Appendix 4

Radiocarbon dating of the Skagen Core

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An age profile for the Skagen Core has been established by extensive AMS ^{14}C dating on shells, foraminifera, organic matter and methane. The shell and foraminifera dates have been reported in Heier-Nielsen *et al.* (1995a), and it is argued here that the shell dates establish the most reliable chronology of the core.

With a few additions, Table 10 lists the original data of this publication while the quoted calibrated ages have been calculated based on the new ^{14}C calibration curves (Stuiver *et al.* 1998b) using the Seattle Radiocarbon Calibration Programme 1999 Rev. 4.1.2. with the marine model of Stuiver *et al.* (1998a). This calibration model for marine samples takes into account the damping effect of the large marine ^{14}C reservoir in the world ocean which produces a marine calibration curve that is smoother than the faster-reacting atmospheric ^{14}C reservoir with its sharper wiggles in the calibration curve. The calibrations have been made with the assumption of the parameter $\Delta R=0$ for the sea around Skagen, indicating no reservoir age difference from the model world ocean, which has a reservoir age of about 400 years (see Heier-Nielsen *et al.* 1995b). The calibrated age is given as an age interval in calendar years B.P. (Before Present = 1950) corresponding to 1 sigma uncertainty in the measured conventional ^{14}C age.

References

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Table 10. ^{14}C dates on shell macrofossils from the Skagen cores 3 and 4

Depth (m)	Species	^{14}C age B.P.	Rcorr. B.P.*	Calibrated age B.P. (marine model)	Centre of age interval	$\delta^{13}C$(‰) (VPDB)	Lab no. (AAR-)
5.25	*Spisula subtruncata*	445 ± 55	45	110 – 0	50	1.3	2142
12.75	*Spisula subtruncata*	1255 ± 60	855	880 – 720	800	1.1	1482
15.75	*Spisula subtruncata*	1295 ± 60	895	910 – 760	840	1.2	1483
16.75	*Donax vittatus*	1900 ± 60	1500	1520 – 1370	1440	1.6	1485
16.75	*Spisula subtruncata*	1335 ± 60	935	930 – 820	870	1.2	1484
19.75	*Spisula subtruncata*	1410 ± 60	1010	1000 – 910	950	1.2	1486
25.25	*Spisula subtruncata*	1360 ± 55	960	950 – 870	910	1.4	1487
30.25	*Spisula subtruncata*	1500 ± 65	1100	1130 – 960	1050	1.9	1488
31.50	Fragment	1430 ± 130	1030	1120 – 870	1000	1.5	864
33.00	Fragment	1430 ± 130	1030	1120 – 870	1000	0.1	865
34.28	Echinoid fragment	2025 ± 80	1625	1690 – 1500	1600	–1.1	1028
38.22	Fragment	1630 ± 80	1230	1270 – 1100	1180	1.7	1033
53.12	Fragment	2520 ± 120	2120	2320 – 2020	2170	0.1	1319
69.43	Fragment	3570 ± 100	3170	3570 – 3350	3460	–0.4	1320
70.33	Echinoid fragment	3760 ± 80	3360	3810 – 3580	3700	–0.1	1030
78.28	Echinoid fragment	5540 ± 120	5140	6050 – 5770	5910	–0.5	1596
80.02	Fragment	5590 ± 105	5190	6110 – 5880	5990	2.5	1034
80.82	Fragment	5800 ± 120	5400	6310 – 6090	6200	0†	1321
90.42	Echinoid fragment	7110 ± 110	6705	7660 – 7480	7570	–0.8	1031
96.18	Echinoid fragment	7780 ± 100	7380	8340 – 8140	8240	–0.3	1032
104.50	Echinoid fragment	8520 ± 80	8120	9260 – 8910	9090	–0.8	1027
111.67	Echinoid fragment	9170 ± 80	8770	9930 – 9610	9770	–0.4	1029
114.64	Fragment	10 230 ± 125	9830	11 590 – 10 840	11 220	0.4	1102
114.76	Fragment	10 450 ± 100	10 050	11 900 – 10 880	11 390	0.1	1115
115.02	Fragment	10 700 ± 85	10 300	12 280 – 11 660	11 970	0.3	1103
115.11	*Macoma*	10 820 ± 130	10 420	12 610 – 11 730	12 170	0.6	1503
115.22	Fragment	10 800 ± 110	10 400	12 600 – 11 720	12 160	1.5	1117
115.29	Fragment	10 850 ± 110	10 450	12 620 – 11 750	12 190	–2.6	1104
115.91	Fragment	12 120 ± 140	11 720	13 820 – 13 420	13 620	2.4	1219
115.97	Fragment	12 070 ± 230	11 480	13 830 – 13 190	13 510	0.2	1119
116.86	Fragment	13 560 ± 130	13 160	15 970 – 15 460	15 720	–1.0	1120
119.19	Fragment	13 750 ± 145	13 350	16 200 – 15 650	15 930	–1.5	1105
128.37	Fragment	14 420 ± 170	14 020	17 010 – 16 400	16 700	0.7	1106
129.43	Fragment	14 850 ± 155	14 450	17 500 – 16 900	17 200	0.1	1107
137.44	Fragment	> 42 000				0.1	1108
143.14	Fragment	> 38 000				0.5	1109
143.44	Fragment	> 44 000				3.0	1110
148.32	Fragment	> 38 000				2.0	1111
175.26	Fragment	> 37 000				0.1	1112

*Rcorr. B.P. is the reservoir-corrected ^{14}C age B.P. (Before Present = A.D. 1950); it is calculated from the conventional ^{14}C age by subtracting a reservoir age of 400 years. The calibrated age interval in calendar years B.P. corresponding to 1 sigma uncertainty in the measured conventional ^{14}C age has been calculated with the Seattle Radiocarbon Calibration Programme Ver. 4.1.2 with calibration data from Stuiver *et al.* (1998b) and using the marine model of Stuiver *et al.* (1998a).

†Standard value assumed, no measurement.