# Analysis of 13C and 15N isotopes from Eurasian Quaternary fossils: Insights in diet, climate and ecology

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# Supplementary Information

## Table SI Chapter 3.1

Results of the isotopic data and woolly mammoth sample information in chronological order.

| Lab code[1] | Locality[2] | $^{14}$C age (yr BP) | Sigma | % C | $\delta^{13}$C (‰) | % N | $\delta^{15}$N (‰) | C:N | Material[3] | % coll | Source[4] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GrA-43037 | New Siberian Arch. | > 45000 | | 46.5 | −21.5 | 18.4 | +7.51 | 3.0 | b | 7.4 | 1 |
| GrA-60422 | New Siberian Arch. | > 45000 | | 44.9 | −22.0 | 16.2 | +8.63 | 3.2 | b | 16.2 | 1 |
| Site 1 M. pr. 20 | New Siberian Arch. | > 45000 | | 40.0 | −21.7 | 15.6 | +7.60 | 3.0 | b/t | 14.1 | 2 |
| Site 1 M. pr. 21 | New Siberian Arch. | > 45000 | | 42.6 | −22.3 | 16.0 | +9.30 | 3.1 | b/t | 16.1 | 2 |
| 95600 | New Siberian Arch. | > 45000 | | 43.2 | −22.2 | 15.8 | +9.20 | 3.2 | b | | 3 |
| UCIAMS38674 | Sanga-Yuriakh | > 45000 | | 35.9 | −22.6 | 12.6 | +10.90 | 3.3 | b | 18.6 | 4,5 |
| UCIAMS38676 | Ari Mas | > 45000 | | 41.1 | −21.8 | 15.2 | +10.50 | 3.2 | b | 7.6 | 4,5 |
| UCIAMS38677 | Arilakh | > 45000 | | 38.2 | −22.0 | 13.4 | +10.00 | 3.3 | b | 22.4 | 4,5 |
| UCIAMS39109 | Arilakh | > 45000 | | 39.8 | −23.2 | 12.8 | +7.80 | 3.6 | b | 15.2 | 4,5 |
| UCIAMS39111 | Popigay | > 45000 | | 32.0 | −22.0 | 11.1 | +7.50 | 3.4 | b | 23.4 | 4,5 |
| UCIAMS39881 | Arilakh | > 45000 | | 38.8 | −22.0 | 14.5 | +11.40 | 3.1 | b | 24.0 | 4,5 |
| Site 1 M. pr. 19 | New Siberian Arch. | 43600 | 1000 | 40.7 | −23.2 | 14.6 | +8.70 | 3.2 | b/t | 15.4 | 2 |
| GrA-25856 | Novaya R. | 42040 | 830 | 45.9 | −22.5 | 17.1 | +8.46 | 3.1 | b | 16.0 | 1 |
| GrA-57720 | New Siberian Arch. | 41650 | +600/ −500 | 43.5 | −22.5 | 15.0 | +10.02 | 3.4 | t | 0.9 | 1 |
| GrA-17439 | Novaya R. | 41580 | 1190 | 43.3 | −21.8 | 16.2 | +9.94 | 3.1 | b | 6.0 | 1 |
| UCIAMS39110 | Taimyr Peninsula | 41000 | 1400 | 35.0 | −22.1 | 12.2 | +8.10 | 3.3 | b | 22.3 | 4,5 |
| 20/415 | Taymyr | 40800 | 200 | 40.6 | −22.2 | 13.7 | +6.50 | 3.5 | b | 16.7 | 6 |
| GrA-38905 | Lena R. | 40800 | +650/ −550 | 43.5 | −21.3 | 15.0 | +9.06 | 3.4 | b | 12.0 | 1 |
| 19/58 | Sviatoy Site 1 | 40200 | 1800 | 44.2 | −21.6 | 15.6 | +11.20 | 3.3 | b | 19.2 | 6 |
| Site 1 M. pr. 18 | New Siberian Arch. | 40200 | 900 | 42.2 | −22.3 | 16.0 | +9.60 | 3.1 | b/t | 16.8 | 2 |
| UCIAMS38678 | Baikura-Turku | 40150 | 990 | 38.4 | −21.7 | 13.6 | +8.90 | 3.3 | b | 20.1 | 4,5 |
| 20/407 | Taymyr | 39800 | 600 | 42.6 | −21.4 | 14.6 | +8.20 | 3.4 | b | 23.1 | 6 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20/412 | Taymyr | 39800 | 500 | 42.2 | −21.4 | 14.2 | +8.40 | 3.5 | b | 20.4 | 6 |
| Site 1 M. pr. 17 | New Siberian Arch. | 39600 | 1000 | 41.6 | −22.5 | 15.8 | +9.40 | 3.1 | b/t | 10.2 | 2 |
| GrA-62205 | New Siberian Arch. | 39460 | +300/ −320 | 46.7 | −22.6 | 17.1 | +11.28 | 3.2 | t | 7.5 | 1 |
| Site 1 M. pr. 16 | New Siberian Arch. | 37800 | 900 | 42.7 | −21.9 | 15.5 | +8.80 | 3.2 | b/t | 16.8 | 2 |
| GrA-57021 | Unspecified | 37710 | +430/ −370 | 42.9 | −21.1 | 17.4 | +10.25 | 2.9 | t | 2.2 | 1 |
| GrA-57652 | Wrangel Isl. | 35870 | +320/ −290 | 43.7 | −21.6 | 16.1 | +11.94 | 3.2 | t | 8.0 | 1 |
| GrA-19528 | Toll's Bay | 35760 | +280/ −370 | 39.8 | −20.05 | | | | t | 0.9 | 1 |
| UCIAMS38680 | Baikura-Turku | 35380 | 550 | 35.4 | −21.4 | 12.5 | +8.70 | 3.3 | b | 14.7 | 4,5 |
| GrA-19284 | Oskar Pen. | 34680 | +350/ −340 | 39.2 | −21.3 | | | | t | 0.4 | 1 |
| Site 2 M. pr. 23 | Lena Delta | 34600 | | 42.1 | −22.2 | 15.6 | +9.10 | 3.1 | b/t | 10.7 | 2 |
| GrA-53289 | Yana-Indigirka lowl. | 34300 | +260/ −240 | 46.7 | −22.85 | 15.9 | +12.01 | 3.4 | b | 22.7 | 1 |
| Site 2 M. pr. 15 | Lena Delta | 34000 | 500 | 39.6 | −22.0 | 15.2 | +8.60 | 3.0 | b/t | 16.1 | 2 |
| Site 1 M. pr. A | New Siberian Arch. | 32500 | 500 | 39.2 | −22.6 | 15.9 | +9.20 | 2.9 | b/t | 17.7 | 2 |
| GrA-19523 | Sabler C. | 32180 | +210/ −200 | 42.2 | −22.35 | 16.2 | +9.14 | 3.0 | t | 7.1 | 1 |
| Site2-14 | Lena Delta | 31500 | 650 | 38.3 | −21.7 | 14.9 | +8.90 | 3.0 | b/t | 13.8 | 2 |
| Site2-13 | Lena Delta | 30200 | 400 | 41.8 | −22.1 | 15.3 | +9.10 | 3.2 | b/t | 5.8 | 2 |
| 19/52 | Sviatoy Site 1 | 30100 | 550 | 42.8 | −22.1 | 14.8 | +9.10 | 3.3 | b | 18.8 | 2 |
| GrA-57019 | Unspecified | 29150 | +190/ −180 | 38.1 | −22.2 | 15.2 | +9.10 | 2.9 | t | 12.1 | 1 |
| UCIAMS39885 | Lake Taimyr | 28700 | 310 | 36.6 | −21.9 | 12.9 | +9.70 | 3.3 | b | 17.2 | 4,5 |
| GrA-60044 | New Siberian Arch. | 28660 | 160 | 47.4 | −22.0 | 17.3 | +10.22 | 3.2 | b | 13.6 | 1 |
| GrA-19275 | Oskar Pen. | 28370 | 200 | 40.5 | −21.3 | 13.4 | +10.78 | 3.5 | t | 1.3 | 1 |
| GrA-19271 | Oskar Pen. | 28350 | 200 | 39.0 | −21.8 | 15.6 | +11.90 | 2.9 | t | 2.6 | 1 |
| Beta-148643 | Lake Taimyr | 28260 | 170 | 40.5 | −21.4 | 15.0 | +9.40 | 3.2 | b | 12.2 | 4,5 |
| Beta-148662 | Arilakh | 28210 | 210 | 39.1 | −21.7 | 14.5 | +10.70 | 3.1 | b | 14.7 | 4,5 |
| Site 1 M. pr. 12 | New Siberian Arch. | 28000 | 180 | 40.7 | −21.6 | 15.7 | +9.00 | 3.0 | b/t | 14.4 | 2 |
| Beta-210777 | Baikura-Turku | 27740 | 220 | 36.7 | −21.9 | 13.6 | +10.00 | 3.1 | b | 26.2 | 4,5 |
| Site2-11 | Lena Delta | 27400 | 800 | 38.6 | −21.9 | 15.8 | +9.10 | 2.8 | b/t | 14.5 | 2 |
| Site2-10 | Lena Delta | 25900 | 600 | 39.0 | −22.5 | 14.8 | +8.90 | 3.1 | b/t | 16.1 | 2 |
| GrA-19311 | Upper Taimyra R. | 24990 | 150 | 42.3 | −22.2 | 15.2 | +10.08 | 3.3 | b | 8.3 | 1 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GrA-19526 | Upper Taimyra R. | 24980 | 130 | 41.2 | −22.3 | 13.8 | +11.14 | 3.5 | t | 2.9 | 1 |
