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10. Data Report: Composition of Pore Water from Site 1202, Southern Okinawa Trough[1]

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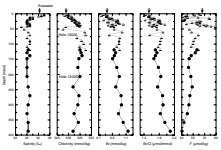
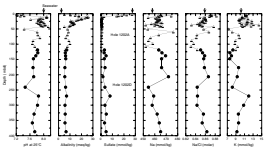
INTRODUCTION

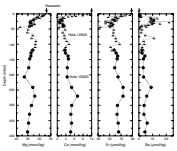
Pore water was collected from sediment cores from Holes 1202A and 1202D in the southern Okinawa Trough during Ocean Drilling Program (ODP) Leg 195. Because drilling at this site was completed only a few hours out of port during the end of the leg, whole rounds of sediment core 5 or 10 cm long were sealed and stored at ~3°C until pore water could be extracted from them during Leg 196, using a titanium squeezer designed by Manheim and Sayles (1974) and standard handling techniques (Shipboard Scientific Party, 2002).

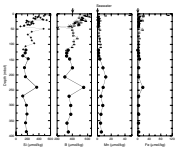
ANALYTICAL METHODS

Immediately following extraction, all pore water was filtered through a 0.45-µm polysulfone filter and analyzed onboard ship for salinity by refractive index, pH (±0.01; 1σ) by ion-specific electrode (ISE), and alkalinity (±2%) by automated potentiometric Gran titration with 0.1-N HCl. Aliquots were shipped to the University of Hawaii where they were analyzed for chlorinity (±0.3%) by automated electrochemical titration with $AgNO_3$, sulfate (±3%) and bromide (±2.4%) by ion chromatography, fluoride (±0.5%) by ISE with correction for Mg concentration, and K (±2%) by flame atomic absorption spectrophotometry. Mg, Ca, Sr, Ba, Si, B, Mn, and Fe were determined by inductively coupled plasma–atomic emission spectrometry with a precision of 2% to 5%. Na (±0.3%) was calculated from charge balance. Results are given in Table **T1** and Figures **F1, F2, F3,** and **F4.**









[1]Mottl, M.J., 2005. Data report: Composition of pore water from Site 1202, southern Okinawa Trough. *In* Shinohara, M., Salisbury, M.H., and Richter, C. (Eds.), *Proc. ODP, Sci. Results,* 195, 1–9 [Online]. Available from World Wide Web: <http://www-odp.tamu.edu/publications/195_SR/VOLUME/CHAPTERS/107.PDF>. [Cited YYYY-MM-DD]
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REFERENCES

Manheim, F.T., and Sayles, F.L., 1974. Composition and origin of interstitial waters of marine sediments, based on deep sea drill cores. *In* Goldberg, E.D. (Ed.), *The Sea* (Vol. 5): *Marine Chemistry: The Sedimentary Cycle:* New York (Wiley), 527–568.

Shipboard Scientific Party, 2002. Site 1200. *In* Salisbury, M.H., Shinohara, M., Richter, C., et al., *Proc. ODP, Init. Repts.,* 195, 1–173 [CD-ROM]. Available from: Ocean Drilling Program, Texas A&M University, College Station TX, 77845-9547, USA. [HTML]

Figure F1. Salinity, chlorinity, Br, Br/chlorinity, and F concentration (per kg of solution) in sediment pore water from Holes 1202A (open triangles) and 1202D (solid circles), compared with bottom seawater (arrow at top).

