	8.93	*

Regression Output:

Constant	1.792089
Std Err of Y Est	0.253287
R Squared	0.989628
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.103389
Std Err of Coef.	0.005292

N2 FLUX = 22 umoles N2/m2/hr
(±3)

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
3C	14	15.75	4.56	*
		15.75	6.22	*
	15	39.75	4.39	
R-4		39.75	4.15	
	16	63.65	6.30	
		63.65	6.47	
	17	87.66	7.42	
		87.66	8.70	

Regression Output:

Constant	1.201915
Std Err of Y Est	0.484083
R Squared	0.938741
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.079107
Std Err of Coef.	0.010104

N2 FLUX = 17 umoles N2/m2/hr
(±6)

AUGUST 1992 - INC #2 FILENAME: AUG92C2.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
4C	12	17.25	3.81
		17.25	2.74
	13	40.66	4.84
T-2		40.66	4.51
	14	65.08	5.96
		65.08	5.74
	15	89.75	7.50
		89.75	7.74

Regression Output:

Constant	2.232261
Std Err of Y Est	0.364216
R Squared	0.962068
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.058726
Std Err of Coef.	0.004760

N2 FLUX = 12 umoles N2/m2/hr
(±3)

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
5C	12	17.83	3.90
		17.83	4.34
	13	41.16	7.19
T-3		41.16	7.18
	14	65.58	9.23
		65.58	9.11
	15	90.58	13.38
		90.58	13.06

Regression Output:

Constant	1.927554
Std Err of Y Est	0.498991
R Squared	0.982896
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.120730
Std Err of Coef.	0.006501

N2 FLUX = 25 umoles N2/m2/hr
(±3)

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
6C	12	18.42	3.04
		18.42	3.46
	13	41.66	5.63
T-4		41.66	4.99
	14	66.08	6.39
		66.08	6.52
	15	91.08	7.83
		91.08	8.04

Regression Output:

Constant	2.340018
Std Err of Y Est	0.346172
R Squared	0.969690
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.062561
Std Err of Coef.	0.004515

N2 FLUX = 13 umoles N2/m2/hr
(±2)

DENITRIFICATION CALCULATIONS - OXYGEN REGRESSIONS

BOSTON HARBOR CORES B. NOWICKI

AUGUST 1992 - INC #1 FILENAME: AUG92B1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
1	7	13	553
		13	573
	8	36.75	495
T-8		36.75	492
	9	61.25	444
		61.25	445
	10	85	348
		85	327

Regression Output:

Constant	607.4873
Std Err of Y Est	17.54240
R Squared	0.966117
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-3.01694
Std Err of Coef.	0.230656

O2 FLUX = 20 mg O2/m2/hr

2	7	14	483
		14	481
	8	38.17	290
T-7		38.17	286
	9	62.5	126
		62.5	129
	10	85.5	33
		85.5	34

Regression Output:

Constant	549.0459
Std Err of Y Est	26.87453
R Squared	0.981314
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-6.31605
Std Err of Coef.	0.355809

O2 FLUX = 43 mg O2/m2/hr

3	7	14.75	522
		14.75	497
	8	39.67	369
R-4		39.67	360
	9	63	254
		63	250
	10	86.16	191
		86.16	190

Regression Output:

Constant	558.9485
Std Err of Y Est	23.31402
R Squared	0.972438
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-4.51470
Std Err of Coef.	0.310296

O2 FLUX = 30 mg O2/m2/hr

AUGUST 1992 - INC #1 FILENAME: AUG92B1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
4	5	16	512
		16	494
	6	39.95	372
T-2		39.95	365
	7	63.75	236
		63.75	240
	8	87.75	56
		87.75	55

Regression Output:

Constant	610.8462
Std Err of Y Est	16.54323
R Squared	0.992489
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-6.16222
Std Err of Coef.	0.218842

O2 FLUX = 42 mg O2/m2/hr

5	5	16.55	517
		16.55	534
	6	40.33	357
T-3		40.33	358
	7	64.25	229
		64.25	235
	8	88.25	74
		88.25	77

Regression Output:

Constant	620.8838
Std Err of Y Est	11.59404
R Squared	0.996310
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-6.17392
Std Err of Coef.	0.153390

O2 FLUX = 42 mg O2/m2/hr

6	5	17.1	488
		17.1	481
	6	40.65	353
T-4		40.65	360
	7	64.67	217
		64.67	219
	8	89	58
		89	63

Regression Output:

Constant	590.7822
Std Err of Y Est	8.035204
R Squared	0.998057
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-5.88553
Std Err of Coef.	0.105993

O2 FLUX = 40 mg O2/m2/hr

DENITRIFICATION CALCULATIONS - OXYGEN REGRESSIONS

BOSTON HARBOR CORES B. NOWICKI

AUGUST 1992 - INC #2 FILENAME: AUG92B2.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
1	14	14	546
		14	556
T-8	16	62.08	470
		62.08	467
	17	86	391
		86	384

Regression Output:

Constant	587.1589
Std Err of Y Est	15.62896
R Squared	0.963486
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-2.18938
Std Err of Coef.	0.213106

O2 FLUX = 15 mg O2/m2/hr

2	14	14.75	453
		14.75	464
	15	38.58	320
T-7		38.58	315
	16	62.74	231
		62.74	231
	17	86.58	137
		86.58	138

Regression Output:

Constant	507.6612
Std Err of Y Est	16.36964
R Squared	0.985574
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-4.37331
Std Err of Coef.	0.216003

O2 FLUX = 30 mg O2/m2/hr

3	14	15.5	473
		15.5	451
	15	39.33	349
R-4		39.33	349
		------	---------
	15	41.91	546
		41.91	543
	16	63.32	456
		63.32	454
	17	87.24	309
		87.24	307

Regression Output:

Constant	772.4888
Std Err of Y Est	13.10922
R Squared	0.988007
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-5.24717
Std Err of Coef.	0.289047

O2 FLUX = 35 mg O2/m2/hr

AUGUST 1992 - INC #2

FILENAME: AUG92B2.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
4	12	16.83	399
		16.83	445
		16.83	455
	13	40.33	276
T-2		40.33	276
	14	64.83	126
		64.83	126
	15	90	20
		90	20

Regression Output:

Constant	519.0932
Std Err of Y Est	23.51231
R Squared	0.983748
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	-5.73653
Std Err of Coef.	0.278682

O2 FLUX = 39 mg O2/m2/hr

5	12	17.5	480
		17.5	480
	13	40.91	404
T-3		40.91	404
	14	65.33	289
		65.33	289
	15	90.25	231
		90.25	229

Regression Output:

Constant	541.5337
Std Err of Y Est	13.74147
R Squared	0.985098
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-3.56595
Std Err of Coef.	0.179049

O2 FLUX = 24 mg O2/m2/hr

6	12	18.17	444
		18.17	443
	13	41.41	280
T-4		41.41	281
	14	65.83	121
		65.83	122
	15	90.83	27
		90.83	27

Regression Output:

Constant	531.4795
Std Err of Y Est	23.77299
R Squared	0.983130
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-5.79851
Std Err of Coef.	0.310093

O2 FLUX = 39 mg O2/m2/hr

DENITRIFICATION CALCULATIONS - PEAK AREA DATA

BOSTON HARBOR CORES B. NOWICKI

AUGUST 1992 - INC #1 FILENAME: AUG92A1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)	
1	7	13	2093195	29936	2.166	1.955	61	553	7.14	
		13	2167640	32207	2.166	1.955	61	573	7.68	
T-8	8	36.75	1845873	55284	2.199	1.879	61	495	12.67	
		36.75	1834421	54392	2.199	1.879	61	492	12.47	
	9	61.25	1639550	76896	2.220	1.94	61	444	18.20	
		61.25	1644655	74773	2.220	1.94	61	445	17.70	
	10	85	1243062	88384	2.293	1.979	61	348	21.34	
		85	1168004	92336	2.293	1.979	61	327	22.29	
1C	7	13.67		23916	2.166	1.955	61	0	5.70	
		13.67		20114	2.166	1.955	61	0	4.80	
T-8	8	37.5		33414	2.199	1.879	61	0	7.66	
		37.5		29752	2.199	1.879	61	0	6.82	
	9	62.33		41726	2.220	1.94	61	0	9.88	
		62.33		45300	2.220	1.94	61	0	10.72	
	10	85.17		49384	2.293	1.979	61	0	11.92	
		85.17		51584	2.293	1.979	61	0	12.45	
2	7	14	1771459	54075	2.166	1.955	63	483	13.32	
		14	1762318	52967	2.166	1.955	63	481	13.05	
T-7	8	38.17	1047411	123983	2.199	1.879	63	290	29.35	
		38.17	1032664	116864	2.199	1.879	63	286	27.67	
	9	62.5	452180	196448	2.220	1.94	63	126	48.02	
		62.5	462356	205514	2.220	1.94	63	129	50.24	
	10	85.5	115074	236329	2.293	1.979	63	33	58.93	
		85.5	117605	241514	2.293	1.979	63	34	60.22	
2C	7	14.42		21959	2.166	1.955	63	0	5.41	
		14.42		23042	2.166	1.955	63	0	5.68	
T-7	8	39		28473	2.199	1.879	63	0	6.74	
		39		29743	2.199	1.879	63	0	7.04	
	9	62.75		43046	2.220	1.94	63	0	10.52	
		62.75		42959	2.220	1.94	63	0	10.50	
	10	85.83		55572	2.293	1.979	63	0	13.86	
		85.83		55932	2.293	1.979	63	0	13.95	
3	7	14.75	1975289	23391	2.166	1.955	61	522	5.58	
		14.75	1880666	21214	2.166	1.955	61	497	5.06	
R-4	8	39.67	1377043	39945	2.199	1.879	61	369	9.16	
		39.67	1342579	40391	2.199	1.879	61	360	9.26	
	9	63	937299	59858	2.220	1.94	61	254	14.17	
		63	923179	59401	2.220	1.94	61	250	14.06	
	10	86.16	681012	1123743	2.293	1.979	61	191	271.31	*
		86.16	680688	1109663	2.293	1.979	61	190	267.91	*

* = Contaminated Chamber

AUGUST 1992 - INC #1 FILENAME: AUG92A1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
3C	7	15		20623	2.166	1.955	63	0	5.08
		15		16632	2.166	1.955	63	0	4.10
R-4	8	40.15		24767	2.199	1.879	63	0	5.86
		40.15		27177	2.199	1.879	63	0	6.43
	9	63.25		38957	2.220	1.94	63	0	9.52
		63.25		43374	2.220	1.94	63	0	10.60
	10	86.41		49917	2.293	1.979	63	0	12.45
		86.41		52272	2.293	1.979	63	0	13.03
4	5	16	1905493	40212	2.203	1.987	61	512	9.75
		16	1837961	37666	2.203	1.987	61	494	9.13
T-2	6	39.95	1340075	87745	2.275	1.699	61	372	18.19
		39.95	1314020	84243	2.275	1.699	61	365	17.46
	7	63.75	848951	133036	2.280	1.758	61	236	28.53
		63.75	863781	134296	2.280	1.758	61	240	28.80
	8	87.75	201616	117892	2.273	1.777	61	56	25.56
		87.75	198266	114689	2.273	1.777	61	55	24.86
4C	5	16.25		16198	2.203	1.987	61	0	3.93
		16.25		18024	2.203	1.987	61	0	4.37
T-2	6	40		31848	2.275	1.699	61	0	6.60
		40		31738	2.275	1.699	61	0	6.58
	7	64		44542	2.280	1.758	61	0	9.55
		64		45227	2.280	1.758	61	0	9.70
	8	88		42261	2.273	1.777	61	0	9.16
		88		39100	2.273	1.777	61	0	8.48
5	5	16.55	1891640	43926	2.203	1.987	62	517	10.82
		16.55	1956348	44353	2.203	1.987	62	534	10.93
T-3	6	40.33	1266959	106758	2.275	1.699	62	357	22.49
		40.33	1268730	104062	2.275	1.699	62	358	21.92
	7	64.25	808967	171767	2.280	1.758	62	229	37.44
		64.25	832808	176824	2.280	1.758	62	235	38.55
	8	88.25	263298	147903	2.273	1.777	62	74	32.59
		88.25	272570	156413	2.273	1.777	62	77	34.47
5C	5	16.75		25847	2.203	1.987	62	0	6.37
		16.75		27667	2.203	1.987	62	0	6.82
T-3	6	40.48		45294	2.275	1.699	62	0	9.54
		40.48		47566	2.275	1.699	62	0	10.02
	7	64.42		66546	2.280	1.758	62	0	14.51
		64.42		66887	2.280	1.758	62	0	14.58
	8	88.67		60198	2.273	1.777	62	0	13.26
		88.67		59886	2.273	1.777	62	0	13.20

