

FROM: Darden Hood, Director (mailto:<mailto:dhood@radiocarbon.com>)
(This is a copy of the letter being mailed. Invoices/receipts follow only by mail.)

February 4, 2008

Dr. Knut Stomsvik
Sor-Trondelag Fylkeskommune
Regional Utvikling
Fylkeshuset
Posttuttak N-7004 Norway

RE: Radiocarbon Dating Results For Samples 240560290001, 480450080001, 532350040001, 532350040005, 532350040008, 532350040009, 532350040015, 532350040017, 532350040020, 532350040021, 642000010001, 642000010002, 642000010003, 642000010004, 642000010005, 642000010006

Dear Dr. Stomsvik:

Enclosed are the radiocarbon dating results for 16 samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses proceeded normally. The report sheet contains the dating result, method used, material type, applied pretreatment and two-sigma calendar calibration result (where applicable) for each sample.

You will notice that Beta-239133 (642000010001) is reported with the units "pMC" rather than BP. "pMC" stands for "percent modern carbon". Results are reported in the pMC format when the analyzed material had more ^{14}C than did the modern (AD 1950) reference standard. The source of this "extra" ^{14}C in the atmosphere is thermo-nuclear bomb testing which on-set in the 1950s. Its presence generally indicates the material analyzed was part of a system that was respiring carbon after the on-set of the testing (AD 1950s). On occasion, the two sigma lower limit will extend into the time region before this "bomb-carbon" onset (i.e. less than 100 pMC). In those cases, there is some probability for 18th, 19th, or 20th century antiquity.

We analyzed these samples on a sole priority basis. No students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analyses. We analyzed them with the combined attention of our entire professional staff.

Information pages are enclosed with the mailed copy of this report. They should answer most of questions you may have. If they do not, or if you have specific questions about the analyses, please do not hesitate to contact us. Someone is always available to answer your questions.

Our invoice is enclosed. Please, forward it to the appropriate officer or send VISA charge authorization. Thank you. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,



Dr. Knut Stomsvik

Report Date: 2/4/2008

Sor-Trondelag Fylkeskommune

Material Received: 12/21/2007

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 239122 SAMPLE : 240560290001 ANALYSIS : Radiometric-Standard delivery MATERIAL/PRETREATMENT : (wood): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 50 to Cal AD 230 (Cal BP 2000 to 1720)	1960 +/- 60 BP	-26.9 o/oo	1930 +/- 60 BP
Beta - 239124 SAMPLE : 480450080001 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 640 to 780 (Cal BP 1320 to 1170)	1360 +/- 50 BP	-26.9 o/oo	1330 +/- 50 BP
Beta - 239125 SAMPLE : 532350040001 ANALYSIS : Radiometric-Standard delivery MATERIAL/PRETREATMENT : (wood): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1420 to 1660 (Cal BP 530 to 290)	350 +/- 70 BP	-23.7 o/oo	370 +/- 70 BP
Beta - 239126 SAMPLE : 532350040005 ANALYSIS : Radiometric-Standard delivery MATERIAL/PRETREATMENT : (wood): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1400 to 1490 (Cal BP 550 to 460)	430 +/- 50 BP	-23.3 o/oo	460 +/- 50 BP
Beta - 239127 SAMPLE : 532350040008 ANALYSIS : Radiometric-Standard delivery MATERIAL/PRETREATMENT : (wood): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1440 to 1650 (Cal BP 510 to 300)	340 +/- 50 BP	-22.8 o/oo	370 +/- 50 BP

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 239128 SAMPLE : 532350040009 ANALYSIS : Radiometric-Standard delivery MATERIAL/PRETREATMENT : (wood): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 920 to 750 (Cal BP 2870 to 2700) AND Cal BC 680 to 670 (Cal BP 2630 to 2620) Cal BC 610 to 600 (Cal BP 2560 to 2560)	2620 +/- 70 BP	-23.4 o/oo	2640 +/- 70 BP
Beta - 239129 SAMPLE : 532350040015 ANALYSIS : Radiometric-Standard delivery MATERIAL/PRETREATMENT : (wood): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1410 to 1650 (Cal BP 540 to 300)	350 +/- 70 BP	-20.8 o/oo	410 +/- 70 BP
Beta - 239130 SAMPLE : 532350040017 ANALYSIS : Radiometric-Standard delivery MATERIAL/PRETREATMENT : (wood): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1320 to 1350 (Cal BP 630 to 600) AND Cal AD 1390 to 1520 (Cal BP 560 to 430) Cal AD 1580 to 1630 (Cal BP 370 to 320)	450 +/- 70 BP	-23.9 o/oo	470 +/- 70 BP
Beta - 239131 SAMPLE : 532350040020 ANALYSIS : Radiometric-Standard delivery MATERIAL/PRETREATMENT : (wood): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1420 to 1540 (Cal BP 530 to 420) AND Cal AD 1540 to 1630 (Cal BP 400 to 320)	400 +/- 50 BP	-24.1 o/oo	410 +/- 50 BP
Beta - 239132 SAMPLE : 532350040021 ANALYSIS : Radiometric-Standard delivery MATERIAL/PRETREATMENT : (wood): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1520 to 1590 (Cal BP 430 to 360) AND Cal AD 1620 to 1960 (Cal BP 330 to 0)	170 +/- 70 BP	-23.3 o/oo	200 +/- 70 BP

Sample Data	Measured Radiocarbon Age	$^{13}\text{C}/^{12}\text{C}$ Ratio	Conventional Radiocarbon Age(*)
Beta - 239133 SAMPLE : 642000010001 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (peat): acid/alkali/acid COMMENT: reported result indicates an age of post 0 BP and has been reported as a % of the modern reference standard, indicating the material was living within the last 50 years.	111.9 +/- 0.5 pMC	-28.9 o/oo	112.8 +/- 0.5 pMC
Beta - 239134 SAMPLE : 642000010002 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (peat): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 1420 to 1130 (Cal BP 3370 to 3080)	3070 +/- 50 BP	-26.7 o/oo	3040 +/- 50 BP
Beta - 239135 SAMPLE : 642000010003 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (peat): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 3930 to 3870 (Cal BP 5880 to 5820) AND Cal BC 3810 to 3640 (Cal BP 5760 to 5590)	4970 +/- 60 BP	-26.6 o/oo	4940 +/- 60 BP
Beta - 239136 SAMPLE : 642000010004 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (peat): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1680 to 1740 (Cal BP 270 to 210) AND Cal AD 1800 to 1940 (Cal BP 150 to 20) Cal AD 1950 to beyond 1960 (Cal BP 0 to 0)	50 +/- 60 BP	-25.9 o/oo	40 +/- 60 BP
Beta - 239137 SAMPLE : 642000010005 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (peat): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1650 to 1890 (Cal BP 300 to 60) AND Cal AD 1910 to 1950 (Cal BP 40 to 0)	200 +/- 40 BP	-26.8 o/oo	170 +/- 40 BP

Dr. Knut Stomsvik

Report Date: 2/4/2008

Sample Data	Measured Radiocarbon Age	$^{13}\text{C}/^{12}\text{C}$ Ratio	Conventional Radiocarbon Age(*)
Beta - 239138 SAMPLE : 642000010006 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (peat): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 400 to 340 (Cal BP 2350 to 2290) AND Cal BC 330 to 200 (Cal BP 2280 to 2150)	2270 +/- 40 BP	-25.6 o/oo	2260 +/- 40 BP

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.9:lab. mult=1)

