

Yucatan Water Chemistry Collected by Ronald Stoessell and Co-Workers

Yucatan Caribbean Data from 1980s and 1990s

Coast

includes Car Wash sinkholes

Stoessell, Ward, Ford Schuffert (1989) GSA Bull. 101, 159-169 & Ford 1985 UNO MS Thesis	depth	T	pH	Ca	Mg	Sr	K	Na	SO4	Cl	HS	NO3	PO4	HCO3	SiO2	del C13 PDB	del O18 SMOW	ch. bal. meq/ kg H2O
	m	oC		mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol			

Akumal beach

Sand Boil	b.m.s.l.																	
6/84 sample	1	26.5	6.98	4.73	13.30	0.0140	2.43	113.0	6.80	133.0	b.d.	n.m.	n.m.	6.10	0.047			-1.2

Tancah Cave Mouth, north of Tulum

profile 6/84	b.w.t.																	
T-1	4.4	27.1	6.85	5.50	16.20	0.0350	2.74	131.0	7.20	156.0	b.d.	n.m.	n.m.	6.31	0.054			0.5
T-3	4.7	27.1	6.90	5.44	16.20	0.0330	2.74	131.0	7.00	157.0	b.d.	n.m.	n.m.	6.04	0.049			0.0
T-5	5	27.1	6.95	5.37	16.30	0.0350	2.84	134.0	9.30	157.0	b.d.	n.m.	n.m.	5.96	0.056			-1.3
T-6	5.6	27.1	6.98	5.42	16.50	0.0330	2.87	133.0	7.70	158.0	b.d.	n.m.	n.m.	6.09	0.049			0.3
T-7	5.9	27.1	6.98	5.50	16.30	0.0350	2.87	131.0	9.00	158.0	b.d.	n.m.	n.m.	5.90	0.054			-4.4
T-8	6.2	27.2	6.98	5.40	16.50	0.0360	2.84	134.0	9.10	160.0	b.d.	n.m.	n.m.	5.76	0.052			-3.2
T-7B	5.6	28.0	6.84	5.78	19.00	0.0430	3.08	154.0	8.80	186.0	b.d.	n.m.	n.m.	5.79	0.052			-2.7
T-8B	6.2	28.0	6.90	5.78	19.70	0.0440	3.05	155.0	8.60	191.0	b.d.	n.m.	n.m.	5.79	0.051			-4.9
T-9B	6.8	28.0	6.90	5.89	20.10	0.0430	3.14	159.0	8.90	191.0	b.d.	n.m.	n.m.	5.74	0.052			-0.3

Xcaret Cave, South of Playa del Carmen

profile 6/83	b.w.t.																	
X=0	0.1	27.0	6.80	6.03	22.10	0.0390	3.95	192.0	11.20	223.0	b.d.	n.m.	n.m.	5.43	0.044	-11.1	-3.5	1.5
X-1/2	0.75	28.0	6.80	5.98	21.70	0.0390	3.95	192.0	10.60	223.0	b.d.	n.m.	n.m.	5.38	0.044	-10.4	-3.4	1.8
X-1	1.7	28.5	6.90	6.24	24.10	0.0440	4.44	213.0	12.60	241.0	b.d.	n.m.	n.m.	5.46	0.041	-10.3	-3.1	6.5
X-2	1.9	30.5	6.90	7.31	31.20	0.0560	5.90	276.0	17.00	331.0	b.d.	n.m.	n.m.	4.85	0.031	-9.3	2.3	-10.8
X-3	2.1	31.5	6.90	8.40	39.50	0.0700	7.62	354.0	19.60	417.0	b.d.	n.m.	n.m.	4.05	0.024	-7.6	-1.5	-2.7
X-4	2.3	33.0	6.90	8.73	43.20	0.0750	8.08	375.0	22.40	444.0	b.d.	n.m.	n.m.	3.67	0.014	-8.1	-1.2	-5.4
X-5	2.5	33.0	6.90	8.86	43.60	0.0760	8.16	381.0	20.50	447.0	b.d.	n.m.	n.m.	3.62	0.015	-7	-1	2.6
X-6	2.7	33.0	6.90	8.99	44.00	0.0780	8.29	390.0	20.90	462.0	b.d.	n.m.	n.m.	3.63	0.014	-6.8	-0.9	-3.0
X-7	2.9	33.0	7.00	9.02	44.50	0.0790	8.40	399.0	21.70	471.0	b.d.	n.m.	n.m.	3.50	0.017	-6.8	-0.8	-3.3
X-8	3.1	33.0	7.20	9.08	45.40	0.0800	8.75	414.0	23.80	480.0	b.d.	n.m.	n.m.	3.42	0.014	-6.3	-0.9	0.8
X-9	4.25	28.0	7.40	9.48	47.10	0.0820	8.97	421.0	26.30	495.0	b.d.	n.m.	n.m.	3.06	0.015	-5.6	-0.9	-7.4

