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Consistent Accuracy . . .
. . . Delivered On-time

Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

March 2, 2011

Dr. Loukas Barton
U.S. National Park Serivce
4175 Geist Road
Fairbanks, AK 99709
USA

RE: Radiocarbon Dating Results For Samples 2010-10/2b, 2010-17/2b, 2010-42, 2010-46/2h, 2010-52/2h, 2010-60/2h

Dear Dr. Barton:

Enclosed are the radiocarbon dating results for six samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses proceeded normally. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable.

As always, 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.

If you have specific questions about the analyses, please contact us. We are always available to answer your questions.

The cost of the analysis was charged to the MASTERCARD card provided. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

Darden Hood
Digital signature on file

BETA ANALYTIC INC.
DR. M.A. TAMERS and MR. D.G. HOOD
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MIAMI, FLORIDA, USA 33155
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beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Loukas Barton

Report Date: 3/2/2011

U.S. National Park Serivce

Material Received: 2/1/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 292743	280 +/- 40 BP	-24.5 o/oo	290 +/- 40 BP
SAMPLE : 2010-10/2b			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1480 to 1660 (Cal BP 470 to 280)			
Beta - 292744	260 +/- 40 BP	-25.4 o/oo	250 +/- 40 BP
SAMPLE : 2010-17/2b			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1520 to 1580 (Cal BP 430 to 370) AND Cal AD 1630 to 1680 (Cal BP 320 to 270) Cal AD 1770 to 1800 (Cal BP 180 to 150) AND Cal AD 1940 to 1950 (Cal BP 10 to 0)			
Beta - 292745	140 +/- 40 BP	-24.4 o/oo	150 +/- 40 BP
SAMPLE : 2010-42			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1660 to 1960 (Cal BP 290 to 0)			
Beta - 292746	270 +/- 40 BP	-24.3 o/oo	280 +/- 40 BP
SAMPLE : 2010-46/2h			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1490 to 1670 (Cal BP 460 to 280) AND Cal AD 1780 to 1790 (Cal BP 160 to 160)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

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REPORT OF RADIOCARBON DATING ANALYSES

Dr. Loukas Barton

Report Date: 3/2/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 292747	400 +/- 40 BP	-26.7 o/oo	370 +/- 40 BP
SAMPLE : 2010-52/2h			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1440 to 1640 (Cal BP 510 to 310)			
Beta - 292748	390 +/- 40 BP	-25.7 o/oo	380 +/- 40 BP
SAMPLE : 2010-60/2h			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1440 to 1640 (Cal BP 510 to 310)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.5:lab. mult=1)