Laboratory number: Beta-239122

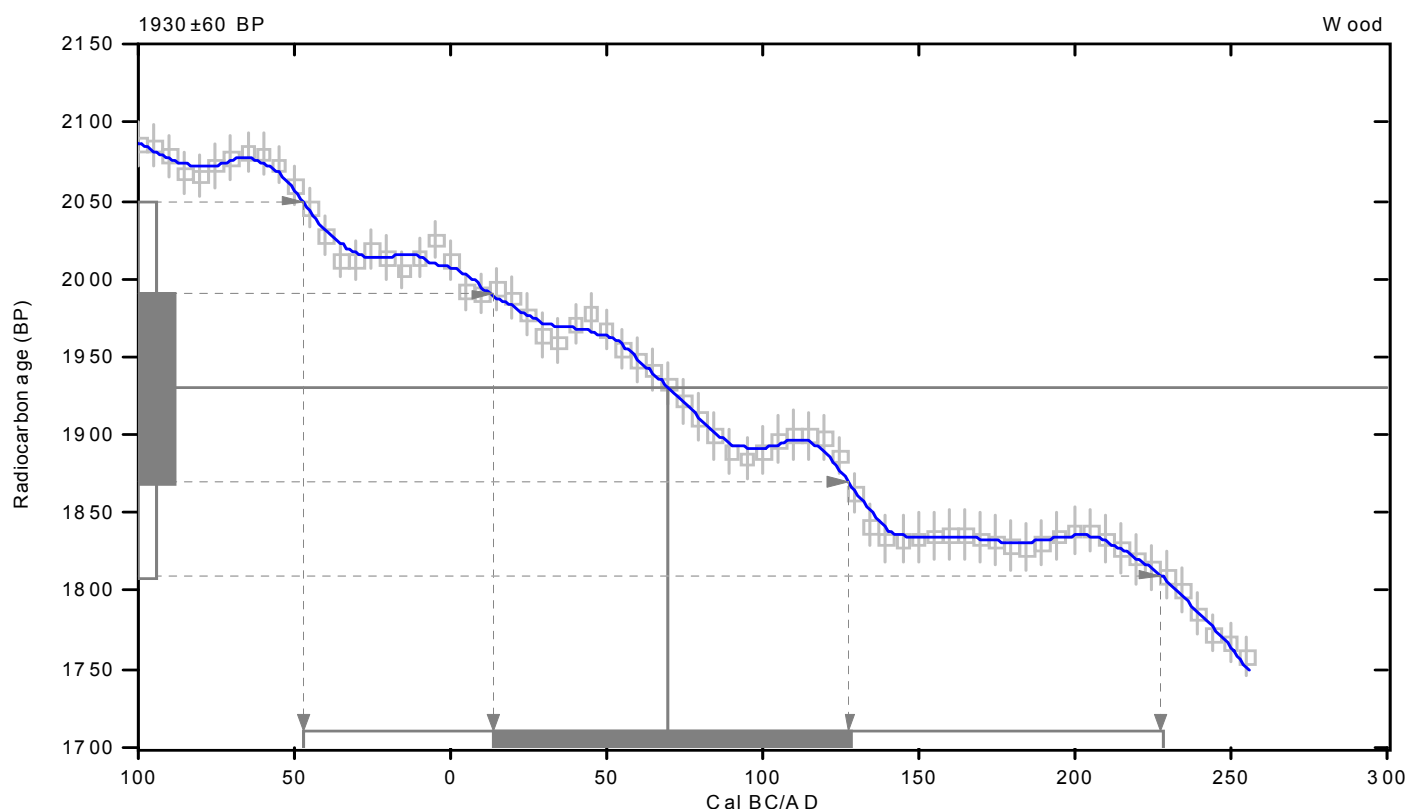
Conventional radiocarbon age: 1930±60 BP

**2 Sigma calibrated result: Cal BC 50 to Cal AD 230 (Cal BP 2000 to 1720)
(95% probability)**

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal AD 70 (Cal BP 1880)

**1 Sigma calibrated result: Cal AD 10 to 130 (Cal BP 1940 to 1820)
(68% probability)**



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

Beta Analytic Radiocarbon Dating Laboratory

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.9:lab. mult=1)

Laboratory number: Beta-239124

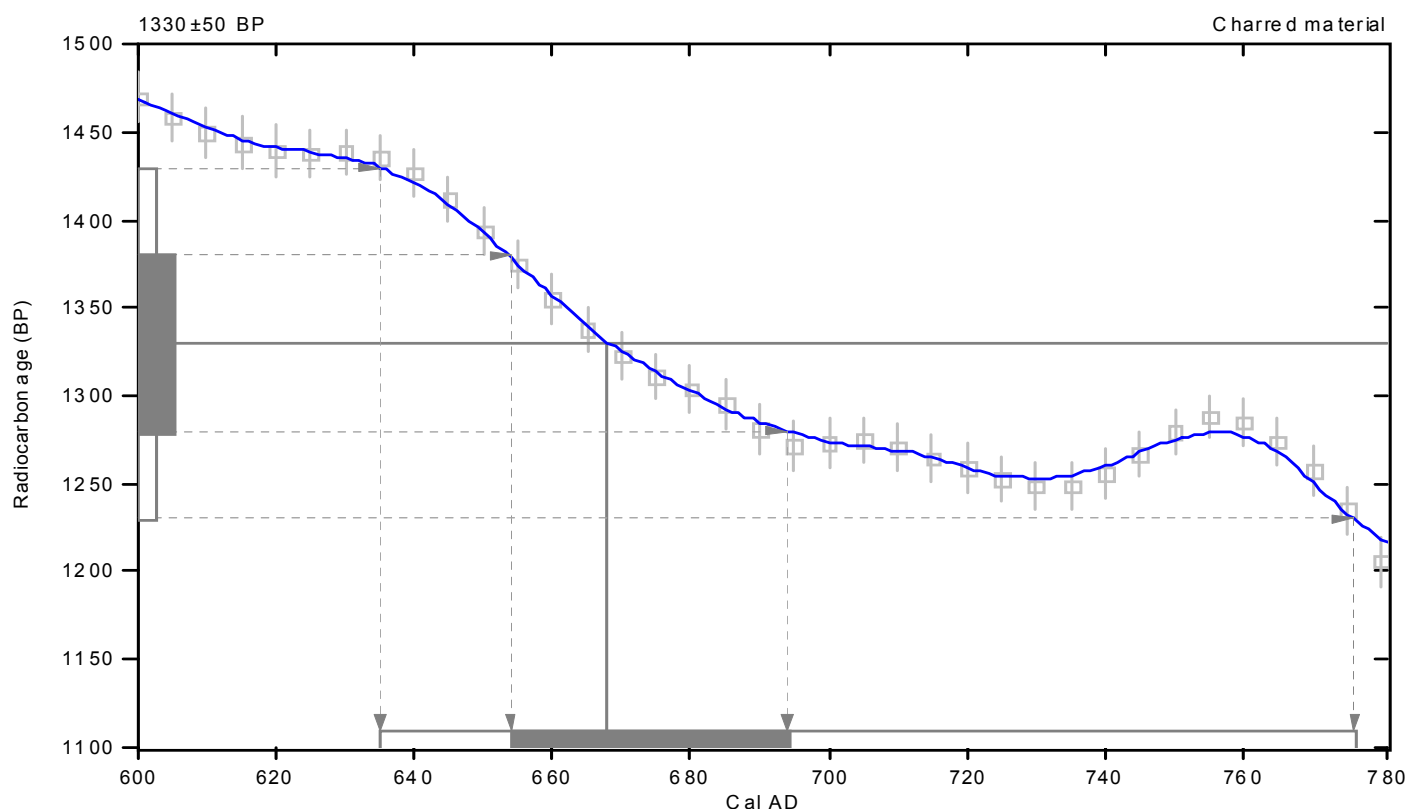
Conventional radiocarbon age: 1330±50 BP

**2 Sigma calibrated result: Cal AD 640 to 780 (Cal BP 1320 to 1170)
(95% probability)**

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal AD 670 (Cal BP 1280)

**1 Sigma calibrated result: Cal AD 650 to 690 (Cal BP 1300 to 1260)
(68% probability)**



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.7:lab. mult=1)