AUGUST 1992 - INC #1 FILENAME: AUG92A1.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
6	5	17.1	1813982	31065	2.203	1.987	61	488	7.53
		17.1	1789506	32969	2.203	1.987	61	481	7.99
T-4	6	40.65	1271337	67944	2.275	1.699	61	353	14.08
		40.65	1296841	67646	2.275	1.699	61	360	14.02
	7	64.67	779093	107263	2.280	1.758	61	217	23.01
		64.67	787715	110466	2.280	1.758	61	219	23.69
	8	89	208905	125278	2.273	1.777	61	58	27.16
		89	225641	118857	2.273	1.777	61	63	25.77
6C	5	17.3		19857	2.203	1.987	61	0	4.81
		17.3		17662	2.203	1.987	61	0	4.28
T-4	6	40.98		30649	2.275	1.699	61	0	6.35
		40.98		27704	2.275	1.699	61	0	5.74
		40.98		29339	2.275	1.699	61	0	6.08
	7	64.92		43230	2.280	1.758	61	0	9.27
		64.92		41602	2.280	1.758	61	0	8.92
	8	89.15		49982	2.273	1.777	61	0	10.84
		89.15		46414	2.273	1.777	61	0	10.06
		89.15		47898	2.273	1.777	61	0	10.38

DENITRIFICATION CALCULATIONS - PEAK AREA DATA

BOSTON HARBOR CORES B. NOWICKI

AUGUST 1992 - INC #2 FILENAME: AUG92A2.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)	
1	14	14	2023066	31743	2.177	2	62	546	7.87	
		14	2058229	30469	2.177	2	62	556	7.56	
	15	38	1579259	94909	2.252	2.086	62	441	24.55	
T-8		38	1499935	89760	2.252	2.086	62	419	23.22	
	16	62.08	1590424	107249	2.382	2.214	62	470	29.44	
		62.08	1579961	109493	2.382	2.214	62	467	30.06	
	17	86	1284302	111406	2.458	2.15	62	391	29.70	**
		86	1258663	107025	2.458	2.15	62	384	28.53	**
1C	14	14.37		16291	2.177	2	62	0	4.04	
		14.37		13957	2.177	2	62	0	3.46	
	15	38.25		22335	2.252	2.086	62	0	5.78	
T-8		38.25		23603	2.252	2.086	62	0	6.11	
	16	62.41		33632	2.382	2.214	62	0	9.23	
		62.41		33583	2.382	2.214	62	0	9.22	
	17	86.25		37170	2.458	2.15	62	0	9.91	**
		86.25		37420	2.458	2.15	62	0	9.98	**
2	14	14.75	1677596	38140	2.177	2	62	453	9.46	
		14.75	1717651	37446	2.177	2	62	464	9.29	
	15	38.58	1145499	78230	2.252	2.086	62	320	20.24	
T-7		38.58	1128744	77290	2.252	2.086	62	315	19.99	
	16	62.74	781596	123927	2.382	2.214	62	231	34.02	
		62.74	781366	127809	2.382	2.214	62	231	35.09	
	17	86.58	450013	153619	2.458	2.15	62	137	40.95	
		86.58	453944	152640	2.458	2.15	62	138	40.69	
2C	14	15.13		12179	2.177	2	62	0	3.02	
		15.13		14597	2.177	2	62	0	3.62	
	15	39		22464	2.252	2.086	62	0	5.81	
T-7		39		23127	2.252	2.086	62	0	5.98	
	16	62.99		30674	2.382	2.214	62	0	8.42	
		62.99		29563	2.382	2.214	62	0	8.12	
	17	86.96		32799	2.458	2.15	62	0	8.74	**
		86.96		33480	2.458	2.15	62	0	8.93	**
3	14	15.5	1751078	28408	2.177	2	62	473	7.05	
		15.5	1669307	20750	2.177	2	62	451	5.15	
	15	39.33	1249351	463433	2.252	2.086	62	349	119.87	*
R-4		39.33	1251475	464111	2.252	2.086	62	349	120.05	*
		---	---	---				---	---	
	15	41.91	1961398	44647	2.246	1.783	62	546	9.87	
		41.91	1949834	42963	2.246	1.783	62	543	9.50	
	16	63.32	1544446	322687	2.382	2.214	62	456	88.59	*
		63.32	1538292	323063	2.382	2.214	62	454	88.69	*
	17	87.24	1012470	694795	2.458	2.15	62	309	185.23	*
		87.24	1006119	688638	2.458	2.15	62	307	183.59	*

* = contaminated chamber

** = clogged needle

AUGUST 1992 - INC #2 FILENAME: AUG92A2.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)	
3C	14	15.75		18394	2.177	2	62	0	4.56	**
		15.75		25075	2.177	2	62	0	6.22	**
	15	39.75		16986	2.252	2.086	62	0	4.39	
R-4		39.75		16032	2.252	2.086	62	0	4.15	
	16	63.65		22959	2.382	2.214	62	0	6.30	
		63.65		23585	2.382	2.214	62	0	6.47	
	17	87.66		27829	2.458	2.15	62	0	7.42	
		87.66		32641	2.458	2.15	62	0	8.70	
4	12	16.83	1478929	38827	2.174	1.907	62	399	9.18	
		16.83	1650128	41029	2.174	1.907	62	445	9.70	
		16.83	1686803	43329	2.174	1.907	62	455	10.25	
	13	40.33	990136	172360	2.246	1.783	62	276	38.11	**
T-2		40.33	990136	173847	2.246	1.783	62	276	38.44	**
	14	64.83	463858	212816	2.199	1.684	62	126	44.44	
		64.83	462980	208876	2.199	1.684	62	126	43.62	
	15	90	70564	246067	2.306	1.765	62	20	53.85	
		90	71547	249545	2.306	1.765	62	20	54.62	
4C	12	17.25		16123	2.174	1.907	62	0	3.81	
		17.25		11592	2.174	1.907	62	0	2.74	
	13	40.66		21885	2.246	1.783	62	0	4.84	
T-2		40.66		20412	2.246	1.783	62	0	4.51	
	14	65.08		28527	2.199	1.684	62	0	5.96	
		65.08		27510	2.199	1.684	62	0	5.74	
	15	89.75		34270	2.306	1.765	62	0	7.50	
		89.75		35357	2.306	1.765	62	0	7.74	
5	12	17.5	1781542	38014	2.174	1.907	62	480	8.99	
		17.5	1780752	38019	2.174	1.907	62	480	8.99	
	13	40.91	1452164	85061	2.246	1.783	62	404	18.81	
T-3		40.91	1449722	84395	2.246	1.783	62	404	18.66	
	14	65.33	1058518	131066	2.199	1.684	62	289	27.37	
		65.33	1060201	131612	2.199	1.684	62	289	27.48	
	15	90.25	807082	172026	2.306	1.765	62	231	37.65	
		90.25	801254	170232	2.306	1.765	62	229	37.26	
5C	12	17.83		16476	2.174	1.907	62	0	3.90	
		17.83		18354	2.174	1.907	62	0	4.34	
	13	41.16		32515	2.246	1.783	62	0	7.19	
T-3		41.16		32472	2.246	1.783	62	0	7.18	
	14	65.58		44186	2.199	1.684	62	0	9.23	
		65.58		43613	2.199	1.684	62	0	9.11	
	15	90.58		61119	2.306	1.765	62	0	13.38	
		90.58		59655	2.306	1.765	62	0	13.06	

AUGUST 1992 - INC #2 FILENAME: AUG92A2.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
6	12	18.17	1645874	37916	2.174	1.907	62	444	8.97
		18.17	1642260	35751	2.174	1.907	62	443	8.45
	13	41.41	1004952	85956	2.246	1.783	62	280	19.00
T-4		41.41	1009897	84338	2.246	1.783	62	281	18.65
	14	65.83	444252	131818	2.199	1.684	62	121	27.53
		65.83	446571	132359	2.199	1.684	62	122	27.64
	15	90.83	94599	180552	2.306	1.765	62	27	39.52
		90.83	93002	176881	2.306	1.765	62	27	38.71
6C	12	18.42		12871	2.174	1.907	62	0	3.04
		18.42		14639	2.174	1.907	62	0	3.46
	13	41.66		25453	2.246	1.783	62	0	5.63
T-4		41.66		22579	2.246	1.783	62	0	4.99
	14	66.08		30595	2.199	1.684	62	0	6.39
		66.08		31206	2.199	1.684	62	0	6.52
	15	91.08		35796	2.306	1.765	62	0	7.83
		91.08		36725	2.306	1.765	62	0	8.04

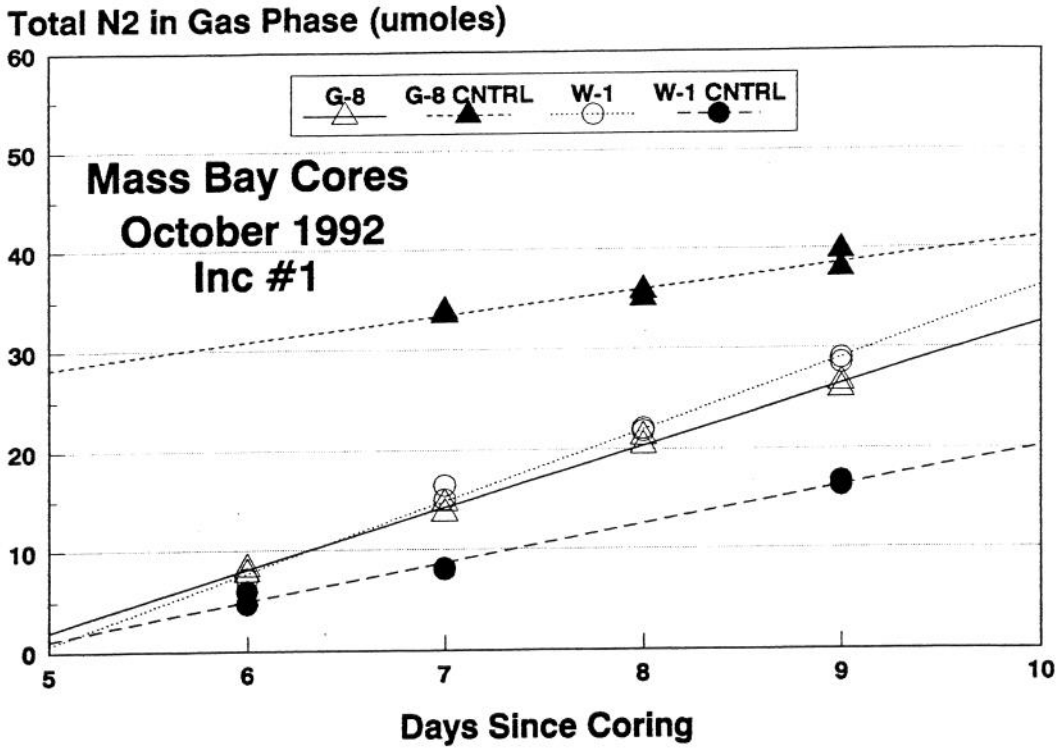
** = clogged needle

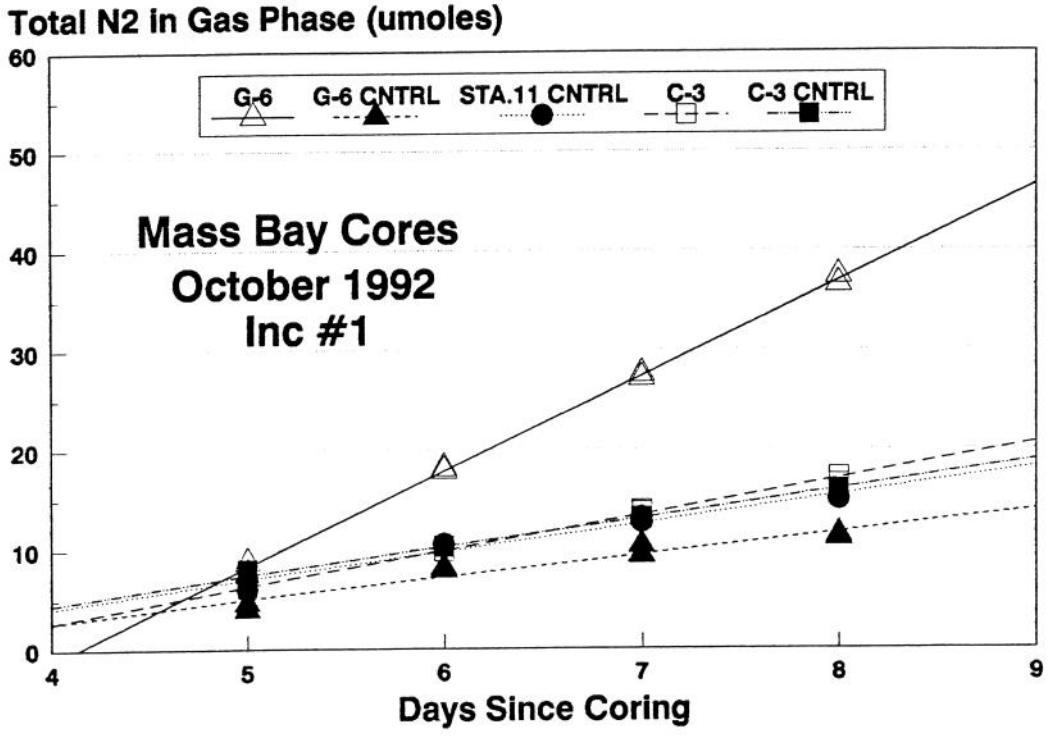
Denitrification in Massachusetts Bay: October 1992
11°C

Station	Incubation #	Days	O_2 Flux	N_2 Flux	Anoxic Control Flux	Corrected N_2 Flux
	#		(mg O_2 m^{-2} h^{-1})	(μmol N_2 m^{-2} h^{-1})		
G-8	1	6- 9	13	54±4	18±6	36±7
	2	13-16	8	13±4	13±3	N.D.
W-1	1	6- 9	17	62±6	33±4	29±7
	2	13-16	9	18±3	19±5	N.D.
G-6	1	5- 8	25	84±3	20±5	64±6
	2	12-15	11	39±3	6±1	33±3
Sta. 11*	1	5- 8	29	-	24±4	-
	2	12-15	6	30±5	7±1	23±5
C-3	1	5- 8	12	31±2	25±3	6±4
	2	12-15	3	9±2	8±2	N.D.