Laboratory number: **Beta-292743**

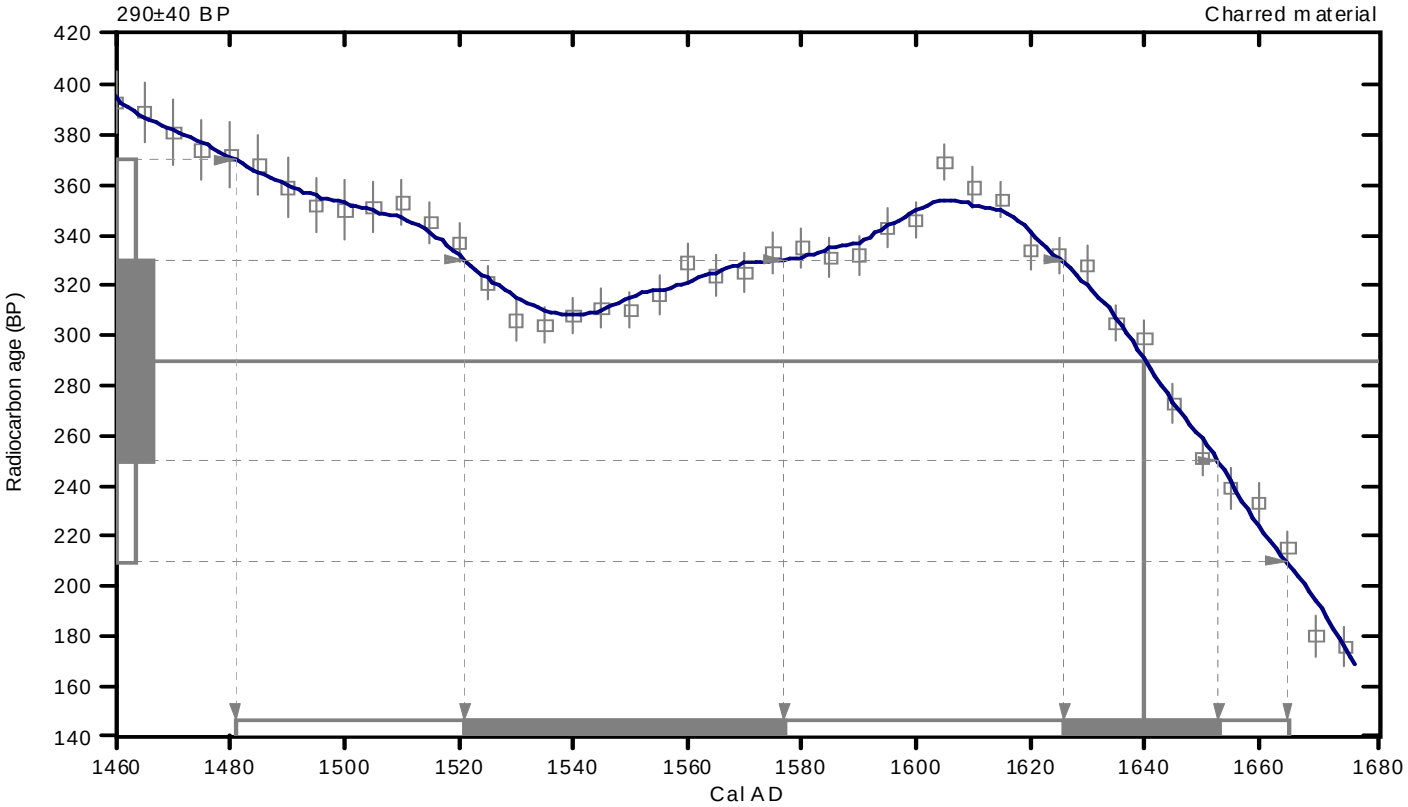
Conventional radiocarbon age: **290±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1480 to 1660 (Cal BP 470 to 280)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1640 (Cal BP 310)

1 Sigma calibrated results: (68% probability) Cal AD 1520 to 1580 (Cal BP 430 to 370) and Cal AD 1630 to 1650 (Cal BP 320 to 300)



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=-25.4:lab. mult=1)