| GrA-38941 | Nordwik C. | 24870 | +130/ −120 | 45.0 | −21.8 | 16.6 | +9.45 | 3.2 | ? | 1.6 | 1 |
| GrA-19273 | Upper Taimyra R. | 24740 | 150 | 40.0 | −21.8 | 13.8 | +9.66 | 3.4 | b | 3.0 | 1 |
| GrA-19238 | Upper Taimyra R. | 24460 | 200 | 37.7 | −21.6 | 14.2 | +10.35 | 3.1 | b | 0.2 | 1 |
| Site2-9 | Lena Delta | 24300 | 200 | 42.6 | −22.3 | 16.1 | +7.30 | 3.1 | b/t | 21.8 | 2 |
| Site 1 M. pr. 8 | New Siberian Arch. | 22100 | 1000 | 41.8 | −21.3 | 14.8 | +8.30 | 3.3 | b/t | 19.8 | 2 |
| GrA-17604 | Taimyr Lake | 20950 | 190 | 44.4 | −22.3 | 16.0 | +8.60 | 3.2 | b | 18.4 | 1 |
| Site2-7 | Lena Delta | 20800 | 600 | 40.7 | −21.7 | 15.2 | +8.30 | 3.1 | b/t | 20.7 | 2 |
| GrA-17347 | Upper Taimyra R. | 20500 | 90 | 45.7 | −21.3 | 15.9 | +11.21 | 3.3 | b | 14.1 | 1 |
| UCIAMS39886 | Sabler C. | 20080 | 110 | 37.3 | −20.8 | 13.1 | +9.10 | 3.3 | b | 25.2 | 4,5 |
| GrA-38930 | Yana-Indigirka lowl. | 19300 | 80 | 44.6 | −21.9 | 16.3 | +8.56 | 3.2 | t | 11.6 | 1 |
| GrA-62207 | New Siberian Arch. | 19160 | 90 | 47.0 | −21.8 | 17.1 | +8.64 | 3.2 | t | 4.4 | 1 |
| UCIAMS38679 | Lake Taimyr | 17300 | 60 | 39.0 | −21.0 | 14.2 | +10.70 | 3.3 | b | 20.0 | 4,5 |
| Beta-148642 | Sabler C. | 15390 | 50 | 37.1 | −21.0 | 13.7 | +10.60 | 3.2 | b | 16.3 | 4,5 |
| GrA-19264 | Sabler C. | 13919 | 70 | 38.6 | −22.3 | | | | b | 16.5 | 1 |
| GrA-57617 | Wrangel Isl. | 13450 | +60/ −50 | 44.0 | −21.5 | 15.6 | +10.62 | 3.3 | t | 11.4 | 1 |
| GrA-65681 | New Siberian Arch. | 13340 | 60 | 43.2 | −21.9 | 15.0 | +12.14 | 3.4 | t | 6.8 | 1 |
| Site2-3 | Lena Delta | 13100 | 500 | 39.9 | −22.7 | 15.4 | +5.60 | 3.0 | b/t | 22.2 | 2 |
| GrA-65517 | New Siberian Arch. | 13040 | 60 | 42.7 | −21.1 | 14.3 | +11.64 | 3.5 | d | 0.3 | 1 |
| GrA-65689 | New Siberian Arch. | 13030 | 60 | 43.3 | −22.2 | 15.4 | +11.12 | 3.3 | t | 0.4 | 1 |
| GrA-60423 | Selliach R. | 12470 | 50 | 41.7 | −21.9 | 15.0 | +8.78 | 3.2 | b | 14.4 | 1 |
| UCIAMS38671 | Berelekh | 12350 | 35 | 37.8 | −22.2 | 13.5 | +9.40 | 3.3 | b | 18.2 | 4,5 |
| GrA-65687 | New Siberian Arch. | 12330 | 60 | 46.6 | −21.5 | 15.2 | +9.82 | 3.6 | t | 2.3 | 1 |
| UCIAMS38672 | Berelekh | 12295 | 40 | 37.8 | −22.0 | 13.2 | +9.40 | 3.3 | b | 23.4 | 4,5 |
| UCIAMS38670 | Berelekh | 12125 | 30 | 43.7 | −21.5 | 15.0 | +9.20 | 3.4 | b | 11.9 | 4,5 |
| Site 1 M. pr. 1 | New Siberian Arch. | 12030 | 60 | 41.3 | −21.6 | 16.1 | +5.70 | 3.0 | b/t | 22.4 | 2 |
| Beta-148663 | Arilakh | 11900 | 40 | 38.2 | −22.5 | 14.2 | +9.10 | 3.1 | b | 10.7 | 4,5 |
| GrA-65512 | New Siberian Arch. | 11250 | 50 | 50.1 | −22.5 | 16.7 | +8.81 | 3.5 | b | 2.6 | 1 |
| 20/411 | Taymyr | 11140 | | 46.0 | −22.4 | 15.4 | +8.10 | 3.5 | b | 18.7 | 6 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| GrA-65686 | New Siberian Arch. | 10920 | 50 | 44.5 | −22.6 | 15.2 | +8.28 | 3.4 | t | 0.7 | 1 |
| GrA-65685 | New Siberian Arch. | 10330 | 50 | 47.0 | −22.5 | 15.9 | +10.18 | 3.4 | t | 7.1 | 1 |
| GrA-19231 | Upper Taimyra R. | 10230 | 60 | 39.4 | −22.0 | 13.4 | +9.50 | 3.4 | t | 10.3 | 1 |
| GrA-17350 | Bikada R. | 9920 | 60 | 42.3 | −22.8 | 14.9 | +8.62 | 3.3 | b | 7.5 | 1 |
| GrA-65680 | New Siberian Arch. | 9445 | 50 | 44.5 | −22.1 | 15.8 | +10.5 | 3.3 | t | 5.7 | 1 |
| GrA-57648 | Wrangel Isl. | 8395 | 45 | 45.2 | −22.5 | 16.5 | +9.71 | 3.2 | t | 13.2 | 1 |
| GrA-57649 | Wrangel Isl. | 8000 | 40 | 43.8 | −21.8 | 15.9 | +8.90 | 3.2 | t | 13.5 | 1 |
| GrA-57645 | Wrangel Isl. | 7505 | 40 | 44.7 | −22.45 | 16.3 | +11.20 | 3.2 | t | 12.5 | 1 |
| GrA-57711 | Wrangel Isl. | 7300 | 35 | ? | −22.6 | 16.8 | +8.47 | | t | 13.5 | 1 |
| GrA-57647 | Wrangel Isl. | 7175 | 40 | 43.1 | −22.5 | 15.7 | +10.32 | 3.2 | t | 5.3 | 1 |
| GrA-57622 | Wrangel Isl. | 7030 | 40 | 46.5 | −22.23 | 16.8 | +9.55 | 3.2 | t | 6.3 | 1 |
| GrA-57650 | Wrangel Isl. | 6455 | 40 | 46.3 | −21.82 | 16.9 | +9.50 | 3.2 | t | 7.6 | 1 |
| GrA-57725 | Wrangel Isl. | 6180 | 35 | 39.3 | −22.55 | 14.3 | +9.12 | 3.2 | d | 4.9 | 1 |
| GrA-57623 | Wrangel Isl. | 6000 | 40 | 48.0 | −22.06 | 17.3 | | | t | 15.8 | 1 |
| GrA-57646 | Wrangel Isl. | 5615 | 35 | 43.8 | −21.73 | 16.0 | +8.77 | 3.2 | t | 7.3 | 1 |
| GrA-57726 | Wrangel Isl. | 5400 | 40 | 45.5 | −21.94 | 16.3 | +8.68 | 3.3 | t | 12.3 | 1 |
| GrA-57731 | Wrangel Isl. | 4955 | 35 | 48.1 | −21.80 | 17.2 | +8.16 | 3.3 | t | 14.3 | 1 |
| GrA-57729 | Wrangel Isl. | 4870 | 35 | 47.6 | −21.85 | 17.5 | +9.38 | 3.2 | t | 8.1 | 1 |
| GrA-57709 | Wrangel Isl. | 4770 | 35 | 42.7 | −21.71 | 15.4 | +10.08 | 3.2 | t | 14.7 | 1 |
| GrA-57621 | Wrangel Isl. | 4535 | 35 | 47.8 | −21.80 | 17.2 | +9.71 | 3.2 | t | 13.9 | 1 |
| GrA-57741 | Wrangel Isl. | 4495 | 35 | 45.3 | −22.28 | 16.5 | +9.80 | 3.2 | t | 14.2 | 1 |
| UCIAMS38673 | Wrangel Isl. | 4420 | 15 | 37.9 | −22.20 | 13.6 | +8.60 | 3.3 | b | 15.5 | 4,5 |
| GrA-57742 | Wrangel Isl. | 4410 | 35 | 47.5 | −21.47 | 17.3 | +9.03 | 3.2 | d | 8.9 | 1 |
| GrA-57727 | Wrangel Isl. | 4155 | 35 | 43.9 | −21.91 | 15.9 | +9.73 | 3.2 | t | 8.7 | 1 |
| GrA-57712 | Wrangel Isl. | 4115 | 30 | 41.4 | −22.18 | 15.0 | +9.11 | 3.2 | t | 5.4 | 1 |
| GrA-57796 | Wrangel Isl. | 4030 | 35 | 40.1 | −22.25 | 15.2 | +10.56 | 3.1 | t | 7.2 | 1 |
| GrA-57619 | Wrangel Isl. | 4020 | 35 | 48.4 | −22.18 | 17.2 | +9.10 | 3.3 | t | 9.3 | 1 |
| GrA-57654 | Wrangel Isl. | 3960 | 35 | 46.7 | −21.97 | 17.0 | +9.25 | 3.2 | t | 12.2 | 1 |
| GrA-57710 | Wrangel Isl. | 3955 | 30 | 46.7 | −22.00 | 17.3 | +8.70 | 3.1 | t | 5.7 | 1 |

[1]Used abbreviations: GrA = Groningen University, Groningen, NL, Beta = Beta Analytic, Miami, USA, UCIAMS = University of California, Irvine, USA. In cases that the lab code is unknown, we mention the sample ID as referred to in the original publication.