Errors show 95% CIS around slopes of linear regressions of N_2 production versus time.
N.D. = non-detectable
*This core contained a large clam worm (Nereis virens).

B 6 1

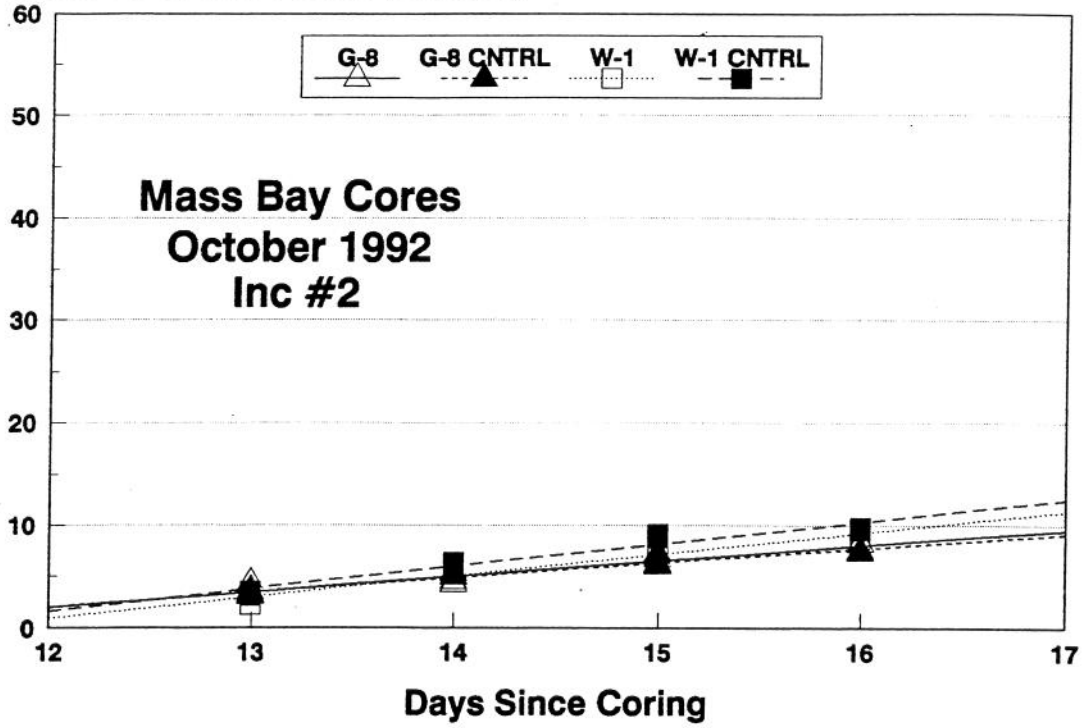




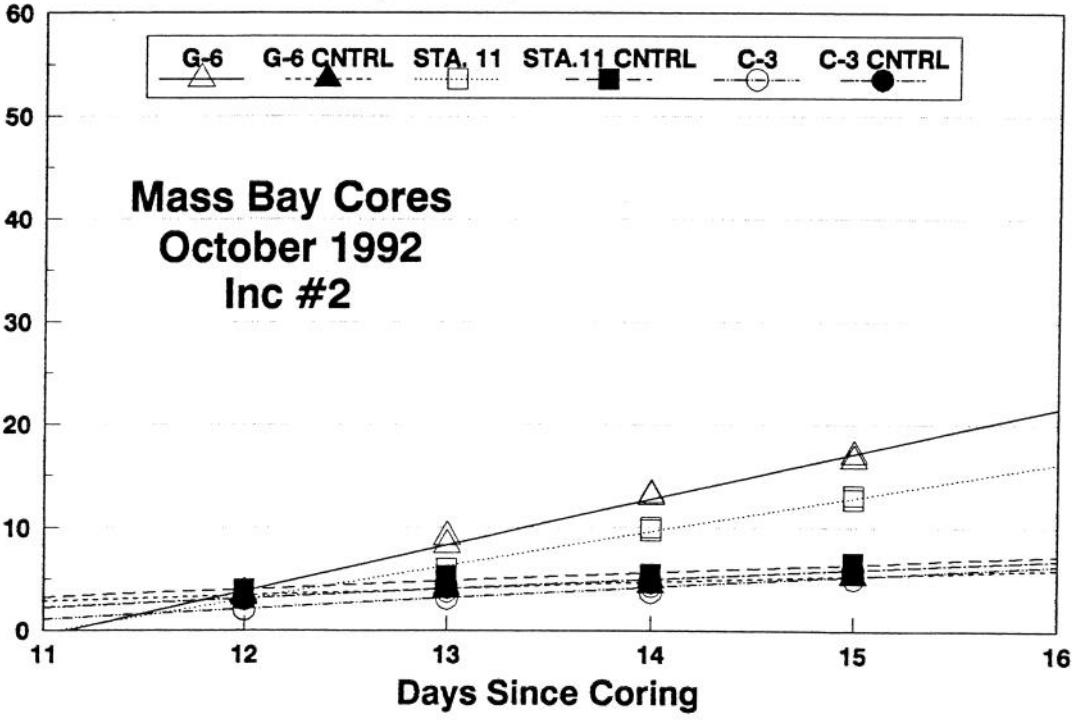
* Note - G-8 Control shows initial contamination by stopper loss on day 6.

OCTPLT1.DRW

Total N2 in Gas Phase (umoles)



Total N2 in Gas Phase (umoles)



OCTPLT2.DRW

DENITRIFICATION CALCULATIONS - NITROGEN REGRESSIONS

MASSACHUSETTS BAY CORES B. NOWICKI

OCTOBER 1992 FILENAME:OCT92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
1	6	13.83	8.26
G-8		13.83	7.77
	7	37.75	14.66
		37.75	13.65
	8	61.5	21.21
		61.5	20.31
	9	86.33	26.52
		86.33	25.87
	13	14.08	4.28
		14.08	3.54
	14	38.08	4.51
		38.08	4.26
	15	62.08	6.71
		62.08	6.20
	16	86.08	8.25
		86.08	8.24
1C	7	38.08	33.90
G-8		38.08	33.61
	8	62	35.85
ANOXIC		62	35.14
CNTRL	9	86.58	37.99
		86.58	39.83
	13	14.33	3.27
		14.33	3.09
	14	38.41	4.99
		38.41	5.36
	15	62.41	7.24
		62.41	6.01
		62.41	6.55
	16	86.33	7.50
		86.33	7.33

Regression Output:

Constant	4.647235
Std Err of Y Est	0.587278
R Squared	0.994495
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.253437
Std Err of Coef.	0.007697

N2 FLUX = 54 um N2/m2/hr (± 4)

Regression Output:

Constant	2.603102
Std Err of Y Est	0.525020
R Squared	0.932146
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.062805
Std Err of Coef.	0.006917

N2 FLUX = 13 um N2/m2/hr (± 4)

Regression Output:

Constant	30.40315
Std Err of Y Est	0.379978
R Squared	0.965019
No. of Observations	5
Degrees of Freedom	3
X Coefficient(s)	0.085351
Std Err of Coef.	0.009382

N2 FLUX = 18 um N2/m2/hr (± 6)

Regression Output:

Constant	2.636030
Std Err of Y Est	0.480340
R Squared	0.927763
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.059350
Std Err of Coef.	0.006259

N2 FLUX = 13 um N2/m2/hr (± 3)

OCTOBER 1992 FILENAME:OCT92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
2	6	14.66	7.23
W-1		14.66	7.14
	7	38.33	16.49
		38.33	15.06
	8	62.33	22.12
		62.33	21.85
	9	86.92	28.59
		86.92	29.05

Regression Output:

Constant	3.518230
Std Err of Y Est	0.824092
R Squared	0.991998
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.295173
Std Err of Coef.	0.010822

N2 FLUX = 62 um N2/m2/hr
(± 6)

	13	14.58	2.26
		14.58	3.15
	14	38.74	5.44
		38.74	5.71
	15	62.74	6.94
		62.74	7.28
	16	86.66	8.74
		86.66	9.54

Regression Output:

Constant	1.737585
Std Err of Y Est	0.495104
R Squared	0.967256
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.086762
Std Err of Coef.	0.006517

N2 FLUX = 18 um N2/m2/hr
(± 3)

2C	6	15.08	5.08
		15.08	4.65
W-1		15.08	5.97
	7	38.75	8.19
ANOXIC		38.75	8.07
CNTRL	9	87.17	16.83
		87.17	16.29

Regression Output:

Constant	2.588130
Std Err of Y Est	0.634706
R Squared	0.987316
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	0.158080
Std Err of Coef.	0.008012

N2 FLUX = 33 um N2/m2/hr
(± 4)

	13	15	3.51
		15	3.20
	14	38.99	6.35
		38.99	6.22
	15	62.99	9.13
		62.99	8.78
	16	87.24	9.62
		87.24	9.81

Regression Output:

Constant	2.472540
Std Err of Y Est	0.687171
R Squared	0.943315
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.090203
Std Err of Coef.	0.009027

N2 FLUX = 19 um N2/m2/hr
(± 5)

OCTOBER 1992 FILENAME:OCT92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
3	5	15.41	8.78
G-6		15.41	7.64
	6	39.17	17.91
		39.17	18.18
	7	63.08	27.53
		63.08	27.13
	8	87.5	37.37
		87.5	36.51

Regression Output:

Constant	2.246236
Std Err of Y Est	0.468597
R Squared	0.998556
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.397427
Std Err of Coef.	0.006169

N2 FLUX = 84 um N2/m2/hr
(± 3)

	12	15.33	3.42
		15.33	3.66
	13	39.32	9.05
		39.32	8.29
	14	63.24	12.99
		63.24	13.16
	15	87.49	17.01
		87.49	16.58

Regression Output:

Constant	1.088892
Std Err of Y Est	0.495353
R Squared	0.992508
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.183713
Std Err of Coef.	0.006515

N2 FLUX = 39 um N2/m2/hr
(± 3)

3C	5	15.66	3.99
G-6		15.66	4.65
	6	42.17	8.18
ANOXIC		42.17	7.92
CNTRL	7	64.83	9.38
		64.83	10.36
	8	88.83	11.08
		88.83	11.35

Regression Output:

Constant	3.419987
Std Err of Y Est	0.725565
R Squared	0.941995
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.093478
Std Err of Coef.	0.009469

N2 FLUX = 20 um N2/m2/hr
(± 5)

	12	17.5	3.26
		17.5	3.67
	13	41.32	4.24
		41.32	3.95
	14	64.57	4.47
		64.57	4.93
	15	88.99	5.31
		88.99	5.39

Regression Output:

Constant	3.010624
Std Err of Y Est	0.197734
R Squared	0.943138
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.026239
Std Err of Coef.	0.002630

N2 FLUX = 6 um N2/m2/hr
(± 1)