Laboratory number: Beta-239125

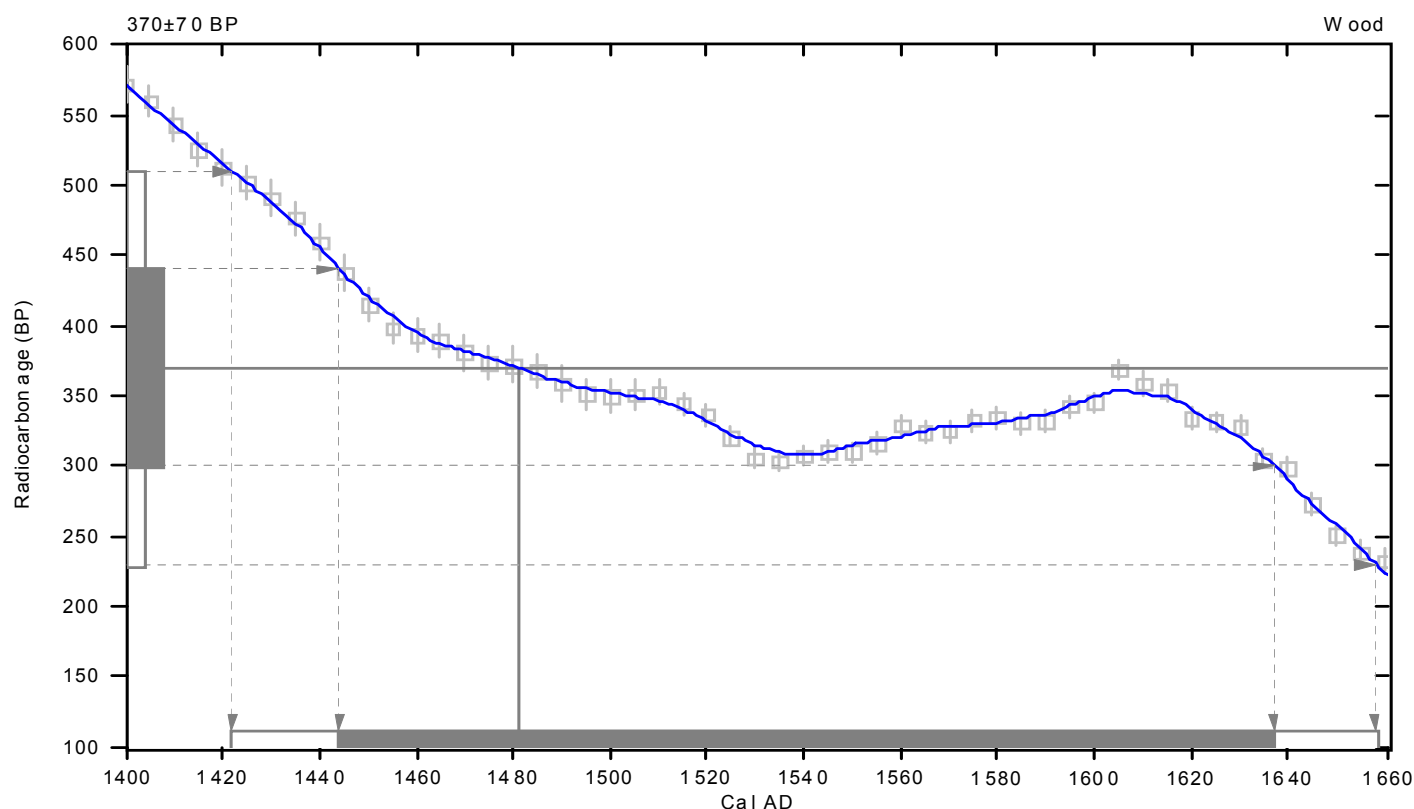
Conventional radiocarbon age: 370±70 BP

**2 Sigma calibrated result: Cal AD 1420 to 1660 (Cal BP 530 to 290)
(95% probability)**

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal AD 1480 (Cal BP 470)

**1 Sigma calibrated result: Cal AD 1440 to 1640 (Cal BP 510 to 310)
(68% probability)**



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.3:lab. mult=1)

Laboratory number: Beta-239126

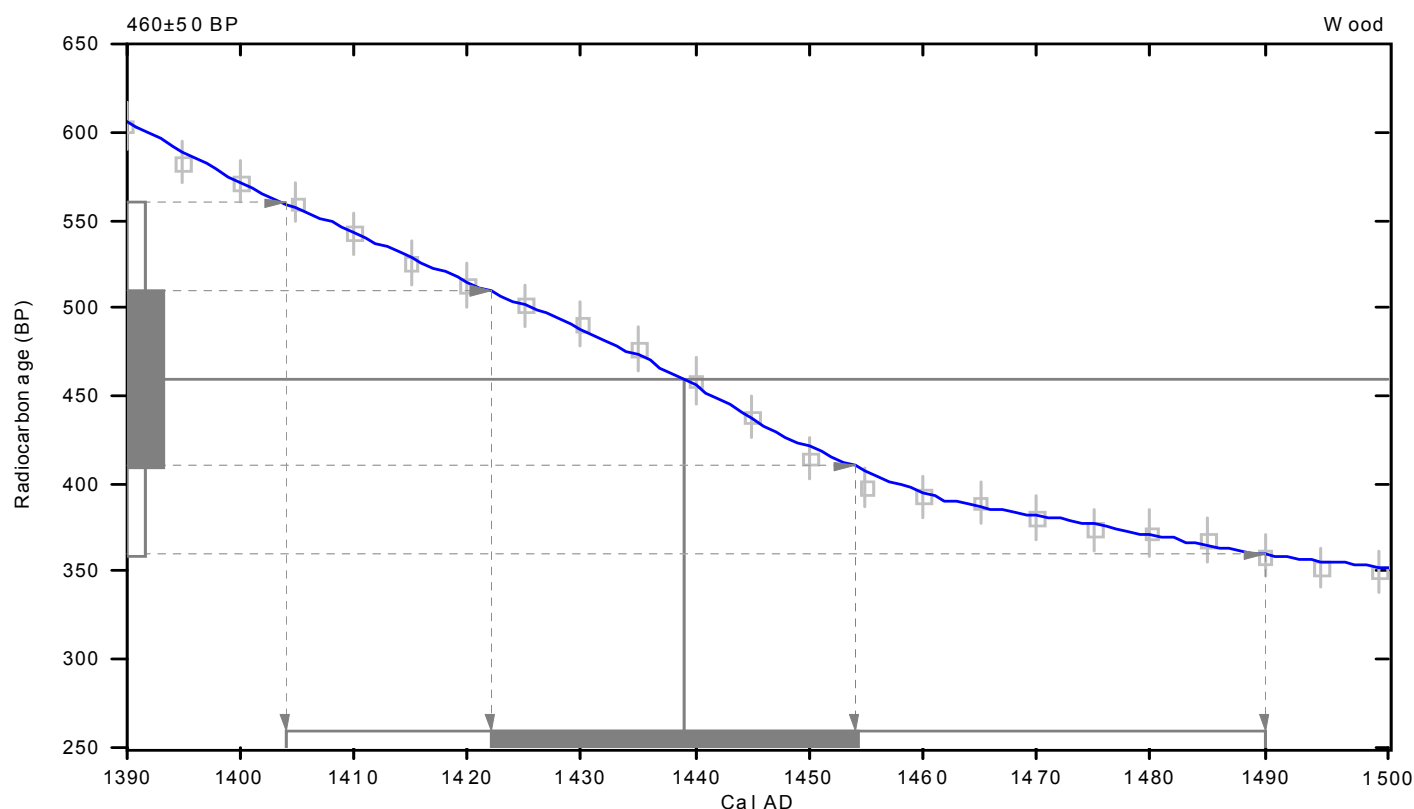
Conventional radiocarbon age: 460±50 BP

**2 Sigma calibrated result: Cal AD 1400 to 1490 (Cal BP 550 to 460)
(95% probability)**

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal AD 1440 (Cal BP 510)

**1 Sigma calibrated result: Cal AD 1420 to 1450 (Cal BP 530 to 500)
(68% probability)**



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-22.8:lab. mult=1)

Laboratory number: **Beta-239127**

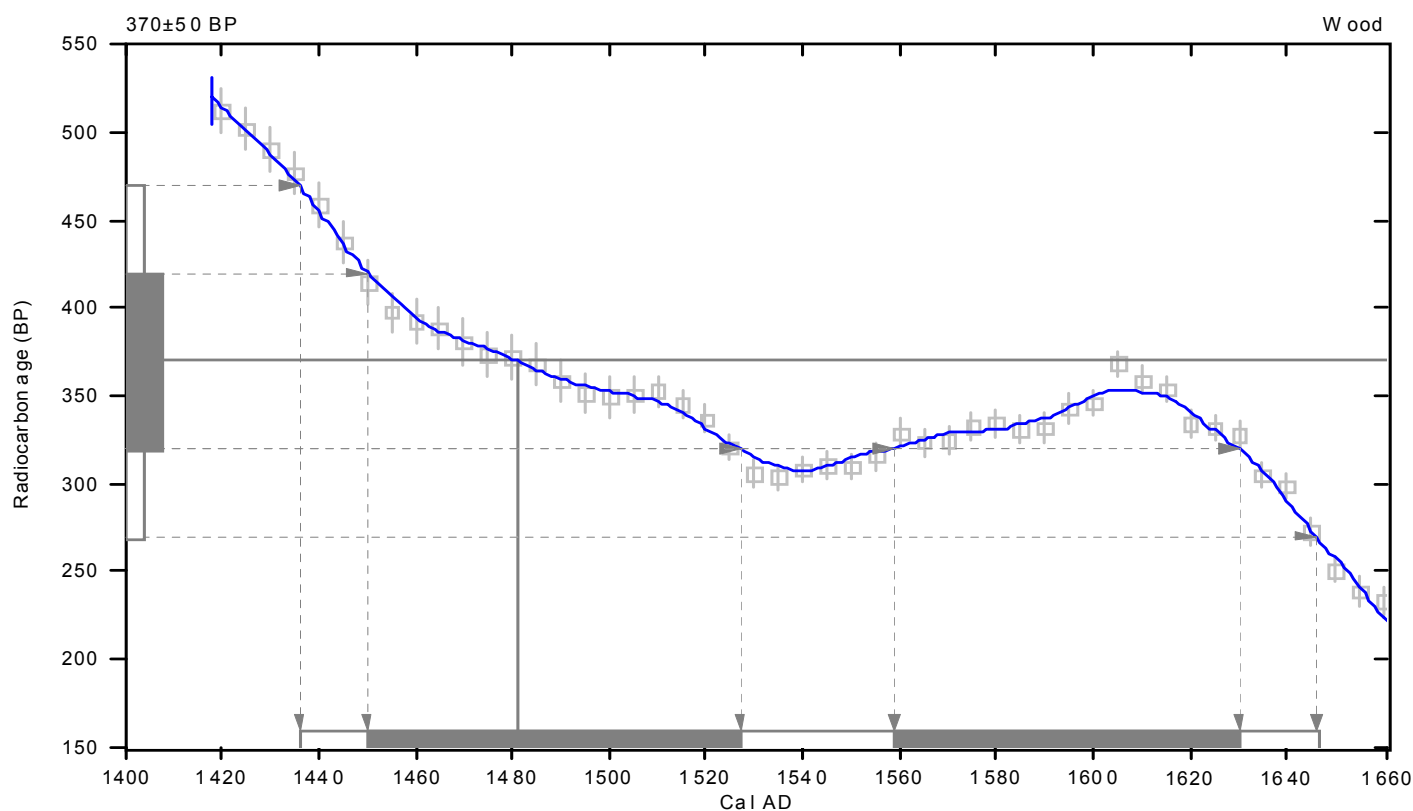
Conventional radiocarbon age: **370±50 BP**