[2] Used abbreviations: Arch = archipel, Isl = island, R = River, C = cave, Lowl = lowland, Pen = Peninsula.

[3] Used abbreviations: b = bone, t = tusk, d = dentine, ? = unspecified.

[4] Used data sources: 1 = current study, 2 = Iacumin *et al.*, 2010, 3 = Bocherens *et al.*, 1996, 4 = Szpak *et al.*, 2010 (stable isotopes), 5 = Debruyne *et al.*, 2008 ($^{14}$C dates), 6 = Iacumin *et al.*, 2000.

## Table SI Chapter 3.2

Isotopic data and sample information from woolly mammoth samples used to define the ranges for 'Alaska' in Fig. 3.4.

| Lab code[iii] | Locality[i] | $^{14}$C age, yr BP | ± | $\delta^{13}$C (‰) | $\delta^{15}$N (‰) | C:N | Source[ii] |
|---|---|---|---|---|---|---|---|
| AA14939 | Ester Cr. | > 45000 | | −20.5 | +5.0 | 3.2 | 1,2 |
| AA14855 | Cripple Cr. | 26022 | 640 | −20.8 | +6.4 | 3.5 | 1,2 |
| AA14904 | Cleary Cr. | 43239 | 1878 | −20.8 | +4.4 | 3.5 | 1,2 |
| AA17538 | Eldorado Cr. | 30000 | 1000 | −20.7 | +7.8 | 3.2 | 1,2 |
| AA17535 | Dawson | 37920 | 2700 | −20.6 | +7.9 | 3.4 | 1,2 |
| UCIAMS-41486 | Paron's L. | > 45000 | | −21.3 | +5.8 | 3.4 | 1,2 |
| UCIAMS-39883 | Dawson | > 45000 | | −20.4 | +8.7 | 3.3 | 1,2 |
| UCIAMS-39884 | Dawson | > 45000 | | −20.3 | +6.9 | 3.3 | 1,2 |
| UCIAMS-39891 | Quartz Cr. | 36690 | 810 | −20.5 | +6.6 | 3.3 | 1,2 |
| UCIAMS-38675 | Whitman G. | 32140 | 370 | −20.7 | +8.1 | 3.1 | 1,2 |
| UCIAMS-39116 | Sulphur Cr. | > 45000 | | −20.8 | +7.5 | 3.3 | 1,2 |
| UCIAMS-39892 | Whitman G. | 39899 | 1200 | −20.5 | +7.3 | 3.3 | 1,2 |
| UCIAMS-39112 | Finning | 29030 | 310 | −20.5 | +7.2 | 3.3 | 1,2 |
| UCIAMS-39113 | Finning | > 45000 | | −20.6 | +6.4 | 3.4 | 1,2 |
| UCIAMS-39114 | Finning | 29170 | 320 | −20.9 | +7.1 | 3.3 | 1,2 |
| UCIAMS-39887 | Finning | 44700 | 2200 | −20.6 | +5.7 | 3.3 | 1,2 |
| UCIAMS-39115 | Finning | 28960 | 310 | −20.6 | +6.8 | 3.3 | 1,2 |
| UCIAMS-39889 | Hunker Cr. | 32470 | 480 | −20.6 | +6.9 | 3.1 | 1,2 |
| UCIAMS-39888 | Hunker Cr. | > 45000 | | −20.7 | +9.0 | 3.3 | 1,2 |
| UCIAMS-39890 | Indian R. | 30630 | 870 | −20.9 | +6.4 | 3.2 | 1,2 |
| UCIAMS-41490 | VGFN Foot | > 45000 | | −21.2 | +9.3 | 3.1 | 1,2 |
| AA14935 | Cleary Cr. | 18379 | 124 | −21.0 | +7.0 | 3.2 | 1,2 |
| AA17574 | Tanana | 23150 | 460 | −21.0 | +9.7 | 3.1 | 1,2 |
| UCIAMS-41487 | Hunker Cr. | 22430 | 140 | −21.0 | +9.4 | 3.3 | 1,2 |
| AA14888 | Sullivan Cr. | 12677 | 142 | −20.8 | +5.9 | 3.3 | 1,2 |
| UCIAMS-149817 | St. Paul Isl. | 4750 | 20 | −20.5 | +8.1 | 3.2 | 3 |
| UCIAMS-148202 | St. Paul Isl. | 5050 | 20 | −20.7 | +7.3 | 3.4 | 3 |
| UCIAMS-148200 | St. Paul Isl. | 5095 | 20 | −20.3 | +6.3 | 3.2 | 3 |
| UCIAMS-149816 | St. Paul Isl. | 5200 | 20 | −20.3 | +7.6 | 3.3 | 3 |
| UCIAMS-149818 | St. Paul Isl. | 5405 | 20 | −19.7 | +7.1 | 3.2 | 3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| UCIAMS-119831 | St. Paul Isl. | 5715 | 30 | −19.5 | +8.3 | 3.3 | 3 |
| UCIAMS-149815 | St. Paul Isl. | 5960 | 20 | −19.2 | +7.2 | 3.2 | 3 |
| UCIAMS-148201 | St. Paul Isl. | 6490 | 20 | −19.2 | +7.8 | 3.3 | 3 |
| UCIAMS-148199 | St. Paul Isl. | 7145 | 25 | −20.2 | +6.8 | 3.2 | 3 |
| UCIAMS-149811 | St. Paul Isl. | 7610 | 20 | −19.1 | +4.4 | 3.3 | 2 |
| UCIAMS-149812 | St. Paul Isl. | 7785 | 25 | −20.7 | +3.5 | 3.3 | 3 |
| UCIAMS-119830 | St. Paul Isl. | 8210 | 35 | −20.9 | +4.2 | 3.3 | 3 |
| UCIAMS-149814 | St. Paul Isl. | 8370 | 20 | −19.0 | +7.6 | 3.2 | 3 |
| UCIAMS-149813 | St. Paul Isl. | 8350 | 25 | −19.1 | +6.7 | 3.2 | 3 |

[i] Used abbreviations: Cr = Creek, G = Gulch, Isl = island, L = Lake, R = River.

[ii] Used data sources: 1 = Szpak *et al.*, 2010 [stable isotopes], 2 = Debruyne *et al.*, 2008 [14C dates], 3 = Graham *et al.*, 2016.

[iii] Used abbreviations: AA = University of Arizona AMS, USA, UCIAMS = University of California, Irvine, USA.

## Table SI Chapter 4

Results of the isotopic data and sample information arranged per species.