OCTOBER 1992 FILENAME:OCT92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
4	5	15.99	15.03	
		15.99	22.03	
Sta. 11		15.99	21.70	
	6	41.17	131.14	*
		41.17	128.36	*
	7	65.08	200.40	*
		65.08	199.35	*
	8	89.08	256.64	*
		89.08	258.30	*
	12	17.75	3.12	
		17.75	3.70	
	13	43.32	6.02	
		43.32	5.64	
		43.32	5.35	
	14	64.82	10.01	
		64.82	9.73	
	15	89.24	13.13	
		89.24	12.73	
4C	5	16.33	6.85	
Sta. 11		16.33	6.04	
	6	41.42	10.59	
ANOXIC		41.42	10.43	
CNTRL	7	65.33	12.69	
		65.33	13.23	
	8	89.58	14.93	
		89.58	15.05	
	12	18.08	3.89	
		18.08	4.03	
	13	43.65	5.08	
		43.65	5.17	
	14	65.07	5.33	
		65.07	5.53	
	15	89.49	6.63	
		89.49	6.45	

* Chamber contaminated

Regression Output:

Constant	0.368786
Std Err of Y Est	0.682063
R Squared	0.971373
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.139589
Std Err of Coef.	0.009057

N2 FLUX = 30 um N2/m2/hr
(± 5)

Regression Output:

Constant	5.091986
Std Err of Y Est	0.641959
R Squared	0.969688
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.115422
Std Err of Coef.	0.008331

N2 FLUX = 24 um N2/m2/hr
(± 4)

Regression Output:

Constant	3.407115
Std Err of Y Est	0.204448
R Squared	0.963091
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.034311
Std Err of Coef.	0.002742

N2 FLUX = 7 um N2/m2/hr
(± 1)

OCTOBER 1992 FILENAME:OCT92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
5	5	16.58	6.12
C-3		16.58	6.30
	6	41.67	9.85
		41.67	9.83
	7	65.58	13.75
		65.58	13.91
	8	89.83	17.20
		89.83	16.53

Regression Output:

Constant	3.805223
Std Err of Y Est	0.317259
R Squared	0.995349
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.147541
Std Err of Coef.	0.004117

N2 FLUX = 31 um N2/m2/hr
(± 2)

	12	18.41	2.07
		18.41	2.00
	13	43.9	3.80
		43.9	3.12
	14	65.32	4.05
		65.32	3.74
		65.32	4.33
	15	89.82	5.07
		89.82	5.63

Regression Output:

Constant	1.279311
Std Err of Y Est	0.326650
R Squared	0.937711
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.044549
Std Err of Coef.	0.004339

N2 FLUX = 9 um N2/m2/hr
(± 2)

5C	5	16.83	8.06
C-3		16.83	6.66
	6	41.92	10.36
ANOXIC		41.92	10.27
CNTRL	7	65.83	13.17
		65.83	13.23
	8	90.16	15.97
		90.16	15.99

Regression Output:

Constant	5.385496
Std Err of Y Est	0.406284
R Squared	0.988157
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.117859
Std Err of Coef.	0.005267

N2 FLUX = 25 um N2/m2/hr
(± 3)

	12	18.91	3.00
	13	44.23	4.40
		44.23	4.15
	14	65.65	4.65
		65.65	5.00
	15	90.15	5.93
		90.15	6.05

Regression Output:

Constant	2.351568
Std Err of Y Est	0.205542
R Squared	0.968428
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	0.039912
Std Err of Coef.	0.003222

N2 FLUX = 8 um N2/m2/hr
(± 2)

DENITRIFICATION CALCULATIONS - OXYGEN REGRESSIONS

MASSACHUSETTS BAY CORES

B. NOWICKI

OCTOBER 1992

FILENAME:OCT92B.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
1	6	13.83	617
G-8		13.83	602
	7	37.75	557
		37.75	533
	8	61.5	529
		61.5	514
	9	86.33	473
		86.33	461

Regression Output:

Constant	629.0757
Std Err of Y Est	13.93304
R Squared	0.946188
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-1.87579
Std Err of Coef.	0.182623

O2 FLUX = 13 mg O2/m2/hr

	13	14.08	436
		14.08	436
	14	38.08	408
		38.08	400
	15	62.08	369
		62.08	369
	16	86.08	351
		86.08	351

Regression Output:

Constant	450.4690
Std Err of Y Est	5.338786
R Squared	0.980021
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-1.20683
Std Err of Coef.	0.070344

O2 FLUX = 8 mg O2/m2/hr

2	6	14.66	592
W-1		14.66	603
	7	38.33	519
		38.33	521
	8	62.33	462
		62.33	460
	9	86.92	410
		86.92	415

Regression Output:

Constant	626.4917
Std Err of Y Est	9.829783
R Squared	0.984806
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-2.54579
Std Err of Coef.	0.129094

O2 FLUX = 17 mg O2/m2/hr

	13	14.58	415
		14.58	437
	14	38.74	395
		38.74	384
	15	62.74	341
		62.74	342
	16	86.66	335
		86.66	330

Regression Output:

Constant	441.8013
Std Err of Y Est	12.49834
R Squared	0.920648
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-1.37262
Std Err of Coef.	0.164515

O2 FLUX = 9 mg O2/m2/hr

OCTOBER 1992

FILENAME:OCT92B.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
3	5	15.41	623
G-6		15.41	615
	6	39.17	507
		39.17	511
	7	63.08	428
		63.08	433
	8	87.5	352
		87.5	343

Regression Output:

Constant	667.5355
Std Err of Y Est	10.43751
R Squared	0.991904
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-3.72604
Std Err of Coef.	0.137420

O2 FLUX = 25 mg O2/m2/hr

	12	15.33	432
		15.33	446
	13	39.32	387
		39.32	372
	14	63.24	358
		63.24	352
	15	87.49	319
		87.49	318

Regression Output:

Constant	455.1011
Std Err of Y Est	10.99178
R Squared	0.953353
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-1.60112
Std Err of Coef.	0.144587

O2 FLUX = 11 mg O2/m2/hr

4	5	15.99	577
		15.99	582
Sta. 11		15.99	583
	6	41.17	466
		41.17	452
	7	65.08	357
		65.08	355
	8	89.08	265
		89.08	267

Regression Output:

Constant	644.9236
Std Err of Y Est	8.514482
R Squared	0.996217
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	-4.33255
Std Err of Coef.	0.100899

O2 FLUX = 29 mg O2/m2/hr

	12	17.75	456
		17.75	450
	13	43.32	426
		43.32	416
	14	64.82	411
		64.82	410
	15	89.24	385
		89.24	383

Regression Output:

Constant	466.7654
Std Err of Y Est	5.357474
R Squared	0.964965
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-0.92250
Std Err of Coef.	0.071760

O2 FLUX = 6 mg O2/m2/hr

OCTOBER 1992

FILENAME:OCT92B.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
5	5	16.58	626
C-3		16.58	599
	6	41.67	560
		41.67	554
	7	65.58	523
		65.58	535
	8	89.83	478
		89.83	479
	12	18.41	417
		18.41	422
		18.41	422
		18.41	428
	14	65.32	411
		65.32	402
		65.32	403
	15	89.82	385
		89.82	388

Regression Output:

Constant	639.0913
Std Err of Y Est	10.71863
R Squared	0.964446
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-1.77463
Std Err of Coef.	0.139102

O2 FLUX = 12 mg O2/m2/hr

Regression Output:

Constant	431.5727
Std Err of Y Est	5.355884
R Squared	0.891492
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	-0.45793
Std Err of Coef.	0.060384

O2 FLUX = 3 mg O2/m2/hr

DENITRIFICATION CALCULATIONS - PEAK AREA DATA

MASSACHUSETTS BAY CORES B. NOWICKI

OCTOBER 1992 FILENAME: OCT92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
1	6	13.83	2180785	33064	2.282	2.014	62	617	8.26
G-8		13.83	2128654	31100	2.282	2.014	62	602	7.77
	7	37.75	2044281	60404	2.196	1.957	62	557	14.66
		37.75	1955767	56244	2.196	1.957	62	533	13.65
	8	61.5	1912682	87601	2.230	1.953	62	529	21.21
		61.5	1857017	83870	2.230	1.953	62	514	20.31
	9	86.33	1649384	105626	2.312	2.025	62	473	26.52
		86.33	1606565	103046	2.312	2.025	62	461	25.87
	13	14.08	1609193	18021	2.184	1.915	62	436	4.28
		14.08	1611640	14909	2.184	1.915	62	436	3.54
	14	38.08	1465711	18294	2.244	1.989	62	408	4.51
		38.08	1436017	17257	2.244	1.989	62	400	4.26
	15	62.08	1313156	27122	2.267	1.996	62	369	6.71
		62.08	1313610	25049	2.267	1.996	62	369	6.20
	16	86.08	1271630	34351	2.229	1.937	62	351	8.25
		86.08	1268806	34291	2.229	1.937	62	351	8.24
1C	6	14.41		*	2.282	2.014	62	0	
G-8		14.41		*	2.282	2.014	62	0	
	7	38.08		139686	2.196	1.957	62	0	33.90
ANOXIC		38.08		138518	2.196	1.957	62	0	33.61
CNTRL	8	62		148025	2.230	1.953	62	0	35.85
		62		145099	2.230	1.953	62	0	35.14
	9	86.58		151302	2.312	2.025	62	0	37.99
		86.58		158611	2.312	2.025	62	0	39.83
	13	14.33		13782	2.184	1.915	62	0	3.27
		14.33		13027	2.184	1.915	62	0	3.09
	14	38.41		20244	2.244	1.989	62	0	4.99
		38.41		21746	2.244	1.989	62	0	5.36
	15	62.41		29343	2.244	1.989	62	0	7.24
		62.41		24296	2.267	1.996	62	0	6.01
		62.41		26445	2.267	1.996	62	0	6.55
	16	86.33		31220	2.229	1.937	62	0	7.50
		86.33		30507	2.229	1.937	62	0	7.33

* 1C was slightly contaminated by stopper loss

OCTOBER 1992 FILENAME: OCT92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
2	6	14.66	2127022	29436	2.282	2.014	61	592	7.23
W-1		14.66	2165527	29071	2.282	2.014	61	603	7.14
	7	38.33	1937969	69070	2.196	1.957	61	519	16.49
		38.33	1943432	63077	2.196	1.957	61	521	15.06
	8	62.33	1696375	92836	2.230	1.953	61	462	22.12
		62.33	1692407	91709	2.230	1.953	61	460	21.85
	9	86.92	1453205	115724	2.312	2.025	61	410	28.59
		86.92	1472803	117591	2.312	2.025	61	415	29.05
	13	14.58	1557677	9694	2.184	1.915	61	415	2.26
		14.58	1640752	13496	2.184	1.915	61	437	3.15
	14	38.74	1442129	22402	2.244	1.989	61	395	5.44
		38.74	1401405	23547	2.244	1.989	61	384	5.71
	15	62.74	1234300	28510	2.267	1.996	61	341	6.94
		62.74	1234832	29902	2.267	1.996	61	342	7.28
	16	86.66	1231041	37000	2.229	1.937	61	335	8.74
		86.66	1211839	40380	2.229	1.937	61	330	9.54
2C	6	15.08		20327	2.282	2.014	62	0	5.08
		15.08		18624	2.282	2.014	62	0	4.65
W-1		15.08		23903	2.282	2.014	62	0	5.97
	7	38.75		33756	2.196	1.957	62	0	8.19
ANOXIC		38.75		33269	2.196	1.957	62	0	8.07
CNTRL	8	62.75		65705	2.230	1.953	62	0	15.91
		62.75		65557	2.230	1.953	62	0	15.88
	9	87.17		67035	2.312	2.025	62	0	16.83
		87.17		64856	2.312	2.025	62	0	16.29
	13	15		14112	2.184	1.915	65	0	3.51
		15		12868	2.184	1.915	65	0	3.20
	14	38.99		24564	2.244	1.989	65	0	6.35
		38.99		24058	2.244	1.989	65	0	6.22
	15	62.99		35201	2.267	1.996	65	0	9.13
		62.99		33833	2.267	1.996	65	0	8.78
	16	87.24		38188	2.229	1.937	65	0	9.62
		87.24		38939	2.229	1.937	65	0	9.81

* Stirrer missing for Chamber 2C — Days 9-16, but appeared not to affect rates, which are reported.

