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UNIVERSITY OF LUND RADIOCARBON DATES XVII

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INTRODUCTION

Most of the ^{14}C measurements reported here were made between October 1982 and October 1983. Equipment, measurement, and treatment of samples are as reported previously (R, 1968, v 10, p 36-37; 1976, v 18, p 290; 1980, v 22, p 1045).

Age calculations are based on a contemporary value equal to 95% of the activity of NBS oxalic acid standard (No. 4990A) and on the conventional half-life for ^{14}C of 5568 yr. Results are reported in years before 1950 (years BP). Errors quoted with the dates are based on counting statistics alone and are equivalent to ± 1 standard deviation ($\pm\sigma$).

Corrections for deviations from $\delta^{13}C = -25.0‰$ in the PDB scale are applied for almost all samples; also for marine shells. The apparent age for marine material due to the reservoir effect must be subtracted from our dates on such samples.

The remark "undersized; diluted," in *Comments* means the sample did not produce enough CO_2 to fill the counter to normal pressure and "dead" CO_2 from anthracite was introduced to make up the pressure. "% sample" indicates amount of CO_2 derived from the sample present in the diluted counting gas; the rest is "dead" CO_2. Organic carbon content reported for bone samples is calculated from yield of CO_2 by combustion of gelatine remaining after treatment. Organic carbon lost during treatment is not included in calculated percentage.

The description of each sample is based on information provided by the submitter.

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SAMPLE DESCRIPTIONS

GEOLOGIC SAMPLES

Sweden

Sännen series

Water mosses and other coarse organic matter washed from sediment from SE corner of Lake Sännen, 13km N of Listerby, Blekinge (56° 19′ N, 15° 23′ E). Coll 1982 and subm by S Björck, Dept Quaternary Geol, Univ Lund. Dating is part of study of deglaciation chronology of S Sweden (Björck, 1979; 1981). Depths refer to water surface. All samples pretreated with HCl.

12,190 ± 80

Lu-2103. Sännen 1, 600 to 605cm $\delta^{13}C = -25.7‰$

Water mosses and other coarse organic matter from slightly muddy clay underlain by unvarved and varved clay, 260 to 265cm below sediment surface. Regional Pollen Assemblage Zone 2 corresponding to Older Dryas Chronozone (Björck, 1979, p 41-45 & p 126, fig 43a; 1981, p 18-19 & p 48, fig 42A). *Comment*: (3 1-day counts.)

12,080 ± 90

Lu-2104. Sännen 2, 595 to 600cm $\delta^{13}C = -25.4‰$

Water mosses and other coarse organic matter from clay, 255 to 260cm below sediment surface. Same pollen zone as Lu-2103, above. *Comment*: (3 1-day counts.)

11,960 ± 90

Lu-2105. Sännen 3, 590 to 595cm $\delta^{13}C = -26.2‰$

Coarse organic matter, mainly water mosses, from clay gyttja, 250 to 255cm below sediment surface. Regional Pollen Assemblage Zone 3 corresponding to 1st half of Allerød Chronozone. *Comment*: (3 1-day counts.)

11,630 ± 90

Lu-2164. Sännen 4, 580 to 585cm $\delta^{13}C = -26.3‰$

Coarse organic matter, mainly moss remains, 240 to 245cm below sediment surface. End of Regional Pollen Assemblage Zone 3. *Comment*: (3 1-day counts.)

10,790 ± 260

Lu-2165. Sännen 5, 570 to 575cm $\delta^{13}C = -25.0‰$

Coarse organic matter, mainly water mosses, 230 to 235cm below sediment surface. End of Regional Pollen Zone 4 corresponding to end of Allerød Chronozone. *Comment*: sample very small; diluted; 19% sample. (4 1-day counts.)

10,510 ± 80

Lu-2166. Sännen 6, 560 to 565cm $\delta^{13}C = -25.8‰$

Coarse organic matter, mainly water mosses, 220 to 225cm below sediment surface. Later part of Regional Pollen Assemblage Zone 5 corresponding to 1st half of Younger Dryas Chronozone. *Comment*: (3 1-day counts.)

Dags Mosse series II

Sediment and peat from S part of Dags Mosse, SW of Lake Tåkern, Östergötland (58° 19.5′ N, 14° 42′ E). Coll 1982 by H Göransson and T Persson; subm by H Göransson, Dept Quaternary Geol, Univ Lund. Dated as complement to Dags Mosse Series I (R, 1983, v 25, p 877-880). Depths refer to present bog surface. All samples pretreated with HCl.

7010 ± 70

Lu-2106. Dags Mosse 1982:I $\delta^{13}C = -29.9‰$

Coarse detritus gyttja, rich in rootlets, 503.5 to 506.5cm. Just below empirical *Tilia* limit.

7000 ± 70

Lu-2107. Dags Mosse 1982:II $\delta^{13}C = -27.5‰$

Coarse detritus gyttja, rich in *Phragmites* rootlets, 493.5 to 496.5cm. Empirical *Tilia* limit (*Tilia* increasing from 0.7 to 1.7%).

6970 ± 70

Lu-2108. Dags Mosse 1982:III $\delta^{13}C = -28.1‰$

Phragmites peat, 446 to 449cm. Rational *Tilia* limit (*Tilia* increasing from 2.7 to 6%).

General Comment (HG): date for rational *Tilia* limit (Lu-2108) agrees with dates for this limit from other studies. Unexpectedly small age differences between samples may be explained by very rapid sediment and peat accumulation, or by some rejuvenation of Lu-2106 and -2107 by penetrating rootlets, or both.

Håkulls mosse series (III)

Sediment from Håkulls mosse on hill ridge Kullaberg, NW Scania (56° 17′ N, 12° 31′ E). Alt ca 125m. Coll 1975 and subm by B E Berglund, Dept Quaternary Geol, Univ Lund. Samples are from Cores I and II taken with Livingstone sampler, 10cm diam. Depths refer to bog surface. For other dates from Håkulls mosse, see R, 1978, v 20, p 416-417; 1980, v 22, p 1049-1050. Pretreated with HCl. (3 1-day counts for all samples.)

11,370 ± 80

Lu-2119. Håkulls mosse 13, 827 to 829cm $\delta^{13}C = -22.7‰$

Clayey fine detritus gyttja, Core II. Middle part of Allerød zone.