2 Sigma calibrated result: Cal AD 1440 to 1650 (Cal BP 510 to 300)
(95% probability)

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal AD 1480 (Cal BP 470)

1 Sigma calibrated results: Cal AD 1450 to 1530 (Cal BP 500 to 420) and
(68% probability) Cal AD 1560 to 1630 (Cal BP 390 to 320)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.4:lab. mult=1)

Laboratory number: **Beta-239128**

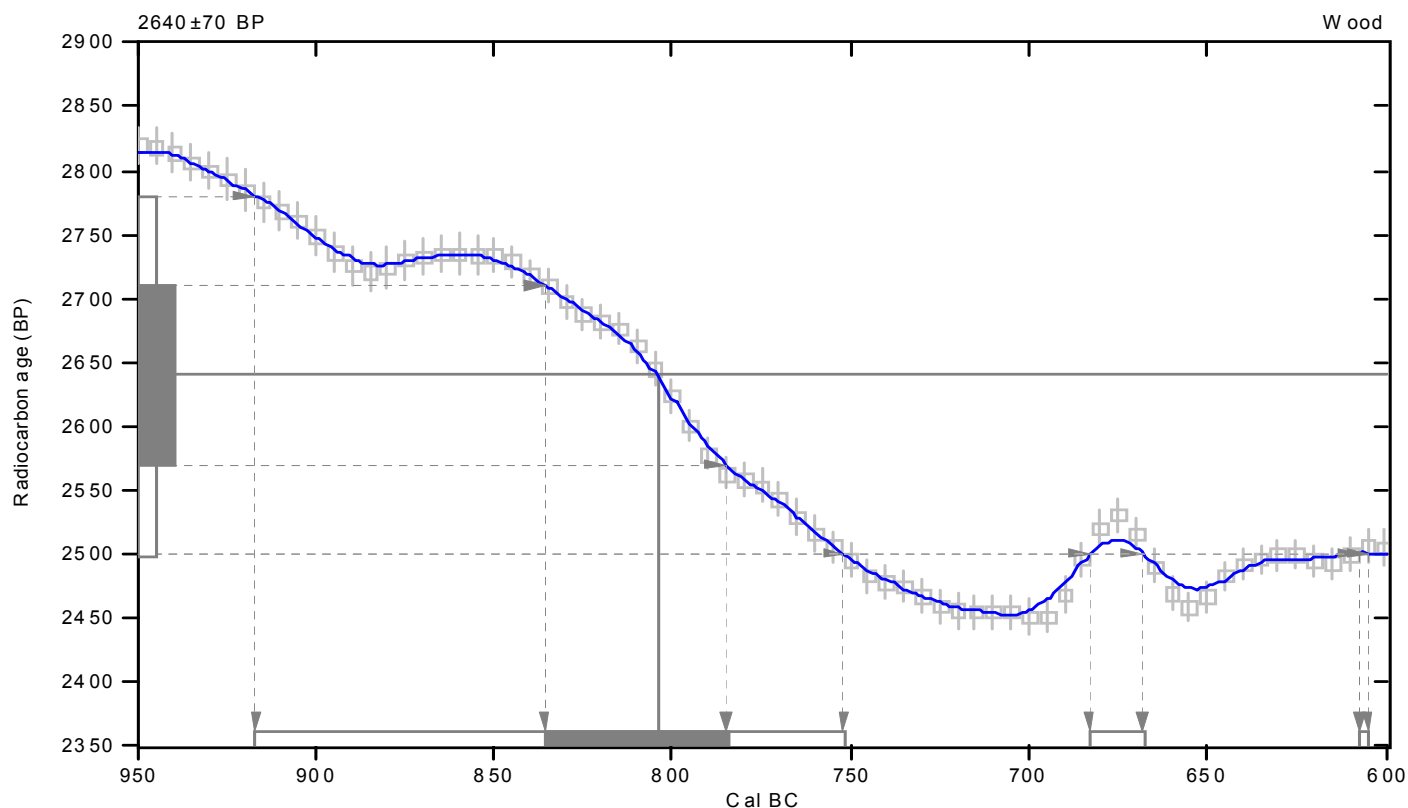
Conventional radiocarbon age: **2640±70 BP**

**2 Sigma calibrated results: Cal BC 920 to 750 (Cal BP 2870 to 2700) and
(95% probability) Cal BC 680 to 670 (Cal BP 2630 to 2620) and
Cal BC 610 to 600 (Cal BP 2560 to 2560)**

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal BC 800 (Cal BP 2750)

1 Sigma calibrated result: Cal BC 840 to 780 (Cal BP 2790 to 2740)
(68% probability)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-20.8:lab. mult=1)

Laboratory number: Beta-239129

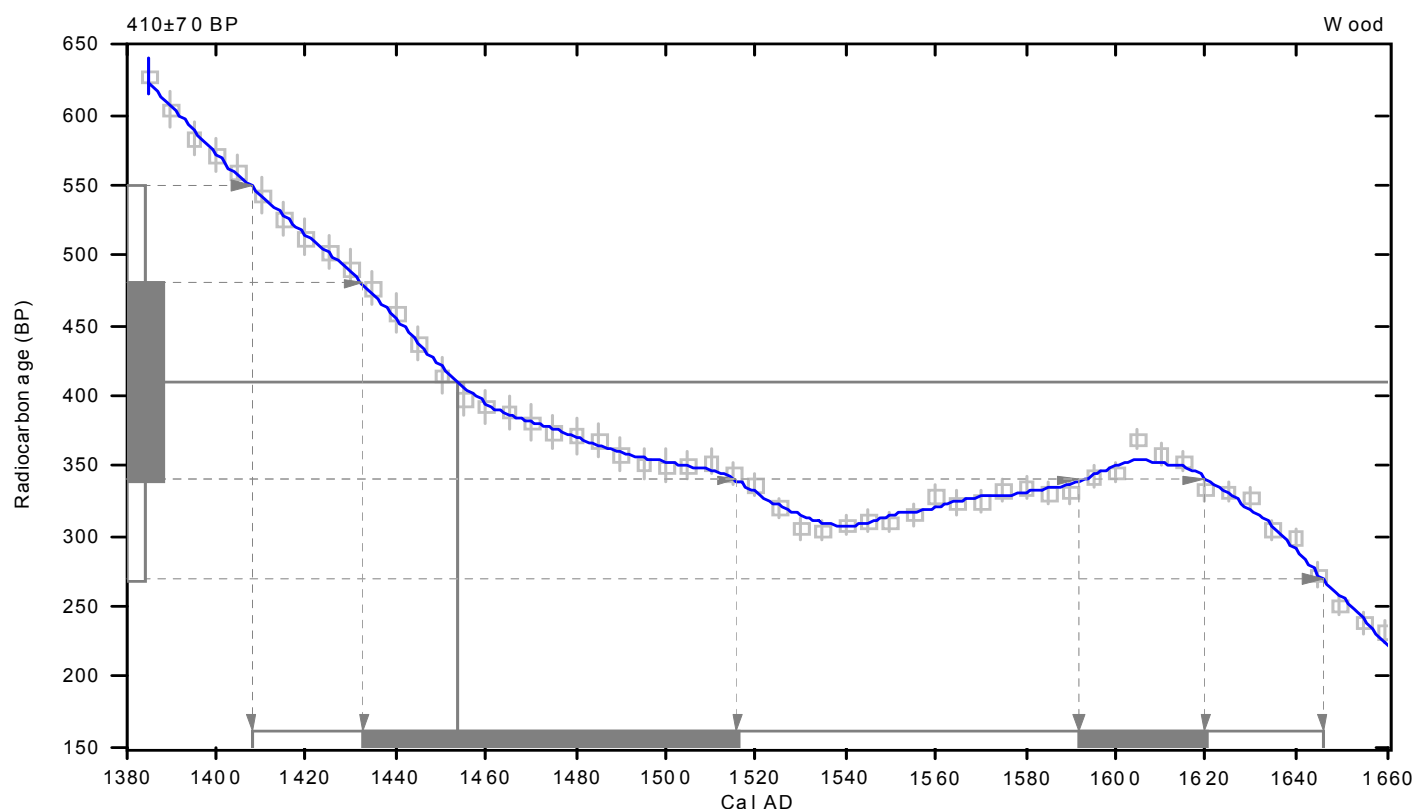
Conventional radiocarbon age: 410±70 BP

**2 Sigma calibrated result: Cal AD 1410 to 1650 (Cal BP 540 to 300)
(95% probability)**

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal AD 1450 (Cal BP 500)