OCTOBER 1992 FILENAME: OCT92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)	
3	5	15.41	2167958	34608	2.282	2.014	63	623	8.78	
G-6		15.41	2139855	30097	2.282	2.014	63	615	7.64	
	6	39.17	1832518	72650	2.196	1.957	63	507	17.91	
		39.17	1846843	73733	2.196	1.957	63	511	18.18	
	7	63.08	1521778	111863	2.230	1.953	63	428	27.53	
		63.08	1540240	110235	2.230	1.953	63	433	27.13	
	8	87.5	1207162	146452	2.312	2.025	63	352	37.37	
		87.5	1176355	143078	2.312	2.025	63	343	36.51	
	12	15.33	1593463	14410	2.184	1.915	62	432	3.42	
		15.33	1647199	15434	2.184	1.915	62	446	3.66	
	13	39.32	1389334	36674	2.244	1.989	62	387	9.05	
		39.32	1336865	33619	2.244	1.989	62	372	8.29	
	14	63.24	1272292	52493	2.267	1.996	62	358	12.99	
		63.24	1252106	53176	2.267	1.996	62	352	13.16	
	15	87.49	1155821	70826	2.229	1.937	62	319	17.01	
		87.49	1149928	69049	2.229	1.937	62	318	16.58	
3C	5	15.66		15976	2.282	2.014	62	0	3.99	
G-6		15.66		18623	2.282	2.014	62	0	4.65	
	6	42.17		36802	2.165	1.792	62	0	8.18	
ANOXIC		42.17		35624	2.165	1.792	62	0	7.92	
CNTRL	7	64.83		45997	2.199	1.644	62	0	9.38	
		64.83		50805	2.199	1.644	62	0	10.36	
	8	88.83		52189	2.325	1.712	62	0	11.08	
		88.83		53476	2.325	1.712	62	0	11.35	
	12	17.5		14253	2.219	1.846	62	0	3.26	
		17.5		16049	2.219	1.846	62	0	3.67	
	13	41.32		18786	2.296	1.822	62	0	4.24	
		41.32		17503	2.296	1.822	62	0	3.95	
	14	64.57		21329	2.248	1.691	62	0	4.47	
		64.57		23510	2.248	1.691	62	0	4.93	
	15	88.99		25635	2.233	1.669	62	0	5.31	
		88.99		26035	2.233	1.669	62	0	5.39	
4	5	15.99	2037351	60168	2.282	2.014	62	577	15.03	
		15.99	2057575	88215	2.282	2.014	62	582	22.03	
Sta. 11		15.99	2059373	86882	2.282	2.014	62	583	21.70	
	6	41.17	1734748	590162	2.165	1.792	62	466	131.14	*
		41.17	1684241	577662	2.165	1.792	62	452	128.36	*
	7	65.08	1308470	983064	2.199	1.644	62	357	200.40	*
		65.08	1303042	977883	2.199	1.644	62	355	199.35	*
	8	89.08	919467	1208943	2.325	1.712	62	265	256.64	*
		89.08	927554	1216765	2.325	1.712	62	267	258.30	*

* Chamber contaminated

OCTOBER 1992 FILENAME: OCT92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
4	12	17.75	1631144	13430	2.219	1.846	63	456	3.12
		17.75	1607969	15909	2.219	1.846	63	450	3.70
Sta. 11	13	43.32	1557360	26215	2.296	1.822	63	451	6.02
		43.32	1473937	24575	2.296	1.822	63	426	5.64
		43.32	1438353	23289	2.296	1.822	63	416	5.35
	14	64.82	1449357	46973	2.248	1.691	63	411	10.01
		64.82	1447681	45657	2.248	1.691	63	410	9.73
	15	89.24	1369771	62445	2.233	1.669	63	385	13.13
		89.24	1361534	60520	2.233	1.669	63	383	12.73
			* Chamber 4 has large Nereis worm						
4C	5	16.33		27004	2.282	2.014	63	0	6.85
Sta. 11		16.33		23810	2.282	2.014	63	0	6.04
	6	41.42		46919	2.165	1.792	63	0	10.59
ANOXIC		41.42		46208	2.165	1.792	63	0	10.43
CNTRL	7	65.33		61261	2.199	1.644	63	0	12.69
		65.33		63860	2.199	1.644	63	0	13.23
	8	89.58		69223	2.325	1.712	63	0	14.93
		89.58		69792	2.325	1.712	63	0	15.05
	12	18.08		16732	2.219	1.846	63	0	3.89
		18.08		17322	2.219	1.846	63	0	4.03
	13	43.65		22125	2.296	1.822	63	0	5.08
		43.65		22501	2.296	1.822	63	0	5.17
	14	65.07		24994	2.248	1.691	63	0	5.33
		65.07		25951	2.248	1.691	63	0	5.53
	15	89.49		31512	2.233	1.669	63	0	6.63
		89.49		30682	2.233	1.669	63	0	6.45
5	5	16.58	2178706	24120	2.282	2.014	63	626	6.12
C-3		16.58	2084559	24833	2.282	2.014	63	599	6.30
	6	41.67	2051516	43608	2.165	1.792	63	560	9.85
		41.67	2032217	43529	2.165	1.792	63	554	9.83
	7	65.58	1888232	66388	2.199	1.644	63	523	13.75
		65.58	1930809	67166	2.199	1.644	63	535	13.91
	8	89.83	1630771	79716	2.325	1.712	63	478	17.20
		89.83	1633981	76635	2.325	1.712	63	479	16.53

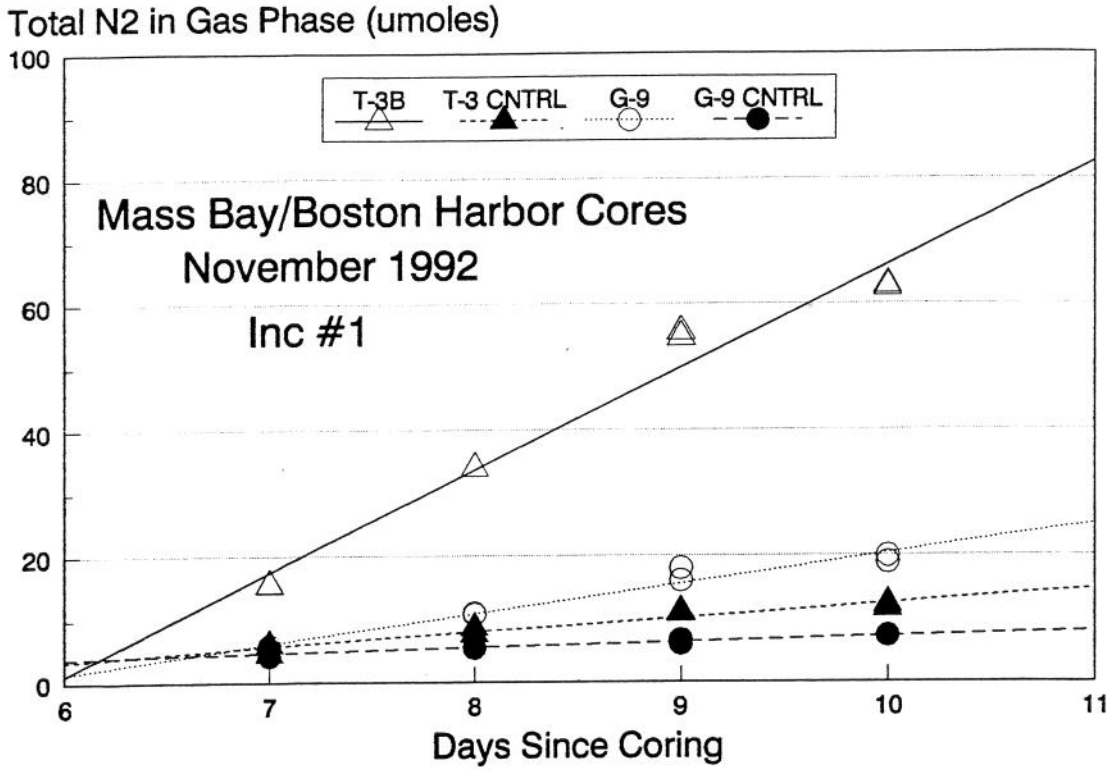
OCTOBER 1992 FILENAME: OCT92A.WK1

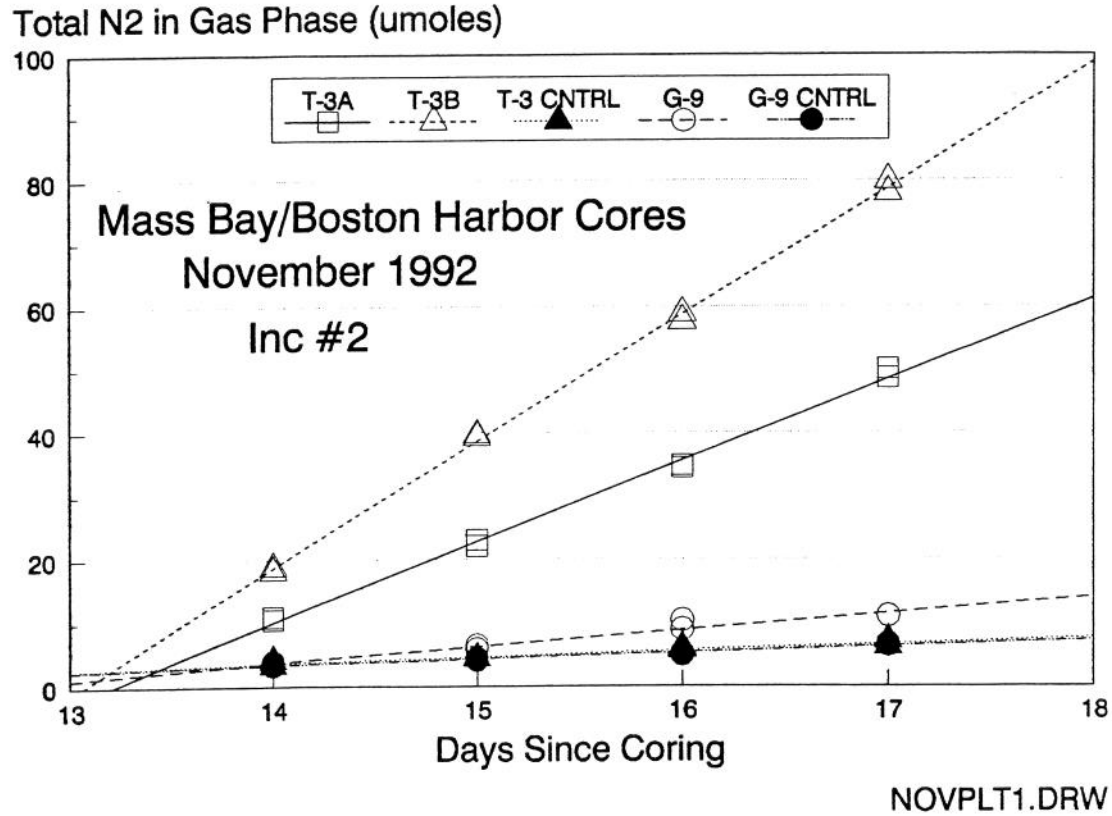
CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
5	12	18.41	1564317	18101	2.219	1.846	60	417	4.01
C-3		18.41	1583481	9329	2.219	1.846	60	422	2.07
		18.41	1586665	9022	2.219	1.846	60	422	2.00
		18.41	1607056	12570	2.219	1.846	60	428	2.78
	13	43.9	1391027	17366	2.296	1.822	60	383	3.80
		43.9	1384047	14268	2.296	1.822	60	381	3.12
		43.9	1387940	20101	2.296	1.822	60	382	4.39
	14	65.32	1525307	19970	2.248	1.691	60	411	4.05
		65.32	1491515	18439	2.248	1.691	60	402	3.74
		65.32	1492710	21326	2.248	1.691	60	403	4.33
	15	89.82	1436789	25292	2.233	1.669	60	385	5.07
		89.82	1449167	28111	2.233	1.669	60	388	5.63
5C	5	16.83		31743	2.282	2.014	63	0	8.06
C-3		16.83		26239	2.282	2.014	63	0	6.66
	6	41.92		45888	2.165	1.792	63	0	10.36
ANOXIC		41.92		45489	2.165	1.792	63	0	10.27
CNTRL	7	65.83		63603	2.199	1.644	63	0	13.17
		65.83		63854	2.199	1.644	63	0	13.23
	8	90.16		74015	2.325	1.712	63	0	15.97
		90.16		74120	2.325	1.712	63	0	15.99
	12	18.91		12698	2.219	1.846	64	0	3.00
		18.91		17943	2.219	1.846	64	0	4.24
		18.91		18770	2.219	1.846	64	0	4.44
	13	44.23		18870	2.296	1.822	64	0	4.40
		44.23		17814	2.296	1.822	64	0	4.15
	14	65.65		21467	2.248	1.691	64	0	4.65
		65.65		23112	2.248	1.691	64	0	5.00
	15	90.15		27737	2.233	1.669	64	0	5.93
		90.15		28333	2.233	1.669	64	0	6.05