Laboratory number: **Beta-292744**

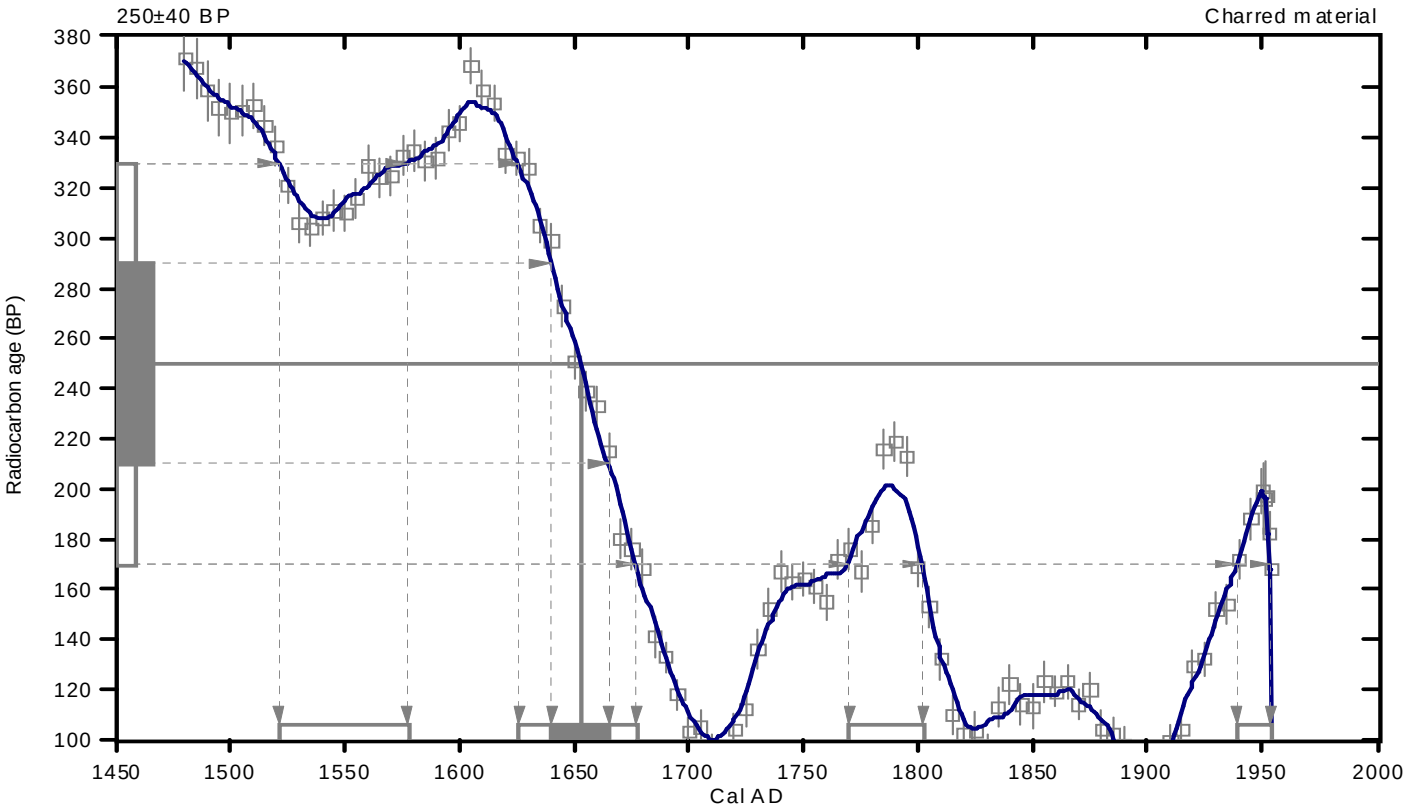
Conventional radiocarbon age: **250±40 BP**

2 Sigma calibrated results: (95% probability)
Cal AD 1520 to 1580 (Cal BP 430 to 370) and
Cal AD 1630 to 1680 (Cal BP 320 to 270) and
Cal AD 1770 to 1800 (Cal BP 180 to 150) and
Cal AD 1940 to 1950 (Cal BP 10 to 0)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1650 (Cal BP 300)

1 Sigma calibrated result: (68% probability) Cal AD 1640 to 1660 (Cal BP 310 to 280)



References:

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.4:lab. mult=1)