11,240 ± 80

Lu-2120. Håkulls mosse 14, 819 to 821cm $\delta^{13}C = -22.0‰$

Clayey fine detritus gyttja, Core II. Later part of Allerød zone.

10,760 ± 80

Lu-2121. Håkulls mosse 15, 798 to 800cm $\delta^{13}C = -26.3‰$

Clay gyttja, Core II. Early part of Younger Dryas zone.

10,640 ± 80

Lu-2122. Håkulls mosse 16, 789 to 791cm $\delta^{13}C = -25.8‰$

Clay gyttja, Core II. Early part of Younger Dryas zone.

10,770 ± 80

Lu-2123. Håkulls mosse 17, 777 to 779cm $\delta^{13}C = -26.1‰$

Clay gyttja, Core II. Middle part of Younger Dryas zone.

10,400 ± 80

Lu-2124. Håkulls mosse 18, 761 to 763cm $\delta^{13}C = -26.4‰$

Clay gyttja, Core II. Later part of Younger Dryas zone.

10,430 ± 80

Lu-2125. Håkulls mosse 19, 743 to 745cm $\delta^{13}C = -25.6‰$

Clay gyttja, Core I. End of Younger Dryas zone. *Comment* (BEB): no exact depth correlation between Core I and Core II.

9530 ± 70

Lu-2126. Håkulls mosse 20, 695 to 697cm $\delta^{13}C = -25.6‰$

Fine detritus gyttja, Core I. Transition Pre-boreal/Boreal.

Vätlingmyr series

Pinus cones and small wood fragments washed from sediment rich in carbonate from core taken near former shore of Vätlingmyr, Austergårds, Stenkyrka parish, Gotland (57° 47′ N, 18° 31′ E). Coll 1982 and subm by N-O Svensson, Dept Quaternary Geol, Univ Lund. Dated as part of study of Late Weichselian and Early Holocene shoreline displacement on Gotland and in E Småland. Depths given are below present surface.

9080 ± 80

Lu-2133. Vätlingmyr, 138 to 148cm $\delta^{13}C = -26.1‰$

Pinus cones and small wood fragments. Immigration of *Corylus* 5cm below sample. *Comment*: no pretreatment; sample undersized; diluted; 89% sample. (3 1-day counts.). Burned at <600°C to avoid thermal decomposition of carbonate.

8800 ± 80

Lu-2131. Vätlingmyr, 133 to 138cm $\delta^{13}C = -25.0‰$

Pinus cones. Increase of *Ulmus* before immigration of *Alnus*. *Comment*: pretreated with HCl and NaOH.

8620 ± 70

Lu-2132. Vätlingmyr, 123 to 128cm $\delta^{13}C = -25.5‰$

Pinus cones. Just before immigration of *Alnus*. *Comment*: pretreated with HCl and NaOH. (3 1-day counts.)

General Comment: dates useful for chronology correlation using pollen stratigraphy in calcareous sediments unsuitable for ^{14}C dating.

Subfossil marine shell series

11,030 ± 100

Lu-2157. Flåghultsåsen $\delta^{13}C = +2.1‰$

Shells (*Mya truncata* and *Balanus porcatus*) from marine clay underlain by glaciofluvial material at S side of hill ridge Flåghultsåsen, N Bohuslän (58° 58.5′ N, 11° 25′ E). Coll 1982 and subm by Å Hillefors, Dept Phys Geog, Univ Göteborg. Dated as part of study of deglaciation chronology in area. *Comment*: outer 61% removed by acid leaching.

12,690 ± 110

Lu-2158. Svedaskogen 1982 $\delta^{13}C = -0.2‰$

Shells (small *Balanus* sp) from glacial-tectonized marine sediment overlain by wave-washed sand and gravel at Svedaskogen, Halland (57° 29′ N, 12° 11′ E). Alt 68m. Coll 1982 and subm by Å Hillefors. Dated as part of study of deglaciation of area. Site described by submitter (Hillefors, 1979, p 159 & fig 7, p 161). For other dates from Svedaskogen, see R, 1976, v 18, p 296; 1979, v 21, p 393. *Comment*: outer 46% removed by acid leaching.

General Comment: corrections for deviations from $\delta^{13}C = -25‰$ PDB are applied also for shell samples. No corrections are made for apparent age of shells of living marine organisms due to reservoir effect. Revised values of reservoir age for different areas pub by Håkansson (1983b, table 3, p 67).

Toppeladugård series

Sediment from ancient lake 0.7km NNE of Toppeladugård, S Scania (55° 36′ N, 13° 22.2′ E). Coll 1982 by S Björck, B Liedberg-Jönsson, and G Lemdahl; subm by B Liedberg-Jönsson, Dept Quaternary Geol, Univ Lund. Dated as part of joint palaeoecol study of Late Weichselian sediments from SW Sweden. Depths given are below present surface.

Lu-2182. Toppeladugård 1 **11,150 ± 100**
$\delta^{13}C = -27.2‰$

Carbonate-rich sand with <1.5% organic carbon, 2.38 to 2.43m, underlain by sand and overlain by slightly organic clay. *Comment*: carbonate removed completely by treatment with HCl before burning.

Lu-2183. Toppeladugård 2, insoluble **11,800 ± 110**
$\delta^{13}C = -27.7‰$

Insoluble organic fraction from clayey carbonate-rich algal gyttja, 2.105 to 2.155m, underlain and overlain by clay gyttja. Pollen analysis indicates Allerød Chronozone. *Comment*: sample pretreated with HCl and NaOH.

Lu-2183A. Toppeladugård 2, soluble **11,410 ± 100**
$\delta^{13}C = -27.7‰$

Acid-precipitated part of NaOH-soluble fraction from Lu-2183.

Atteköps mosse series

Limnetic brown-mosses and small amounts of terrestrial organic matter washed from sediment from Atteköps mosse, 4km NE of Grevie, NW Scania (56° 23′ N, 12° 51′ E). Coll 1982 and subm by B Liedberg-Jönsson. Dated as part of same study as Toppeladugård series, above. Depths given are below present surface. Samples pretreated with HCl.

Lu-2207. Atteköps mosse 2, 6.73 to 6.78m **12,980 ± 140**
$\delta^{13}C = -29.6‰$

Comment: sample undersized; diluted; 80% sample.