Yalku Caleta Cave, just north of Akumal

profile 6/83	b.w.t.																		
Y3-1	0.1	30.0	7.00	7.26	30.90	0.0570	5.85	274.0	15.40	320.0	b.d.	n.m.	n.m.	4.75	0.037	-9.5	-2.2	0.7	
Y3-2	0.3	30.0	7.10	7.55	32.30	0.0590	6.06	285.0	15.80	337.0	b.d.	n.m.	n.m.	4.51	0.037	-9.8	-2.6	-2.2	
Y3-3	0.5	30.0	7.20	8.40	39.20	0.0700	7.37	337.0	19.10	411.0	b.d.	n.m.	n.m.	3.97	0.029	-8.4	-2	-13.5	
Y3-4	0.7	30.5	7.40	8.99	43.20	0.0780	8.24	391.0	21.10	459.0	b.d.	n.m.	n.m.	3.62	0.026	-6.8	-1.4	-1.0	
Y3-5	0.9	30.2	7.70	9.61	49.30	0.0860	9.19	436.0	28.10	510.0	b.d.	n.m.	n.m.	3.13	0.012	-5.1	-1.1	-6.1	
Y3-6	1.1	30.5	7.70	9.91	50.60	0.0900	9.60	454.0	29.30	534.0	b.d.	n.m.	n.m.	2.90	0.014	-4.6	-0.9	-10.7	
Y3-7	1.3	30.0	7.80	10.07	52.40	0.0910	9.79	459.0	29.70	549.0	b.d.	n.m.	n.m.	2.83	0.007	-4.5	-0.5	-17.3	
Y3-8 (s.w.)	3	30.0	7.90	10.24	52.80	0.0920	10.09	473.0	32.30	558.0	b.d.	n.m.	n.m.	2.66	0.009	-3.4	-0.1	-15.9	

Car Wash Cenote on Tulum-Coba Road, 6 km from Tulum

profile 6/84	b.w.t.																		
CW-4	4	25.0	6.70	3.47	2.51	0.0230	0.26	13.5	0.76	16.2	b.d.	n.m.	n.m.	7.14	0.070			0.9	
CW-7	11	25.0	6.90	3.47	2.47	0.0140	0.26	13.2	0.74	16.8	b.d.	n.m.	n.m.	7.17	0.070			-0.1	

Coast Interior

Yong Chen (1991)	depth m	T oC	pH	Ca mmol	Mg mmol	Sr mmol	K mmol	Na mmol	SO4 mmol	Cl mmol	HS mmol	NO3 mmol	PO4 mmol	HCO3 mmol	SiO2 mmol	Fe mmol	Mn mmol	ch. bal. meq/kg H2O
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UNO MS Thesis

Calica P2 Borehole, south of Xcaret

August, 1990	b.m.s.l.																		
CP2-1	-4.20	25.0	7.02	3.23	2.45	0.0091	0.32	15.4	0.90	17.6	b.d.	0.12	0.0001	6.90	0.069	0.0034	b.d.	0.7	
CP2-2	-8.70	29.6	7.07	3.15	2.43	0.0091	0.32	15.0	0.83	17.3	b.d.	0.16	0.0001	6.85	0.066	0.0054	b.d.	0.5	
CP2-3	11.80	30.0	7.09	4.02	6.39	0.0156	1.09	52.1	2.83	60.8	b.d.	0.13	0.0002	6.81	0.060	0.0054	b.d.	0.7	
CP2-4	-12.40	31.3	7.06	6.32	22.87	0.0390	4.05	195.9	11.34	221.1	b.d.	0.08	0.0003	5.82	0.044	0.0113	0.0005	8.7	
CP2-5	-14.7	29.8	7.37	9.77	48.84	0.0892	9.22	440.5	25.43	507.3	b.d.	b.d.	0.0002	2.83	0.016	0.0191	0.0017	6.1	
CP2-6	-17.7	30.4	7.24	9.85	49.41	0.0911	9.43	450.1	26.70	519.2	b.d.	b.d.	0.0001	2.50	0.016	0.0201	0.0016	3.1	

