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Holocene sea-level changes in the Bristol Channel - Evidence from Porlock, Somerset, UK

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Appendix 1 – Database of Holocene sea level index points. (Jennings *et al*., 1998)

Site	Reference	Cal. age BP (Mean)	MSL (m)	Error (m)
Highbridge	1	9450	-25.77	0.21
Highbridge	1	9399	-25.27	0.23
Highbridge	1	9378	-26.97	0.82
Porlock Forest Bed	4	8463	-13.12	0.4
Bridgewater	1	8126	-14.42	0.22
Bridgewater	1	8066	-14.12	0.82
Porlock Forest Bed	4	7863	-12.45	0.2
Bridgewater	1	7861	-13.13	0.34
Bridgewater	1	7659	-11.99	0.24
Porlock Forest Bed	4	7647	-11.32	0.8
Burnham	1	7176	-10.67	0.54
Bridgewater	1	7122	-7.42	0.22
Porlock Forest Bed	4	7017	-8.22	0.41
Kenn Pier	1	6942	-7.94	0.32
Kenn Moor	3	6942	-7.94	0.24
Goldcliff 1	2	6821	-6.48	0.21
Goldcliff 1	2	6690	-6.42	0.21
Clevedon	1	6659	-6.9	0.85
Goldcliff 2	2	6417	-5.72	0.21
Tealham Moor	1	6409	-6.06	0.26
Kingston Seymour	1	6374	-5.85	0.47
Goldcliff 1	2	6303	-5.57	0.21
Shapwick Heath	1	6297	-5.77	0.32
Goldcliff 2	2	6289	-4.79	0.7
Goldcliff 1	2	6239	-5.98	0.21
Tealham Moor	1	6237	-6.06	0.26
Stolford	1	6186	-6.67	0.12
Goldcliff 1	2	6177	-6.04	0.21
Clevedon	1	6177	-5.77	0.85
Stolford	2	6139	-6.67	0.43
Stolford	2	5969	-5.17	0.42
Porlock Marsh	4	5969	-5.64	0.22
Goldcliff 2	2	5926	-5.31	0.7
Porlock Marsh	4	5911	-5.49	0.22
Porlock Forest Bed	4	5821	-6.11	0.7
Goldcliff 1	2	5819	-5.84	0.21
Goldcliff 1	2	5741	-6.63	0.21
Stolford	1	5527	-3.37	0.42
Weston-super-Mare	1	5157	-5.83	0.32
Portbury	1	4830	-2.9	0.41
Avonmouth	1	4378	-2.95	0.26
Kingston Seymour	1	4029	-4.7	0.47
Weston-super-Mare	1	3982	-4.1	0.32
Kenn Pier	1	3771	-1.31	0.5
Stolford	1	3694	-6.27	0.07
Goldcliff 1	2	3689	-4.58	0.8
Kenn Pier	1	3664	-3.76	0.42
Goldcliff 1	2	3354	-4.29	0.21
Avonmouth	1	3345	-2.34	0.47

References: 1- Heyworth and Kidson (1982); 2- Smith and Morgan (1989); 3 - Gilbertson and Hawkins (1983); 4 - Jennings *et al*. (1998)