Lu-2208. Atteköps mosse 3, 6.78 to 6.83m **13,060 ± 120**
$\delta^{13}C = -30.0‰$

Lu-2209. Atteköps mosse 4, 6.83 to 6.88m **13,070 ± 120**
$\delta^{13}C = -29.6‰$

Nissunvagge series (II)

Organic matter from plant horizon buried by debris flow lobe from W slope of Nissuntjårro Mt, Nissunvagge valley (68° 16′ N, 18° 53′ E),

Abisko area, N Sweden. Coll 1982 and subm by R Nyberg, Dept Phys Geog, Univ Lund. Dated as complement to Nissunvagge series (R, 1982, v 24, p 197). Depths given refer to present surface.

310 ± 45

Lu-2161. Nissunvagge 1982:1, insoluble $\delta^{13}C = -26.2‰$

Insoluble organic fraction, depth 130cm, 175cm from lobe front. *Comment*: pretreated with HCl and NaOH.

320 ± 45

Lu-2161A. Nissunvagge 1982:1, soluble *Est* $\delta^{13}C = -26.1‰$

Acid-precipitated part of NaOH-soluble fraction from Lu-2161. *Comment*: no $\delta^{13}C$ measurement. $\delta^{13}C$ value estimated from values for Lu-2161 and -2162.

600 ± 45

Lu-2162. Nissunvagge 1982:2 $\delta^{13}C = -25.9‰$

Total organic fraction, depth 75cm, 160cm from lobe front.

Rakaslako series

Peat from mire with permafrost mounds (*sw* palsmyr) at Rakaslako, 5km W of Björkliden, N Sweden (68° 26′ N, 18° 34′ E). Coll 1982 and subm by B Malmström and J Åkerman, Dept Phys Geog, Univ Lund. Pretreated with HCl and NaOH.

8040 ± 80

Lu-2216. Rakaslako 1, insoluble $\delta^{13}C = -24.0‰$

Insoluble fraction of peat from 45cm below present surface in presumed fossil solifluction lobe.

7030 ± 90

Lu-2216A. Rakaslako 1, soluble $\delta^{13}C = -26.3‰$

Acid-precipitated part of NaOH-soluble fraction from Lu-2216. *Comment*: sample undersized; diluted; 69% sample.

2670 ± 50

Lu-2217. Rakaslako 2, insoluble $\delta^{13}C = -25.2‰$

Insoluble fraction of peat from 60cm below present surface, just above 2nd uppermost ice lens in permafrost mound (*sw* pals).

2210 ± 50

Lu-2217A. Rakaslako 2, soluble $\delta^{13}C = -27.1‰$

Acid-precipitated part of NaOH-soluble fraction from Lu-2217.

7360 ± 70

Lu-2211. Ängelholm $\delta^{13}C = -25.1‰$

Wood from ca 15 of outermost remaining annual rings of oak trunk with ca 300 annual rings from deposits of Rönneå R, town of Ängelholm, NW Scania (56° 14.7′ N, 12° 52.1′ E). Coll 1982 in connection with construction work for bridge; subm by E Lehmann, Cultural Council, Ängelholm. Pretreated with HCl and NaOH.

Norway

4570 ± 60

Lu-2206. Kåsi, Mysuseter, 1983 $\delta^{13}C = -25.6‰$

Wood from firmly rooted large pine stump from bottom of unintentionally drained small lake near Kåsi Mt, ca 1km N of Mysuseter, Rondane (61° 49′ N, 9° 40′ E). Alt ca 1000m. Coll 1983 and subm by A Lima-De-Faria, Dept Molecular Cytogenetics, Univ Lund. Other wood sample from same site dated at 4890 ± 65 BP (Lu-995, R, 1980, v 22, p 1051). Pretreated with HCl and NaOH.

Iceland

1600 ± 50

Lu-2101. Önundafjördur $\delta^{13}C = -27.7‰$

Wood (*Betula* sp) pieces from thin wood layer, 1m below present surface and 0.5m below present sea level at Vadall, Önundafjördur, NW Iceland (66° 05′ N, 23° 20′ W). Wood layer underlain by marine sand containing walrus remains and overlain by marine sand containing ill-preserved shell fragments. Coll 1981 and subm by L A Símonarson, Sci Inst, Univ Iceland, Reykjavík. Pretreated with HCl and NaOH.

Icelandic Subfossil Marine Shell Series II

Marine bivalve shells from SW Iceland. Coll 1980 and 1982 and subm by O Ingolfsson, Dept Quaternary Geol, Univ Lund. Dated as part of study of Late Weichselian glacial stratigraphy and chronology of lower part of Borgarfjördur region. For other shell dates from area, see R, 1983, v 25, p 882.

12,830 ± 110

Lu-2193. Melabakkar-Melaleiti 1 $\delta^{13}C = +1.8‰$

One shell valve (*Chlamys islandica*) from glacial-marine silt; ca +2m at Melabakkar, N of Akranes (64° 25′ N, 22° 02′ W). Silt probably overridden by last ice advance in area. *Comment*: outer 36% of shell removed by acid leaching.

12,460 ± 120

Lu-2192. Melabakkar-Melaleiti 2 $\delta^{13}C = +1.4‰$

Large shell fragments (*Chlamys islandica* and *Mya truncata*) from glacial-marine silt; ca +3.5m. Same site as Lu-2193, above. *Comment*: outer 15% removed by acid leaching. Sample undersized; diluted; 91% sample.

12,830 ± 110

Lu-2194. Grjóteyri $\delta^{13}C = +0.6‰$

Shell fragments (*Hiatella arctica, Mya truncata,* and *Macoma calcarea*) from glacial-marine drift, alt ca 20m, at Grjoteyri, E of Borgarnes (64° 32′ N, 21° 50′ W). Drift overridden by last ice advance in area (*cf* Ashwell, 1975). *Comment*: outer 18% removed by acid leaching.

12,870 ± 110

Lu-2195. 'Asbakkar $\delta^{13}C = +1.6‰$

Two shell valve parts (*Chlamys islandica*) from glacial-marine silt,

overlain by basal till; ca +2m at 'Asbakkar, N of Akranes (64° 24′ N, 22° 02′ W). *Comment*: outer 39% removed by acid leaching.