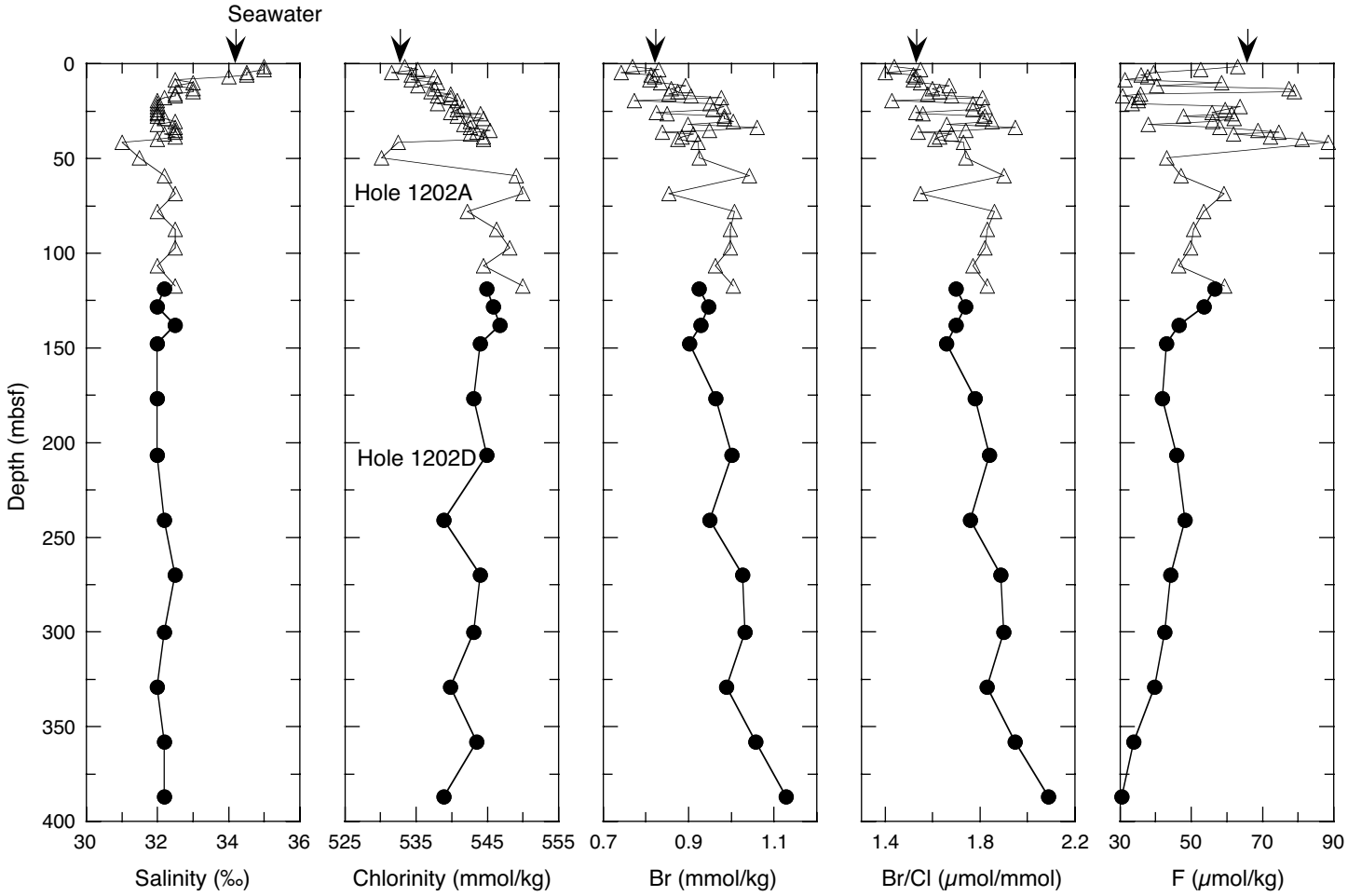

Figure F2. pH, alkalinity, sulfate, Na, Na/chlorinity, and K concentration (per kg of solution) in sediment pore water from Holes 1202A (open triangles) and 1202D (solid circles), compared with bottom seawater (arrow at top).