Laboratory number: **Beta-292745**

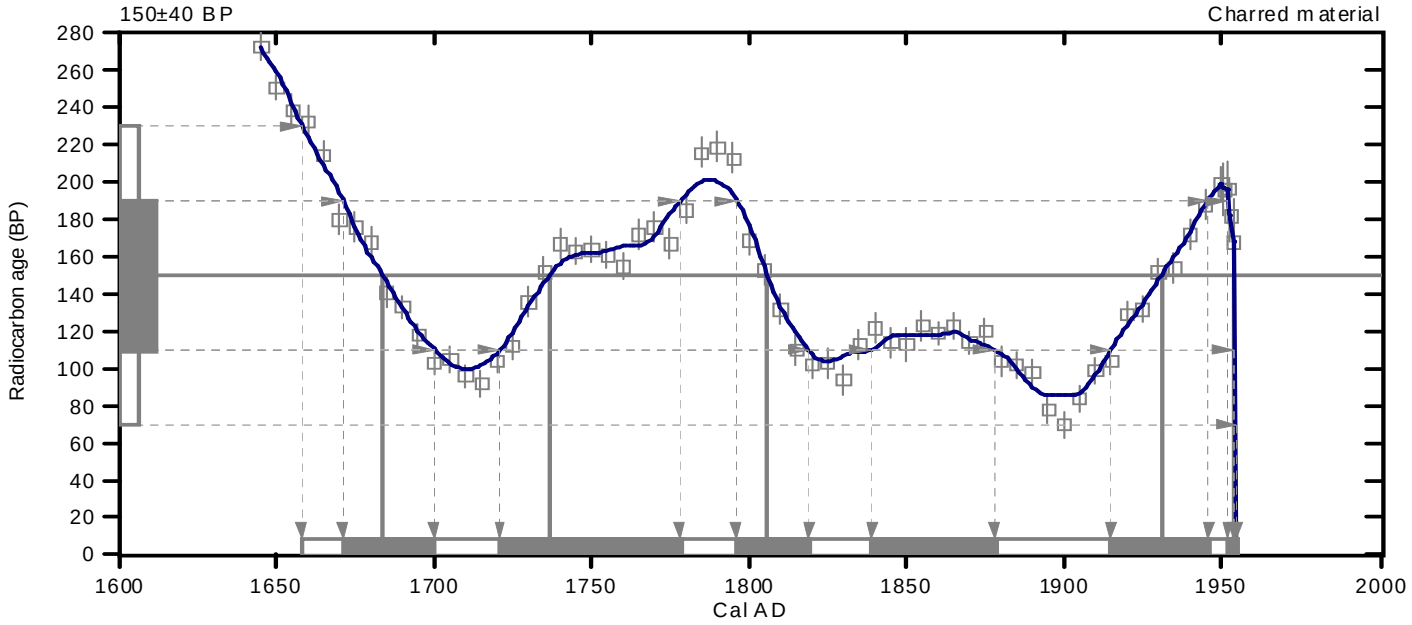
Conventional radiocarbon age: **150±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1660 to 1960 (Cal BP 290 to 0)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1680 (Cal BP 270) and
Cal AD 1740 (Cal BP 210) and
Cal AD 1810 (Cal BP 140) and
Cal AD 1930 (Cal BP 20) and
Cal AD 1950 (Cal BP 0)

1 Sigma calibrated results: (68% probability) Cal AD 1670 to 1700 (Cal BP 280 to 250) and
Cal AD 1720 to 1780 (Cal BP 230 to 170) and
Cal AD 1800 to 1820 (Cal BP 150 to 130) and
Cal AD 1840 to 1880 (Cal BP 110 to 70) and
Cal AD 1920 to 1950 (Cal BP 40 to 0) and
Cal AD 1950 to 1950 (Cal BP 0 to 0)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

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Mathematics

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.3:lab. mult=1)