| lab code | locality | age ($^{14}$C yr BP) | ± | C% | $\delta^{13}$C (‰) | N% | $\delta^{15}$N (‰) | C/N ratio | species | skeletal element |
|---|---|---|---|---|---|---|---|---|---|---|
| GrA-54021 | Zuid-Holland, Zandmotor | 31140 | 200 | 32.3 | -21.3 | | | | *Lepus species* | mandible |
| GrA-30722 | Brown Bank | 8910 | 50 | 45.1 | -21.1 | 16.5 | 4.8 | 3.2 | *Castor fiber* | femur |
| GrA-22183 | Eurogully | >45000 | | 43.4 | -19.4 | 15.4 | 7.7 | 3.3 | *Canis lupus* | femur |
| GrA-24209 | Eurogully | 8780 | 50 | 47.7 | -25.6 | 16.7 | 10.2 | 3.3 | *Canis species* | cranium |
| GrA-69520 | Zuid-Holland, Zandmotor | 29900 | 550 | 34.3 | -20.7 | 12.5 | 8.5 | 3.2 | *Alopex lagopus* | unknown |
| GrA-50465 | Brown Bank | >45000 | | 43 | -20.3 | 14.3 | 7.7 | 3.5 | *Ursus arctos* | mandible |
| GrA-25816 | Eurogully | >45000 | | 35.9 | -22.3 | 14.2 | 3.5 | 3 | *Ursus species* | unknown |
| GrA-11643 | Brown Bank | 40660 | 350 | 39.3 | -20.1 | | | | *Crocuta c. spelaea* | ulna |
| GrA-23151 | Eurogully | >45000 | | 39.9 | -19.2 | 15.7 | 8.7 | 3 | *Panthera spelaea* | ulna |
| GrA-31471 | North Sea | 39970 | 360 | 41.5 | -19.4 | 13.9 | 8.2 | 3.5 | *Panthera spelaea* | scapula |
| GrA-34644 | Brown Bank | 10730 | 60 | 33.9 | -21.2 | | | | *Gulo gulo* | mandible |
| GrA-52432 | Eurogully | 8825 | 45 | 39.4 | -24.8 | | | | *Lutra lutra* | cranium |
| GrA-52433 | Zuid-Holland, Maasvlakte 2 | 8300 | 40 | 32 | -26.2 | 13.3 | 8.6 | 2.8 | *Lutra lutra* | mandible |
| GrA-22178 | Eurogully | >45000 | | 45.6 | -12.5 | 14.6 | 11.5 | 3.6 | *Odobenus rosmarus* | cranium |
| GrN-28548 | Southern Bight | >45000 | | 41.9 | -14.1 | | | | *Odobenus rosmarus* | femur |
| GrA-59468 | Eurogully | >45000 | | 42.2 | -13.3 | 15.5 | 11.2 | 3.2 | *Odobenus rosmarus* | mandible |
| GrA-64644 | Denmark, Holmgren | 40360 | 240 | 39.1 | -13.9 | 15.3 | 12 | 3 | *Odobenus rosmarus* | atlas |
| GrA-57505 | Eurogully | 2070 | 30 | 43.7 | -12.9 | 16.9 | 13.6 | 3 | *Odobenus rosmarus* | tooth |
| GrA-65933 | Zuid-Holland, Maasvlakte 2 | 25130 | 130 | 26.2 | -15.5 | 9.3 | 14.5 | 3.3 | *Halichoerus grypus* | unknown |
| GrN-28551 | Southern Bight | 7180 | 60 | 38.7 | -11.7 | | | | *Halichoerus grypus* | bone |
| GrN-28546 | Southern Bight | >45000 | | 43.9 | -15.8 | | | | *Pagophilus groenlandica* | humerus |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| GrN-28547 | Southern Bight | 43500 | | 40.1 | -15 | | | | *Pagophilus groenlandica* | humerus |
| GrA-59476 | Brown Bank | >45000 | | 42.7 | -21.4 | 15.4 | 7.8 | 3.2 | *Mammuthus primigenius* | tusk |
| GrA-50851 | Eurogully | >45000 | | 47.9 | -22.3 | 15.9 | 6.1 | 3.5 | *Mammuthus primigenius* | tibia |
| GrA-50847 | Eurogully | >45000 | | 46.9 | -22.1 | 15.8 | 6.2 | 3.5 | *Mammuthus primigenius* | tibia |
| GrA-50854 | Brown Bank | >45000 | | 40 | -21.7 | 14.8 | 7.2 | 3.1 | *Mammuthus primigenius* | tooth |
| GrA-50860 | Brown Bank | >45000 | | 41.3 | -21.5 | 14.3 | 9 | 3.4 | *Mammuthus primigenius* | tooth |
| GrA-50848 | North Sea | >45000 | | 43.2 | -22.2 | 13.4 | 8.3 | 3.7 | *Mammuthus primigenius* | tooth |
| GrA-52416 | Brown Bank | >45000 | | 46 | -21.6 | 15.9 | 9.1 | 3.4 | *Mammuthus primigenius* | tooth |
| GrA-50846 | Brown Bank | >45000 | | 40.3 | -22.4 | 15.2 | 8 | 3.1 | *Mammuthus primigenius* | tooth |
| GrA-50843 | Brown Bank | >45000 | | 45.1 | -22.4 | 14.1 | 8.4 | 3.7 | *Mammuthus primigenius* | tooth |
| GrA-11640 | Brown Bank | >45000 | | 47.9 | -22.4 | | | | *Mammuthus primigenius* | epistropheus |
| GrA-56656 | Brown Bank | >45000 | | 40.3 | -21.9 | 14.9 | 5.9 | 3.2 | *Mammuthus primigenius* | unknown |
| GrA-56660 | Eurogully | >45000 | | 39.6 | -21.9 | 14.6 | 5.6 | 3.2 | *Mammuthus primigenius* | humerus |
| GrA-56661 | Eurogully | >45000 | | 41.4 | -21.8 | 15.1 | 5.7 | 3.2 | *Mammuthus primigenius* | humerus |
| GrA-56675 | Zuid-Holland, Maasvlakte | >45000 | | 41.8 | -21.6 | 15.4 | 5 | 3.2 | *Mammuthus primigenius* | femur |
| GrA-56662 | Eurogully | 43910 | 550 | 43.4 | -21.8 | 15.9 | 6.5 | 3.2 | *Mammuthus primigenius* | ulna |
| GrA-20134 | Eurogully | 43800 | 600 | 39.7 | -22.4 | | | | *Mammuthus primigenius* | fibula |
| GrA-50866 | Brown Bank | 42690 | 550 | 39.1 | -21.4 | 14.8 | 6.6 | 3.1 | *Mammuthus primigenius* | tooth |
| GrA-50858 | Brown Bank | 41450 | 490 | 44.7 | -22.4 | 13.7 | 8.8 | 3.8 | *Mammuthus primigenius* | tooth |
| GrA-56655 | North Sea | 41090 | 400 | 36.4 | -22.1 | 13.3 | 6.1 | 3.2 | *Mammuthus primigenius* | unknown |
| GrA-50864 | North Sea | 39970 | 440 | 34.9 | -21.7 | 13.3 | 7.9 | 3.1 | *Mammuthus primigenius* | tooth |
| GrA-56658 | Brown Bank | 39860 | 350 | 41.2 | -21.5 | 15.1 | 7.2 | 3.2 | *Mammuthus primigenius* | femur |
| GrA-50852 | Eurogully | 38960 | 400 | 38.6 | -22.4 | 13.8 | 7.3 | 3.3 | *Mammuthus primigenius* | vertebra |
| GrN-27410 | Eurogully | 37580 | 810 | 45.6 | -21.7 | | | | *Mammuthus primigenius* | cranium |
| GrA-39962 | Great Yarmouth | 37240 | 280 | 27.5 | -22.6 | | | | *Mammuthus primigenius* | vertebra |
| GrA-30740 | Zeeland, Westerschelde | >45000 | | 46.9 | -20.7 | 17.5 | 7.5 | 3.1 | *Palaeoloxodon antiquus* | unknown |

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|---|---|---|---|---|---|---|---|---|---|---|
| GrA-30590 | Zeeland, Westerschelde | >45000 | | 48.7 | -21.2 | 17.3 | 8.1 | 3.3 | *Palaeoloxodon antiquus* | unknown |
| GrA-30591 | Zeeland, Westerschelde | >45000 | | 45.5 | -20.6 | 15.7 | 10.1 | 3.4 | *Palaeoloxodon antiquus* | unknown |
| GrA-30592 | Zeeland, Westerschelde | >45000 | | 41.6 | -20.6 | 13.7 | 11.2 | 3.5 | *Palaeoloxodon antiquus* | unknown |
| GrA-56664 | Zuid-Holland, Maasvlakte | >45000 | | 39.1 | -20.2 | 14.1 | 9.8 | 3.2 | *Palaeoloxodon antiquus* | cranium |
| GrA-52410 | Eurogully | >45000 | | 35.3 | -20.8 | 16.4 | 11.6 | 2.5 | *Palaeoloxodon antiquus* | molar root |
| GrA-40013 | Zeeland, Westerschelde | 42400 | 1100 | 36.6 | -20.5 | 13.1 | 11.1 | 3.3 | *Palaeoloxodon antiquus* | mandible |
| GrA-56674 | Zuid-Holland, Maasvlakte | >45000 | | 40 | -21.3 | 14.8 | 3 | 3.2 | *Equus species* | tibia |
| GrA-42704 | Southern Bight | >45000 | | 36.4 | -21.4 | 12.7 | 6.4 | 3.3 | *Equus species* | metacarpal |
| GrA-23582 | Brown Bank | 44780 | 1635 | 40.7 | -21.4 | 14.4 | 5.4 | 3.3 | *Equus caballus* | tibia |
| GrA-22585 | Eurogully | 43550 | 1200 | 44.5 | -22 | 16.5 | 2.3 | 3.1 | *Equus species* | ulna |
| GrA-39964 | Great Yarmouth | 42960 | 500 | 38.2 | -21.4 | 14.1 | 4.1 | 3.2 | *Equus species* | metacarpal |
| GrA-37558 | Stekels | 37860 | 355 | 41.9 | -19.9 | 16.3 | 4.8 | 3 | *Equus caballus* | metacarpal |
| GrN-32392 | Eurogully | >45000 | | 44.4 | -20.7 | | | | *Coelodonta antiquitatis* | unknown |
| GrA-39965 | Great Yarmouth | >45000 | | 42 | -20.6 | 4.8 | 4.5 | 3.3 | *Coelodonta antiquitatis* | mandible |
| GrN-27411 | Eurogully | 39910 | 1070 | 45.8 | -20.8 | | | | *Coelodonta antiquitatis* | pelvis |
| GrA-66408 | Yerseke | 2190 | 30 | 39.4 | -16.7 | 13.4 | 9.3 | 3.4 | *Balaenidae* | bulla |
| GrA-34338 | Southern Bight | >45000 | | 40.9 | -14.8 | 12.7 | 14.3 | 3.3 | *Balaena mysticetus* | radius |
| GrA-37034 | Southern Bight | >45000 | | 46 | -12.6 | | | | *Balaenoptera physalus* | thoracic vertebra |
| GrA-22182 | Eurogully | >45000 | | 42.2 | -14.4 | 14.8 | 13.3 | 3.3 | *Eschrichtius robustus* | vertebra |
| GrA-34348 | Zuid-Holland, Scheveningen | >45000 | | 44.3 | -14.8 | 16.6 | 12.9 | 3.1 | *Eschrichtius robustus* | vertebra |
| GrA-34381 | Southern Bight | >45000 | | 42.1 | -13.3 | 16.2 | 14.8 | 3 | *Eschrichtius robustus* | axis |
| GrN-28549 | Southern Bight | 42800 | 4100 | 42.3 | -15.4 | | | | *Eschrichtius robustus* | vertebra |
| GrA-34349 | Eurogullly | 39100 | 360 | 1.6 | -14 | 13.3 | 12.2 | 3.6 | *Eschrichtius robustus* | atlas |
| GrA-34378 | North Sea | 4815 | 40 | 40.4 | -14 | 16.2 | 13.9 | 2.9 | *Eschrichtius robustus* | cranium |
| GrA-34380 | Southern Bight | 4230 | 35 | 46.8 | -15 | 14.6 | 14.5 | 3.7 | *Eschrichtius robustus* | vertebra |
| GrN-31093 | Noord-Holland, Andijk | 4130 | 40 | 39.1 | -14.1 | | | | *Eschrichtius robustus* | unknown |