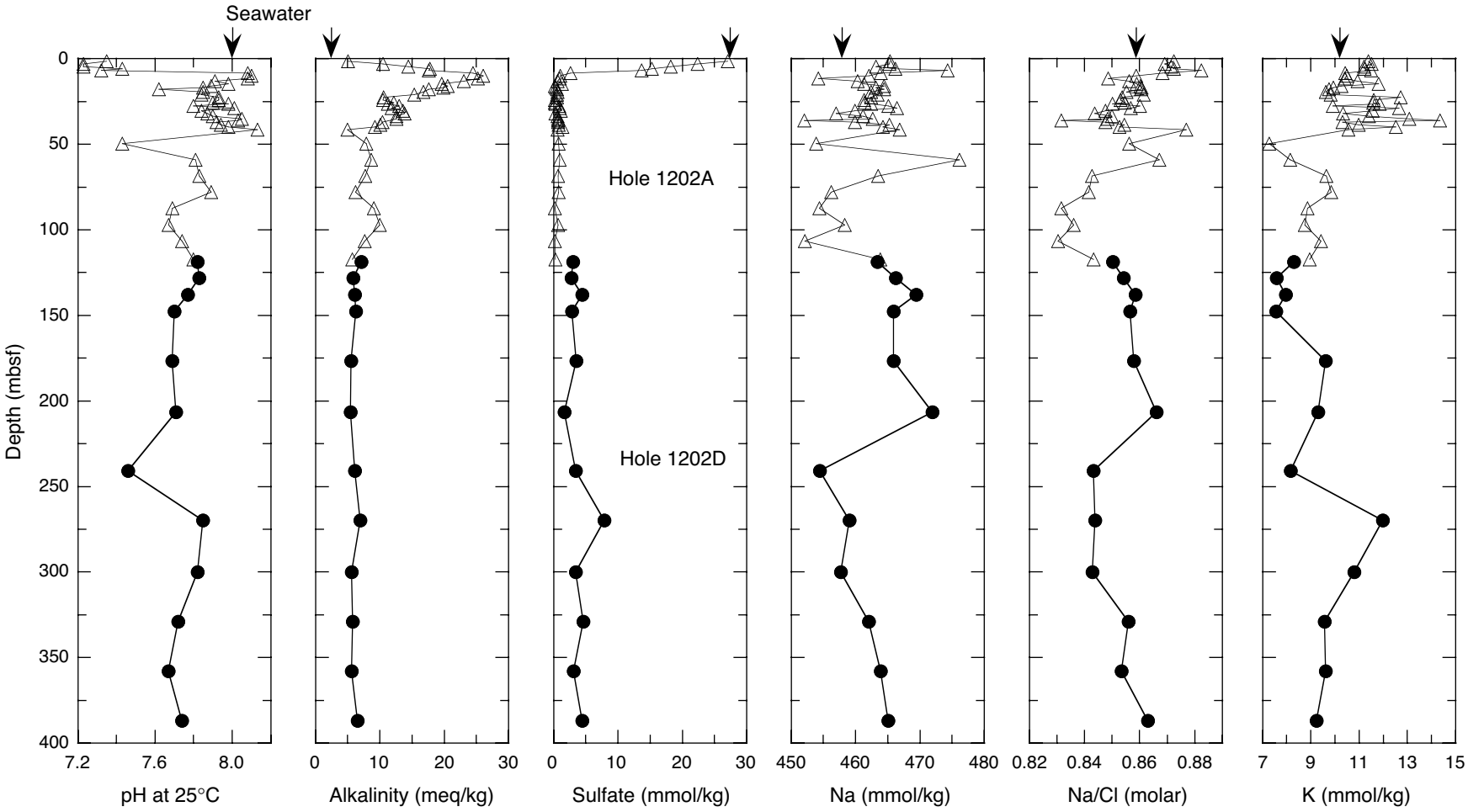

Figure F3. Concentrations (per kg of solution) of Mg, Ca, Sr, and Ba in sediment pore water from Holes 1202A (open triangles) and 1202D (solid circles), compared with bottom seawater (arrow at top).