11,980 ± 130

Lu-2196. 'Asbakkar-'Asgil $\delta^{13}C = +1.1‰$

Shell fragments (*Mya truncata* and *Chlamys islandica*) from glacial-marine silt; ca +3m at 'Asbakkar, N of Akranes (64° 24′ N, 22° 02′ W). Silt underlain and overlain by basal till. Shell fragments not *in situ*. *Comment*: outer 11% removed by acid leaching. Sample undersized; diluted; 74% sample.

10,370 ± 90

Lu-2197. Skipanes $\delta^{13}C = +1.1‰$

Two shell valves (*Chlamys islandica*) found *in situ* in littoral sand; ca +4m at Skipanes, Melasveit, N of Akranes (64° 24′ N, 21° 54′ W). Sand probably deposited in connection with Holocene marine transgression in area. *Comment*: outer 17% removed by acid leaching.

General Comment: corrections for deviations from $\delta^{13}C = -25‰$ PDB are applied. No corrections are made for reservoir age of living marine mollusks. Reservoir age for coastal waters of Iceland pub by Håkansson (1983b) based on Icelandic recent marine shell series (R, 1983, v 25, p 881).

Spitsbergen

Bohemanflya series

Marine bivalve shells from Bohemanflya, Isfjorden, W Spitsbergen. Coll 1982 by C Hjort and E Lagerlund in connection with reconnaissance for study of shoreline displacement and till stratigraphy in area; subm by C Hjort, Dept Quaternary Geol, Univ Lund.

9440 ± 80

Lu-2136. Bohemanflya 1 $\delta^{13}C = +1.4‰$

Shell fragments (*Mya truncata*) from till at Bohemanflya (78° 28′ N, 14° 25′ E). *Comment*: outer 30% of shells removed by acid leaching.

8130 ± 80

Lu-2137. Bohemanflya 2 $\delta^{13}C = +0.4‰$

Shell fragments (*Mytilus edulis*) from beach gravel; ca +10m; between 2 distinct beach cuts at Bohemanflya (78° 26′ N, 14° 35′ E). *Comment*: outer 44% removed by acid leaching.

9630 ± 90

Lu-2138. Bohemanflya 3 $\delta^{13}C = +1.3‰$

Shells (*Mya truncata*) from silt, alt 18 to 20m, above uppermost distinct beach cut at Bohemanflya (78° 26′ N, 14° 34′ E). *Comment*: outer 50% removed by acid leaching.

4620 ± 60

Lu-2139. Bohemanflya 4 $\delta^{13}C = +1.3‰$

Shells (*Hiatella arctica*) from push-moraine at Bohemanflya (78° 28′ N, 14° 32′ E). *Comment*: outer 22% removed by acid leaching.

General Comment: corrections for deviations from $\delta^{13}C = -25‰$ PDB are applied. No corrections are made for reservoir age of living marine mollusks. Revised reservoir age for coastal waters of Spitsbergen pub by Olsson (1980, fig 6, p 673).

Northern Ireland

Sandelford series

Estuarine mud from E bank of R Bann 100m S of Sandelford Bridge, Coleraine, N Ireland (55° 07′ 30″ N, 6° 40′ 10″ W). Coll 1980 and subm by R W Battarbee, Palaeoecol Lab, Univ College London. Dated as part of study of sea-level change in area.

Lu-2127. Sandelford 1 **7440 ± 70**
$\delta^{13}C = -25.9‰$

Mud from 507 to 517cm below ground. Core SF VII.

Lu-2128. Sandelford 2 **6980 ± 70**
$\delta^{13}C = -22.8‰$

Mud from 467 to 477cm below ground. Core SF VII.

Lu-2129. Sandelford 3 **6430 ± 70**
$\delta^{13}C = -27.2‰$

Mud from 145 to 150cm below ground. From monolith tin (SF M).

Lu-2130. Sandelford 4 **6120 ± 70**
$\delta^{13}C = -25.9‰$

Mud from 105 to 110cm below ground. From monolith tin (SF M).

Czechoslovakia

Vernérovice series (II)

Peat from mire 0.5km S of village Vernéřovice near Broumov, N Czechoslovakia (50° 06′ N, 16° 15′ E). Alt ca 400m. Coll 1973 by M Peichlová, E Rybníčková, and K Rybníček; subm by M Peichlová, Dept Ecol Bot, Czechoslovak Acad Sci, Brno. Dated as complement to Vernéřovice series (R, 1982, v 24, p 202). Pollen zones according to Firbas (1949). Pretreated with HCl.

Lu-2199. Vernérovice BV-2-A, 32cm **2180 ± 50**
$\delta^{13}C = -28.3‰$

Highly humified peat with small wood fragments and other coarse plant remains. Depth 32cm. Boundary Sub-boreal/Sub-atlantic.

Lu-2200. Vernérovice BV-2-A, 45cm **3040 ± 50**
$\delta^{13}C = -25.7‰$

Slightly humified peat. Depth 45cm. Beginning of Sub-boreal with 1st traces of human activity.

Bulgaria

Tschokljovo Marsh Series II

Clay and peat from Tschokljovo marsh, W Bulgaria (42° 22′ N, 22° 50′ E). Alt 870m. Coll 1980 and 1982 and subm by E Bozilova, Biol Fac,

Univ Sofia. Dated as complement to Tschokljovo Marsh Series I (R, 1983, v 25, p 883-884). Lu-2169 pretreated with HCl. All other samples too small for pretreatment and, therefore, burned at <600°C to avoid thermal decomposition of carbonate. No $\delta^{13}C$ measurements available for this series. Estimated $\delta^{13}C$ value is based on previous measurements on 8 samples from same site. Standard deviation for dates increased accordingly.

8000 ± 110

Lu-2167. Tschokljovo I, 437 to 442cm *Est* $\delta^{13}C = -25.5‰$

Clay with ca 4.5% organic carbon. Depth 437 to 442cm. *Comment*: sample undersized; diluted; 62% sample.

4760 ± 80

Lu-2168. Tschokljovo I, 353 to 358cm *Est* $\delta^{13}C = -25.5‰$

Highly humified *Phragmites* and *Carex* peat. Depth 353 to 358cm. *Comment*: sample undersized; diluted; 67% sample.