Calica P6 Borehole, South of Xcaret

August, 1990	b.m.s.l.																		
CP6-1	-0.93	29.8	6.93	4.53	1.08	0.0084	0.14	11.0	0.55	12.9	b.d.	0.16	0.0001	6.51	0.064	0.0037	b.d.	1.7	
CP6-2	-4.13	29.1	7.12	4.47	1.20	0.0086	0.15	11.0	0.51	13.8	b.d.	0.15	0.0002	6.61	0.062	0.0047	b.d.	0.9	
CP6-3	-10.23	26.7	6.93	3.86	1.97	0.0098	0.25	14.1	0.75	16.1	b.d.	0.22	0.0002	6.43	0.063	0.0037	b.d.	1.7	
CP6-4	-13.83	28.0	7.00	4.83	5.79	0.0167	0.88	47.1	2.34	49.5	b.d.	0.23	0.0002	6.41	0.060	0.0047	0.0005	8.5	
CP6-5	-14.47	27.3	7.03	9.37	30.34	0.0554	5.30	271.4	14.78	309.0	b.d.	0.08	0.0002	4.64	0.039	0.0152	0.0013	13.0	
CP6-6	-17.83	28.9	7.31	11.10	48.86	0.0952	9.46	453.3	26.06	519.2	b.d.	b.d.	0.0002	2.64	0.023	0.0219	0.0017	8.9	

Calica P8 Borehole, South of Xcaret

August, 1990	b.m.c.l.																		
CP8-1	-0.85	27.7	6.97	3.17	2.28	0.0093	0.25	13.8	0.73	16.5	b.d.	0.08	0.0002	6.69	0.070	0.0044	b.d.	0.2	
CP8-2	-4.15	28.0	7.31	3.08	2.26	0.0089	0.25	13.1	0.69	15.2	b.d.	0.18	0.0002	6.72	0.068	0.0034	b.d.	0.5	
CP8-3	-10.25	29.8	7.17	3.04	2.23	0.0088	0.26	12.8	0.72	14.4	b.d.	0.17	0.0003	6.65	0.068	0.0047	b.d.	1.0	
CP8-4	-13.25	30.0	7.16	4.60	9.80	0.0208	1.69	81.7	4.19	94.3	b.d.	0.13	0.0002	6.27	0.057	0.0056	b.d.	3.2	
CP8-5	-13.89	27.9	7.32	6.39	21.26	0.0373	3.80	185.8	10.08	211.2	b.d.	0.07	0.0002	5.36	0.045	0.0123	0.0005	8.2	
CP8-6	-15.41	28.7	7.20	10.03	46.94	0.0875	8.62	415.0	23.81	468.3	b.d.	b.d.	0.0001	3.15	0.025	0.019	0.0017	18.6	

Stoessell, Moore, & Coke (1993) Ground Water J. 31, 566- 575	depth m	T oC	pH	Ca mmol	Mg mmol	Sr mmol	K mmol	Na mmol	SO4 mmol	Cl mmol	HS mmol	NO3 mmol	PO4 mmol	HCO3 mmol	SiO2 mmol	Fe mmol	del S34 in SO4 ppt. C. Diablo	ch. bal. meq/ kg H2O
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Calica P2 Borehole, south of Xcaret

5/15-16/91 profile	b.m.s.l.																	
CP2-1	3.8	27.7	7.04	3.07	2.06	0.0078	0.28	12.6	0.67	14.5	b.d.	0.11	0.0001	8.14	0.064	0.005		-0.9
CP2-2	10.2	28.3	6.92	3.07	2.28	0.0066	0.31	14.9	0.78	16.1	b.d.	0.17	0.0003	6.73	0.067	0.005		1.4
CP2-3	13	27.3	6.98	6.74	24.10	0.0326	4.52	206.0	13.00	240.3	b.d.	0.08	0.0005	5.72	0.044	0.013		0.2
CP2-4	17.8	28.0	7.35	10.50	51.90	0.0606	10.10	467.0	28.20	543.7	b.d.	b.d.	0.0001	2.61	0.015	0.013	18.6	-0.7

Little Calica Cenote, south of Xcaret

5/16-18/91 profile	b.m.s.l.																	
LC-1	6	27.6	7.13	2.97	1.95	0.0086	0.23	11.0	0.80	13.3	b.d.	0.15	0.0002	6.83	0.058	0.005		-0.8
LC-2	13.6	27.2	7.15	3.00	1.91	0.0086	0.22	11.1	0.76	10.6	b.d.	0.16	0.0002	6.66	0.060	0.005		2.2
LC-3	14.4	26.6	7.13	4.93	11.40	0.0156	1.64	84.6	4.04	101.7	1.17	0.02	0.0140	10.59	0.300	0.007		-2.6
LC-4	15.1	28.6	6.90	8.45	31.00	0.0308	5.01	272.0	11.00	311.5	4.03	b.d.	0.0250	16.52	0.610	0.009		1.9
LC-5	15.9	26.6	6.80	9.69	38.30	0.0305	6.74	330.0	14.10	388.4	2.76	b.d.	0.0200	18.27	0.650	0.009	31.4	-4.8

