Beta Analytic Inc.
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June 10, 2011

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

RE: Radiocarbon Dating Results For Samples 2010-042b, 2010-073b, 2010-112d, 2010-142b, 2010-202d, 2010-212h, 2010-263h, 2010-382b, 2010-402h, 2010-612h

Dear Dr. Barton:

Enclosed are the radiocarbon dating results for ten 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.

Our invoice has been sent separately. Thank you for your prior efforts in arranging payment. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

Digital signature on file

BETA ANALYTIC INC.
DR. M.A. TAMERS and MR. D.G. HOOD
4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Loukas Barton

Report Date: 6/10/2011

U.S. National Park Serivce

Material Received: 5/25/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 299600	1190 +/- 30 BP	-25.2 o/oo	1190 +/- 30 BP
SAMPLE : 2010-042b			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 770 to 900 (Cal BP 1180 to 1050)			
Beta - 299601	1940 +/- 30 BP	-23.1 o/oo	1970 +/- 30 BP
SAMPLE : 2010-073b			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 40 to Cal AD 80 (Cal BP 1990 to 1870)			
Beta - 299602	1060 +/- 30 BP	-26.5 o/oo	1040 +/- 30 BP
SAMPLE : 2010-112d			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 970 to 1030 (Cal BP 980 to 920)			
Beta - 299603	1430 +/- 30 BP	-25.4 o/oo	1420 +/- 30 BP
SAMPLE : 2010-142b			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 590 to 660 (Cal BP 1360 to 1290)			

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 Date: 6/10/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 299604	1460 +/- 30 BP	-23.7 o/oo	1480 +/- 30 BP
SAMPLE : 2010-202d			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 540 to 640 (Cal BP 1410 to 1310)			
Beta - 299605	1890 +/- 30 BP	-25.1 o/oo	1890 +/- 30 BP
SAMPLE : 2010-212h			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 60 to 210 (Cal BP 1890 to 1740)			
Beta - 299606	4150 +/- 40 BP	-22.4 o/oo	4190 +/- 40 BP
SAMPLE : 2010-263h			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 2890 to 2830 (Cal BP 4840 to 4780) AND Cal BC 2820 to 2630 (Cal BP 4770 to 4580)			
Beta - 299607	1170 +/- 30 BP	-26.3 o/oo	1150 +/- 30 BP
SAMPLE : 2010-382b			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 780 to 980 (Cal BP 1160 to 970)			

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 Date: 6/10/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 299608	1190 +/- 30 BP	-24.2 o/oo	1200 +/- 30 BP
SAMPLE : 2010-402h			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 720 to 740 (Cal BP 1230 to 1210) AND Cal AD 770 to 890 (Cal BP 1180 to 1060)			
Beta - 299609	1880 +/- 30 BP	-25.0 o/oo	1880 +/- 30 BP
SAMPLE : 2010-612h			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 60 to 220 (Cal BP 1880 to 1730)			

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=-25.2:lab. mult=1)

Laboratory number: **Beta-299600**

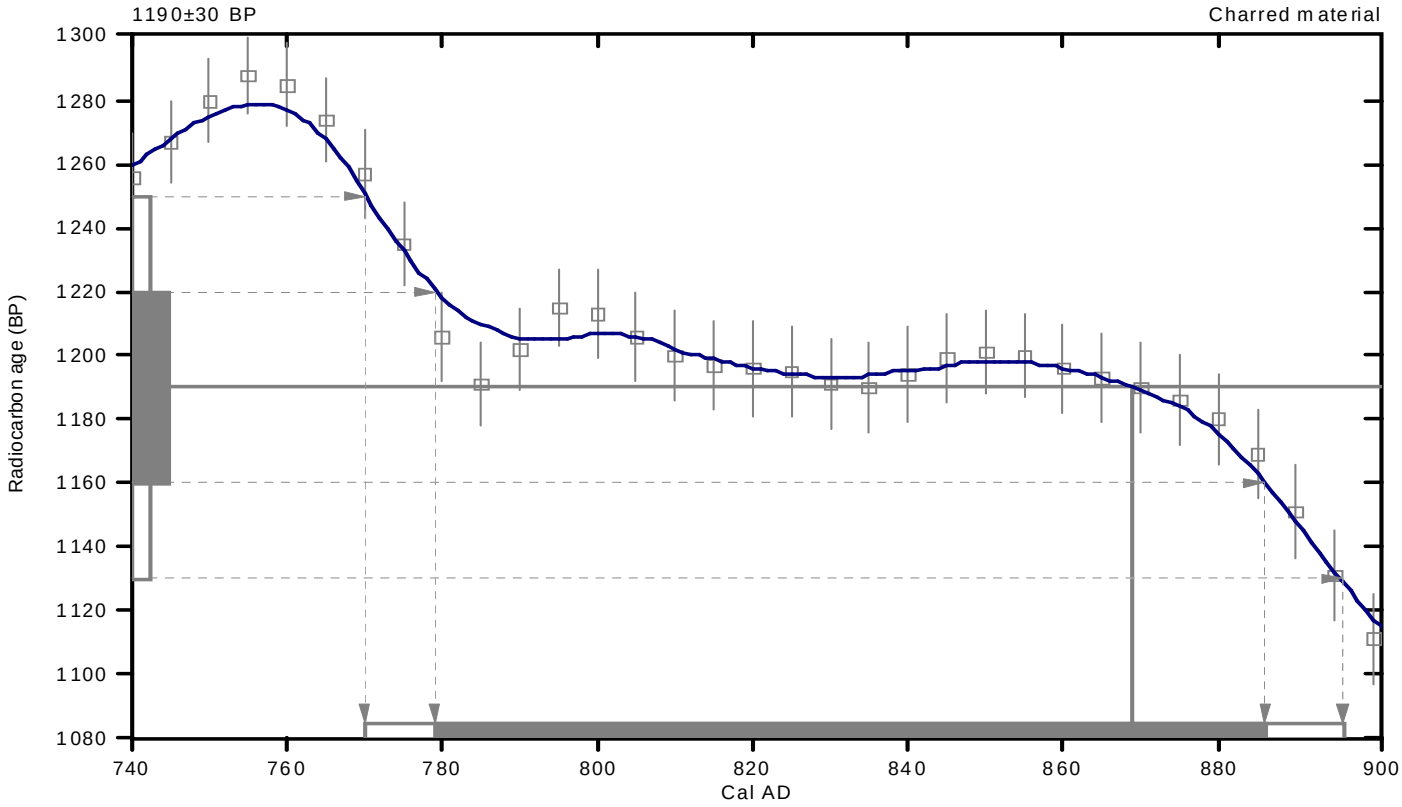
Conventional radiocarbon age: **1190±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 770 to 900 (Cal BP 1180 to 1050)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 870 (Cal BP 1080)