Appendix 2 – Percentage counts of foraminifera from EH3

Sample	Depth (m)	E. williamsoni	H. germanica	A. beccarii	T. inflata	J. macrescens	M. fusca	Calcareous foraminifera	Agglutinated foraminifera	Total foraminifera
1	1.81	26.08	64.25	9.66	0	0	0	100	0	207
2	2.2	33.33	57.14	9.52	0	0	0	100	0	42
3	3.69	46.51	37.98	7.75	7.75	0	0	92.24	7.75	129
4	3.71	47.05	34.45	9.24	9.24	0	0	90.74	9.24	119
5	3.72	39.35	22.48	15.66	2.4	13.25	0	77.49	15.65	249
6	3.74	47.28	30.43	15.21	2.17	4.89	0	92.92	7.06	184
7	3.76	43.93	35.6	16.66	3.78	0	0	96.19	3.78	132
8	3.78	60.96	31.14	6.14	1.75	0	0	98.24	1.75	228
9	4.03	36.36	60.96	0.53	0	2.13	0	97.85	2.13	187
10	4.16	22.22	69.44	7.87	0.46	0	0	99.53	0.46	216
11	4.18	20.39	64.17	13.43	0	0.49	0	97.99	0.49	201
12	4.2	21.71	63.8	14.47	0	0	0	100	0	221
13	4.22	37.5	50.83	11.66	0	0	0	100	0	240
14	4.24	20.35	56.28	22.75	0	0.59	0	99.38	0.59	167
15	4.32	60.71	33.67	5.61	0	0	0	100	0	196
16	4.34	37.69	56.54	5.75	0	0	0	100	0	191
17	4.36	45.27	48.25	4.47	1.99	0	0	97.99	1.99	201
18	4.38	28.32	65.89	4.62	1.15	0	0	98.83	1.15	173
19	4.88	23.23	68.3	7.74	0.7	0	0	99.27	0.07	142
20	4.9	18.94	70.52	10.52	0	0	0	100	0	95
21	5.26	0	92.38	7.61	0	0	0	100	0	197
22	5.28	3.06	80.1	16.83	0	0	0	100	0	196
23	5.3	1.5	77.5	20	1	0	0	99	1	200
24	5.32	4.78	77.65	17.02	0.53	0	0	99.45	0.53	188
25	5.35	24.88	52.63	22.48	0	0	0	100	0	209
26	5.37	15.78	38.77	24.56	0.87	0	0	99.11	0.87	114
27	5.51	6.91	68.2	24.42	0.46	0	0	99.53	0.46	217
28	5.6	12.06	56.28	31.65	0	0	0	100	0	199
29	5.7	19.71	47.88	30.28	1.4	0.7	0	97.87	2.1	142
30	5.8	3.42	71.42	24	0	1.14	0	98.84	1.14	175
31	5.9	13.85	50	34.93	1.2	0	0	98.78	1.2	166
32	6.38	58.38	30.87	8.72	0.67	0	0	97.97	0.67	149
33	6.42	13.98	23.07	60.13	0.69	2.09	0	97.18	2.78	143
34	6.44	17.07	25.2	55.28	2.43	0	0	97.55	2.43	123
35	6.455	46.66	46.66	0	6.66	0	0	93.32	6.66	15
36	6.47	100	0	0	0	0	0	100	0	32
37	6.49	80	17.5	2.5	0	0	0	100	0	40
38	6.51	17.88	40.65	35.77	0	0	5.69	94.3	5.69	123
39	7.36	0	0	0	0	100	0	0	100	24
40	7.375	0	0	0	0	100	0	0	100	4
41	7.39	0	0	0	0	100	0	0	100	4
42	7.51	5.88	0	0	23.52	35.39	35.29	5.88	94.2	68
43	7.59	0	0	0	5.88	88.23	0	5.88	88.23	51
44	7.68	0	0	0	0	100	0	0	100	12
45	7.8	0	33.33	11.11	11.11	44.44	0	44.44	55.55	36

Appendix 3 – Raw counts of foraminifera from EH3

Sample	Depth (m)	Elphidium williamsoni	Haynesina germanica	Ammonia beccarii	Trochammina inflata	Jadammina macrescens	Miliammina fusca	Total count
1	1.81	54	133	20	0	0	0	207
2	2.2	14	24	4	0	0	0	42
3	3.69	60	49	10	10	0	0	129
4	3.71	56	41	11	11	0	0	119
5	3.72	98	73	39	6	33	0	249
6	3.74	87	56	28	4	9	0	184
7	3.76	58	47	22	5	0	0	132
8	3.78	139	71	14	4	0	0	228
9	4.03	68	114	1	0	4	0	187
10	4.16	48	150	17	1	0	0	216
11	4.18	41	132	27	0	1	0	201
12	4.2	48	141	32	0	0	0	221
13	4.22	90	122	28	0	0	0	240
14	4.24	34	94	38	0	1	0	167
15	4.32	119	66	11	0	0	0	196
16	4.34	72	108	11	0	0	0	191
17	4.36	91	97	9	4	0	0	201
18	4.38	49	114	8	2	0	0	173
19	4.88	33	97	11	1	0	0	142
20	4.9	18	67	10	0	0	0	95
21	5.26	0	182	15	0	0	0	197
22	5.28	6	157	33	0	0	0	196
23	5.3	3	155	40	2	0	0	200
24	5.32	9	146	32	1	0	0	188
25	5.35	52	110	47	0	0	0	209
26	5.37	18	67	28	1	0	0	114
27	5.51	15	148	53	1	0	0	217
28	5.6	24	112	63	0	0	0	199
29	5.7	28	68	43	2	1	0	142
30	5.8	6	125	42	0	2	0	175
31	5.9	23	83	58	2	0	0	166
32	6.38	87	46	15	1	0	0	149
33	6.42	20	33	86	1	3	0	143
34	6.44	21	31	68	3	0	0	123
35	6.455	7	7	0	1	0	0	15
36	6.47	32	0	0	0	0	0	32
37	6.49	32	7	1	0	0	0	40
38	6.91	22	50	44	0	0	7	123
39	7.36	0	0	0	0	24	0	24
40	7.375	0	0	0	0	4	0	4
41	7.39	0	0	0	0	4	0	4
42	7.51	4	0	0	16	24	24	68
43	7.59	0	3	0	3	45	0	51
44	7.68	0	0	0	0	12	0	12
45	7.8	0	12	4	4	16	0	36