Angelita Cenote, south of Tulum

5/19-21/91 profile	b.w.t.																	
A-1	22.9		6.95	3.17	1.30	0.0128	0.12	7.0	0.44	8.2	b.d.	0.17	0.0012	7.15	0.113	0.005		-0.4
A-2	29.6	27.5	6.86	3.45	2.03	0.0139	0.25	12.6	0.74	14.5	b.d.	0.11	0.0003	6.98	0.113	0.004		0.8
A-3	30.2	27.8	6.77	8.84	17.10	0.0433	3.00	155.0	11.00	180.7	0.06	b.d.	0.0003	6.63	0.141	0.009	18.7	0.6
A-4	30.5		6.86	8.66	17.80	0.0425	3.13	149.0	10.40	180.7	0.06	b.d.	0.0003	6.62	0.138	0.009	18.6	-3.0
A-5	31.1		6.86	19.50	45.80	0.0991	8.81	420.0	31.70	491.9	0.28	b.d.	0.0015	4.42	0.180	0.009	18.5	-0.4

Maya Blue Cave, just south of Tulum

5/18/91 sample	b.w.t.																	
5/18/91 sample	16.8	28.5	7.15	10.10	48.00	0.0568	9.39	428.0	26.10	499.4	b.d.	0.02	0.0003	3.00	0.025	0.006		-0.9

Playa del Carmen, Caribbean Sea beach

5/16/91 s.w.	b.m.s.l.																	
5/16/91 s.w.	0.3	28.8	8.05	10.40	52.80	0.0580	10.00	476.0	28.90	556.5	b.d.	b.d.	b.d.	2.66	0.004	0.006	18.3	-4.4

R. K. Stoessell Unpub. Data	depth m	T oC	pH	Ca mmol	Mg mmol	Sr mmol	K mmol	Na mmol	SO4 mmol	Cl mmol	HS mmol	NO3 mmol	PO4 mmol	HCO3 mmol	SiO2 mmol	Fe mmol	Mn mmol	ch. bal. meq/ kg H2O
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Little Calica Cenote, south of Xcaret

4/15/92 profile	b.w.t.																	
LC-1	13.6	27.0	6.99	2.97	2.11	0.0090	0.23	11.7	0.71	13.9	b.d.	0.13	b.d.	6.66	0.070	0.001	0.001	0.0
LC-2	14.8	27.0	6.87	6.91	22.00	0.0410	3.29	177.3	9.18	201.1	2.15	b.d.	0.0139	14.60	0.550	0.002	0.002	2.3
LC-3	15.9	26.0	6.63	9.53	36.60	0.0620	6.31	318.6	16.21	363.0	4.28	b.d.	0.0129	18.10	0.700	0.002	0.002	-0.5

Big Calica Cenote, south of Xcaret

4/14/92 profile	b.w.t.																		
BC-1	12	25.3	7.05	2.97	2.48	0.0090	0.22	11.3	0.73	13.3	b.d.	0.15	b.d.	6.70	0.074	0.001	0.001	0.8	
BC-2	13.5	26.2	7.01	3.91	6.65	0.0160	1.12	54.6	3.00	63.8	b.d.	0.05	b.d.	6.95	0.149	0.001	0.001	0.1	
BC-3	15.1	26.7	6.60	7.88	23.60	0.0440	4.03	197.5	10.80	231.5	1.63	b.d.	0.0080	12.80	0.670	0.002	0.002	-3.0	
BC-4	16.6	26.5	6.78	9.23	32.00	0.0550	5.51	278.6	16.20	324.2	1.64	b.d.	0.0053	10.60	0.510	0.002	0.002	-2.2	
BC-5	19.6	26.3	6.92	10.40	44.90	0.0700	7.95	382.2	22.60	442.6	0.68	b.d.	0.0034	5.90	0.280	0.002	0.002	6.5	
BC-6	24.2	26.2	6.87	11.40	52.00	0.0810	9.96	467.0	26.00	546.9	1.38	b.d.	0.0034	7.50	0.450	0.002	0.002	-3.9	