1 Sigma calibrated results: Cal AD 1430 to 1520 (Cal BP 520 to 430) and
(68% probability) Cal AD 1590 to 1620 (Cal BP 360 to 330)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.9:lab. mult=1)

Laboratory number: Beta-239130

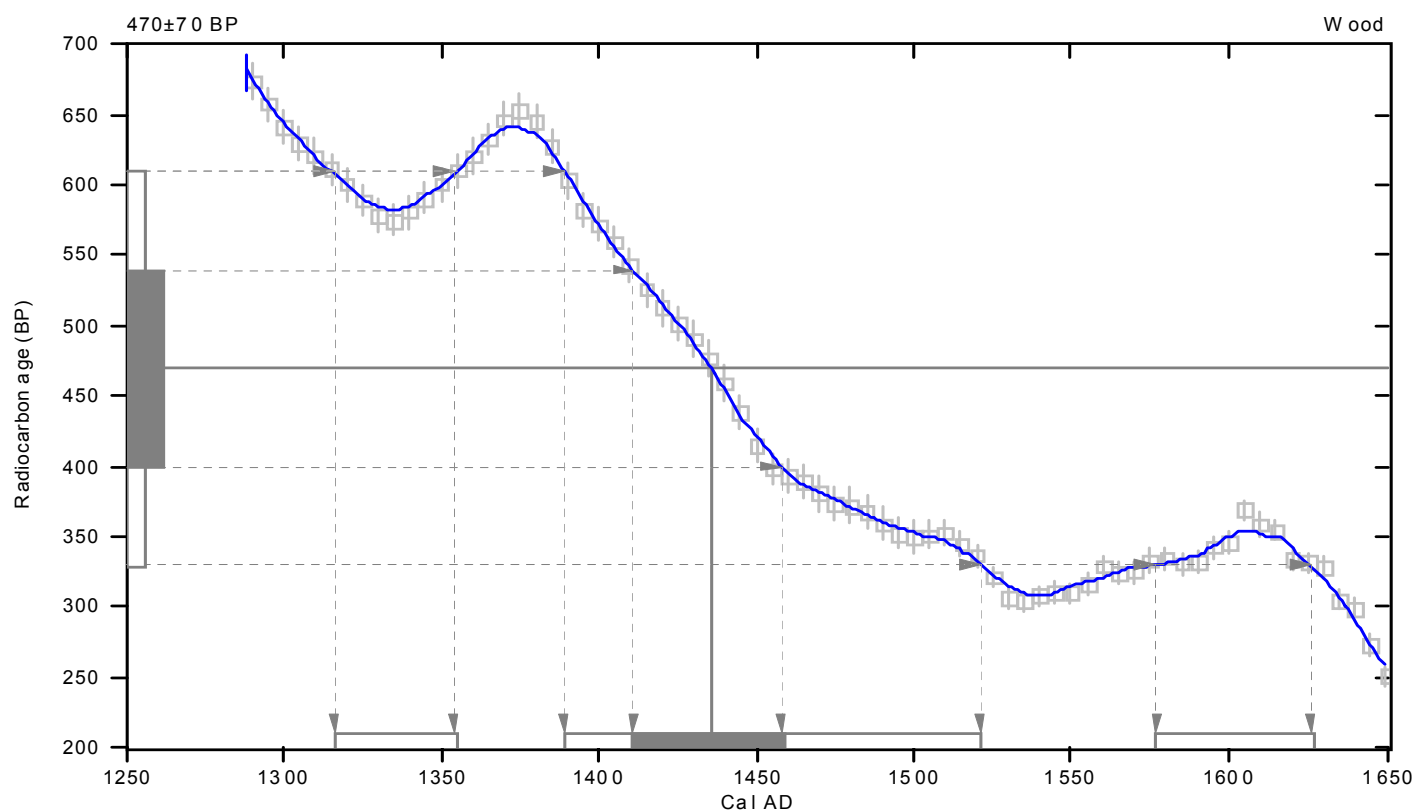
Conventional radiocarbon age: 470±70 BP

**2 Sigma calibrated results: Cal AD 1320 to 1350 (Cal BP 630 to 600) and
(95% probability) Cal AD 1390 to 1520 (Cal BP 560 to 430) and
Cal AD 1580 to 1630 (Cal BP 370 to 320)**

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal AD 1440 (Cal BP 510)

1 Sigma calibrated result: Cal AD 1410 to 1460 (Cal BP 540 to 490)
(68% probability)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.1:lab. mult=1)

Laboratory number: Beta-239131

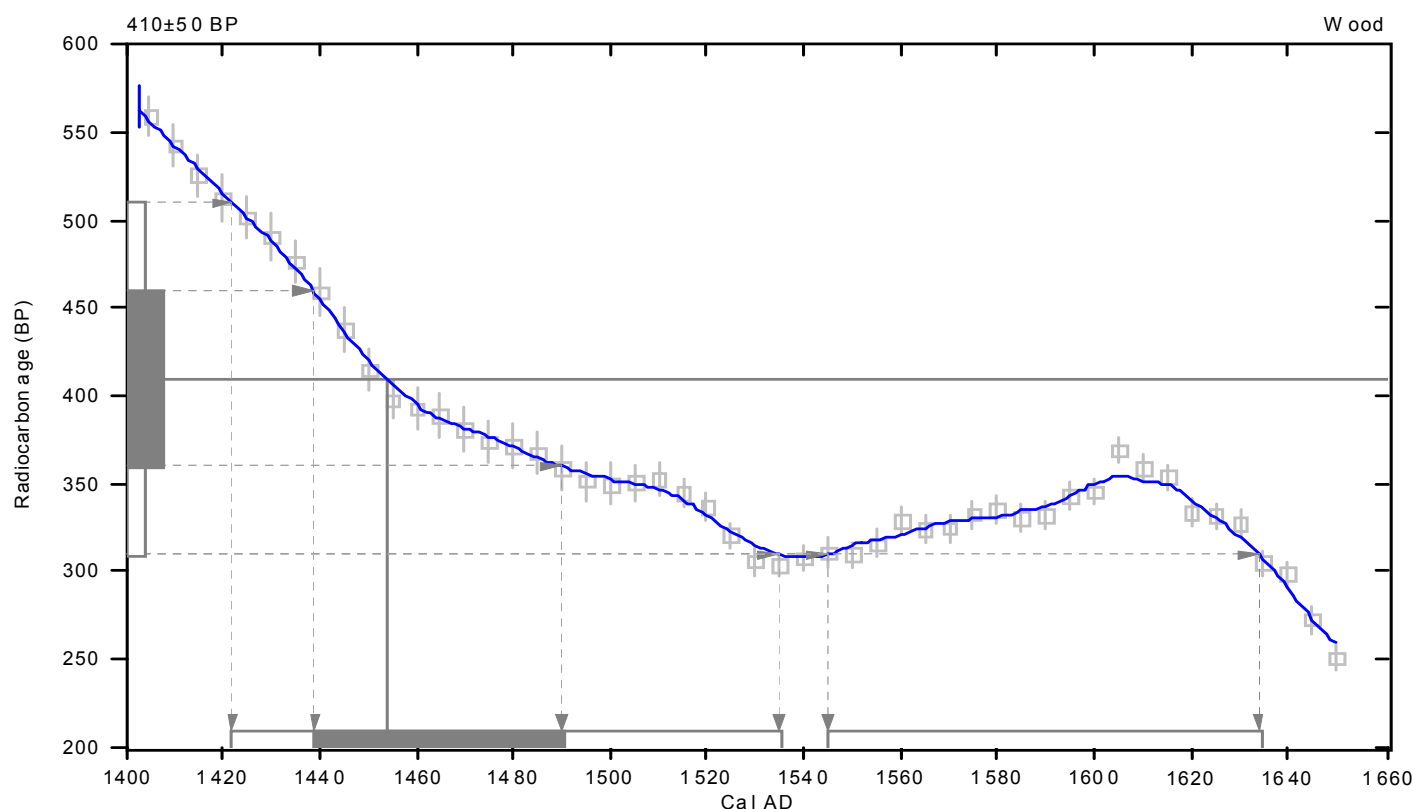
Conventional radiocarbon age: 410±50 BP

**2 Sigma calibrated results: Cal AD 1420 to 1540 (Cal BP 530 to 420) and
(95% probability) Cal AD 1540 to 1630 (Cal BP 400 to 320)**