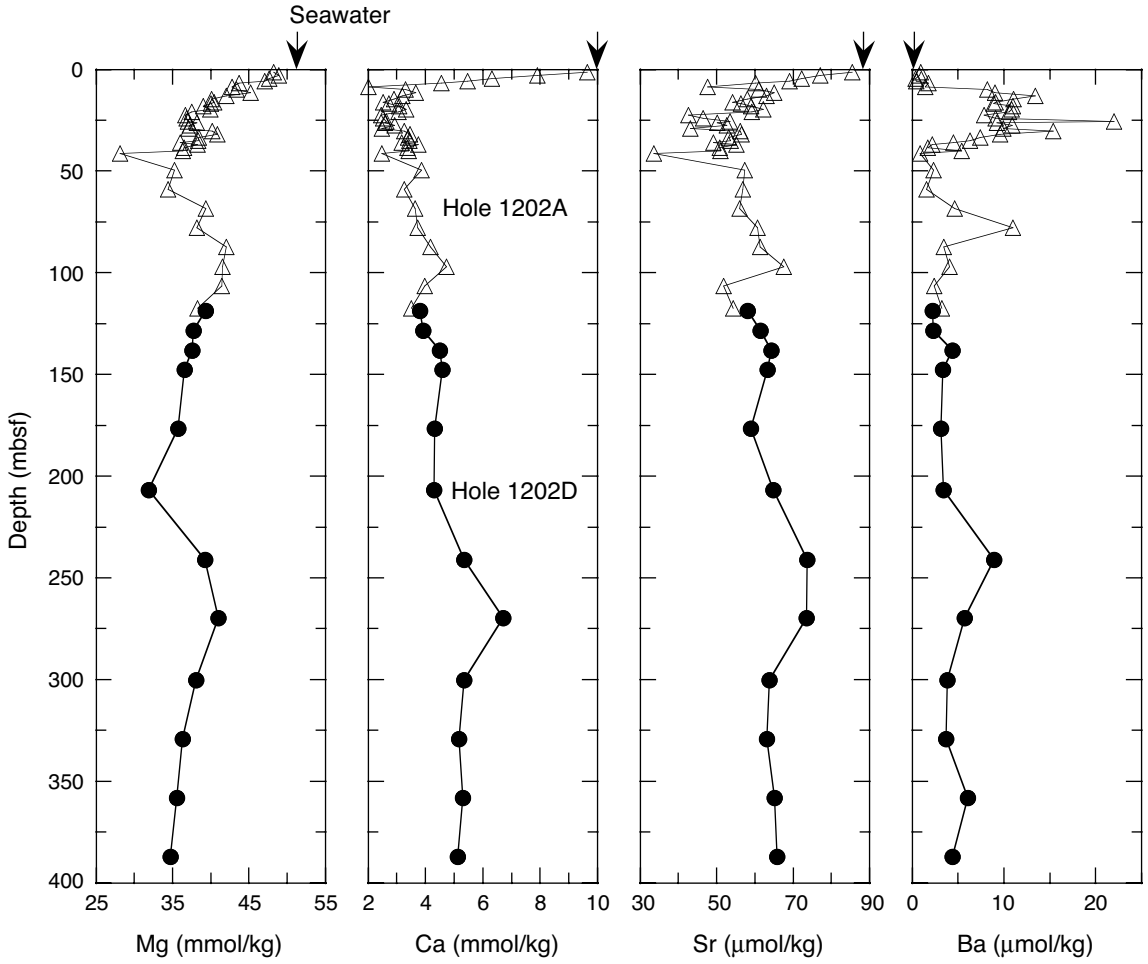

Figure F4. Concentrations (per kg of solution) of Si, B, Mn, and Fe in sediment pore water from Holes 1202A (open triangles) and 1202D (solid circles), compared with bottom seawater (arrow at top).