Denitrification in Boston Harbor (T3) and Massachusetts Bay: November 1992
10°C

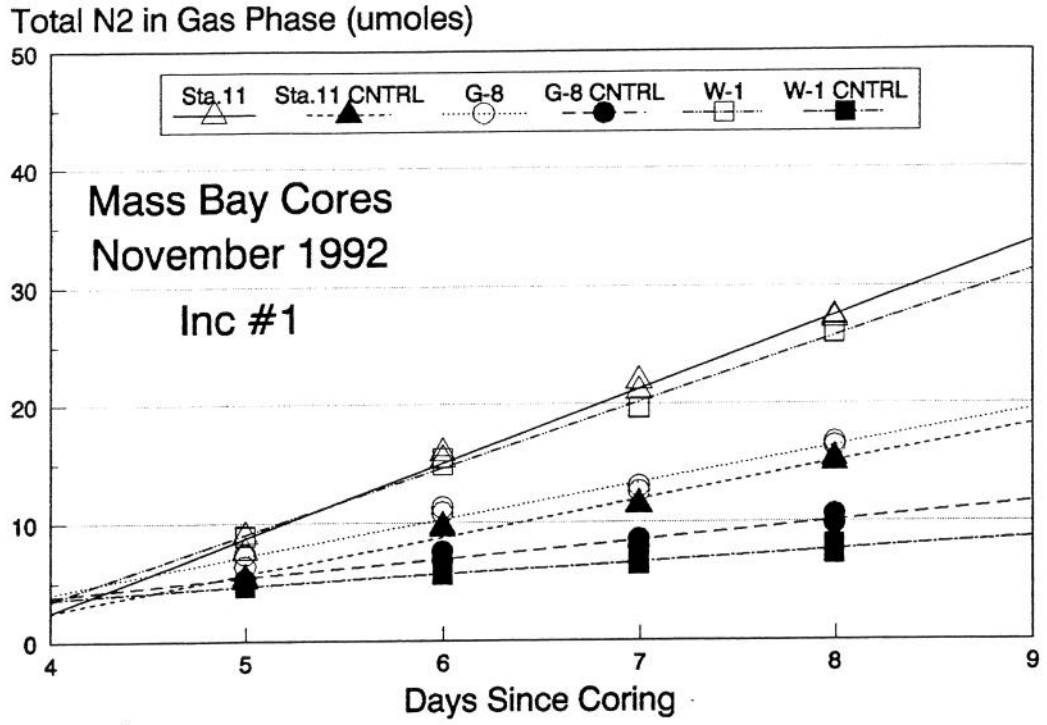
Station	Incubation #	Days	O_2 Flux	N_2 Flux	Anoxic Control Flux	Corrected N_2 Flux
	#		(mg O_2 m^{-2} h^{-1})		(µmol N_2 m^{-2} h^{-1})	
T-3A	1	7-10	38	-	20±5	-
	2	14-17	36	113± 7	9±3	104± 8
T-3B	1	7-10	44	142±20	20±5	122±21
	2	14-17	44	178± 5	9±3	169± 6
G-9	1	7-10	14	42± 7	9±2	33± 7
	2	14-17	11	23± 5	8±2	15± 5
W-1	1	7-10	8	51± 2	9±2	42± 3
	2	14-17	15	39± 4	11±4	28± 6
Sta. 11	1	5- 8	19	57± 6	28±3	29± 7
	2	12-15	18	37± 3	13±2	24± 4
G-8	1	5- 8	8	27± 4	14±4	13± 6
	2	12-15	8	13± 4	11±3	2± 5

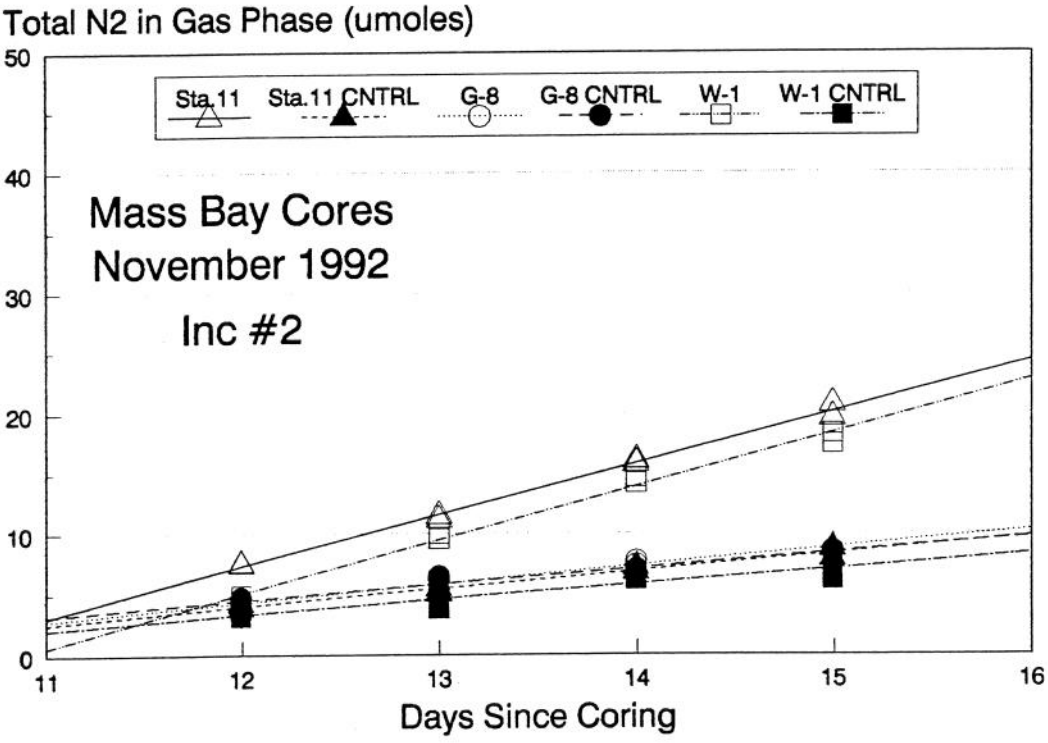
Errors show 95% CIS around slopes of linear regressions of N_2 production versus time.
T-3 cores were loaded with active Ampelisca


Total N2 in Gas Phase (umoles)
T-3B
T-3 CNTRL
G-9
G-9 CNTRL
Mass Bay/Boston Harbor Cores
November 1992
Inc #1
100
80
60
40
20
0
6
7
8
9
10
11
Days Since Coring


Total N2 in Gas Phase (umoles)
T-3A
T-3B
T-3 CNTRL
G-9
G-9 CNTRL
Mass Bay/Boston Harbor Cores
November 1992
Inc #2
100
80
60
40
20
0
13
14
15
16
17
18
Days Since Coring

NOVPLT1.DRW


Total N2 in Gas Phase (umoles)
Sta.11
Sta.11 CNTRL
G-8
G-8 CNTRL
W-1
W-1 CNTRL
Mass Bay Cores
November 1992
Inc #1
50
40
30
20
10
0
4
5
6
7
8
9
Days Since Coring


Total N2 in Gas Phase (umoles)
Sta.11
Sta.11 CNTRL
G-8
G-8 CNTRL
W-1
W-1 CNTRL
Mass Bay Cores
November 1992
Inc #2
50
40
30
20
10
0
11
12
13
14
15
16
Days Since Coring

NOVPLT2.DRW

DENITRIFICATION CALCULATIONS - NITROGEN REGRESSIONS

MASSACHUSETTS BAY CORES B. NOWICKI

NOVEMBER 1992 FILENAME: NOV92C.WK1

(±) = 95% Confidence Interval

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)	
1A	7	17.08	13.39	
T-3A		17.08	12.71	
	8	41.25	76.71	*
		41.25	78.79	*
	9	67.58	200.53	*
		67.58	199.03	*
	10	89.08	321.08	*
		89.08	316.40	*

* Chamber contaminated during sampling

14	17.5	10.45	
	17.5	10.91	
15	41.42	22.08	
	41.42	23.07	
16	65.09	34.86	
	65.09	34.43	
17	89.09	48.55	
	89.09	49.96	

Regression Output:

Constant	0.736090
Std Err of Y Est	0.972106
R Squared	0.996540
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.535957
Std Err of Coef.	0.012892

N2 FLUX = 113 um N2/m2/hr
(± 7)

1B	7	17.33	15.54
T-3B		17.33	15.62
	8	41.58	34.06
		41.58	34.01
	9	67.83	54.77
		67.83	55.62
	10	89.33	62.97
		89.33	62.57

Regression Output:

Constant	5.420636
Std Err of Y Est	3.029506
R Squared	0.979863
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.675244
Std Err of Coef.	0.039518

N2 FLUX = 142 um N2/m2/hr
(± 20)

14	17.75	18.12	
	17.75	18.73	
15	41.67	39.30	
	41.67	39.67	
16	65.42	57.57	
	65.42	58.80	
17	89.51	79.83	
	89.51	77.90	
	89.51	79.93	
	89.51	79.60	

Regression Output:

Constant	3.653858
Std Err of Y Est	0.842344
R Squared	0.998976
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	0.843963
Std Err of Coef.	0.009550

N2 FLUX = 178 um N2/m2/hr
(± 5)

NOVEMBER 1992 FILENAME: NOV92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
1C	7	17.66	6.06
T-3		17.66	4.58
ANOXIC	8	41.83	8.66
CONTRL		41.83	7.71
	9	68.08	11.06
		68.08	11.00
	10	89.66	12.28
		89.66	11.66

Regression Output:

Constant	3.984119
Std Err of Y Est	0.741701
R Squared	0.941032
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.094677
Std Err of Coef.	0.009675

N2 FLUX = 20 um N2/m2/hr
(± 5)

	14	18	3.27
		18	4.03
	15	42	4.36
	16	65.75	5.89
		65.75	5.59
	17	90.01	6.13
		90.01	7.01

Regression Output:

Constant	2.860559
Std Err of Y Est	0.408004
R Squared	0.921212
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	0.041737
Std Err of Coef.	0.005458

N2 FLUX = 9 um N2/m2/hr
(± 3)

2	7	17.99	5.88
G-9		17.99	5.48
	8	42.16	10.82
		42.16	11.04
	9	68.33	16.13
		68.33	18.06
	10	89.99	19.95
		89.99	18.98

Regression Output:

Constant	2.527351
Std Err of Y Est	1.036900
R Squared	0.972493
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.197081
Std Err of Coef.	0.013531

N2 FLUX = 42 um N2/m2/hr
(± 7)

	14	18.33	3.18
		18.33	3.84
	15	42.25	6.44
		42.25	5.79
	16	66	8.87
		66	10.25
	17	90.26	10.94
		90.26	11.00

Regression Output:

Constant	1.695982
Std Err of Y Est	0.709364
R Squared	0.956668
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.107781
Std Err of Coef.	0.009364

N2 FLUX = 23 um N2/m2/hr
(± 5)

NOVEMBER 1992 FILENAME: NOV92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
2C	7	18.24	5.35
G-9		18.24	4.16
ANOXIC	8	42.41	5.44
CONTRL		42.41	5.63
	9	68.58	6.70
		68.58	6.04
	10	90.24	7.27
		90.24	7.37

Regression Output:

Constant	3.602166
Std Err of Y Est	0.266432
R Squared	0.954347
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	0.041352
Std Err of Coef.	0.004044

N2 FLUX = 9 um N2/m2/hr
(± 2)

	14	18.58	3.67
		18.58	3.43
	15	42.5	4.05
		42.5	4.38
	16	66.25	4.85
		66.25	5.10
	17	90.51	6.63
		90.51	6.30

Regression Output:

Constant	2.642689
Std Err of Y Est	0.297369
R Squared	0.944421
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.039638
Std Err of Coef.	0.003925

N2 FLUX = 8 um N2/m2/hr
(± 2)

3	7	20.07	8.88
W-1		20.07	8.97
	8	44.66	14.84
		44.66	15.45
	9	64.5	19.57
		64.5	19.67
	10	90.49	26.03
		90.49	25.93

Regression Output:

Constant	4.179681
Std Err of Y Est	0.231945
R Squared	0.998962
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.240958
Std Err of Coef.	0.003170

N2 FLUX = 51 um N2/m2/hr
(± 2)

	14	19.83	4.96
		19.83	4.37
	15	44.83	10.05
		44.83	9.63
	16	69.34	14.26
		69.34	14.72
	17	92.84	17.47
		92.84	18.39

Regression Output:

Constant	1.369841
Std Err of Y Est	0.563409
R Squared	0.990470
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.182674
Std Err of Coef.	0.007314