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal AD 1450 (Cal BP 500)

1 Sigma calibrated result: Cal AD 1440 to 1490 (Cal BP 510 to 460)
(68% probability)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.3:lab. mult=1)

Laboratory number: **Beta-239132**

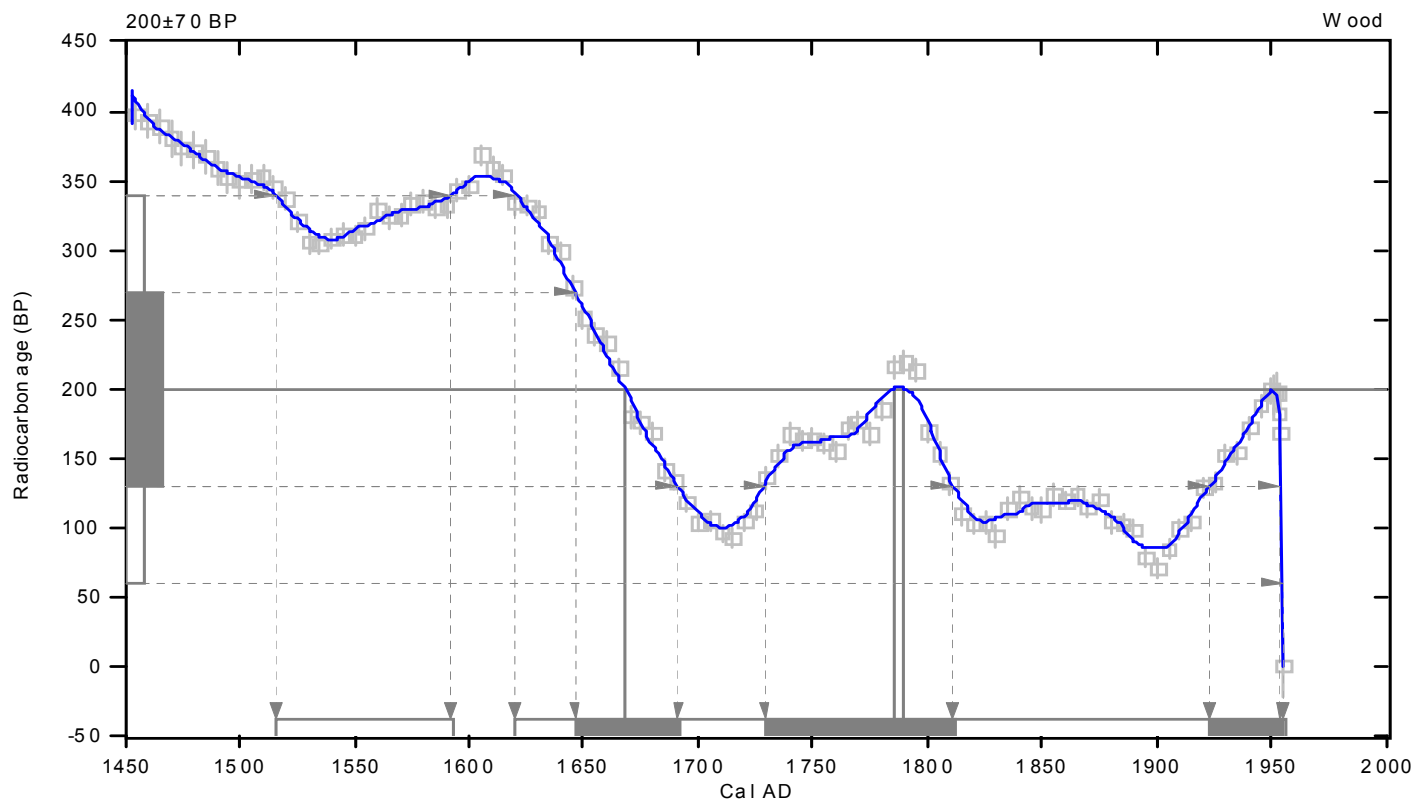
Conventional radiocarbon age: **200±70 BP**

2 Sigma calibrated results: Cal AD 1520 to 1590 (Cal BP 430 to 360) and
(95% probability) Cal AD 1620 to 1960 (Cal BP 330 to 0)

Intercept data

Intercepts of radiocarbon age
with calibration curve: Cal AD 1670 (Cal BP 280) and
Cal AD 1780 (Cal BP 160) and
Cal AD 1790 (Cal BP 160)

1 Sigma calibrated results: Cal AD 1650 to 1690 (Cal BP 300 to 260) and
(68% probability) Cal AD 1730 to 1810 (Cal BP 220 to 140) and
Cal AD 1920 to 1950 (Cal BP 30 to 0)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.7:lab. mult=1)

Laboratory number: **Beta-239134**

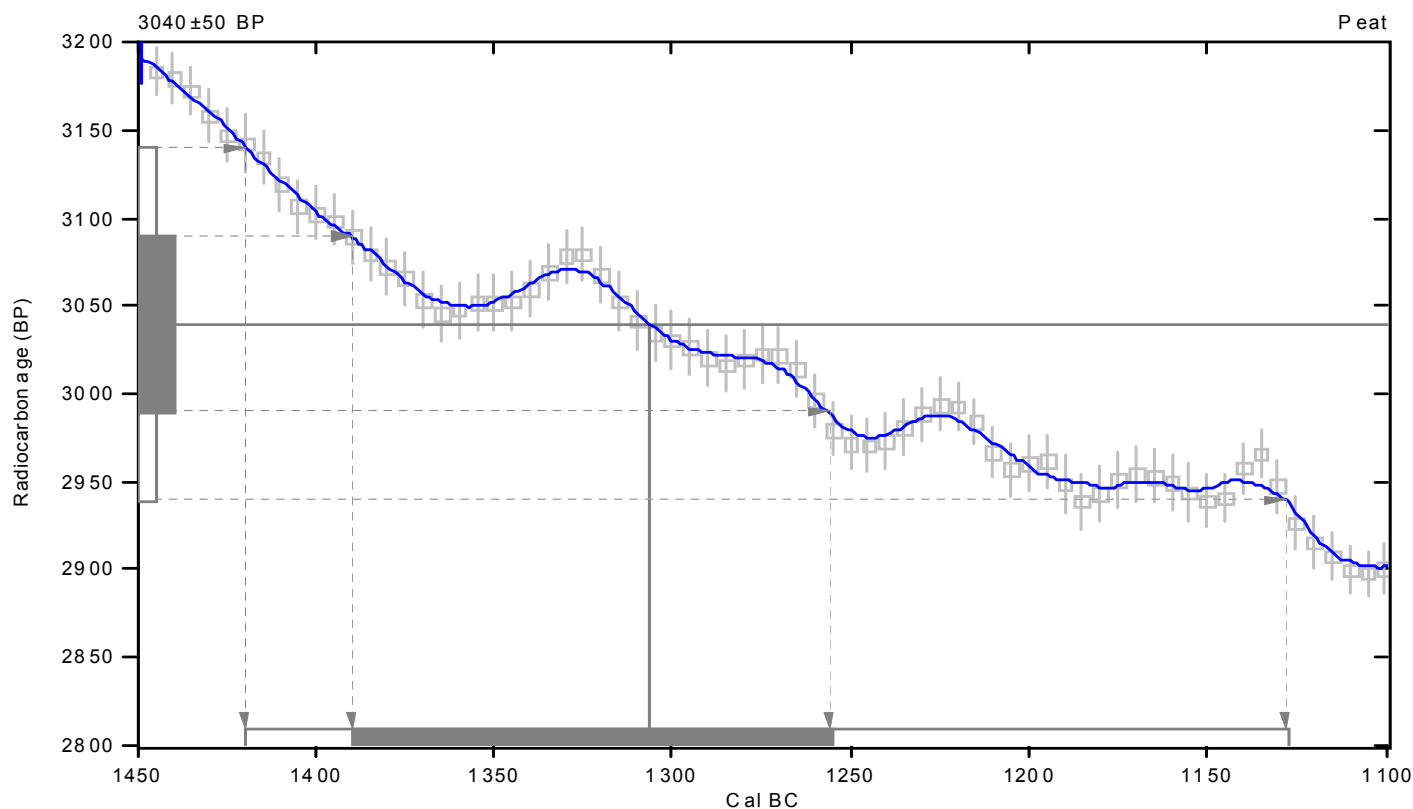
Conventional radiocarbon age: **3040±50 BP**