1250 ± 50

Lu-2169. Tschokljovo 1982, 90 to 105cm *Est* $\delta^{13}C = -25.5‰$

Moderately humified peat with coarse plant material. Depth 90 to 105cm.

8520 ± 170

Lu-2170. Tschokljovo III, 360 to 365cm *Est* $\delta^{13}C = -25.5‰$

Clay with ca 1.5% organic carbon. Depth 360 to 365cm. *Comment*: sample undersized; diluted; 22% sample. (3 1-day counts.)

Jamaica

Black River Morass Series II

Peat from coastal wetland at Black R, S Jamaica (18° 05′ N, 77° 50′ W). Coll 1982 and 1983 (Lu-2201) and subm by G Digerfeldt, Dept Quaternary Geol, Univ Lund. Dating is part of study of development of coastal wetland and eustatic sea-level changes in area. For other dates from Black R Morass, see R, 1982, v 24, p 203. Depths given are below surface. All samples pretreated with HCl.

6500 ± 70

Lu-2072. Black R Morass B 1, 695 to 705cm $\delta^{13}C = -26.5‰$

Swamp forest peat, highly humified.

6120 ± 70

Lu-2096. Black R Morass B 1, 640 to 650cm $\delta^{13}C = -27.2‰$

Sedge peat, highly humified.

4760 ± 60

Lu-2095. Black R Morass B 1, 440 to 450cm $\delta^{13}C = -26.5‰$

Sedge peat, moderately humified.

3310 ± 50

Lu-2094. Black R Morass B 1, 240 to 250cm $\delta^{13}C = -26.7‰$

Sedge peat, highly humified.

Lu-2093. Black R Morass B 1, 140 to 150cm **2160 ± 50**
$\delta^{13}C = -27.3‰$
Mangrove peat, highly humified.

Lu-2077. Black R Morass B 2, 260 to 270cm **4140 ± 60**
$\delta^{13}C = -28.5‰$
Swamp forest peat, highly humified.

Lu-2189. Black R Morass B 2, 140 to 150cm **2020 ± 50**
$\delta^{13}C = -28.5‰$
Swamp forest peat, highly humified.

Lu-2069. Black R Morass B 3, 175 to 185cm **3590 ± 60**
$\delta^{13}C = -26.8‰$
Swamp forest peat, highly humified.

Lu-2070. Black R Morass B 4, 300 to 310cm **5470 ± 60**
$\delta^{13}C = -29.0‰$
Swamp forest peat, highly humified.

Lu-2092. Black R Morass B 4, 240 to 250cm **4470 ± 60**
$\delta^{13}C = -28.5‰$
Sedge peat, highly humified.

Lu-2091. Black R Morass B 4, 80 to 90cm **1240 ± 45**
$\delta^{13}C = -25.8‰$
Sedge peat, highly humified.

Lu-2076. Black R Morass B 5, 460 to 470cm **6080 ± 70**
$\delta^{13}C = -27.2‰$
Sedge peat, moderately humified.

Lu-2188. Black R Morass B 5, 340 to 350cm **4940 ± 60**
$\delta^{13}C = -26.4‰$
Sedge peat, highly humified.

Lu-2187. Black R Morass B 5, 140 to 150cm **2720 ± 50**
$\delta^{13}C = -27.1‰$
Sedge peat, highly humified.

Lu-2071. Black R Morass B 6, 190 to 200cm **4410 ± 60**
$\delta^{13}C = -42.3‰$
Sedge peat, highly humified.

Lu-2074. Black R Morass B 7, 670 to 680cm **6470 ± 70**
$\delta^{13}C = -29.6‰$
Mangrove peat, highly humified.

Lu-2099. Black R Morass B 7, 540 to 550cm **5490 ± 70**
$\delta^{13}C = -27.7‰$
Mangrove peat, highly humified.

Lu-2098. Black R Morass B 7, 340 to 350cm **3700 ± 60**
$\delta^{13}C = -27.6‰$
Mangrove peat, highly humified.

Lu-2097. Black R Morass B 7, 140 to 150cm **2100 ± 50**
$\delta^{13}C = -26.9‰$
Mangrove peat, moderately humified.

Lu-2075. Black R Morass B 8, 506 to 516cm — **6030 ± 70**; $\delta^{13}C = -28.2‰$
Sedge peat, highly humified.

Lu-2186. Black R Morass B 8, 440 to 450cm — **5680 ± 70**; $\delta^{13}C = -28.3‰$
Mangrove peat, moderately humified.

Lu-2185. Black R Morass B 8, 240 to 250cm — **4180 ± 60**; $\delta^{13}C = -27.2‰$
Mangrove peat, moderately humified.

Lu-2184. Black R Morass B 8, 140 to 150cm — **3240 ± 60**; $\delta^{13}C = -26.8‰$
Mangrove peat, moderately humified.

Lu-2078. Black R Morass B 9, 230 to 240cm — **3890 ± 60**; $\delta^{13}C = -23.2‰$
Mangrove peat, highly humified.

Lu-2191. Black R Morass B 9, 140 to 150cm — **2680 ± 50**; $\delta^{13}C = -27.3‰$
Mangrove peat, moderately humified.

Lu-2073. Black R Morass B 10, 700 to 710cm — **5950 ± 70**; $\delta^{13}C = -27.6‰$
Mangrove peat, highly humified.

Lu-2082. Black R Morass B 10, 640 to 650cm — **5760 ± 60**; $\delta^{13}C = -26.3‰$
Mangrove peat, moderately humified.

Lu-2081. Black R Morass B 10, 440 to 450cm — **4500 ± 60**; $\delta^{13}C = -21.5‰$
Sedge peat, highly humified.

Lu-2080. Black R Morass B 10, 240 to 250cm — **2700 ± 50**; $\delta^{13}C = -26.0‰$
Sedge peat, highly humified.

Lu-2079. Black R Morass B 10, 140 to 150cm — **1510 ± 45**; $\delta^{13}C = -27.8‰$
Mangrove peat, highly humified.

Lu-2089. Black R Morass B 11, 640 to 650cm — **6220 ± 70**; $\delta^{13}C = -28.7‰$
Sedge peat, highly humified.