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|---|---|---|---|---|---|---|---|---|---|---|
| GrA-34761 | Southern Bight | 4055 | 35 | 46.7 | -14.6 | 13.8 | 16 | 3.4 | *Eschrichtius robustus* | unknown |
| GrA-34379 | North Sea | 3925 | 35 | 42.2 | -13.1 | 16.6 | 14 | 3 | *Eschrichtius robustus* | cranium |
| GrA-34385 | Southern Bight | 3650 | 35 | 47.2 | -13.4 | 17.4 | 14.6 | 3.2 | *Eschrichtius robustus* | vertebra |
| GrA-34383 | Southern Bight | 2270 | 35 | 45 | -14.6 | 16.1 | 12.5 | 3.3 | *Eschrichtius robustus* | axis |
| GrA-34369 | White Bank | 1870 | 35 | 43.6 | -15.1 | 17 | 16.1 | 3 | *Eschrichtius robustus* | mandible |
| GrA-34368 | North Sea | 1865 | 30 | 42.8 | -14.9 | 15.6 | 15.9 | 3.2 | *Eschrichtius robustus* | vertebra |
| GrA-25852 | Southern Bight | 3120 | 40 | 39.8 | -12 | 14.7 | 15.6 | 3.2 | *Lagenorhynchus albirostris* | mandible |
| GrA-37555 | Stekels | 2505 | 35 | 43.2 | -12.4 | 15 | 16.2 | 3.4 | *Lagenorhynchus albirostris* | vertebra |
| GrA-34342 | Wadden Sea (G) | 4550 | 35 | 45.2 | -12.3 | 17.1 | 15.4 | 3.1 | *Orcinus orca* | maxila |
| GrA-25820 | Southern Bight | 3900 | 45 | 38.7 | -11.6 | 14.4 | 17.4 | 3.1 | *Orcinus orca* | unknown |
| GrA-25851 | Southern Bight | 8135 | 45 | 40 | -11.4 | 15.6 | 15.9 | 3 | *Tursiops truncatus* | mandible |
| GrA-25850 | Southern Bight | 7390 | 50 | 43.5 | -12.4 | 16 | 14.9 | 3.2 | *Tursiops truncatus* | mandible |
| GrN-28544 | Southern Bight | >45000 | | 40.5 | -16.5 | | | | *Delphinapterus leucas* | vertebra |
| GrA-22179 | Eurogully | >45000 | | 40.9 | -14.8 | 12.8 | 13.9 | 3.7 | *Delphinapterus leucas* | axis |
| GrA-25849 | Borkumrif | >45000 | | 44.6 | -14.4 | 17.3 | 16.5 | 3 | *Delphinapterus leucas* | vertebra |
| GrA-34337 | Zeeland, Yerseke | 40550 | 400 | 40.5 | -16.4 | 14.7 | 15.1 | 3.1 | *Delphinapterus leucas* | mandible |
| GrA-34339 | Southern Bight | 8860 | 40 | 39.1 | -21.9 | | | | *Sus scrofa* | mandible |
| GrA-32600 | Eurogully | 8710 | 45 | 41.7 | -21.2 | 15.1 | 4 | 3.2 | *Sus scrofa* | humerus |
| GrA-30721 | Eurogully | 7780 | 50 | 31.9 | -21.9 | 13.4 | 6.2 | 2.8 | *Sus scrofa* | atlas |
| GrA-38353 | Eurogully | >45000 | | 43 | -20.6 | 15.2 | 6.6 | 3.3 | *Megaloceros giganteus* | cranium |
| GrA-32601 | Eurogully | >45000 | | 45.7 | -19.5 | 14.9 | 2.5 | 3.6 | *Megaloceros giganteus* | antler |
| GrA-32685 | Eurogully | >45000 | | 40.5 | -19.8 | | | | *Megaloceros giganteus* | unknown |
| GrA-32599 | Eurogully | 40750 | 440 | 38.7 | -20.1 | 14.2 | 5.5 | 3.2 | *Megaloceros giganteus* | antler |
| GrA-36110 | Brown Bank | 10000 | 50 | 44.4 | -21.1 | 14.8 | 3.7 | 3.5 | *Cervus elaphus* | antler |
| GrA-37796 | Stekels | 9815 | 40 | 42.9 | -21.2 | 15.1 | 3.5 | 3.3 | *Cervus elaphus* | antler |
| GrA-37795 | Stekels | 9675 | 40 | 43.7 | -20.8 | 16.5 | 4.1 | 3.1 | *Cervus elaphus* | antler |

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|---|---|---|---|---|---|---|---|---|---|---|
| GrA-25514 | North Sea | 9500 | 180 | 41.5 | -21.5 | | | | *Cervus elaphus* | antler |
| GrA-30732 | Brown Bank | 9070 | 50 | 40.6 | -21.9 | 14.5 | 5 | 3.3 | *Cervus elaphus* | tibia |
| GrA-40524 | Eurogully | 9070 | 45 | 38.1 | -21.6 | 13.7 | 3.2 | 3.2 | *Cervus elaphus* | antler |
| GrA-29204 | Brown Bank | 8870 | 50 | 42.4 | -22.2 | | | | *Cervus elaphus* | antler |
| GrA-37561 | Stekels | 8830 | 40 | 44.2 | -21.7 | 15.2 | 2.5 | 3.4 | *Cervus elaphus* | antler |
| GrA-36113 | Brown Bank | 8710 | 50 | 39.7 | -22.5 | 13.4 | 2.2 | 3.5 | *Cervus elaphus* | antler |
| GrA-25568 | Southern Bight | 8600 | 50 | 36.6 | -21.8 | 13.9 | 2.1 | 3.1 | *Cervus elaphus* | antler |
| GrA-22999 | Eurogully | 8070 | 50 | 38.5 | -20.4 | 16 | 3.4 | 2.8 | *Cervus elaphus* | antler |
| GrA-20280 | Zeeland, Roompot | 4030 | 60 | 32.2 | -22.6 | | | | *Cervus elaphus* | antler |
| GrA-50510 | North Sea | 3540 | 40 | 42.5 | -22.6 | 14.6 | 5.1 | 3.4 | *Cervus elaphus* | antler |
| * | Zeeland, Roompot | 1352 | 34 | 37.1 | -20.9 | | | | *Cervus elaphus* | antler |
| GrA-23581 | Brown Bank | 44560 | 1665 | 43.9 | -20.4 | 15.3 | 4.7 | 3.3 | *Alces alces* | antler |
| GrA-27206 | Brown Bank | 9910 | 50 | 39.9 | -20.9 | 16.6 | 1.7 | 2.8 | *Alces alces* | antler |
| GrA-37004 | Brown Bank | 9520 | 50 | 39.7 | -21.7 | 14.1 | 3.4 | 2.8 | *Alces alces* | antler |
| GrA-68250 | Zuid-Holland | 9510 | 50 | 44.3 | -20.6 | 16.2 | 2.2 | 3.2 | *Alces alces* | antler |
| GrA-30731 | Brown Bank | 8240 | 50 | 45.8 | -21.2 | 16.4 | 4.2 | 3.3 | *Alces alces* | antler |
| GrA-20475 | Brown Bank | >45000 | | 32.4 | -19.6 | | | | *Rangifer tarandus* | bone |
| GrA-20303 | Brown Bank | >45000 | | 39.7 | -19.6 | | | | *Rangifer tarandus* | metacarpal |
| GrA-20475 | Brown Bank | >45000 | | 32.4 | -19.6 | 15.2 | 2.9 | 2.5 | *Rangifer tarandus* | unknown |
| GrA-32597 | Eurogully | 45150 | 650 | 36.6 | -19.1 | 15.1 | 2.9 | 2.8 | *Rangifer tarandus* | metatarsal |
| GrA-20259 | Brown Bank | 42300 | 1000 | 36.3 | -18.9 | 13.8 | 3.2 | 3.1 | *Rangifer tarandus* | astragalus |
| * | Brown Bank | 41604 | 645 | 39.8 | -19.1 | 14.4 | 5.1 | 3.2 | *Rangifer tarandus* | radius |
| * | Eurogully/Brown Bank | 41832 | 612 | 41.1 | -19.2 | | | | *Rangifer tarandus* | calcaneum |
| * | Brown Bank | 39210 | 665 | 42.2 | -19.1 | 14.7 | 4.4 | 3.3 | *Rangifer tarandus* | metacarpal |
| GrA-20257 | Eurogully | 39200 | 700 | 35.9 | -21.2 | 13.7 | 6.8 | 3.1 | *Rangifer tarandus* | phalanx |
| GrA-20261 | Brown Bank | 39000 | 700 | 39 | -19.2 | 14.1 | 4.3 | 3.2 | *Rangifer tarandus* | epistropheus |