N2 FLUX = 39 um N2/m2/hr
(± 4)

NOVEMBER 1992 FILENAME: NOV92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
3C	7	19.82	4.62
W-1		19.82	4.66
ANOXIC	8	44.41	5.58
CONTRL		44.41	5.75
	9	64.25	6.39
		64.25	6.94
	10	90.82	8.12
		90.82	7.25

Regression Output:

Constant	3.784674
Std Err of Y Est	0.308852
R Squared	0.947017
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.043378
Std Err of Coef.	0.004188

N2 FLUX = 9 um N2/m2/hr
(± 2)

	14	19.58	3.93
		19.58	3.19
	15	44.5	3.94
		44.5	3.85
	16	69.17	6.86
		69.17	6.21
	17	92.51	6.20
		92.51	7.47
		92.51	6.71

Regression Output:

Constant	2.372543
Std Err of Y Est	0.705787
R Squared	0.833613
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.049656
Std Err of Coef.	0.008384

N2 FLUX = 11 um N2/m2/hr
(± 4)

4	5	21.07	7.62
Sta. 11		21.07	8.97
	6	45.15	15.89
		45.15	15.30
	7	64.92	21.01
		64.92	21.90
	8	90.99	27.11
		90.99	27.30

Regression Output:

Constant	3.031731
Std Err of Y Est	0.807674
R Squared	0.990084
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.272017
Std Err of Coef.	0.011113

N2 FLUX = 57 um N2/m2/hr
(± 6)

	12	20.33	7.47
		20.33	7.56
	13	45.32	11.18
		45.32	11.52
	14	69.92	15.83
		69.92	16.11
	15	93.26	19.60
		93.26	20.75

Regression Output:

Constant	3.742833
Std Err of Y Est	0.427118
R Squared	0.994001
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.174967
Std Err of Coef.	0.005548

N2 FLUX = 37 um N2/m2/hr
(± 3)

NOVEMBER 1992 FILENAME: NOV92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
4C	5	20.32	5.13
STA. 11		20.32	5.40
ANOXIC	6	44.82	9.72
CONTRL		44.82	9.52
	7	64.67	11.42
		64.67	11.53
	8	92.65	14.94
		92.65	15.32

Regression Output:

Constant	2.974434
Std Err of Y Est	0.496969
R Squared	0.985346
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.133017
Std Err of Coef.	0.006622

N2 FLUX = 28 um N2/m2/hr
(± 3)

	12	20.08	4.29
		20.08	3.90
	13	45.16	5.08
		45.16	5.47
	14	69.67	7.21
		69.67	7.02
		69.67	6.83
	15	93.01	7.92
		93.01	8.76

Regression Output:

Constant	2.791596
Std Err of Y Est	0.316257
R Squared	0.968570
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.059648
Std Err of Coef.	0.004061

N2 FLUX = 13 um N2/m2/hr
(± 2)

5	5	20.57	6.37
G-8		20.57	7.40
	6	45.65	11.30
		45.65	10.84
	7	65.34	12.58
		65.34	13.04
	8	92.99	16.41
		92.99	16.69

Regression Output:

Constant	4.522972
Std Err of Y Est	0.551363
R Squared	0.981245
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.130129
Std Err of Coef.	0.007344

N2 FLUX = 27 um N2/m2/hr
(± 4)

	12	20.75	3.28
		20.75	4.66
	13	45.9	6.18
		45.9	6.27
	14	70.34	7.76
		70.34	7.43
	15	93.76	8.52
		93.76	8.58

Regression Output:

Constant	2.995722
Std Err of Y Est	0.540705
R Squared	0.929021
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	0.062227
Std Err of Coef.	0.007021

N2 FLUX = 13 um N2/m2/hr
(± 4)

NOVEMBER 1992 FILENAME: NOV92C.WK1

CORE	DAYS	ELAPSE TIME (hrs)	N2 in GasPhase (umoles)
5C	5	20.82	5.25
G-8	6	45.4	7.61
ANOXIC		45.4	6.81
CONTRL	7	65.17	7.95
		65.17	8.58
	8	93.32	9.86
		93.32	10.64
	12	20.5	4.23
		20.5	4.79
	13	45.65	5.29
		45.65	6.51
		45.65	5.61
	14	70.09	7.08
		70.09	6.78
	15	93.51	8.48
		93.51	8.60

Regression Output:

Constant	3.999334
Std Err of Y Est	0.430551
R Squared	0.953365
No. of Observations	7
Degrees of Freedom	5
X Coefficient(s)	0.066971
Std Err of Coef.	0.006624

N2 FLUX = 14 um N2/m2/hr
(± 4)

Regression Output:

Constant	3.331643
Std Err of Y Est	0.403509
R Squared	0.939803
No. of Observations	9
Degrees of Freedom	7
X Coefficient(s)	0.054219
Std Err of Coef.	0.005186

N2 FLUX = 11 um N2/m2/hr
(± 3)

DENITRIFICATION CALCULATIONS - OXYGEN REGRESSIONS

MASSACHUSETTS BAY CORES B. NOWICKI

NOVEMBER 1992 FILENAME: NOV92B.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
1A	7	17.08	502
T-3A		17.08	483
	8	41.25	320
		41.25	328
	9	67.58	178
		67.58	175
	10	89.08	88
		89.08	86

Regression Output:

Constant	573.3094
Std Err of Y Est	19.37646
R Squared	0.988130
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-5.64713
Std Err of Coef.	0.252670

O2 FLUX = 38 mg O2/m2/hr

	14	17.5	527
		17.5	524
	15	41.42	394
		41.42	401
	16	65.09	270
		65.09	265
	17	89.09	138
		89.09	143

Regression Output:

Constant	619.7197
Std Err of Y Est	3.148048
R Squared	0.999639
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-5.38776
Std Err of Coef.	0.041750

O2 FLUX = 36 mg O2/m2/hr

1B	7	17.33	501
T-3B		17.33	508
	8	41.58	274
		41.58	275
	9	67.83	78
		67.83	75
	10	89.33	45
		89.33	43

Regression Output:

Constant	579.8346
Std Err of Y Est	52.82063
R Squared	0.938145
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-6.57289
Std Err of Coef.	0.689019

O2 FLUX = 44 mg O2/m2/hr

	14	17.75	311
		17.75	315
	15	41.67	91
		41.67	90
	16	65.42	6
		65.42	5
	17	89.51	5
		89.51	8
		89.51	7

Regression Output:

Constant	404.6807
Std Err of Y Est	39.68394
R Squared	0.937498
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-6.44819
Std Err of Coef.	0.832470

O2 FLUX = 44 mg O2/m2/hr

NOVEMBER 1992 FILENAME: NOV92B.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
2	7	17.99	611
G-9		17.99	600
	8	42.16	573
		42.16	544
	9	68.33	517
		68.33	491
	10	89.99	466
		89.99	457
	14	18.33	597
		18.33	589
	15	42.25	563
		42.25	551
	16	66	526
		66	526
	17	90.26	486
		90.26	474
3	7	20.07	531
W-1		20.07	547
	8	44.66	486
		44.66	500
	9	64.5	424
		64.5	424
	10	90.49	362
		90.49	357
	14	19.83	556
		19.83	554
	15	44.83	519
		44.83	521
	16	69.34	446
		69.34	444
	17	92.84	400
		92.84	402

Regression Output:

Constant	642.1914
Std Err of Y Est	11.95259
R Squared	0.965087
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-2.00880
Std Err of Coef.	0.155979

O2 FLUX = 14 mg O2/m2/hr

Regression Output:

Constant	623.1068
Std Err of Y Est	6.378602
R Squared	0.982595
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-1.54978
Std Err of Coef.	0.084206

O2 FLUX = 11 mg O2/m2/hr

Regression Output:

Constant	597.1796
Std Err of Y Est	10.41645
R Squared	0.982485
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-2.61177
Std Err of Coef.	0.142363

O2 FLUX = 18 mg O2/m2/hr

Regression Output:

Constant	604.9482
Std Err of Y Est	9.530956
R Squared	0.981343
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-2.19835
Std Err of Coef.	0.123743

O2 FLUX = 15 mg O2/m2/hr

NOVEMBER 1992 FILENAME: NOV92B.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 in GasPhase (umoles)
4	5	21.07	525
Sta. 11		21.07	526
	6	45.15	480
		45.15	470
	7	64.92	401
		64.92	410
	8	90.99	338
		90.99	335

Regression Output:

Constant	589.4037
Std Err of Y Est	8.304259
R Squared	0.989851
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-2.76425
Std Err of Coef.	0.114265

O2 FLUX = 19 mg O2/m2/hr

	12	20.33	526
		20.33	531
	13	45.32	490
		45.32	488
	14	69.92	387
		69.92	399
	15	93.26	348
		93.26	350

Regression Output:

Constant	589.1227
Std Err of Y Est	14.49465
R Squared	0.969677
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-2.60829
Std Err of Coef.	0.188300

O2 FLUX = 18 mg O2/m2/hr

5	5	20.57	551
G-8		20.57	556
	7	65.34	490
		65.34	497
	8	92.99	467
		92.99	466

Regression Output:

Constant	576.8476
Std Err of Y Est	4.548551
R Squared	0.989577
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-1.21278
Std Err of Coef.	0.062230

O2 FLUX = 8 mg O2/m2/hr

	12	20.75	566
		20.75	545
	14	70.34	490
		70.34	479
	15	93.76	473
		93.76	466

Regression Output:

Constant	578.8163
Std Err of Y Est	11.20306
R Squared	0.943207
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	-1.22471
Std Err of Coef.	0.150261

O2 FLUX = 8 mg O2/m2/hr

DENITRIFICATION CALCULATIONS - PEAK AREA DATA

MASSACHUSETTS BAY CORES B. NOWICKI

NOVEMBER 1992 FILENAME: NOV92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)	
1A	7	17.08	1716168	52206	2.320	2.036	63	502	13.39	
T-3A		17.08	1653029	49537	2.320	2.036	63	483	12.71	
	8	41.25	1147942	311245	2.209	1.956	63	320	76.71	
		41.25	1178848	319693	2.209	1.956	63	328	78.79	
	9	67.58	614697	783229	2.293	2.032	63	178	200.53	*
		67.58	605760	777364	2.293	2.032	63	175	199.03	*
	10	89.08	315432	1302801	2.204	1.956	63	88	321.08	*
		89.08	308247	1283795	2.204	1.956	63	86	316.40	*
	14	17.5	1874181	41805	2.268	2.016	62	527	10.45	
		17.5	1863332	43662	2.268	2.016	62	524	10.91	
	15	41.42	1441317	91437	2.203	1.947	62	394	22.08	
		41.42	1466409	95563	2.203	1.947	62	401	23.07	
	16	65.09	961560	144033	2.267	1.952	62	270	34.86	
		65.09	941533	142259	2.267	1.952	62	265	34.43	
	17	89.09	496772	197038	2.248	1.987	62	138	48.55	
		89.09	511652	202759	2.248	1.987	62	143	49.96	
1B	7	17.33	1713431	60574	2.320	2.036	63	501	15.54	
T-3B		17.33	1736555	60886	2.320	2.036	63	508	15.62	
	8	41.58	985131	138187	2.209	1.956	63	274	34.06	
		41.58	987276	137995	2.209	1.956	63	275	34.01	
	9	67.83	270949	213938	2.293	2.032	63	78	54.77	
		67.83	260791	217257	2.293	2.032	63	75	55.62	
	10	89.33	160468	255506	2.204	1.956	63	45	62.97	
		89.33	153359	253875	2.204	1.956	63	43	62.57	
	14	17.75	1107423	72465	2.268	2.016	62	311	18.12	
		17.75	1118809	74916	2.268	2.016	62	315	18.73	
	15	41.67	332492	162777	2.203	1.947	62	91	39.30	
		41.67	327783	164299	2.203	1.947	62	90	39.67	
	16	65.42	22040	237858	2.267	1.952	62	6	57.57	
		65.42	19381	242935	2.267	1.952	62	5	58.80	
	17	89.51		323988	2.248	1.987	62		79.83	
		89.51	18893	316154	2.248	1.987	62	5	77.90	
		89.51	27743	324391	2.248	1.987	62	8	79.93	
		89.51	24724	323067	2.248	1.987	62	7	79.60	