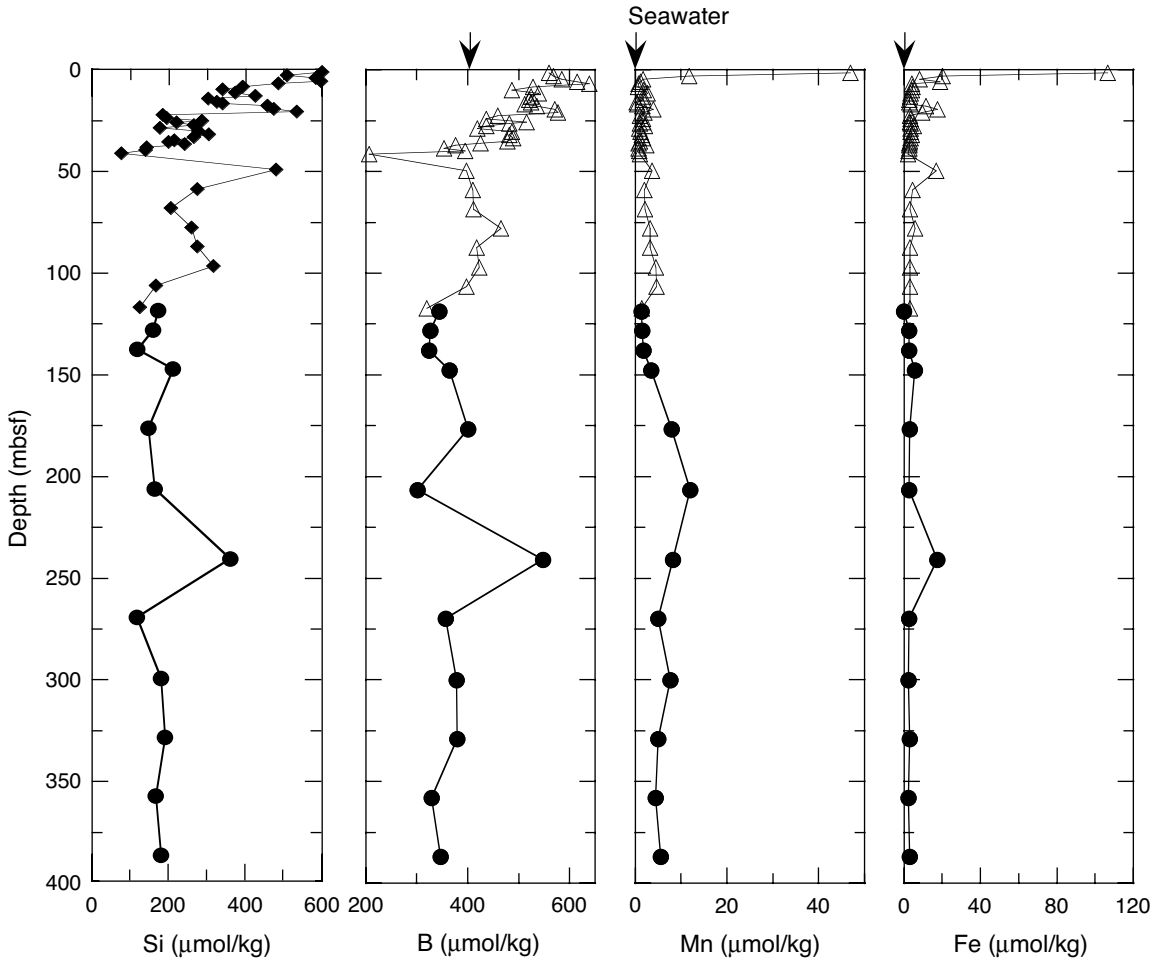

Table T1. Interstitial water composition, Site 1202 (Continued on next page.)