Appendix 4 – Indicative meanings of sediment samples. Computed by the WA-PLS component 2 transfer function (Massey et al., 2006). Asterisks (*) represent peat bed contacts

Sample	Depth (m)	WAPLS_C2
1	1.81	0.192571
2	2.2	0.393154
3	3.69	1.03569
4	3.71	1.09433
5	3.72	1.07128
6	3.74	0.95353
7	3.76	0.777613
8	3.78	1.23415
9	4.03	0.583725
10	4.16	0.112061
11	4.18	0.0358339
12	4.2	0.045649
13	4.22	0.496274
14	4.24	-0.0215841
15	4.32	1.16932
16	4.34	0.534216
17	4.36	0.81942
18	4.38	0.322184
19	4.88	0.149085
20	4.9	-0.00890698
21	5.26	-0.514889
22	5.28	-0.48142
23	5.3	-0.50712
24	5.32	-0.416626
25	5.35	0.0887737
26	5.37	-0.143209
27	5.51	-0.401187
28	5.6	-0.315136
29	5.7	-0.0291138
30	5.8	-0.480353
31	5.9	-0.242142
32	6.38	1.13293
33	6.42	-0.339016
34	6.44	-0.222885
35	6.455	1.04482
36	6.47	2.28284
*37	6.49	1.7179
*38	6.91	-0.066962
39	7.36	2.21988
40	7.375	2.21988
41	7.39	2.21988
*42	7.51	2.1432
*43	7.59	2.26891
44	7.68	2.21988
45	7.8	1.04898

Appendix 5 – Indicative meanings of sediment samples ("Stretched C2X) after adjusting for tidal range. 1.97 is the multiple used for 'stretching' the indicative meanings. Asterisks (*) represent peat bed contacts