Lu-2090. Black R Morass B 14, 610 to 620cm — **6320 ± 70**; $\delta^{13}C = -28.6‰$
Sedge peat, highly humified.

Lu-2088. Black R Lower Morass at Luana — **480 ± 45**; $\delta^{13}C = -27.9‰$
Sedge peat, 130 to 140cm, highly humified.

Lu-2086. Black R Upper Morass 2 — **3000 ± 50**; $\delta^{13}C = -29.1‰$
Sedge peat, 160 to 170cm, highly humified.

1470 ± 45

Lu-2201. Black R Upper Morass 2 $\delta^{13}C = -28.1‰$

Sedge peat, 60 to 70cm, highly humified.

1180 ± 45

Lu-2087. Black R Upper Morass 4 $\delta^{13}C = -26.4‰$

Sedge peat, 110 to 120cm, moderately humified.

Negril Morass Series III

Peat from coastal wetland at Negril, W Jamaica (18° 20′ N, 78° 20′ W). Coll 1982 and subm by G Digerfeldt. Dating is part of same study as Black River Morass Series II, above. For other dates from Negril Morass, see R, 1982, v 24, p 203-204; 1983, v 25, p 884-886. Depths given are below surface. All samples pretreated with HCl.

7720 ± 80

Lu-2083. Negril Morass N 9, 1370 to 1380cm $\delta^{13}C = -26.0‰$

Sedge peat, highly humified.

3560 ± 60

Lu-2084. Negril Morass, at E canal $\delta^{13}C = -28.5‰$

Swamp forest peat, highly humified, 140 to 150cm.

7880 ± 80

Lu-2085. Negril Morass $\delta^{13}C = -28.5‰$

Sedge peat, highly humified, 1185 to 1195cm, 175m E of Crystal Water.

ARCHAEOLOGIC SAMPLES

Sweden

Kyrkudden series

Charcoal and wood from excavation of medieval site at Kyrkudden, Hietaniemi parish, Norrbotten (66° 13′ N, 23° 43′ E). Coll 1978 to 1980 and subm by T Wallerström, Norrbottens Mus, Luleå. Dated as complement to unpub series dated by Lab for Isotope Geol, Stockholm.

440 ± 40

Lu-2058. Kyrkudden, F1856 $\delta^{13}C = -25.5‰$

Small pieces of wood (No. IV) from frame belonging to Carelian grave construction. *Comments*: mild pretreatment with HCl and NaOH. (3 1-day counts.) (TW): wood from same frame dated at 320 ± 110 BP (St-7762).

50 ± 45

Lu-2059. Kyrkudden, F2340 $\mathbf{D^{14}C^{*} = -6.0 \pm 5.1‰}$

$\delta^{13}C = -25.0‰$

Small pieces of wood from log in cultural layer. Log supposed to be part of nearby rampart construction. *Comments*: normal pretreatment with HCl and NaOH. (TW): sample obviously not from rampart construction. * $D^{14}C$ according to Stuiver and Polach (1977, p 357).

560 ± 45

Lu-2060. Kyrkudden, F2879 $\delta^{13}C = -24.3‰$

Charcoal from wall of burned building. Coordinates 987.71: 341.95. *Comment*: mild pretreatment with HCl and NaOH.

620 ± 45

Lu-2061. Kyrkudden, F3119 $\delta^{13}C = -24.4‰$

Charcoal from burned vegetation layer below clay floor. *Comments*: normal pretreatment with HCl and NaOH. (TW): other dates from same layer are: 610 ± 80 BP (St-7974), 665 ± 155 BP (St-7763), and 640 ± 90 BP (St-8097).

320 ± 45

Lu-2062. Kyrkudden, F2181 $\delta^{13}C = -24.8‰$

Charcoal from cultural layer close to defense rampart; coordinates 991.27:315.60. Sample supposedly derives from and dates superstructure of rampart. *Comment*: mild pretreatment with NaOH and HCl.

630 ± 45

Lu-2063. Kyrkudden, F2719 $\delta^{13}C = -25.4‰$

Charcoal from cultural layer in burned house; coordinates 984.75: 339.78. Sample supposedly comes from house walls or posts. *Comment*: mild pretreatment with NaOH and HCl.

410 ± 45

Lu-2064. Kyrkudden, F2891 $\delta^{13}C = -25.1‰$

Charcoal from wall of same building as Lu-2060 and -2063, above, derive from; coordinates 983.62:341.05. *Comment*: mild pretreatment with NaOH and HCl.

320 ± 45

Lu-2066. Västra Kikkejaure $\delta^{13}C = -25.2‰$

Wood from keel of sewn boat (Hallström, 1909) found after storm on shore of W Kikkejaure, Lappland (65° 40′ N, 19° 05′ E). Coll 1972 by H Wigenstam; subm by S Jansson, Skellefteå Mus, Skellefteå. *Comment*: pretreated with HCl and NaOH. 320 ± 45 BP corresponds approx to AD 1485 to AD 1640 according to calibration graphs by Stuiver (1982, p 8-9).

Skateholm Series III

Charcoal, wood, and human bone from settlement area (Early Ertebølle culture) with 2 settlements (Skateholm I and II) combined with grave fields at Skateholm, Tullstorp parish, S Scania (55° 23′ 10″ N, 13° 29′ E). Coll 1932 and 1982 by L Larsson, H Göransson (Lu-2110), and F Hansen (Lu-2156); subm by L Larsson, Inst Archaeol, Univ Lund. Preliminary excavation repts pub by submitter (Larsson, 1980; 1981; 1982). For other dates from area, see R, 1982, v 24, p 205-206; 1983, v 25, p 887. Bone collagen extracted as described previously (R, 1976, v 18, p 290), Lu-2109 with NaOH treatment and Lu-2156 without.

6270 ± 70

Lu-2109. Skateholm, Grave 37 $\delta^{13}C = -16.8‰$

Collagen from femur of human female from Grave 37 (Larsson, 1982,

p 22). *Comment*: organic carbon content: 2.5%. Sample undersized; diluted; 68% sample. (3 1-day counts.)

7030 ± 70

Lu-2110. Skateholm I, *Alnus* $\delta^{13}C = -28.7‰$

Wood from *Alnus* stem (id by T Bartholin) from level 230 to 244 in trench for pollen sampling. *Comment*: pretreated with HCl and NaOH.