Laboratory number: **Beta-292746**

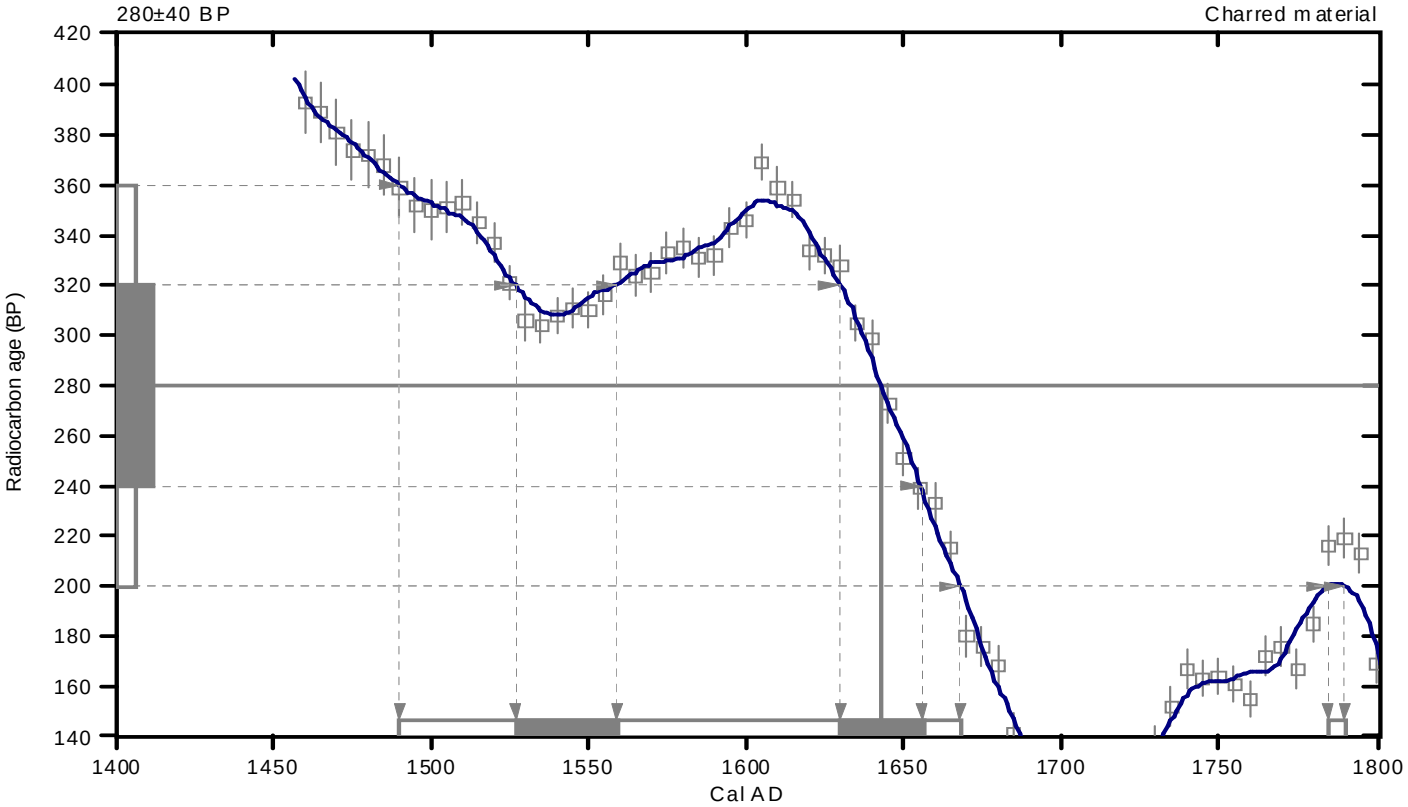
Conventional radiocarbon age: **280±40 BP**

2 Sigma calibrated results: **Cal AD 1490 to 1670 (Cal BP 460 to 280) and**
(95% probability) **Cal AD 1780 to 1790 (Cal BP 160 to 160)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1640 (Cal BP 310)

1 Sigma calibrated results: Cal AD 1530 to 1560 (Cal BP 420 to 390) and
(68% probability) Cal AD 1630 to 1660 (Cal BP 320 to 290)



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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number: **Beta-292747**