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|---|---|---|---|---|---|---|---|---|---|---|
| GrA-31284 | Brown Bank | 38960 | 355 | 35.1 | -19.8 | 13.2 | 3.6 | 3.1 | *Rangifer tarandus* | antler |
| GrA-25570 | Brown Bank | 35160 | 315 | 36 | -19.3 | 12.6 | 2.2 | 3.3 | *Rangifer tarandus* | antler |
| GrA-39966 | Great Yarmouth | 31460 | 160 | 42.8 | -19.5 | 14.4 | 2.5 | 3.5 | *Rangifer tarandus* | antler |
| GrA-20294 | Eurogully/Brown Bank | 29460 | 250 | 38.5 | -19.4 | 15.7 | 4.1 | 2.9 | *Rangifer tarandus* | astragalus |
| GrA-20256 | Brown Bank | 8820 | 60 | 40.6 | -22.7 | 16.8 | 4 | 2.8 | *Rangifer tarandus* | phalanx |
| GrA-20353 | Brown Bank | 8350 | 50 | 30.6 | -23.3 | | | | *Rangifer tarandus* | phalanx |
| GrA-31283 | Brown Bank | 8880 | 40 | 38.9 | -22.2 | 12.8 | 2.4 | 3.6 | *Capreolus capreolus* | tibia |
| GrA-33949 | Eurogully | 8405 | 45 | 36.8 | -21.4 | 12.5 | 3 | 3.4 | *Capreolus capreolus* | antler |
| GrA-37797 | Stekels | >45000 | | 45.9 | -20.4 | 17.9 | 4.3 | 3 | *Bos primigenius* | femur |
| GrA-51668 | North Sea | 8900 | 40 | 44.3 | -22.4 | 15.6 | 5.2 | 3.3 | *Bos primigenius* | unknown |
| GrA-25569 | Brown Bank | 8800 | 50 | 38.2 | -22.3 | 14.7 | 5.2 | 3 | *Bos primigenius* | metapodal |
| GrA-22998 | Brown Bank | 8780 | 60 | 36.2 | -22.6 | 15.5 | 5.5 | 2.7 | *Bos primigenius* | metacarpal |
| GrA-51786 | Eurogully | 8175 | 40 | 42.8 | -22.8 | 16.6 | 6.1 | 3 | *Bos primigenius* | horn pit |
| GrN-28261 | Eurogully | >45000 | | 50.7 | -19.6 | | | | *Bison priscus* | lendal vertebra |
| GrA-39518 | Great Yarmouth | 39900 | 850 | 35.6 | -20.9 | | | | *Bison species* | metacarpale |
| GrA-28364 | Brown Bank | 11560 | 50 | 37.9 | -20.6 | 14.5 | 3.9 | 3.1 | *Bison species* | metatarsus |
| GrA-34524 | Brown Bank | >45000 | | 37.5 | -21.9 | 13.2 | 6.1 | 3.3 | *Bovidae* | unknown |
| GrA-34531 | Brown Bank | >45000 | | 39.2 | -21.7 | 14.3 | 5.4 | 3.2 | *Bovidae* | unknown |
| GrA-34533 | Brown Bank | >45000 | | 42.1 | -21.9 | 15.1 | 6.7 | 3.2 | *Bovidae* | unknown |
| GrA-51667 | North Sea | 9220 | 40 | 38.6 | -22.7 | 14.7 | 4.9 | 3.1 | *Bovidae* | metacarpal |
| GrA-34526 | Brown Bank | 110 | 50 | 45.2 | -21.8 | 15.9 | 5.1 | 3.3 | *Bovidae* | unknown |
| GrA-11641 | Brown Bank | 36740 | 230 | 42.5 | -20.1 | | | | *Ovibos moschatus* | metacarpal |
| * | Brown Bank | 15183 | 36 | 37 | -19.2 | 14.1 | 7.5 | 3 | *Caprinae* | unknown |
| GrA-58271 | Zuid-Holland, Maasvlakte | 11050 | 45 | 41.6 | -20.6 | 14.9 | 9.7 | 3.3 | *Homo sapiens* | bone |
| GrA-42700 | Southern Bight | 10070 | 50 | 36 | -24.7 | 13.3 | 11.2 | 3.2 | *Homo sapiens* | cranium |
| GrA-42702 | Southern Bight | 9440 | 50 | 41.5 | -24.2 | 15.6 | 13.6 | 3.1 | *Homo sapiens* | cranium |

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|---|---|---|---|---|---|---|---|---|---|---|
| GrA-57506 | Eurogully/Brown Bank | 9440 | 45 | 40.3 | -24.4 | 15.1 | 12.2 | 3.1 | *Homo sapiens* | femur |
| GrA-50459 | Eurogully | 9220 | 60 | 35.4 | -22.8 | 13.1 | 10 | 3.2 | *Homo sapiens* | femur |
| GrA-62470 | Zuid-Holland, Maasvlakte | 9180 | 50 | 42.7 | -23 | 16.2 | 10.3 | 3.1 | *Homo sapiens* | cranium |
| GrA-49638 | North Sea | 9150 | 50 | 44.5 | -22.7 | 16.3 | 4.5 | 3.2 | *Homo sapiens* | bone |
| GrA-27188 | Brown Bank | 9140 | 50 | 36.4 | -23.1 | 15.4 | 10.2 | 2.8 | *Homo sapiens* | humerus |
| GrA-30733 | Brown Bank | 9080 | 50 | 42.6 | -22 | 15.3 | 11.6 | 3.2 | *Homo sapiens* | bone |
| GrA-31287 | Brown Bank | 9035 | 40 | 33.2 | -23.4 | 12.3 | 11.4 | 3.2 | *Homo sapiens* | bone |
| GrA-35949 | Brown Bank | 9005 | 45 | 40.7 | -23.3 | 14.1 | 10.8 | 3.4 | *Homo sapiens* | humerus |
| GrA-62225 | Eurogully | 8945 | 45 | 40.4 | -13.4 | 15 | 14.1 | 3.1 | *Homo sapiens* | humerus |
| GrA-51669 | North Sea | 8910 | 40 | 43.7 | -22.1 | 15.7 | 9.4 | 3.2 | *Homo sapiens* | bone |
| GrA-49637 | North Sea | 8820 | 50 | 44.1 | -22.5 | 13.9 | 9.3 | 3.7 | *Homo sapiens* | bone |
| GrA-67124 | Zuid-Holland, Zandmotor | 8680 | 45 | 44 | -23.6 | 16.1 | 12.4 | 3.2 | *Homo sapiens* | cranium |
| GrA-45801 | Brown Bank | 8665 | 45 | 43.6 | -16.5 | 15.3 | 15.7 | 3.3 | *Homo sapiens* | femur |
| GrA-54735 | North Sea | 8660 | 50 | 43.1 | -16.7 | 15.6 | 13.8 | 3.2 | *Homo sapiens* | femur |
| M-21188 | Zuid-Holland, Hoek van Holland | 8630 | 25 | 51.3 | -23.4 | 18 | 14.1 | 3.3 | *Homo sapiens* | tooth |
| GrA-57501 | Zuid-Holland, Maasvlakte | 8565 | 45 | 37.3 | -23.5 | 14 | 12.7 | 3.1 | *Homo sapiens* | cranium |
| * | Eurogully | 8610 | 36 | 43 | -24.1 | 15.4 | 12.4 | 3.3 | *Homo sapiens* | femur |
| GrA-65508 | Slijtgeul | 8560 | 50 | 30.5 | -19.8 | 11.2 | 12.9 | 3.2 | *Homo sapiens* | maxilla |
| GrA-56366 | Zuid-Holland, Hoek van Holland | 8425 | 40 | 37.4 | -21.3 | 14.2 | 14.9 | 3.1 | *Homo sapiens* | tooth |
| GrA-63432 | Zuid-Holland, Hoek van Holland | 8375 | 45 | 34 | -23.1 | 12.8 | 12.5 | 3.1 | *Homo sapiens* | cranium |
| GrA-11642 | North Sea | 8370 | 50 | 39 | -15.6 | 14.3 | 15.7 | 3.2 | *Homo sapiens* | mandible |
| GrA-56352 | Zeeland, Burgh Haamstede | 8290 | 40 | 42 | -19.9 | 15.7 | 15 | 3.1 | *Homo sapiens* | tooth |
| GrA-27205 | Brown Bank | 8180 | 45 | 40.6 | -22.6 | 17.7 | 15.1 | 2.7 | *Homo sapiens* | femur |
| GrA-65943 | Zuid-Holland, Zandmotor | 8140 | 45 | 39.1 | -22.5 | 14 | 15.9 | 3.3 | *Homo sapiens* | cranium |
| GrM-10211 | Noord-Holland, Castricum | 8000 | 45 | 43.2 | -16.9 | 15.5 | 17.4 | 3.2 | *Homo sapiens* | bone |
| GrA-51670 | North Sea | 7955 | 40 | 43.3 | -21.5 | 15.6 | 14.6 | 3.2 | *Homo sapiens* | bone |