1 Sigma calibrated result: (68% probability) Cal AD 780 to 890 (Cal BP 1170 to 1060)



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=-23.1:lab. mult=1)

Laboratory number: **Beta-299601**

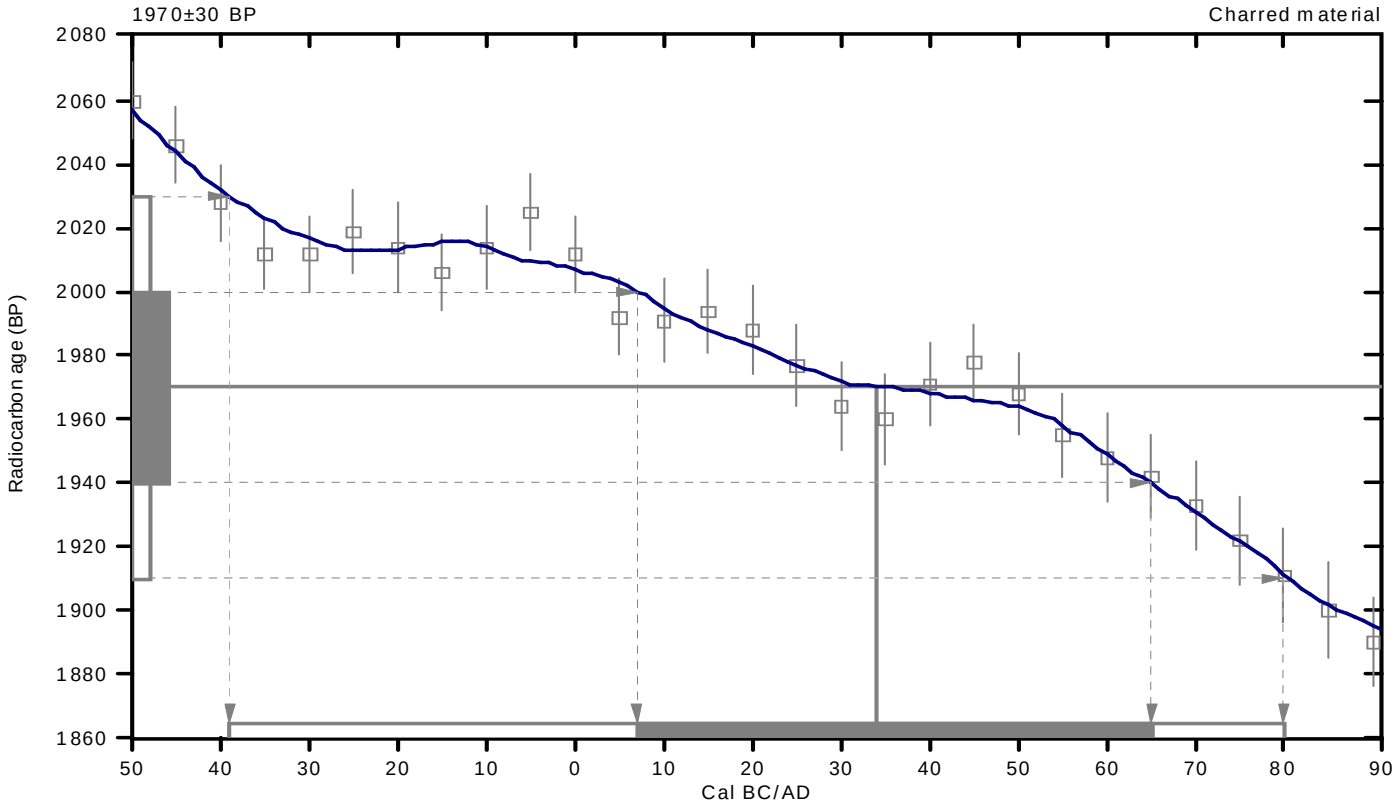
Conventional radiocarbon age: **1970±30 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 40 to Cal AD 80 (Cal BP 1990 to 1870)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 30 (Cal BP 1920)