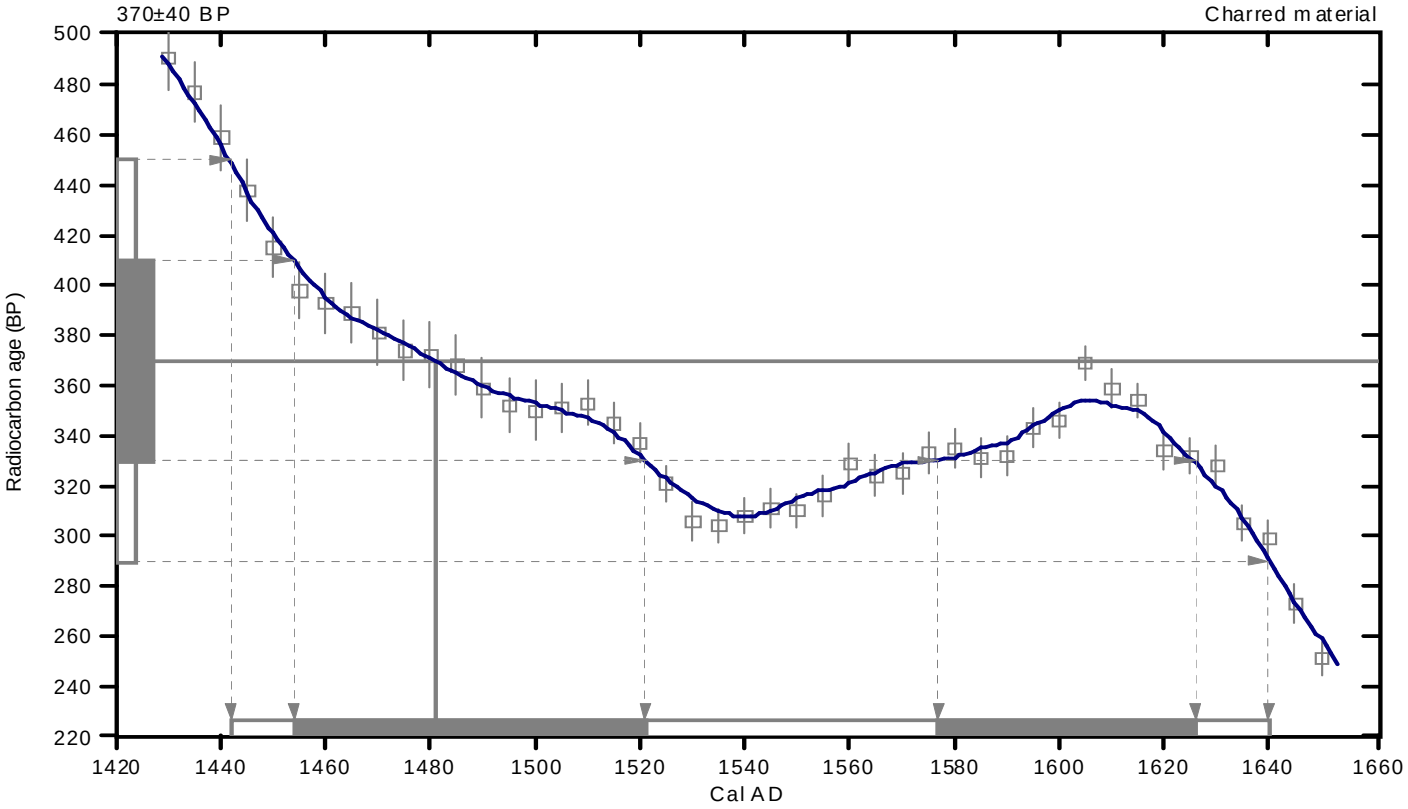
Conventional radiocarbon age: **370±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1440 to 1640 (Cal BP 510 to 310)**

Intercept data

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

1 Sigma calibrated results: (68% probability) Cal AD 1450 to 1520 (Cal BP 500 to 430) and Cal AD 1580 to 1630 (Cal BP 370 to 320)



References:

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.7:lab. mult=1)