6430 ± 70

Lu-2111. Skateholm, PII:1 $\delta^{13}C = -27.1‰$

Wood (*Alnus* sp) id by T Bartholin and unid. bark from sampling Point II. *Comment*: wood pretreated with HCl and NaOH; bark only pretreated with HCl.

6370 ± 70

Lu-2112. Skateholm, PII:2 $\delta^{13}C = -27.6‰$

Wood (*Corylus avellana*) id by T Bartholin from sampling Point II. *Comment*: no pretreatment; sample undersized; diluted; 78% sample. (3 1-day counts.)

6590 ± 70

Lu-2113. Skateholm II, x=200, y=221 $\delta^{13}C = -25.7‰$

Charcoal from cultural layer; x=200, y=221. *Comment*: pretreated with HCl and NaOH.

6910 ± 70

Lu-2114. Skateholm II, x=200, y=225 $\delta^{13}C = -26.5‰$

Charcoal from cultural layer; x=200, y=225, level 70 to 80cm. *Comment*: pretreated with HCl and NaOH.

6380 ± 70

Lu-2115. Skateholm II, x=200, y=220 $\delta^{13}C = -25.7‰$

Charcoal from cultural layer; x=200, y=220, level 35 to 50cm. *Comment*: pretreated with HCl and NaOH.

5990 ± 70

Lu-2116. Skateholm I, Grave 26 $\delta^{13}C = -25.5‰$

Charcoal (*Fraxinus, Corylus avellana,* & *Alnus* sp) id by T Bartholin from Grave 26 (Larsson, 1982, p 17). *Comment*: mild pretreatment with NaOH and HCl.

5850 ± 90

Lu-2156. Skateholm 1932 $\delta^{13}C = -18.6‰$

Collagen from human femur and tibia, id by O Persson, from grave structure. *Comment*: organic carbon content: 1.2%. Sample undersized; diluted; 43% sample.

1280 ± 70

Lu-2135. Transval, Åhus $\delta^{13}C = -19.3‰$

Collagen from human tibia from top of gravel pit wall at Transval, Åhus parish, E Scania (55° 55′ N, 14° 17′ E). Coll 1974; subm by J Callmer, Inst Archaeol, Univ Lund. *Comment*: collagen extracted as described previously (R, 1976, v 18, p 290) without NaOH treatment. Organic carbon content: 3.3%. Sample undersized; diluted; 48% sample.

Nymölla series (II)

Charcoal from coastal settlement areas (Middle Neolithic—Pitted Ware culture) at Nymölla 12^{35} and 12^{38}, Gualöv parish, NE Scania (56° 02′ N, 14° 28′ E). Coll 1981 and 1982 by B Wyszomirska and B Helgesson; subm by B Wyszomirska, Inst Archaeol, Univ Lund. Dated as complement to Nymölla series (R, 1982, v 24, p 210). No $\delta^{13}C$ measurements available for this series. Standard deviation for dates increased accordingly.

2400 ± 70

Lu-2140. Nymölla 12^{35}, Sq z17 *Est* $\delta^{13}C = -25.0‰$

Charcoal from Hearth No. 2, Sq z17, x=16.6, y=17.14, ca +3.6m. Assoc with flint implements and potsherds indicating Pitted Ware culture. *Comment*: mild pretreatment with NaOH and HCl. Sample undersized; diluted; 84% sample. Date much too late for assoc artifacts indicating re-use of site.

3880 ± 110

Lu-2141. Nymölla 12^{38}, Sq j10 *Est* $\delta^{13}C = -25.0‰$

Charcoal from occupation layer, Sq j10, x=9.5, y=9.5, ca +7.1m. Assoc with fragments of ground flint axes and potsherds indicating Pitted Ware culture. *Comment*: no pretreatment; sample undersized; diluted; 31% sample. (3 1-day counts.)

3800 ± 70

Lu-2142. Nymölla 12^{38}, Sq k10 *Est* $\delta^{13}C = -25.0‰$

Charcoal from occupation layer, Sq k10, x=10.5, y=9.5, ca +7.3m. Assoc with flint implements and Pitted Ware potsherds. *Comment*: mild pretreatment with NaOH and HCl. Sample undersized; diluted; 87% sample.

4170 ± 70

Lu-2143. Nymölla 12^{38}, Sq L10 *Est* $\delta^{13}C = -25.0‰$

Charcoal from occupation layer, Sq L10, x=11.5, y=9.5, ca +7.3m. Assoc with iron ocher, fragment of ground axe, flint implements, and potsherds. *Comment*: normal pretreatment with HCl and NaOH.

4470 ± 70

Lu-2144. Nymölla 12^{38}, Sq m10 *Est* $\delta^{13}C = -25.0‰$

Charcoal from occupation layer, Sq m10, x=12.5, y=9.5, ca +7.3m. Assoc with Middle Neolithic potsherds and flint implements. *Comment*: normal pretreatment with HCl and NaOH.

5390 ± 110

Lu-2198. Stenbocksvallar, Barsebäck $\delta^{13}C = -26.3‰$

Charcoal (*Corylus* & *Quercus*) id by T Bartholin from cultural layer (Ertebølle culture) at coastal site Stenbocksvallar, Barsebäck 38:3, Barsebäck parish, W Scania (55° 46′ N, 12° 55′ E). x=490, y=196, Layer 3. Coll 1982 and subm by K Jennbert-Spång, Inst Archaeol, Univ Lund. Assoc with pottery and flint waste. *Comment*: pretreated with HCl. Sample undersized; diluted; 33% sample. (3 1-day counts.)

Fosie Series I

Charcoal from settlement area with traces (*eg*, posthole marks) of houses from Stone, Bronze, and Iron ages (Björhem & Säfvestad, 1983) at Fosie, Lockarp parish, S Scania (55° 33′ N, 13° 03′ to 13° 04′ E). Coll 1979 and 1981 and subm by U Säfvestad, Inst Archaeol, Univ Lund. Excavation of area necessitated by exploitation of farmland for industry. Lu-2205 only pretreated with HCl; all other samples pretreated with HCl and NaOH.