Angelita Cenote, south of Tulum

4/12/92 profile	b.w.t.																		
A-1	22.9	28.3	6.65	3.47	1.08	0.0140	0.13	7.1	0.44	9.0	b.d.	0.16	0.0019	6.97	0.114	0.0005	0.001	-0.7	
A-2	29	27.0	6.68	3.30	1.66	0.0140	0.15	8.3	0.52	10.0	b.d.	0.16	b.d.	7.04	0.120	0.003	0.001	0.2	
A-3	30	27.4	6.56	9.61	19.40	0.0650	3.06	162.6	12.60	190.9	0.08	0.02	b.d.	7.22	0.153	0.001	0.001	0.4	
A-4	30.5	27.3	6.61	18.20	42.20	0.1340	7.24	370.2	28.40	438.1	0.47	b.d.	0.0006	5.79	0.195	0.004	0.002	-2.7	
A-5	32	27.3	6.73	20.30	48.50	0.1560	9.29	456.5	31.90	533.1	0.20	b.d.	b.d.	3.55	0.181	0.003	0.002	3.1	
A-6	35.1	27.3	6.73	19.90	48.50	0.1550	9.26	451.1	32.10	533.0	0.19	b.d.	b.d.	3.60	0.181	0.004	0.002	-3.5	

Akumal, beach

4/15/92 s.w.	b.m.s.l.																		
4/15/92 s.w.	1.5	28.0	8.28	10.60	55.50	0.0790	10.50	489.1	29.10	575.8	b.d.	b.d.	b.d.	2.48	0.004	0.002	0.002	-4.5	

L. Marcella -1994	depth	T	pH	Ca	Mg	Sr	K	Na	SO4	Cl	HS	NO3	PO4	HCO3	SiO2	Fe	del C13	del O18	ch. bal.
UNO MS Thesis	m	oC		mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol	mmol	ppt	ppt	meq/
																	PDB	SMOW	kg H2O

Big Calica Cenote, south of Xcaret

4/13/93 profile	b.w.t.																		
BC-1	12.1	25.2	6.93	2.87	2.09	0.0090	0.23	11.6	0.83	14.1	b.d.	0.12	0.0003	6.64	0.088	0.0014	-13.52	-3.4	-0.8
BC-2	13.6	26.3	6.93	4.24	7.77	0.0160	1.33	64.3	3.98	76.5	b.d.	0.02	0.0002	7.04	0.240	0.0003	-12.99	-2.63	-1.8
BC-3	15.1	26.6	6.66	8.03	25.49	0.0380	4.44	214.6	9.85	250.1	3.24	b.d.	0.0040	12.76	0.828	0.0011	-18.45	-0.56	0.4
BC-4	16.6	26.1	6.66	9.01	32.75	0.0440	5.72	276.1	14.71	325.7	3.63	b.d.	0.0078	9.94	0.630	0.0014	-19.37	-0.11	-3.3
BC-5	19.7	25.8	6.77	10.18	43.63	0.0540	8.00	379.5	21.72	447.9	1.95	b.d.	0.0023	5.66	0.389	0.0016	-16.4	0.94	-3.7
BC-6	27.3	25.6	6.73	11.28	51.93	0.0610	10.09	470.4	22.98	544.3	3.65	b.d.	0.0053	7.11	0.596	0.0015	-17.9	2.02	6.0

Angelita Cenote, south of Tulum

4/15/93 profile	b.w.t.																		
A-1	29	26.4	6.62	3.12	1.66	0.0140	0.15	8.6	0.28	10.2	b.d.	0.03	0.0011	6.95	0.137	0.0014	-12.92	-3.41	0.6
A-2	30	26.2	6.54	5.33	8.09	0.0300	1.21	63.9	4.63	74.9	b.d.	0.06	b.d.	7.29	0.174	0.0011	-12.99	-3.69	0.5
A-3	30.5	26.0	6.58	14.70	33.86	0.0950	5.48	287.1	23.50	341.4	b.d.	0.01	0.0002	6.87	0.233	0.0019			-5.4
A-4	32	26.7	6.71	19.84	47.47	0.1300	9.21	448.6	32.16	528.7	0.23	0.02	b.d.	3.55	0.230	0.0014	-12.34	1.07	-4.1
A-5	35.1	26.6	6.66	19.92	48.43	0.1340	9.41	465.1	33.13	538.3	0.31	0.01	b.d.	3.47	0.231	0.0017	-8.29	1.54	3.1
A-6	39	26.2	6.81	20.38	49.12	0.1360	9.50	459.7	33.93	540.6	0.28	0.02	b.d.	3.42	0.235	0.0017	-8.36	1.69	-3.7