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|---|---|---|---|---|---|---|---|---|---|---|
| GrA-68069 | North Sea | 7950 | 45 | 43 | -17.6 | 15.7 | 16.2 | 3.2 | *Homo sapiens* | tooth |
| GrA-63431 | Zuid-Holland, Monster | 7885 | 45 | 38.4 | -21.3 | 15 | 14.1 | 3 | *Homo sapiens* | cranium |
| GrA-63799 | Zuid-Holland, Maasvlakte | 7870 | 45 | 40.8 | -23.7 | 15 | 12.9 | 3.2 | *Homo sapiens* | cranium |
| GrA-67123 | Zuid-Holland, Zandmotor | 7810 | 45 | 41.5 | -20.9 | 15.1 | 15.6 | 3.2 | *Homo sapiens* | cranium |
| GrA-65507 | Zuid-Holland, Zandmotor | 7760 | 45 | 36.3 | -21.6 | 13.1 | 16.4 | 3.2 | *Homo sapiens* | femur |
| GrA-68591 | Zuid-Holland, Den Haag | 7725 | 45 | 44.8 | -23.2 | 16.3 | 13.9 | 3.2 | *Homo sapiens* | cranium |
| GrM-10161 | Wadden Sea, Texel | 5020 | 25 | 45.8 | -21 | 16.7 | 9.6 | 3.2 | *Homo sapiens* | cranium |
| GrM-10748 | Noord-Holland, Bloemendaal | 3130 | 20 | 44.9 | -20.2 | 16.4 | 13.4 | 3.2 | *Homo sapiens* | vertebra |
| GrM-10746 | Noord-Holland, Noordwijk | 2985 | 20 | 46.3 | -20.2 | 16.9 | 8 | 3.2 | *Homo sapiens* | femur |
| GrM-12352 | Noord-Holland, Noordwijk | 2842 | 16 | 44 | -20.2 | 16 | 9.5 | 3.2 | *Homo sapiens* | humerus |
| GrA-65511 | Wadden Sea, Terschelling | 2740 | 35 | 40.5 | -20.4 | 14.1 | 10.2 | 3.3 | *Homo sapiens* | vertebra |
| GrM-13967 | North Sea | 2518 | 16 | 42.3 | -20.3 | 15.3 | 8.5 | 3.2 | *Homo sapiens* | phalanx |
| GrM-12977 | Katwijk/Wassenaar | 2515 | 16 | 44.7 | -19.8 | 15.9 | 10.2 | 3.3 | *Homo sapiens* | mandible |
| GrA-67067 | North Sea | 2285 | 30 | 42.3 | -20.4 | 15.5 | 11.3 | 3.2 | *Homo sapiens* | vertebra |
| GrA-68058 | Zuid-Holland, Den Haag | 2190 | 30 | 38 | -19.6 | 13.9 | 12.2 | 3.2 | *Homo sapiens* | tooth |
| GrM-12817 | Wadden Sea, Texel | 2156 | 15 | 44 | -19.4 | 15.9 | 11.7 | 3.2 | *Homo sapiens* | cranium |
| GrA-69134 | Zuid-Holland, Katwijk | 1995 | 30 | 45.2 | -20.2 | 16.4 | 10.4 | 3.2 | *Homo sapiens* | scapula |
| GrM-12923 | Scheveningen | 1838 | 15 | 47.3 | -19.9 | 17.2 | 10 | 3.2 | *Homo sapiens* | femur |
| GrA-63619 | Wadden Sea, Terschelling | 1830 | 30 | 44.2 | -19.9 | 16.6 | 9.9 | 3.1 | *Homo sapiens* | bone |
| GrM-12944 | Noordwijk | 1808 | 15 | 46.2 | -19.7 | 16.9 | 12.1 | 3.2 | *Homo sapiens* | vertebra |
| GrA-64747 | Noord-Holland, Zaandam | 1805 | 30 | 46.4 | -20.2 | 16.9 | 9.9 | 3.2 | *Homo sapiens* | femur |
| GrM-13316 | Cadzand | 1799 | 15 | 42.9 | -18.7 | 15.7 | 9.8 | 3.2 | *Homo sapiens* | mandible |
| GrA-64726 | Zeeland, Borsele | 1335 | 30 | 41.9 | -19.4 | 15.2 | 12 | 3.2 | *Homo sapiens* | tooth |
| GrA-50511 | Southern Bight | 1260 | 40 | 43.3 | -20.3 | 12.7 | 8.8 | 4 | *Homo sapiens* | bone |
| GrM-10157 | Wadden Sea, Texel | 1225 | 20 | 45.4 | -20.1 | 16.6 | 9.6 | 3.2 | *Homo sapiens* | cranium |
| GrM-10158 | Wadden Sea, Texel | 1205 | 20 | 45.5 | -20 | 16.7 | 9.7 | 3.2 | *Homo sapiens* | cranium |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| GrM-12819 | Wadden Sea, Texel | 1212 | 15 | 43.3 | -19.8 | 15.7 | 10.8 | 3.2 | *Homo sapiens* | cranium |
| GrA-31286 | Zeeland, Westerschelde | 1200 | 25 | 49.6 | -19.5 | 17.1 | 12 | 3.4 | *Homo sapiens* | bone |
| GrA-65510 | Zuid-Holland, Maasvlakte | 1175 | 30 | 47 | -20.6 | 16 | 10.8 | 3.4 | *Homo sapiens* | cranium |
| GrM-12519 | Zeeland | 1141 | 13 | 46.5 | -20 | 17 | 12.3 | 3.2 | *Homo sapiens* | vertebra |
| GrM-10814 | Zeeland | 1115 | 12 | 42.5 | -19.5 | 15.6 | 11.9 | 3.2 | *Homo sapiens* | mandible |
| GrM-12518 | Zeeland | 1035 | 14 | 47.5 | -20 | 17.4 | 9.4 | 3.2 | *Homo sapiens* | cranium |
| GrA-66669 | Zuid-Holland, Den Haag | 1015 | 30 | 46.2 | -19.7 | 16.7 | 10.9 | 3.2 | *Homo sapiens* | vertebra |
| GrM-12512 | Zeeland | 986 | 14 | 46.7 | -19.9 | 17.2 | 10.6 | 3.2 | *Homo sapiens* | mandible |
| GrM-12513 | Zeeland | 975 | 13 | 45.8 | -19.7 | 16.7 | 10 | 3.2 | *Homo sapiens* | vertebra |
| GrM-12594 | Zeeland | 951 | 13 | 46.4 | -20.3 | 16.8 | 12.2 | 3.2 | *Homo sapiens* | cranium |
| GrM-10150 | Wadden Sea, Texel | 905 | 20 | 43.9 | -18 | 16 | 13.6 | 3.2 | *Homo sapiens* | humerus |
| GrA-67125 | Zuid-Holland, Den Haag | 875 | 30 | 44.4 | -19.1 | 16.1 | 11.3 | 3.2 | *Homo sapiens* | humerus |
| GrM-10156 | Wadden Sea, Texel | 840 | 20 | 43.8 | -19.7 | 15.9 | 14 | 3.2 | *Homo sapiens* | mandible |
| GrM-10172 | North Sea | 791 | 17 | 40.5 | -19.4 | 14.6 | 12.4 | 3.2 | *Homo sapiens* | bone |
| GrM-10162 | Wadden Sea, Texel | 730 | 20 | 43 | -19.2 | 15.7 | 10.7 | 3.2 | *Homo sapiens* | femur |
| GrA-68787 | Zuid-Holland, Monster | 730 | 30 | 45.4 | -19.4 | 16.6 | 12.5 | 3.2 | *Homo sapiens* | mandible |
| GrM-10163 | Wadden Sea, Texel | 695 | 20 | 43.5 | -19.8 | 15.8 | 12.9 | 3.2 | *Homo sapiens* | femur |
| GrM-12511 | Zeeland | 654 | 13 | 46.7 | -19.6 | 17.2 | 11.8 | 3.2 | *Homo sapiens* | cranium |
| GrM-10160 | Wadden Sea, Texel | 630 | 20 | 42.5 | -20 | 15.4 | 12.7 | 3.2 | *Homo sapiens* | cranium |
| GrA-69069 | Noord-Holland, Noordwijk | 585 | 30 | 42.8 | -18.3 | 15.5 | 14.6 | 3.2 | *Homo sapiens* | scapula |
| GrA-68049 | North Sea | 540 | 30 | 42.5 | -19.9 | 15.4 | 11.5 | 3.2 | *Homo sapiens* | mandible |
| GrA-61784 | Noord-Holland, Wijk aan Zee | 485 | 35 | 43.4 | -18.5 | 15.5 | 13.7 | 3.3 | *Homo sapiens* | mandible |
| GrM-12592 | Wadden Sea, Griend | 477 | 13 | 46 | -17.2 | 16.8 | 15.2 | 3.2 | *Homo sapiens* | pelvis |
| GrA-62687 | Zuid-Holland, Biesbosch | 470 | 30 | 13.3 | -19.9 | 4.5 | 13.5 | 3.5 | *Homo sapiens* | cranium |
| GrA-67126 | Zuid-Holland, Den Haag | 450 | 30 | 41.7 | -18.9 | 15.1 | 13.4 | 3.2 | *Homo sapiens* | femur |
| GrM-11117 | Wadden Sea | 374 | 17 | 35.7 | -20.1 | 13 | 12.2 | 3.2 | *Homo sapiens* | tooth |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| GrM-12514 | Zeeland | 356 | 13 | 47.9 | -19.4 | 17.6 | 14.1 | 3.2 | *Homo sapiens* | cranium |
| GrA-66670 | Zuid-Holland, Den Haag | 355 | 30 | 47.3 | -20.1 | 17.1 | 11.4 | 3.2 | *Homo sapiens* | vertebra |
| GrM-10351 | Schiermonnikoog | 340 | 15 | 43.8 | -18.5 | 16.3 | 13.1 | 3.1 | *Homo sapiens* | bone |
| GrM12013 | North Sea | 338 | 11 | 45.9 | -20.5 | 16.3 | 10.7 | 3.3 | *Homo sapiens* | bone |
| GrA-69720 | Wadden Sea, Texel | 335 | 35 | 41.9 | -19.9 | 15.2 | 12.9 | 3.2 | *Homo sapiens* | vertebra |
| GrM-12590 | Zeeland, Domburg | 334 | 13 | 46.8 | -18.5 | 17.1 | 11.6 | 3.2 | *Homo sapiens* | femur |
| GrM-10152 | Wadden Sea, Texel | 310 | 25 | 42.6 | -21.6 | | | | *Homo sapiens* | femur |
| GrA-69722 | Wadden Sea, Texel | 300 | 35 | 43.4 | -20.1 | 15.9 | 13.6 | 3.2 | *Homo sapiens* | vertebra |
| GrA-37072 | Eurogully | 280 | 35 | 40.9 | -18.2 | 13.5 | 12.2 | 3.5 | *Homo sapiens* | humerus |
| GrA-68584 | Zeeland, Vlissingen | 250 | 30 | 41 | -19.5 | 14.8 | 13.5 | 3.2 | *Homo sapiens* | cranium |
| GrA-68309 | North Sea | 248 | 28 | 44.8 | -19.9 | 16.2 | 12.3 | 3.2 | *Homo sapiens* | mandible |
| GrM-10159 | Wadden Sea, Texel | 235 | 20 | 46.2 | -19.5 | 16.9 | 11.3 | 3.2 | *Homo sapiens* | cranium |
| GrA-64893 | North Sea | 225 | 30 | 44.1 | -17 | 15.5 | 15.1 | 3.3 | *Homo sapiens* | tibia |
| GrA-67581 | Zeeland, Oostkapelle | 225 | 30 | 44.9 | -18 | 16.3 | 11.2 | 3.2 | *Homo sapiens* | cranium |
| GrM-12348 | Wadden Sea, Terschelling | 223 | 14 | 45.6 | -13.4 | 16.5 | 13.4 | 3.2 | *Homo sapiens* | tibia |
| GrM-10149 | Wadden Sea, Texel | 220 | 20 | 43.1 | -18.4 | 15.5 | 12.8 | 3.2 | *Homo sapiens* | humerus |
| GrA-67523 | Wadden Sea, Holwerd | 210 | 30 | 46.9 | -18.1 | 17 | 11.8 | 3.2 | *Homo sapiens* | tibia |
| GrM-10200 | North Sea | 207 | 13 | 45.3 | -19.7 | 16.4 | 11.6 | 3.2 | *Homo sapiens* | bone |
| GrA-63668 | North Sea | 205 | 30 | 46.8 | -17.2 | 17.3 | 11.1 | 3.2 | *Homo sapiens* | bone |
| GrA-64239 | North Sea | 200 | 30 | 47 | -19.6 | 17 | 11.9 | 3.2 | *Homo sapiens* | bone |
| GrA-64895 | North Sea | 195 | 30 | 44.6 | -19.2 | 15.1 | 11.3 | 3.5 | *Homo sapiens* | tibia |
| GrM-10173 | North Sea | 191 | 16 | 42.9 | -19.2 | 15.5 | 13.4 | 3.2 | *Homo sapiens* | bone |
| GrA-68059 | North Sea | 191 | 30 | 39.8 | -18.6 | 14.4 | 10.6 | 3.2 | *Homo sapiens* | cranium |
| GrA-68655 | Zuid-Holland, Wassenaar | 190 | 30 | 45.6 | -17.7 | 16.7 | 12.1 | 3.2 | *Homo sapiens* | vertebra |
| GrM-10168 | Wadden Sea, Texel | 190 | 20 | 45 | -17.8 | 16.3 | 11.8 | 3.2 | *Homo sapiens* | femur |
| GrM-12516 | Zeeland | 178 | 13 | 46.9 | -18.5 | 17.2 | 12.1 | 3.2 | *Homo sapiens* | fibula |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| GrA-68310 | North Sea | 175 | 30 | 45.1 | -19.5 | 16.3 | 11.8 | 3.2 | *Homo sapiens* | mandible |
| GrA-69018 | Zeeland, Sluis | 170 | 30 | 47.5 | -19.5 | 17 | 12.6 | 3.3 | *Homo sapiens* | humerus |
| GrA-65315 | Noord-Holland, Bergen aan Zee | 165 | 30 | 41.6 | -17.4 | 14.5 | 11.6 | 3.3 | *Homo sapiens* | humerus |
| GrA-69724 | Wadden Sea, Texel | 165 | 30 | 45.2 | -19.3 | 16.6 | 10.9 | 3.2 | *Homo sapiens* | femur |
| GrA-69020 | Zeeland, Sluis | 160 | 30 | 43.8 | -19.9 | 15.6 | 12.6 | 3.3 | *Homo sapiens* | pelvis |
| GrM-10151 | Wadden Sea, Texel | 160 | 20 | 45.3 | -19.6 | 16.4 | 10.1 | 3.2 | *Homo sapiens* | humerus |
| GrM-10164 | Wadden Sea, Texel | 160 | 20 | 39.8 | -19.9 | 14.6 | 12.6 | 3.2 | *Homo sapiens* | femur |
| GrM-12346 | Wadden Sea, Schiermonnikoog | 159 | 14 | 44.6 | -19.2 | 16.1 | 13.6 | 3.2 | *Homo sapiens* | tibia |
| GrA-69723 | Wadden Sea, Texel | 155 | 35 | 45.1 | -18.5 | 16.5 | 12.1 | 3.2 | *Homo sapiens* | femur |
| GrM-12589 | Zeeland, Domburg | 144 | 12 | 46.9 | -19.3 | 17.2 | 11.8 | 3.2 | *Homo sapiens* | mandible |
| GrA-69019 | Zeeland, Sluis | 140 | 30 | 47.4 | -19.6 | 17 | 12.6 | 3.3 | *Homo sapiens* | cranium |
| GrM-10199 | North Sea | 130 | 14 | 45.8 | -20 | 16.7 | 11.6 | 3.2 | *Homo sapiens* | bone |
| GrA-64894 | North Sea | 120 | 30 | 40.8 | -18.2 | 14.4 | 11.7 | 3.3 | *Homo sapiens* | tibia |
| GrA-64891 | Wadden Sea | 115 | 30 | 43.8 | -19.9 | 15.7 | 11.2 | 3.2 | *Homo sapiens* | cranium |
| GrA-64892 | Wadden Sea | 75 | 30 | 45.3 | -19.6 | 16.2 | 12.3 | 3.3 | *Homo sapiens* | cranium |
| GrA-69016 | North Sea | 0 | 25 | 48.8 | -19.6 | 17 | 12.4 | 3.4 | *Homo sapiens* | cranium |
| GrA-69725 | Zuid-Holland | 0 | 25 | 44.2 | -19.8 | 16.1 | 12.2 | 3.2 | *Homo sapiens* | humerus |
| GrA-64453 | Zuid-Holland, Hoek van Holland | 43290 | 380 | 39.9 | -14.9 | 14.5 | 17.6 | 3.2 | *Pinguinus impennis* | humerus |
| GrA-64384 | Zuid-Holland, Zandmotor | 6480 | 40 | 35.5 | -14.3 | 12.9 | 17.7 | 3.2 | *Pinguinus impennis* | humerus |
| GrA-65546 | Zuid-Holland, Zandmotor | 3505 | 35 | 39.4 | -14.2 | 13.8 | 16 | 3.3 | *Pinguinus impennis* | unknown |
| GrA-43620 | Stekels | >45000 | | 36.6 | -23 | 13.7 | 4.6 | 3.1 | *unknown* | unknown |
| GrA-40522 | Brown Bank, SW | >45000 | | 38.9 | -20.6 | 14.4 | 5.2 | 3.2 | *unknown* | cf tibia |
| GrA-43612 | Stekels | 8945 | 45 | 34.8 | -22.8 | 13.9 | 5.4 | 2.9 | *unknown* | bone |
| GrA-59743 | Zuid-Holland, Maasvlakte | 8680 | 60 | 37.8 | -19.6 | 13.9 | 4.2 | 3.2 | *unknown* | unknown |
| GrA-30795 | Brown Bank | 8660 | 50 | 45.7 | -21.9 | 16.1 | 5.3 | 3.3 | *unknown* | metapodal |
| GrA-42195 | Zuid-Holland, Rockanje | 8295 | 45 | 42.4 | -22.1 | 13.1 | 6.3 | 3.8 | *unknown* | unknown |