Lu-2202. Fosie IV, Settlement I **7480 ± 70** $\delta^{13}C = -24.0‰$

Charcoal from post holes and storage pit, Settlement I, Structures 193 (Sq C, Level I), 259, and 262 (Coordinate 200). Assoc with animal bones, flint, and pottery, indicating Late Bronze age. *Comment* (US): date earlier than expected from assoc material.

Lu-2203. Fosie IV, Settlement I, House II **1640 ± 50** $\delta^{13}C = -26.0‰$

Charcoal from hearth in W part of House II, Settlement I. Assoc with pottery indicating Late Iron age. *Comment* (US): date somewhat earlier than expected.

Lu-2204. Fosie IV, Settlement IV, Sample 1 **1630 ± 50** $\delta^{13}C = -25.8‰$

Charcoal from post holes, Settlement IV, House XLII (Iron age). *Comment* (US): date ca 400 yr earlier than expected, but acceptable, since datable finds are scarce on this site.

Lu-2205. Fosie IV, Settlement IV, Sample 2 **1660 ± 50** $\delta^{13}C = -25.4‰$

Charcoal from post holes, Settlement IV, Houses LVI and LXII (Iron age). *Comment*: sample undersized; diluted; 91% sample.

Lu-2102. Ängdala 1981:MHM 6434 **4560 ± 70** $\delta^{13}C = -25.9‰$

Charcoal from hearth-pit in area with Neolithic flint mines at Ängdala, S Sallerup parish, S Scania (55° 35′ 20″ N, 13° 07′ 20″ E). Coll 1981 by E Rudebäck; subm by M Larsson. *Comment*: no pretreatment; sample undersized; diluted; 36% sample. (4 1-day counts.)

Lu-2212. Ängdala 1983 **4960 ± 70** $\delta^{13}C = -27.8‰$

Wood from flint mine (No. 25, Area C) in Senonian chalk at Ängdala, S Sallerup parish, S Scania (55° 35′ 20″ N, 13° 07′ 20″ E). Coll 1983 and subm by E Rudebäck, Malmö Mus. Assoc with bone and worked flint indicating Early Neolithic culture. For other dates from area, see R, 1980, v 22, p 1058; 1981, v 23, p 398, and Lu-2102, above. *Comment*: no pretreatment; sample undersized; diluted; 83% sample.

Fotevik Series II

Wood and fibrous calking material from pole and boat wreck assoc with Late Viking age stone blocking in entrance to bay Foteviken, SW

Scania (55° 28′ N, 12° 56′ E). Coll 1982 by Malmö Sjöfartsmuseum; subm by C Ingelman-Sundberg and P Söderhielm, Malmö Sjöfartsmus, Malmö. Preliminary repts pub by Ingelman-Sundberg and Söderhielm (1982) and Hårdh (1983). Dated as complement to Fotevik Series I (R, 1983, v 25, p 888).

Lu-2213. Fotevik, F82.V1.27 **1030 ± 45** $\delta^{13}C = -24.0‰$

Fibrous calking material from Board 2B, boat Wreck 1 (Ingelman-Sundberg & Söderhielm, 1982, p 5-14). *Comment*: sample charred in nitrogen atmosphere before burning.

Lu-2214. Fotevik, F82.V3.5 **950 ± 60** $\delta^{13}C = -27.4‰$

Wooden peg with wedge from boat rib, Wreck 3 (Ingelman-Sundberg & Söderhielm, 1982, p 18). *Comment*: no pretreatment; sample undersized; diluted; 70% sample.

Lu-2215. Fotevik, F82.s.54 **950 ± 45** $\delta^{13}C = -28.6‰$

Wood from Pole ARÖ near Wreck 2, N part of stone blocking (Ingelman-Sundberg & Söderhielm, 1982, p 16, fig 11). *Comment*: pretreated with HCl and NaOH.

Lu-2218. DRACO, Lund **2020 ± 60** $\delta^{13}C = -26.3‰$

Charcoal from hearth (Structure 7, Layer 1) excavated in rescue operation at DRACO industrial area, NE part of Lund, S Scania (55° 42′ 35″ N, 13° 13′ 15″ E). Coll 1983 and subm by B Bondesson, Mus Cultural Hist, Lund. Assoc with pottery indicating Bronze or Iron age. *Comment*: pretreated with HCl. Sample undersized; diluted; 68% sample.

Aaland

Otterböte series

Food remains from potsherds from Bronze age settlement at Otterböte, Kökar I., Aaland (59° 56′ N, 20° 52′ E). Coll 1950 during study of settlement by C F Meinander, M Dreijer, and B Schönbäck; subm by B Hulthén, Lab for ceramic and clay mineralogy, Dept Quaternary Geol, Univ Lund. Pottery indicates Late Bronze or Early Iron age. Mild pretreatment with NaOH and HCl.

Lu-2159. Otterböte, 200:218 **2790 ± 50** $\delta^{13}C = -27.6‰$

Food remains from potsherd No. 200:218.

Lu-2160. Otterböte, 200:153 **2850 ± 50** $\delta^{13}C = -27.2‰$

Food remains from potsherd No. 200:153.

Denmark

Jonstrupvang series

Collagen from mixture of animal bone fragments and teeth underlying layer of hand-sized granite chips in megalithic construction "Ting-

stedet" (Laumann Jörgensen, 1980, p 25-27) at Jonstrupvang (Afd 69), NW of Copenhagen (55° 46′ N, 12° 13.5′ E). Coll 1980 and subm by E Laumann Jörgensen, Vaerlöse Mus, Vaerlöse. Bone sample from other megalithic construction in area dated at 4500 ± 55 BP (Lu-1952, R, 1982, v 24, p 211). Collagen extracted as described previously (R, 1976, v 18, p 290) without NaOH treatment.

Lu-2017. Jonstrupvang, Sample 1 **170 ± 70**
$\delta^{13}C = -20.6‰$

Collagen from mixture of ill-preserved animal bone fragments. *Comment*: organic carbon content: 2.9% (1-day count.) No explanation for unexpectedly late date.

Lu-2163. Jonstrupvang, Sample 2 **150 ± 45**
$\delta^{13}C = -22.4‰$

Collagen from mixture of ill-preserved animal bone fragments and teeth from same collection as Lu-2017, above. Dated as check on Lu-2017 by request of submitter. *Comment*: organic carbon content: 2.8%. Sample undersized; diluted; 65% sample. (3 1-day counts.)

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