* contaminated during sampling

DENITRIFICATION CALCULATIONS - PEAK AREA DATA

MASSACHUSETTS BAY CORES B. NOWICKI

NOVEMBER 1992 FILENAME: NOV92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)	
1A	7	17.08	1716168	52206	2.320	2.036	63	502	13.39	
T-3A		17.08	1653029	49537	2.320	2.036	63	483	12.71	
	8	41.25	1147942	311245	2.209	1.956	63	320	76.71	
		41.25	1178848	319693	2.209	1.956	63	328	78.79	
	9	67.58	614697	783229	2.293	2.032	63	178	200.53	*
		67.58	605760	777364	2.293	2.032	63	175	199.03	*
	10	89.08	315432	1302801	2.204	1.956	63	88	321.08	*
		89.08	308247	1283795	2.204	1.956	63	86	316.40	*
	14	17.5	1874181	41805	2.268	2.016	62	527	10.45	
		17.5	1863332	43662	2.268	2.016	62	524	10.91	
	15	41.42	1441317	91437	2.203	1.947	62	394	22.08	
		41.42	1466409	95563	2.203	1.947	62	401	23.07	
	16	65.09	961560	144033	2.267	1.952	62	270	34.86	
		65.09	941533	142259	2.267	1.952	62	265	34.43	
	17	89.09	496772	197038	2.248	1.987	62	138	48.55	
		89.09	511652	202759	2.248	1.987	62	143	49.96	
1B	7	17.33	1713431	60574	2.320	2.036	63	501	15.54	
T-3B		17.33	1736555	60886	2.320	2.036	63	508	15.62	
	8	41.58	985131	138187	2.209	1.956	63	274	34.06	
		41.58	987276	137995	2.209	1.956	63	275	34.01	
	9	67.83	270949	213938	2.293	2.032	63	78	54.77	
		67.83	260791	217257	2.293	2.032	63	75	55.62	
	10	89.33	160468	255506	2.204	1.956	63	45	62.97	
		89.33	153359	253875	2.204	1.956	63	43	62.57	
	14	17.75	1107423	72465	2.268	2.016	62	311	18.12	
		17.75	1118809	74916	2.268	2.016	62	315	18.73	
	15	41.67	332492	162777	2.203	1.947	62	91	39.30	
		41.67	327783	164299	2.203	1.947	62	90	39.67	
	16	65.42	22040	237858	2.267	1.952	62	6	57.57	
		65.42	19381	242935	2.267	1.952	62	5	58.80	
	17	89.51		323988	2.248	1.987	62		79.83	
		89.51	18893	316154	2.248	1.987	62	5	77.90	
		89.51	27743	324391	2.248	1.987	62	8	79.93	
		89.51	24724	323067	2.248	1.987	62	7	79.60	

* contaminated during sampling

NOVEMBER 1992 FILENAME: NOV92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
1C	7	17.66		23604	2.320	2.036	63	0	6.06
T-3		17.66		17850	2.320	2.036	63	0	4.58
ANOXIC	8	41.83		35138	2.209	1.956	63	0	8.66
CONTRL		41.83		31274	2.209	1.956	63	0	7.71
	9	68.08		43183	2.293	2.032	63	0	11.06
		68.08		42978	2.293	2.032	63	0	11.00
	10	89.66		49829	2.204	1.956	63	0	12.28
		89.66		47326	2.204	1.956	63	0	11.66
	14	18		13074	2.268	2.016	62	0	3.27
		18		16138	2.268	2.016	62	0	4.03
	15	42		26625	2.203	1.947	62	0	6.43
		42		18067	2.203	1.947	62	0	4.36
	16	65.75		24328	2.267	1.952	62	0	5.89
		65.75		23074	2.267	1.952	62	0	5.59
	17	90.01		24886	2.248	1.987	62	0	6.13
		90.01		28459	2.248	1.987	62	0	7.01
2	7	17.99	2124635	23288	2.320	2.036	62	611	5.88
G-9		17.99	2085264	21708	2.320	2.036	62	600	5.48
	8	42.16	2092716	44624	2.209	1.956	62	573	10.82
		42.16	1986044	45502	2.209	1.956	62	544	11.04
	9	68.33	1818048	64022	2.293	2.032	62	517	16.13
		68.33	1727994	71659	2.293	2.032	62	491	18.06
	10	89.99	1704116	82245	2.204	1.956	62	466	19.95
		89.99	1673949	78241	2.204	1.956	62	457	18.98
	14	18.33	2123847	12705	2.268	2.016	62	597	3.18
		18.33	2095854	15372	2.268	2.016	62	589	3.84
	15	42.25	2060889	26670	2.203	1.947	62	563	6.44
		42.25	2017526	23973	2.203	1.947	62	551	5.79
	16	66	1872258	36642	2.267	1.952	62	526	8.87
		66	1869616	42355	2.267	1.952	62	526	10.25
	17	90.26	1742605	44406	2.248	1.987	62	486	10.94
		90.26	1701494	44657	2.248	1.987	62	474	11.00
2C	7	18.24		20862	2.320	2.036	63	0	5.35
G-9		18.24		16204	2.320	2.036	63	0	4.16
ANOXIC	8	42.41		22092	2.209	1.956	63	0	5.44
CONTRL		42.41		22850	2.209	1.956	63	0	5.63
	9	68.58		26153	2.293	2.032	63	0	6.70
		68.58		23587	2.293	2.032	63	0	6.04
	10	90.24		29502	2.204	1.956	63	0	7.27
		90.24		29917	2.204	1.956	63	0	7.37
	14	18.58		14445	2.268	2.016	63	0	3.67
		18.58		13515	2.268	2.016	63	0	3.43
	15	42.5		16514	2.203	1.947	63	0	4.05
		42.5		17871	2.203	1.947	63	0	4.38
	16	66.25		19721	2.267	1.952	63	0	4.85
		66.25		20741	2.267	1.952	63	0	5.10
	17	90.51		26467	2.248	1.987	63	0	6.63
		90.51		25146	2.248	1.987	63	0	6.30

NOVEMBER 1992 FILENAME: NOV92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
3	7	20.07	1876405	37669	2.281	1.901	62	531	8.88
W-1		20.07	1932327	38033	2.281	1.901	62	547	8.97
	8	44.66	1775548	65525	2.207	1.826	62	486	14.84
		44.66	1825358	68236	2.207	1.826	62	500	15.45
	9	64.5	1495459	82579	2.287	1.911	62	424	19.57
		64.5	1493500	82993	2.287	1.911	62	424	19.67
	10	90.49	1324240	111294	2.204	1.886	62	362	26.03
		90.49	1307906	110878	2.204	1.886	62	357	25.93
	14	19.83	1985123	21222	2.26	1.883	62	556	4.96
		19.83	1976133	18712	2.260	1.883	62	554	4.37
	15	44.83	1861779	41637	2.246	1.947	62	519	10.05
		44.83	1869339	39872	2.246	1.947	62	521	9.63
	16	69.34	1573696	57786	2.288	1.99	62	446	14.26
		69.34	1564648	59655	2.288	1.99	62	444	14.72
	17	92.84	1415597	74288	2.28	1.896	62	400	17.47
		92.84	1423311	78206	2.28	1.896	62	402	18.39
3C	7	19.82		19599	2.281	1.901	62	0	4.62
W-1		19.82		19757	2.281	1.901	62	0	4.66
ANOXIC	8	44.41		24651	2.207	1.826	62	0	5.58
CONTRL		44.41		25406	2.207	1.826	62	0	5.75
	9	64.25		26959	2.287	1.911	62	0	6.39
		64.25		29289	2.287	1.911	62	0	6.94
	10	90.82		34710	2.204	1.886	62	0	8.12
		90.82		30983	2.204	1.886	62	0	7.25
	14	19.58		16835	2.26	1.883	62	0	3.93
		19.58		13681	2.260	1.883	62	0	3.19
	15	44.5		16320	2.246	1.947	62	0	3.94
		44.5		15966	2.246	1.947	62	0	3.85
	16	69.17		27805	2.288	1.99	62	0	6.86
		69.17		25165	2.288	1.99	62	0	6.21
	17	92.51		26370	2.28	1.896	62	0	6.20
		92.51		31767	2.28	1.896	62	0	7.47
		92.51		28533	2.28	1.896	62	0	6.71
4	5	21.07	1857557	32332	2.281	1.901	62	525	7.62
Sta. 11		21.07	1860493	38041	2.281	1.901	62	526	8.97
	6	45.15	1754225	70173	2.207	1.826	62	480	15.89
		45.15	1718254	67580	2.207	1.826	62	470	15.30
	7	64.92	1414373	88648	2.287	1.911	62	401	21.01
		64.92	1447021	92416	2.287	1.911	62	410	21.90
	8	90.99	1238214	115937	2.204	1.886	62	338	27.11
		90.99	1227212	116744	2.204	1.886	62	335	27.30

B 92

NOVEMBER 1992 FILENAME: NOV92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
4	12	20.33	1876418	31995	2.26	1.883	62	526	7.47
Sta. 11		20.33	1895651	32369	2.260	1.883	62	531	7.56
	13	45.32	1760934	46295	2.246	1.947	62	490	11.18
		45.32	1751010	47718	2.246	1.947	62	488	11.52
	14	69.92	1363448	64152	2.288	1.99	62	387	15.83
		69.92	1407776	65300	2.288	1.99	62	399	16.11
	15	93.26	1231709	83360	2.28	1.896	62	348	19.60
		93.26	1236691	88262	2.28	1.896	62	350	20.75
4C	5	20.32		21777	2.281	1.901	62	0	5.13
STA. 11		20.32		22898	2.281	1.901	62	0	5.40
ANOXIC	6	44.82		42929	2.207	1.826	62	0	9.72
CONTRL		44.82		42033	2.207	1.826	62	0	9.52
	7	64.67		48185	2.287	1.911	62	0	11.42
		64.67		48664	2.287	1.911	62	0	11.53
	8	92.65		63886	2.204	1.886	62	0	14.94
		92.65		65504	2.204	1.886	62	0	15.32
	12	20.08		18352	2.26	1.883	62	0	4.29
		20.08		16693	2.260	1.883	62	0	3.90
	13	45.16		21043	2.246	1.947	62	0	5.08
		45.16		22669	2.246	1.947	62	0	5.47
	14	69.67		29210	2.288	1.99	62	0	7.21
		69.67		28441	2.288	1.99	62	0	7.02
		69.67		27695	2.288	1.99	62	0	6.83
	15	93.01		33671	2.28	1.896	62	0	7.92
		93.01		37252	2.28	1.896	62	0	8.76
5	5	20.57	1948837	27006	2.281	1.901	62	551	6.37
G-8		20.57	1964277	31412	2.281	1.901	62	556	7.40
	6	45.65	2008095	49891	2.207	1.826	62	550	11.30
		45.65	2003214	47894	2.207	1.826	62	548	10.84
	7	65.34	1728239	53101	2.287	1.911	62	490	12.58
		65.34	1753405	55016	2.287	1.911	62	497	13.04
	8	92.99	1708946	70151	2.204	1.886	62	467	16.41
		92.99	1704929	71357	2.204	1.886	62	466	16.69
	12	20.75	2021397	14035	2.26	1.883	62	566	3.28
		20.75	1946044	19979	2.260	1.883	62	545	4.66
	13	45.9	1976147	25605	2.246	1.947	62	550	6.18
		45.9	2007598	25969	2.246	1.947	62	559	6.27
	14	70.34	1727919	31434	2.288	1.99	62	490	7.76
		70.34	1689857	30116	2.288	1.99	62	479	7.43
	15	93.76	1673354	36245	2.28	1.896	62	473	8.52
		93.76	1646616	36499	2.28	1.896	62	466	8.58

NOVEMBER 1992 FILENAME: NOV92A.WK1

CORE	DAYS	ELAPSE TIME (hrs)	O2 PEAK AREA	N2 PEAK AREA	F O2	F N2	GAS VOL (ml)	O2 in GasPhase (umoles)	N2 in GasPhase (umoles)
5C	5	20.82		22260	2.281	1.901	62	0	5.25
G-8		20.82		17257	2.281	1.901	62	0	4.07
		20.82		16189	2.281	1.901	62	0	3.82
ANOXIC	6	45.4		33619	2.207	1.826	62	0	7.61
CONTRL		45.4		30056	2.207	1.826	62	0	6.81
	7	65.17		33547	2.287	1.911	62	0	7.95
		65.17		36209	2.287	1.911	62	0	8.58
	8	93.32		42171	2.204	1.886	62	0	9.86
		93.32		45507	2.204	1.886	62	0	10.64
	12	20.5		17833	2.26	1.883	63	0	4.23
		20.5		20210	2.260	1.883	63	0	4.79
	13	45.65		21552	2.246	1.947	63	0	5.29
		45.65		26529	2.246	1.947	63	0	6.51
		45.65		22856	2.246	1.947	63	0	5.61
	14	70.09		28246	2.288	1.99	63	0	7.08
		70.09		27050	2.288	1.99	63	0	6.78
	15	93.51		35515	2.28	1.896	63	0	8.48
		93.51		35983	2.28	1.896	63	0	8.60