Akumal sea water

4/14/93 s.w.	b.m.s.l.		Akumal beach																
4/14/93 s.w.	1.5	26.7	7.98	10.50	54.90	0.0560	10.37	496.4	30.42	574.5	b.d.	b.d.	b.d.	2.44	0.006	0.0017			-0.1

depth inches	pH	mS	mv	mM	meters	HCO3	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	meq/l	mg/l
2	7.29				0.05	6.42	b.d.	10.92	b.d.	0.221	2.17	2.97	0.007	0.068	12.72	0.021	0.133	b.d.	0.690	0.067	b.d.	0.69	1355	
12	6.9	24.81	2.15	290	0.158	0.30	6.65	b.d.	11.05	b.d.	0.222	2.19	3.12	0.006	0.063	12.78	0.021	0.133	b.d.	0.694	0.068	b.d.	0.87	1381

In southern Yucatan Peninsula near Belice, inland sinkhole on east side of highway at Bacular

Cenote	sample near restaurant on west side				4/7/03	alk as																elec.			
Azul	pH	oC	sp. cond.		depth	mM	Li	Na	NH4	K	Mg	Ca	Sr	F	Cl	Br	NO3	PO4	SO4	SiO2	S2-	neut.	tds	⁸⁷ Sr/ ⁸⁶ Sr	
depth feet	pH	oC	mS		meters	HCO3	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	meq/l	mg/l	
100	7.19	28.60	2.46		30.48	4.97	0.004	1.653	b.d.	0.083	3.88	11.98	0.095	0.054	1.33	0.002	0.012	b.d.	13.01	0.444	b.d.	1.25	2252	0.707657	
220	7.23	28.50	2.5		67.06	4.93	0.001	1.553	b.d.	0.078	3.78	11.78	0.093	0.081	1.29	0.002	0.013	b.d.	12.91	0.443	b.d.	0.80	2225	0.707656	

Interior sinkhole in cave with collapsed roof in east north-central Yucatan Peninsula

Cave	Main Ent.	N 20.59.295	W 88.36.063	noon	7/24/03	alk as																elec.			
Ucil Cenote	pH	oC	sp. cond.	Eh	O2	depth	mM	Li	Na	NH4	K	Mg	Ca	Sr	F	Cl	Br	NO3	PO4	SO4	SiO2	S2-	neut.	tds	⁸⁷ Sr/ ⁸⁶ Sr
depth feet	pH	oC	mS	mv	mM	meters	HCO3	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	meq/l	mg/l	
10	6.72	26.24	1.63	324	0.119	3.04	7.93	b.d.	6.57	b.d.	0.176	1.78	3.42	b.d.	0.048	7.62	0.013	0.290	b.d.	0.35	0.278	b.d.	0.54	1162	
100	6.82	26.23	1.64	309	0.117	30.48	7.92	b.d.	6.74	b.d.	0.179	1.81	3.54	b.d.	0.048	7.73	0.013	0.289	b.d.	0.35	0.278	b.d.	0.92	1174	
200	7.15	26.10	1.65	309	0.158	60.96	7.88	b.d.	6.74	b.d.	0.178	1.79	3.54	b.d.	0.048	7.62	0.013	0.292	b.d.	0.35	0.278	b.d.	1.03	1168	
235 approx.	7.13	26.20	3.53	286	0.140	71.63	7.82	b.d.	22.10	b.d.	0.371	3.70	4.37	b.d.	0.121	25.6	0.041	0.258	b.d.	1.27	0.271	b.d.	2.26	2332	

Inland coastal sinkhole south of Tulum near Caribbean Coast

Laguna	center	N 20.16603	W 87.55314	noon	9/17/03	alk as																elec.			
Chumkopo	pH	oC	sp. cond.	Eh	O2	depth	mM	Li	Na	NH4	K	Mg	Ca	Sr	F	Cl	Br	NO3	PO4	SO4	SiO2	S2-	neut.	tds	⁸⁷ Sr/ ⁸⁶ Sr
depth feet	pH	oC	mS	mv	mM	meters	HCO3	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	meq/l	mg/l	
10	8.14	30.91	2.01	330	0.233	3.05	2.92	b.d.	12.27	b.d.	0.235	2.00	1.39	0.011	n.m.	14.7	0.021	0.008	b.d.	0.78	0.119	b.d.	0.07	1181	0.708365
50	6.92	25.32	2.38	364	0.085	15.24	6.95	b.d.	12.79	b.d.	0.244	2.17	3.42	0.012	n.m.	15.0	0.023	0.166	b.d.	0.83	0.113	b.d.	0.47	1548	0.708366
100	7.19	25.73	51.3	-49	0.005	30.48	4.56	0.022	490.2	b.d.	9.591	45.67	19.19	0.138	n.m.	551.2	0.834	0.000	b.d.	31.54	0.208	0.599	9.57	36482	0.708539
220	7.67	26.67	52.7	-116	0.006	67.06	4.39	0.022	477.2	b.d.	9.515	43.20	19.96	0.155	n.m.	547.5	0.834	0.000	b.d.	32.38	0.185	0.699	-4.85	36094	0.708503