Core, section, interval (cm)	IW#	Depth (mbsf)	In situ* Temp. (°C)	pH at 25°C	Alkalinity (meq/kg)	Salinity (‰)	Chlorinity (mmol/kg)	Sulfate (mmol/kg)	Na (mmol/kg)	K (mmol/kg)	Mg (mmol/kg)	Ca (mmol/kg)
Method:				ISE	ET	RI	ET	IC	Calc.	FAAS	ICP-AES	ICP-AES
Bottom seawater		0.00	4.6	8.0	2.21	34.15	532.70	27.56	457.67	9.96	51.54	10.03
195-1202A-												
1H-1, 145–150	1	1.45	4.7	7.35	5.09	35.0	533.39	27.09	465.34	11.39	48.24	9.64
1H-2, 145–150	2	2.95	4.7	7.23	10.45	35.0	535.23	22.41	465.23	11.52	48.88	7.91
1H-3, 145–150	3	4.45	4.8	7.23	14.40	34.5	531.54	18.23	463.18	11.20	47.62	6.31
1H-4, 145–150	4	5.95	4.8	7.43	17.74	34.5	534.31	15.28	466.21	11.22	47.06	5.46
1H-5, 94–99	5	6.94	4.9	7.32	17.62	34.0	537.54	13.64	474.26	11.50	43.71	4.56
2H-1, 145–150	6	8.55	4.9	8.08	24.46	32.5	534.31	2.65	463.93	10.42	42.79	2.02
2H-2, 145–150	7	10.05	5.0	8.10	26.03	33.0	538.00	1.01	462.05	10.48	43.40	3.30
2H-3, 145–150	8	11.55	5.1	8.08	25.20	32.5	535.23	0.98	454.17	10.40	45.20	3.65
2H-4, 145–150	9	13.05	5.1	7.91	23.10	33.0	537.54	0.59	460.28	10.94	42.04	3.20
2H-5, 145–150	10	14.55	5.2	7.98	19.62	33.0	537.08	1.28	461.35	11.80	40.10	2.89
2H-6, 145–150	11	16.05	5.2	7.89	20.55	32.5	539.84	0.18	464.41	10.26	40.46	2.52
2H-7, 75–80	12	16.85	5.3	7.85	19.84	32.5	538.00	0.40	463.13	9.92	40.03	2.71
3H-1, 145–150	13	18.05	5.3	7.62	17.62	32.2	539.84	0.54	464.46	9.76	39.03	3.07
3H-2, 145–150	14	19.55	5.4	7.85	16.73	32.0	540.77	0.59	462.44	9.63	39.91	3.33
3H-3, 145–150	15	21.05	5.4	7.84	15.37	32.0	538.00	0.56	463.45	9.82	37.49	3.06
3H-4, 145–150	16	22.55	5.5	7.93	10.60	32.0	541.69	0.55	462.38	12.73	36.65	2.45
3H-5, 145–150	17	24.05	5.6	7.93	10.52	32.0	540.77	0.21	461.33	11.61	36.83	2.52
3H-6, 145–150	18	25.55	5.6	7.90	12.14	32.0	539.84	0.20	461.38	11.58	37.01	2.64
3H-7, 72–77	19	26.32	5.7	7.98	11.29	32.0	544.00	0.32	462.44	11.84	38.17	2.60
4H-1, 145–150	20	27.55	5.7	7.80	13.00	32.0	540.77	0.87	465.13	9.90	37.26	2.93
4H-2, 145–150	21	29.05	5.8	8.01	11.86	32.2	544.46	0.96	466.44	12.66	37.05	2.48
4H-3, 145–150	22	30.55	5.8	7.84	13.58	32.5	542.61	1.12	459.91	11.57	40.17	3.26
4H-4, 145–150	23	32.05	5.9	7.87	13.82	32.0	541.69	0.28	457.00	10.33	40.87	3.45