Sample	Depth (m)	WAPLS_C2	Multiple used	Stretched C2X
1	1.81	0.192571	1.978494624	0.381000688
2	2.2	0.393154	1.978494624	0.777853075
3	3.69	1.03569	1.978494624	2.049107097
4	3.71	1.09433	1.978494624	2.165126022
5	3.72	1.07128	1.978494624	2.119521721
6	3.74	0.95353	1.978494624	1.886553979
7	3.76	0.777613	1.978494624	1.53850314
8	3.78	1.23415	1.978494624	2.44175914
9	4.03	0.583725	1.978494624	1.154896774
10	4.16	0.112061	1.978494624	0.221712086
11	4.18	0.0358339	1.978494624	0.070897179
12	4.2	0.045649	1.978494624	0.090316301
13	4.22	0.496274	1.978494624	0.981875441
14	4.24	-0.0215841	1.978494624	-0.042704026
15	4.32	1.16932	1.978494624	2.313493334
16	4.34	0.534216	1.978494624	1.056943484
17	4.36	0.81942	1.978494624	1.621218065
18	4.38	0.322184	1.978494624	0.637439312
19	4.88	0.149085	1.978494624	0.294963871
20	4.9	-0.00890698	1.978494624	-0.017622412
21	5.26	-0.514889	1.978494624	-1.018705118
22	5.28	-0.48142	1.978494624	-0.952486882
23	5.3	-0.50712	1.978494624	-1.003334194
24	5.32	-0.416626	1.978494624	-0.824292301
25	5.35	0.0887737	1.978494624	0.175638288
26	5.37	-0.143209	1.978494624	-0.283338237
27	5.51	-0.401187	1.978494624	-0.793746323
28	5.6	-0.315136	1.978494624	-0.623494882
29	5.7	-0.0291138	1.978494624	-0.057601497
30	5.8	-0.480353	1.978494624	-0.950375828
31	5.9	-0.242142	1.978494624	-0.479076645
32	6.38	1.13293	1.978494624	2.241495914
33	6.42	-0.339016	1.978494624	-0.670741333
34	6.44	-0.222885	1.978494624	-0.440976774
35	6.455	1.04482	1.978494624	2.067170753
36	6.47	2.28284	1.978494624	4.516586667
*37	6.49	1.7179	1.978494624	3.398855915
*38	6.91	-0.066962	1.978494624	-0.132483957
39	7.36	2.21988	1.978494624	4.392020646
40	7.375	2.21988	1.978494624	4.392020646
41	7.39	2.21988	1.978494624	4.392020646
*42	7.51	2.1432	1.978494624	4.240309678
*43	7.59	2.26891	1.978494624	4.489026237
44	7.68	2.21988	1.978494624	4.392020646
45	7.8	1.04898	1.978494624	2.075401291

Appendix 6 – Adjusted indicative meanings with elevation (OD) in the formulation of foraminifera sea level index points, using the equation S=H-I. Asterisks (*) represent peat bed contacts

Sample	Depth (m)	Stretched WAPLS_C2	Height (OD)	S=H-I
1	1.81	0.381242065	3.4	-3.01876
2	2.2	0.778264602	3.02	-2.24174
3	3.69	2.04987871	2.77	0.720121
4	3.71	2.165937205	2.52	0.354063
5	3.72	2.120293334	2.27	0.149707
6	3.74	1.887377033	2.02	0.132623
7	3.76	1.539243097	1.77	0.230757
8	3.78	2.442807742	1.52	-0.92281
9	4.03	1.155332043	1.4	0.244668
10	4.16	0.221856516	1.27	1.048143
11	4.18	0.071042796	1.25	1.178957
12	4.2	0.090488232	1.23	1.139512
13	4.22	0.982397764	1.21	0.227602
14	4.24	-0.042505583	1.19	1.232506
15	4.32	2.314522151	1.15	-1.16452
16	4.34	1.057430194	1.13	0.07257
17	4.36	1.621892731	1.1	-0.52189
18	4.38	0.637710366	1.08	0.44229
19	4.88	0.295134022	0.95	0.654866
20	4.9	-0.017541432	0.89	0.907541
21	5.26	-1.019086968	0.85	1.869087
22	5.28	-0.952734194	0.83	1.782734
23	5.3	-1.00358942	0.81	1.813589
24	5.32	-0.824496086	0.79	1.614496
25	5.35	0.175937239	0.76	0.584063
26	5.37	-0.283229419	0.74	1.023229
27	5.51	-0.793851183	0.68	1.473851
28	5.6	-0.623435527	0.59	1.213436
29	5.7	-0.057354779	0.49	0.547355
30	5.8	-0.950561807	0.39	1.340562
31	5.9	-0.478942108	0.29	0.768942
32	6.38	2.242524732	-0.1	-2.34252
33	6.42	-0.670428731	-0.5	0.170429
34	6.44	-0.440622624	-0.52	-0.07938
35	6.455	2.067902796	-0.525	-2.5929
36	6.47	4.518486022	0.56	-3.95849
*37	6.49	3.400300216	0.58	-2.8203
*38	6.91	-0.132243966	-1	-0.86776
39	7.36	4.39219871	-2.6	-6.9922
40	7.375	4.39219871	-2.615	-7.0072
41	7.39	4.39219871	-2.63	-7.0222
*42	7.51	4.240527313	-2.75	-6.99053
*43	7.59	4.489204302	-2.83	-7.3192
44	7.68	4.39219871	-2.92	-7.3122
45	7.8	2.075401291	-3.04	-5.1154