Interior sinkhole in cave with collapsed roof in east north-central Yucatan Peninsula

Cenote Ucil	in cave	N 20.98828	W 88.60103	3 PM	9/18/03	alk as																elec.			
depth feet	pH	oC	sp. cond.	Eh	O2	depth	mM	Li	Na	NH4	K	Mg	Ca	Sr	F	Cl	Br	NO3	PO4	SO4	SiO2	S2-	neut.	tds	⁸⁷ Sr/ ⁸⁶ Sr
150	6.84	26.22	1.65	397	0.127	45.72	8.00	b.d.	6.61	b.d.	0.172	1.74	3.47	b.d.	n.m.	8.10	0.013	0.284	b.d.	0.35	0.281	b.d.	0.14	1196	0.708290
260	7.53	26.80	26.8	291	0.010	79.25	6.11	0.006	207.9	b.d.	2.839	26.6	13.9	0.164	n.m.	258.0	0.395	b.d.	b.d.	11.76	0.206	b.d.	3.96	16918	0.708307
300	8.3	27.53	37.3	-87	0.011	91.44	6.51	0.012	300.1	b.d.	4.143	37.2	17.6	0.219	n.m.	371.0	0.569	b.d.	b.d.	15.20	0.195	0.624	4.86	23925	0.708340

Interior sinkhole in north-central Yucatan Peninsula, east of Merida

Cenote	center	N 20.90952	W 88.86725	noon	9/19/03	alk as																elec.			
Xcolak	pH	oC	sp. cond.	Eh	O2	depth	mM	Li	Na	NH4	K	Mg	Ca	Sr	F	Cl	Br	NO3	PO4	SO4	SiO2	S2-	neut.	tds	⁸⁷ Sr/ ⁸⁶ Sr
depth feet	pH	oC	mS	mv	mM	meters	HCO3	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	meq/l	mg/l	
50	6.82	26.66	1.284	370	0.012	15.24	7.56	b.d.	4.17	b.d.	0.088	1.76	2.79	b.d.	n.m.	5.11	0.009	0.114	b.d.	0.23	0.160	b.d.	0.14	940	0.708325
150	6.72	26.08	1.32	372	0.031	45.72	7.65	b.d.	4.32	b.d.	0.091	1.92	2.74	b.d.	n.m.	5.25	0.009	0.176	b.d.	0.24	0.170	b.d.	0.20	962	0.708331
200	7.43	26.16	14.48	-116	0.014	60.96	11.70	0.001	97.0	b.d.	0.931	14.5	9.83	0.104	n.m.	131.7	0.203	b.d.	b.d.	2.30	0.659	0.951	-2.33	8725	0.708420
300	7.19	27.69	40.8	-134	0.011	91.44	10.00	0.012	326.7	b.d.	3.888	42.8	21.7	0.253	n.m.	416.6	0.637	b.d.	b.d.	13.33	0.563	1.800	4.31	26503	0.708464

Inland coastal sinkhole near Celestun on Bay of Campeche

Cenote Santa Rosa Celestun 17 km inland		N 20.85028	W 90.23557	9 AM	4/18/04	alk as															elec.				
	pH	T	Sp. Cond.	Eh	O2	depth	mM	Li	Na	NH4	K	Mg	Ca	Sr	F	Cl	Br	NO3	PO4	SO4	SiO2	S2-	neut.	tds	⁸⁷ Sr/ ⁸⁶ Sr
depth feet		oC	mS/cm		mM	meters	HCO3	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	meq/l	mg/l	
50 feet	6.76	26.58	3.13	382	0.052	15.24	6.95	n.m.	16.09	b.d.	0.327	3.24	4.27	b.d.	n.m.	19.38	0.030	0.177	b.d.	2.91	0.323	b.d.	-0.87	2040	0.708042
100 feet	6.58	26.53	32.5	38	0.009	30.58	6.52	n.m.	237.6	b.d.	4.399	24.6	12.2	0.106	n.m.	272.8	0.432	b.d.	b.d.	15.77	0.340	0.113	4.36	18348	0.708595