4H-5, 145–150	24	33.55	5.9	7.90	12.59	32.5	542.61	0.60	461.20	11.41	38.46	3.39
4H-6, 145–150	25	35.05	6.0	8.05	12.58	32.5	545.38	0.75	462.69	13.07	38.36	3.43
4H-7, 82–87	26	35.92	6.0	8.03		32.5	543.54	0.67	452.00	14.36	36.05	3.17
5H-1, 145–150	27	37.05	6.1	7.92	10.40	32.2	542.61	0.67	459.94	10.30	38.27	3.74
5H-2, 145–150	28	38.55	6.1	7.94	10.10	32.5	544.46	0.83	465.23	10.99	36.56	3.38
5H-3, 145–150	29	40.05	6.2	7.98	9.25	32.0	544.46	1.36	464.24	12.53	36.37	3.41
5H-4, 145–150	30	41.55	6.3	8.13	4.99	31.0	532.46	0.62	466.84	10.57	28.14	2.47
6H-3, 145–150	31	49.55	6.6	7.43	7.88	31.5	530.16	0.76	453.91	7.27	35.28	3.86
7H-3, 145–150	32	59.05	7.0	7.81	8.67	32.2	549.07	0.98	476.17	8.14	34.38	3.26
8H-3, 145–150	33	68.55	7.3	7.83	7.74	32.5	550.00	0.75	463.49	9.64	39.37	3.63
9H-3, 145–150	34	78.05	7.7	7.89	6.23	32.0	542.15	0.81	456.24	9.85	38.18	3.72
10-H3, 145–150	35	87.45	8.1	7.69	9.08	32.5	546.30	0.17	454.36	8.85	42.03	4.17
11-H3, 145–150	36	97.05	8.5	7.67	10.03	32.5	548.15	0.75	458.28	8.75	41.53	4.73
12-H3, 145–150	37	106.55	8.9	7.74	7.60	32.0	544.46	0.22	452.17	9.41	41.43	3.98
13-H6, 132–142	38	117.37	9.3	7.80	5.75	32.5	550.00	0.30	463.83	8.96	38.23	3.49
195-1202D-												
14-X3, 140–150	39	118.9	9.4	7.82	7.14	32.2	544.92	3.04	463.42	8.31	39.33	3.82
15-X3, 140–150	40	128.5	9.7	7.83	5.91	32.0	545.84	2.79	466.25	7.60	37.76	3.93
16-X3, 140–150	41	138.2	10.1	7.77	6.15	32.5	546.77	4.43	469.47	7.97	37.60	4.51
17-X3, 140–150	42	147.8	10.5	7.70	6.28	32.0	544.00	2.90	465.96	7.56	36.61	4.60
20-X3, 140–150	43	176.7	11.7	7.69	5.55	32.0	543.07	3.56	465.91	9.62	35.71	4.33
23X-4, 92–102	44	206.72	12.9	7.71	5.44	32.0	544.92	1.72	471.93	9.30	31.91	4.31
27X-1, 140–150	45	241.1	14.2	7.46	6.15	32.2	538.92	3.45	454.45	8.17	39.25	5.35
30X-1, 140–150	46	269.9	15.4	7.85	6.94	32.5	544.00	7.87	459.09	11.99	41.02	6.71
33X-2, 140–150	47	300.3	16.6	7.82	5.60	32.2	543.07	3.44	457.73	10.81	38.07	5.37
36X-2, 140–150	48	329.1	17.8	7.72	5.83	32.0	539.84	4.59	462.11	9.57	36.34	5.18
39X-2, 140–150	49	358.2	18.9	7.67	5.64	32.2	543.53	3.15	463.91	9.62	35.60	5.31
42X-2, 140–150	50	387.1	20.1	7.74	6.54	32.2	538.92	4.44	465.12	9.24	34.79	5.13