**2 Sigma calibrated result: Cal BC 1420 to 1130 (Cal BP 3370 to 3080)
(95% probability)**

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal BC 1310 (Cal BP 3260)

**1 Sigma calibrated result: Cal BC 1390 to 1260 (Cal BP 3340 to 3210)
(68% probability)**



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.6:lab. mult=1)

Laboratory number: **Beta-239135**

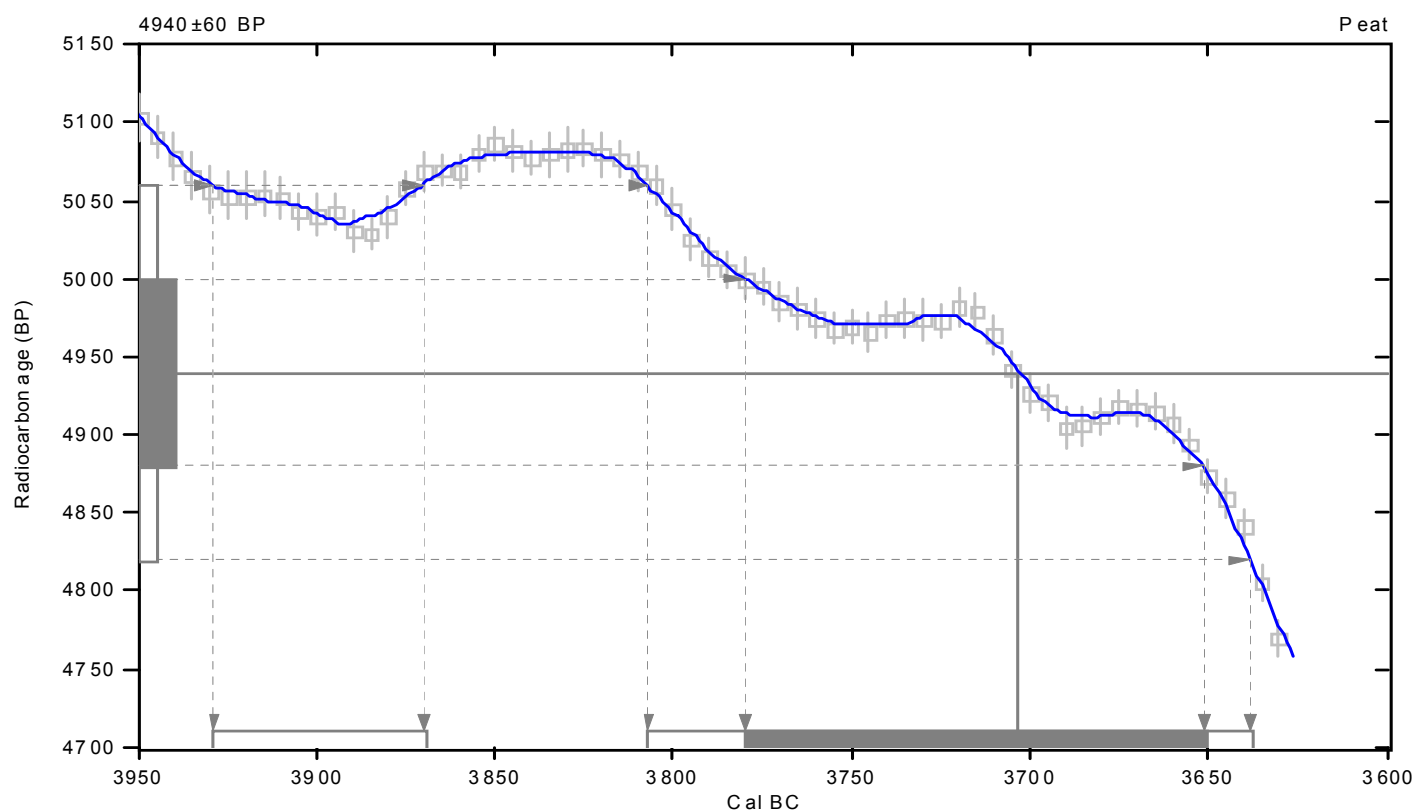
Conventional radiocarbon age: **4940±60 BP**

**2 Sigma calibrated results: Cal BC 3930 to 3870 (Cal BP 5880 to 5820) and
(95% probability) Cal BC 3810 to 3640 (Cal BP 5760 to 5590)**

Intercept data

Intercept of radiocarbon age
with calibration curve: Cal BC 3700 (Cal BP 5650)

1 Sigma calibrated result: Cal BC 3780 to 3650 (Cal BP 5730 to 5600)
(68% probability)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.9:lab. mult=1)

Laboratory number: **Beta-239136**

Conventional radiocarbon age: **40±60 BP**

**2 Sigma calibrated results²: Cal AD 1680 to 1740 (Cal BP 270 to 210) and
(95% probability) Cal AD 1800 to 1940 (Cal BP 150 to 20) and
Cal AD 1950 to beyond 1960 (Cal BP 0 to 0)**

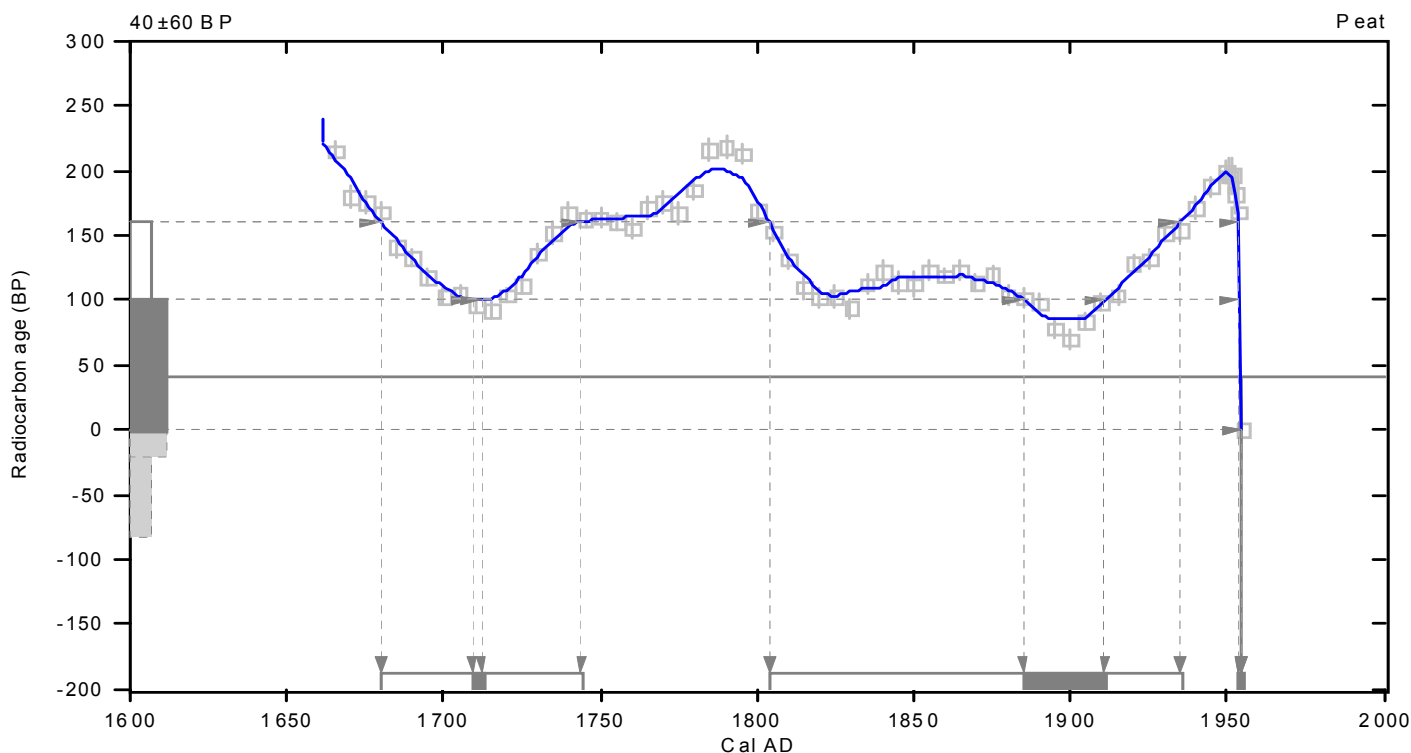
² 2 Sigma range being quoted is the maximum antiquity based on the minus 2 Sigma range

Intercept data

Intercept of radiocarbon age
with calibration curve: **Cal AD 1960 (Cal BP 0)**

**1 Sigma calibrated results³: Cal AD 1710 to 1710 (Cal BP 240 to 240) and
(68% probability) Cal AD 1880 to 1910 (Cal BP 60 to 40) and
Cal AD 1950 to beyond 1960 (Cal BP 0 to 0)**