Interior sinkhole in west north-central Yucatan Peninsula, south of Merida

Cenote Sabak-Ha		N 20.58040	W 89.58831	2 PM	4/18/04	alk as															elec.				
	pH	T	Sp. Cond.	Eh	O2	depth	mM	Li	Na	NH4	K	Mg	Ca	Sr	F	Cl	Br	NO3	PO4	SO4	SiO2	S2-	neut.	tds	⁸⁷ Sr/ ⁸⁶ Sr
depth feet		oC	mS/cm		mM	meters	HCO3	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	meq/l	mg/l	
50	6.61	27.54	2.44	339	0.135	15.24	6.85	n.m.	10.48	b.d.	0.209	2.89	4.37	b.d.	n.m.	12.24	0.021	0.244	b.d.	3.16	0.371	b.d.	-0.42	1670	0.707907
150	6.62	27.54	2.46	346	0.114	45.72	6.77	n.m.	10.57	b.d.	0.210	2.93	4.37	b.d.	n.m.	12.47	0.019	0.242	b.d.	3.15	0.374	b.d.	-0.37	1675	
225	6.56	28.32	40.0	271	0.008	68.58	6.24	n.m.	328.0	b.d.	5.652	32.4	19.7	0.184	n.m.	381.9	0.592	b.d.	b.d.	22.03	0.403	b.d.	5.35	25437	
250	6.57	28.71	56.0	133	0.007	76.20	4.85	n.m.	500.7	b.d.	9.105	47.7	23.8	0.181	n.m.	592.1	0.904	b.d.	b.d.	30.43	0.296	b.d.	-5.58	38275	0.708630

Interior lake in central Yucatan

Laguna Chankanaab		N 19.87768	W 88.77071	11 AM	4/19/04	alk as															elec.				
	pH	T	Sp. Cond.	Eh	O2	depth	mM	Li	Na	NH4	K	Mg	Ca	Sr	F	Cl	Br	NO3	PO4	SO4	SiO2	S2-	neut.	tds	⁸⁷ Sr/ ⁸⁶ Sr
depth feet		oC	mS/cm		mM	meters	HCO3	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	meq/l	mg/l	
1	7.99	27.78	4	332	0.229	0.30	2.31	n.m.	7.70	0.028	0.302	8.311	16.42	0.172	n.m.	6.40	0.011	0.007	b.d.	24.152	1.147	b.d.	0.77	3753	0.707773

Interior lake in central Yucatan

Laguna Esmeralda		N 19.78253	W 88.73931	noon	4/19/04	alk as															elec.				
	pH	T	Sp. Cond.	Eh	O2	depth	mM	Li	Na	NH4	K	Mg	Ca	Sr	F	Cl	Br	NO3	PO4	SO4	SiO2	S2-	neut.	tds	⁸⁷ Sr/ ⁸⁶ Sr
depth feet		oC	mS/cm		mM	meters	HCO3	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	meq/l	mg/l	
1	7.87	27.29	3.01	341	0.201	0.30	3.93	n.m.	4.83	0.028	0.191	5.554	12.43	0.127	n.m.	3.78	0.007	0.003	b.d.	16.344	0.980	b.d.	0.82	2707	0.707774

Inland coastal sinkhole at CALICA mining area, south of Xcaret, west of coastal highway

Cenote Big Calica		CALICA		N 20.58819	W 87.17826	2 PM	4/20/04	alk as															elec.		
	pH	T	Sp. Cond.	Eh	O2	depth	mM	Li	Na	NH4	K	Mg	Ca	Sr	F	Cl	Br	NO3	PO4	SO4	SiO2	S2-	neut.	tds	⁸⁷ Sr/ ⁸⁶ Sr
depth feet		oC	mS/cm		mM	meters	HCO3	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	mM	meq/l	mg/l	
25 feet	6.79	24.82	2.24	408	6.490	7.62	7.03	n.m.	11.27	b.d.	0.224	2.10	2.99	0.007	n.m.	13.88	0.022	0.125	b.d.	0.70	0.067	b.d.	-0.77	1437	0.708582
95 feet	7.15	25.52	52.2	-150	0.290	29.00	2.57	n.m.	468.0	b.d.	9.540	49.99	10.50	0.059	n.m.	548.0	0.836	b.d.	b.d.	27.90	0.043	0.295	-8.58	35108	0.709151