Notes: * = calculated from bottom water temperature of 4.6°C and a temperature gradient of 0.040°C/m, as estimated from downhole measurements. Methods: ISE = ion-specific electrode, ET = electrochemical titration, RI = refractive index, IC = ion chromatography, Calc. = calculated from charge balance, FAAS = flame atomic absorption spectrophotometry, ICP-AES = inductively coupled plasma atomic emission spectrometry.

Table T1 (continued).

Core, section, interval (cm)	Na/Cl (mol/mol)	Br/Cl (µmol/mmol)	F/Br (µmol/mmol)	Br (mmol/kg)	F (mmol/kg)	Sr (µmol/kg)	Ba (µmol/kg)	Mn (µmol/kg)	Fe (µmol/kg)	Si (µmol/kg)	B (µmol/kg)
Method:				IC	ISE	ICP-AES	ICP-AES	ICP-AES	ICP-AES	ICP-AES	ICP-AES
Bottom Seawater	0.8591	1.54	80.6	0.821	66.2	88.9	0.14	0	0		403
195-1202A-											
1H-1, 145–150	0.8724	1.44	82.2	0.768	63.1	85.5	0.90	46.95	106.5	600	560
1H-2, 145–150	0.8692	1.55	63.4	0.830	52.6	77.1	0.80	11.75	20.2	509	569
1H-3, 145–150	0.8714	1.40	53.1	0.742	39.4	72.3	0.39	1.73	8.0	583	584
1H-4, 145–150	0.8725	1.52	44.3	0.812	36.0	69.1	0.44	1.19	18.9	597	615
1H-5, 94–99	0.8823	1.53	46.1	0.821	37.8	60.2	1.78	0.71	4.2	486	639
2H-1, 145–150	0.8683	1.52	38.7	0.810	31.4	47.7	1.45	0.62	4.3	393	528
2H-2, 145–150	0.8588	1.55	70.1	0.834	58.5	61.1	8.16	1.87	4.0	340	487
2H-3, 145–150	0.8485	1.67	45.1	0.893	40.3	65.1	9.05	2.66	3.5	374	540
2H-4, 145–150	0.8563	1.60	90.0	0.860	77.4	63.0	13.43	1.68	3.1	426	524
2H-5, 145–150	0.8590	1.63	90.3	0.874	78.9	58.1	11.09	1.77	2.8	303	521
2H-6, 145–150	0.8603	1.58	41.9	0.854	35.8	54.2	9.09	0.40	3.0	326	524
2H-7, 75–80	0.8608	1.68	34.0	0.906	30.8	56.4	8.90	0.49	3.5	340	512
3H-1, 145–150	0.8604	1.81	36.1	0.977	35.3	59.0	10.98	1.64	11.5	458	536
3H-2, 145–150	0.8552	1.43	45.3	0.773	35.0	62.3	10.81	4.00	17.6	474	571
3H-3, 145–150	0.8614	1.77	35.2	0.950	33.4	59.2	10.55	2.05	9.5	534	577
3H-4, 145–150	0.8536	1.82	64.9	0.983	63.8	42.7	7.87	1.07	3.2	185	459
3H-5, 145–150	0.8531	1.77	62.1	0.957	59.5	46.5	9.06	1.74	3.6	195	436
3H-6, 145–150	0.8547	1.53	67.7	0.825	55.9	53.5	22.01	1.78	3.3	287	516
3H-7, 72–77	0.8501	1.56	72.4	0.849	61.4	50.1	9.22	0.98	3.5	221	482
4H-1, 145–150	0.8601	1.82	48.5	0.984	47.8	52.7	10.93	2.09	5.1	266	437
4H-2, 145–150	0.8567	1.81	63.0	0.984	62.0	43.1	9.95	0.93	3.5	177	419
4H-3, 145–150	0.8476	1.85	55.7	1.005	56.0	56.1	15.36	1.24	3.4	277	487
4H-4, 145–150	0.8437	1.66	42.2	0.898	37.9	56.5	9.56	1.51	4.0	304	482
4H-5, 145–150	0.8500	1.95	54.7	1.060	58.0	53.1	7.39	1.73	3.4	266	489
4H-6, 145–150	0.8484	1.74	72.4	0.949	68.7	53.7	6.32	1.02	3.1	215	478
4H-7, 82–87	0.8316	1.54	88.8	0.839	74.6	49.1	4.45	0.71	2.9	199	425
5H-1, 145–150	0.8476	1.68	68.0	0.911	61.9	55.1	2.21	2.44	2.8	241	376
5H-2, 145–150	0.8545	1.63	81.6	0.885	72.2	50.8	1.71	0.75	2.6	142	354
5H-3, 145–150	0.8527	1.61	92.8	0.874	81.1	50.9	5.39	0.84	2.3	139	395
5H-4, 145–150	0.8768	1.73	95.9	0.923	88.4	33.6	0.86	1.02	2.2	77	207
6H-3, 145–150	0.8562	1.74	46.7	0.925	43.2	57.4	2.30	3.67	16.7	480	398
7H-3, 145–150	0.8672	1.90	45.3	1.042	47.2	56.8	1.56	1.99	4.4	275	410
8H-3, 145–150	0.8427	1.55	69.2	0.854	59.1	56.0	4.63	2.13	3.2	206	411
9H-3, 145–150	0.8415	1.86	53.2	1.007	53.5	60.6	10.94	3.22	5.7	259	466
10-H3, 145–150	0.8317	1.83	50.8	0.997	50.7	61.4	3.41	3.21	3.2	275	417
11-H3, 145–150	0.8360	1.82	49.9	0.997	49.8	67.5	4.03	4.56	3.3	316	423
12-H3, 145–150	0.8305	1.77	48.2	0.963	46.4	51.8	2.42	4.59	3.1	166	398
13-H6, 132–142	0.8433	1.83	59.1	1.005	59.4	54.4	3.26	1.52	3.1	125	320
195-1202D-											
14-X3, 140–150	0.8504	1.70	61.2	0.925	56.7	58.2	2.22	1.47	3.3	173	345
15-X3, 140–150	0.8542	1.74	56.7	0.948	53.7	61.5	2.29	1.57	2.7	159	327
16-X3, 140–150	0.8586	1.70	50.2	0.929	46.6	64.3	4.42	1.80	2.8	118	324
17-X3, 140–150	0.8566	1.66	47.8	0.903	43.2	63.4	3.39	3.61	5.6	212	365
20-X3, 140–150	0.8579	1.78	43.6	0.964	42.0	59.0	3.19	7.98	3.3	147	402
23X-4, 92–102	0.8661	1.84	45.8	1.002	45.9	64.8	3.41	12.02	2.6	163	302
27X-1, 140–150	0.8433	1.76	50.9	0.950	48.4	73.7	8.97	8.30	17.7	360	548
30X-1, 140–150	0.8439	1.89	43.2	1.027	44.3	73.6	5.74	5.04	2.9	117	357
33X-2, 140–150	0.8428	1.90	41.3	1.033	42.6	63.9	3.88	7.75	2.3	180	379
36X-2, 140–150	0.8560	1.83	40.1	0.989	39.7	63.2	3.74	5.02	3.3	191	380
39X-2, 140–150	0.8535	1.95	32.0	1.058	33.9	65.3	6.10	4.56	2.3	166	330
42X-2, 140–150	0.8631	2.09	27.1	1.128	30.6	65.8	4.41	5.55	3.1	180	348