³ 1 Sigma range being quoted is the maximum antiquity based on the minus 1 Sigma range



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

In tCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.8:lab. mult=1)

Laboratory number: Beta-239137

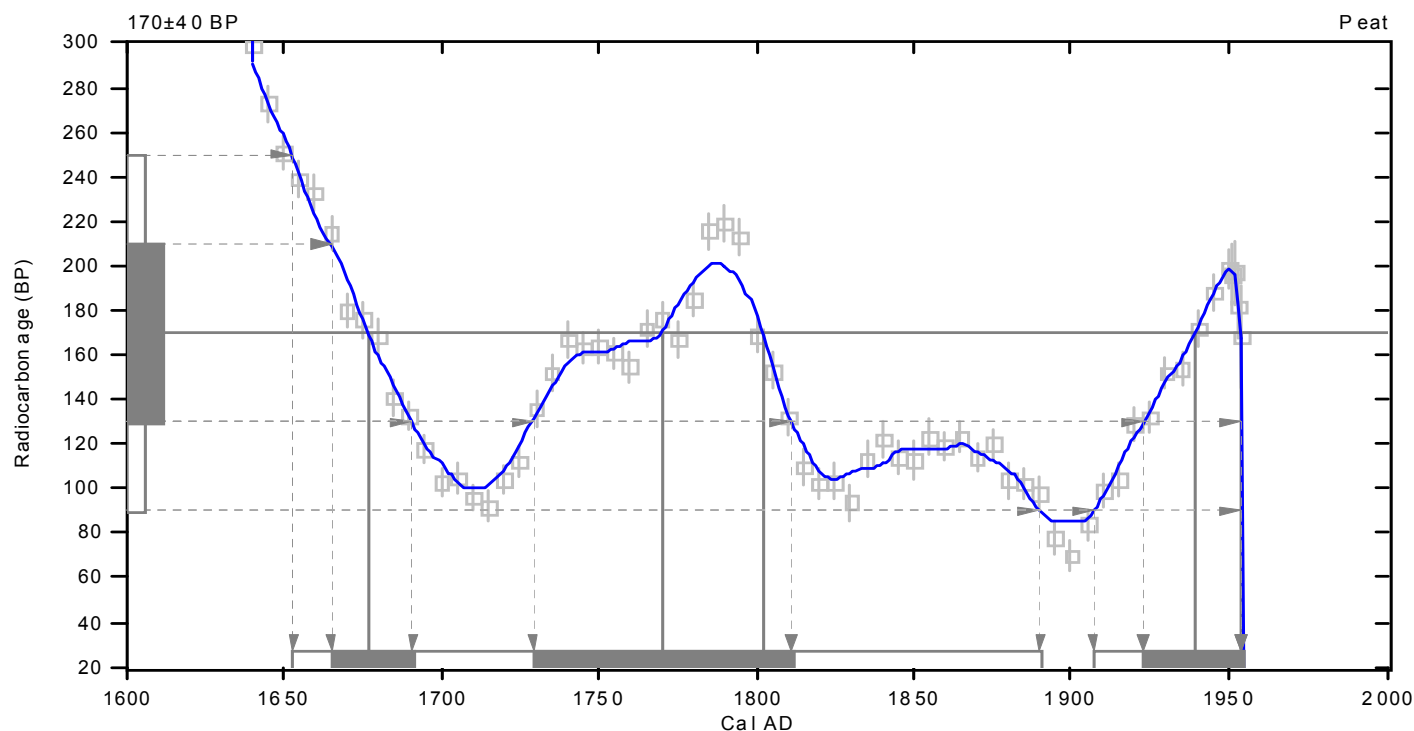
Conventional radiocarbon age: 170±40 BP

**2 Sigma calibrated results: Cal AD 1650 to 1890 (Cal BP 300 to 60) and
(95% probability) Cal AD 1910 to 1950 (Cal BP 40 to 0)**

Intercept data

Intercepts of radiocarbon age
with calibration curve: Cal AD 1680 (Cal BP 270) and
Cal AD 1770 (Cal BP 180) and
Cal AD 1800 (Cal BP 150) and
Cal AD 1940 (Cal BP 10) and
Cal AD 1950 (Cal BP 0)

**1 Sigma calibrated results: Cal AD 1660 to 1690 (Cal BP 280 to 260) and
(68% probability) Cal AD 1730 to 1810 (Cal BP 220 to 140) and
Cal AD 1920 to 1950 (Cal BP 30 to 0)**



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.6:lab. mult=1)

Laboratory number: **Beta-239138**

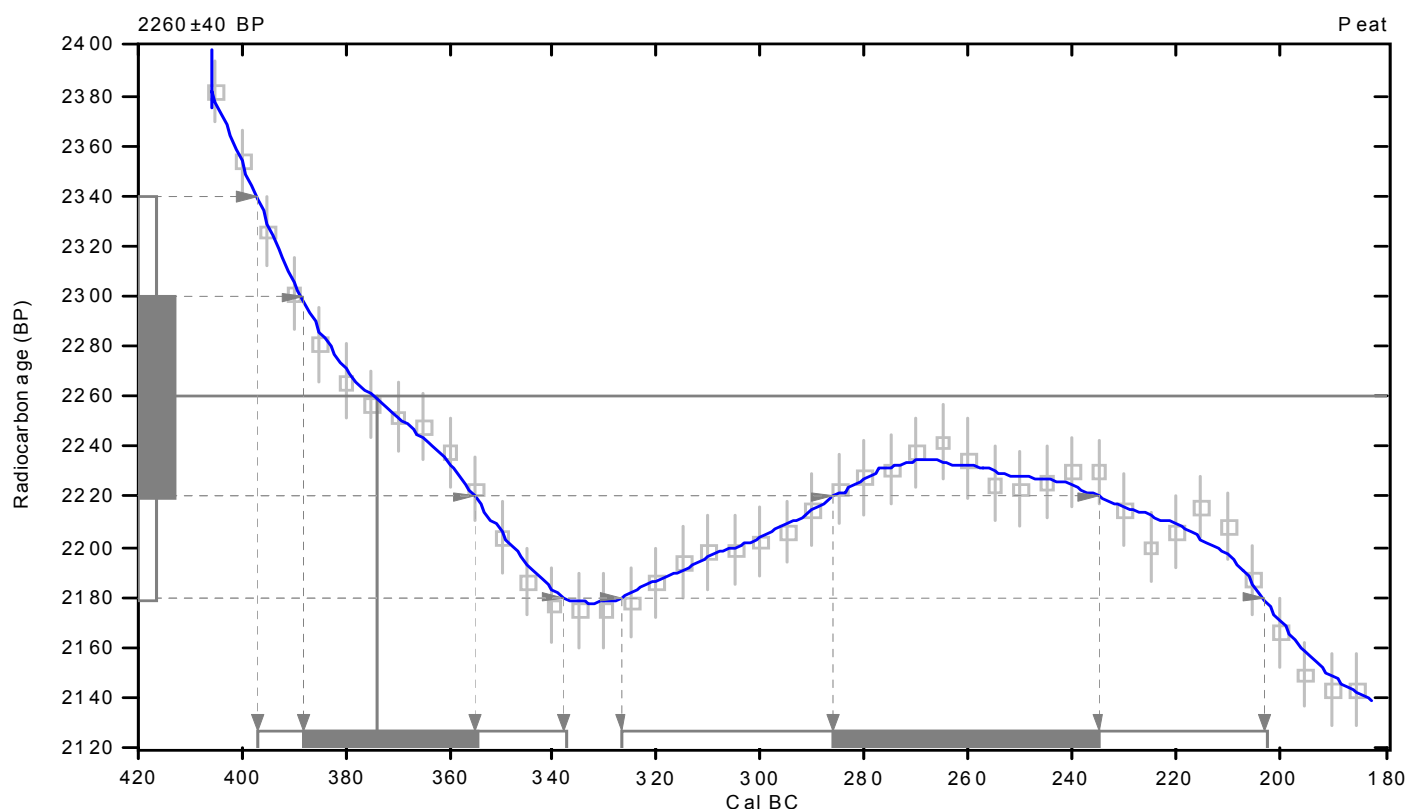
Conventional radiocarbon age: **2260±40 BP**

2 Sigma calibrated results: **Cal BC 400 to 340 (Cal BP 2350 to 2290) and
(95% probability) Cal BC 330 to 200 (Cal BP 2280 to 2150)**

Intercept data

Intercept of radiocarbon age
with calibration curve: **Cal BC 370 (Cal BP 2320)**

1 Sigma calibrated results: **Cal BC 390 to 360 (Cal BP 2340 to 2300) and
(68% probability) Cal BC 290 to 240 (Cal BP 2240 to 2180)**



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

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