Laboratory number: **Beta-292748**

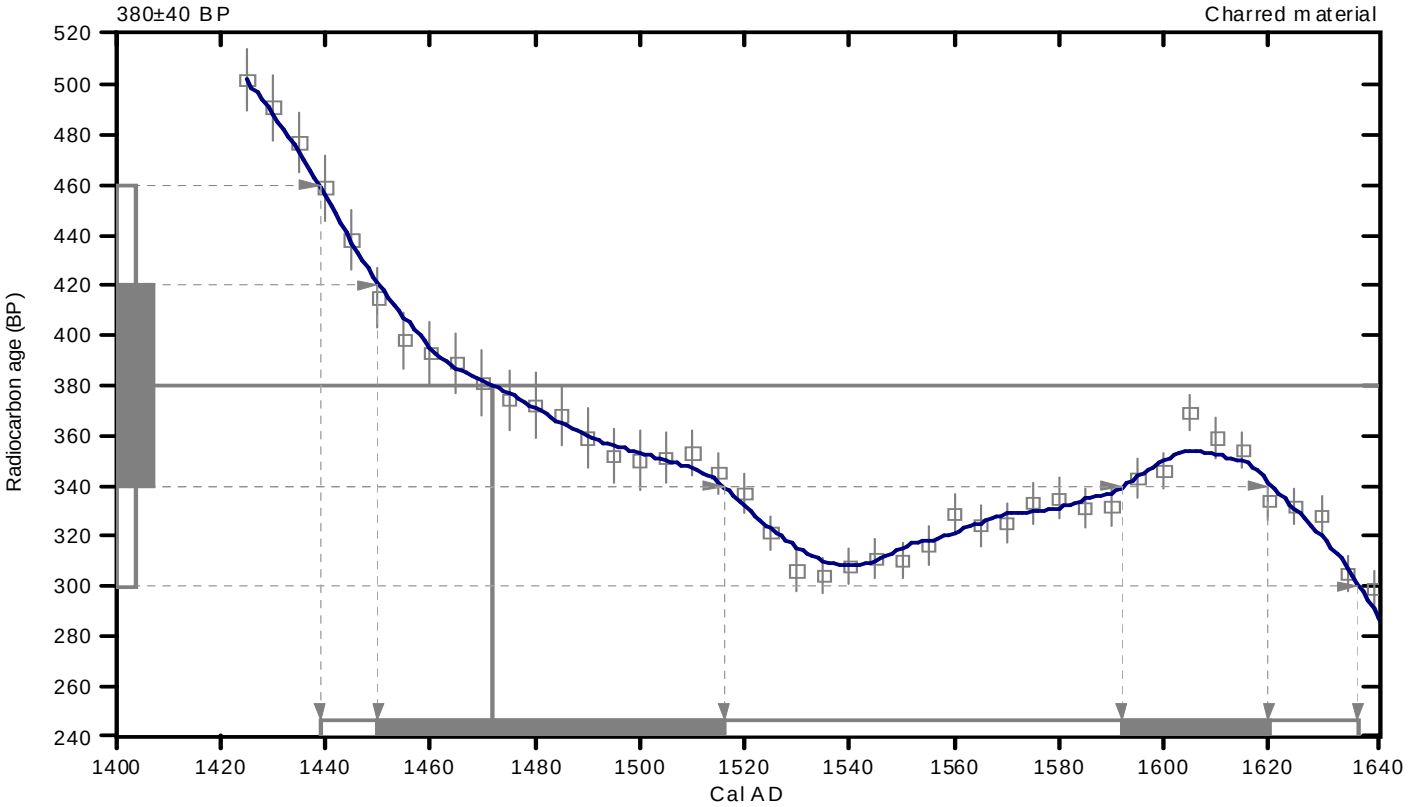
Conventional radiocarbon age: **380±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1440 to 1640 (Cal BP 510 to 310)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1470 (Cal BP 480)

1 Sigma calibrated results: (68% probability) Cal AD 1450 to 1520 (Cal BP 500 to 430) and Cal AD 1590 to 1620 (Cal BP 360 to 330)



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