## SI Chapter 7

OxCal code used to establish the final extinction date of the woolly mammoth.

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# About the author

Margot Kuitems was born in Houten on 7 October 1985 and was raised in Opperdoes, the Netherlands. She studied Archaeology at Leiden University. Both her Bachelors and Masters were focused on archaeological sciences and prehistory, and her theses involved stable carbon and nitrogen analysis of animal tissue. After her graduation in 2009, Margot worked part-time as analyst at the Centre of Isotope Research (CIO), University of Groningen. In addition, she continued working as a researcher in the field of archaeological sciences. At the Faculty of Archaeology, Leiden University, she was among others involved in the NWO-funded Dutch Russia Research Cooperation on the 'Collapse of the Mammoth Steppe Ecosystem' (COMSEC), in the geo-archaeological and palaeontological research that was carried out as part of the creation of the Maasvlakte 2 harbour area of Rotterdam, and in the determination and molecular investigation of fossil bones from the archaeological site Schöningen (Germany). Her PhD thesis presents a compilation of a number of stable isotope case studies executed by Margot during the past years. Since 2017, she is employed within the ERC-funded project 'Exact Chronology of Early Societies' (ECHOES), based at the CIO, University of Groningen. She works on a new approach to radiocarbon dating, one that is accurate to the exact calendar year. The technique is built on the recent discovery of annual rises, or 'Miyake Events', in the concentration of radiocarbon in the atmosphere. Margot is using this novel method for radiocarbon dating archaeological sites at an unprecedented precision.

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