1 Sigma calibrated result: (68% probability) Cal AD 10 to 60 (Cal BP 1940 to 1880)



References:

Database used

INTCAL04

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Mathematics

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.5:lab. mult=1)

Laboratory number: **Beta-299602**

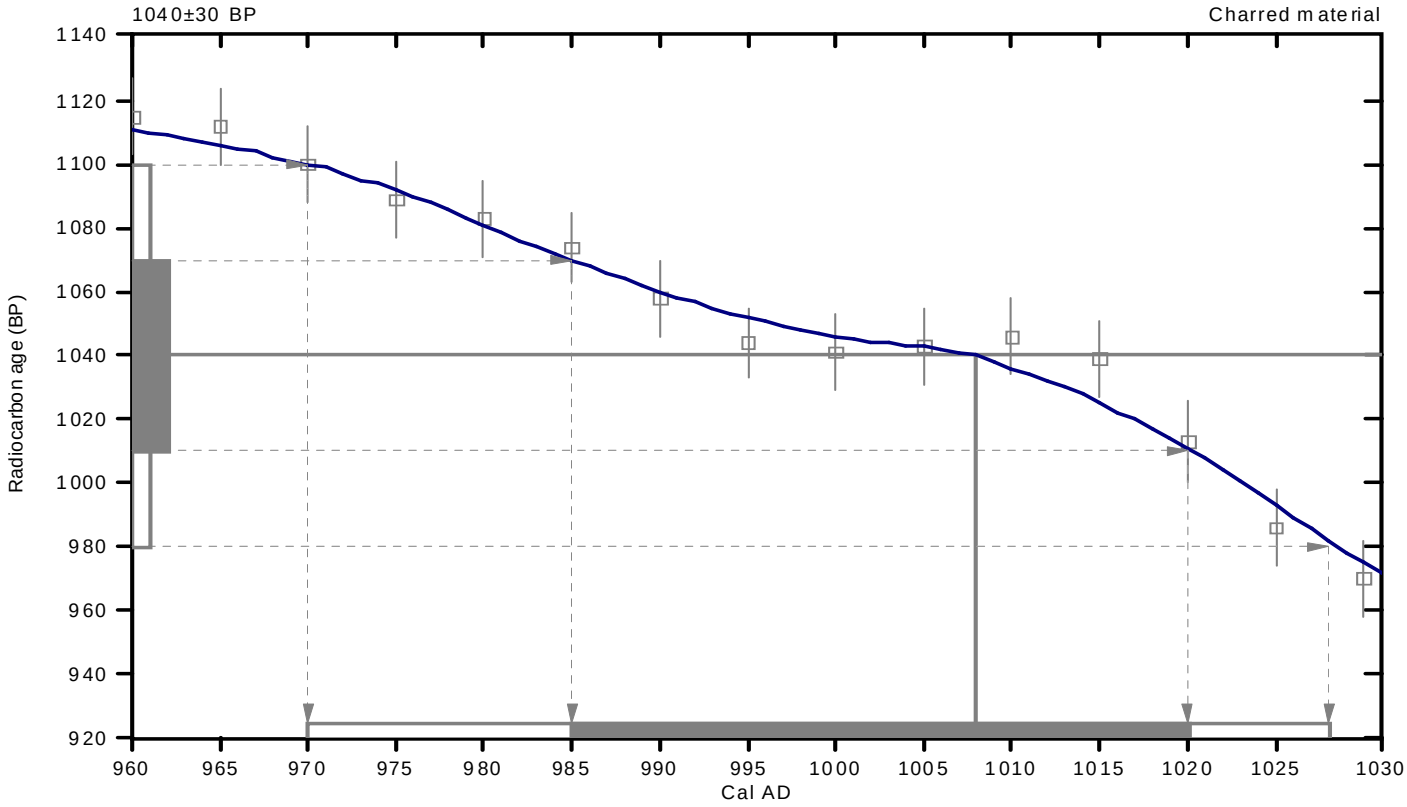
Conventional radiocarbon age: **1040±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 970 to 1030 (Cal BP 980 to 920)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1010 (Cal BP 940)

1 Sigma calibrated result: (68% probability) Cal AD 980 to 1020 (Cal BP 960 to 930)



References:

Database used

INTCAL04

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Mathematics

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.4:lab. mult=1)

Laboratory number: **Beta-299603**

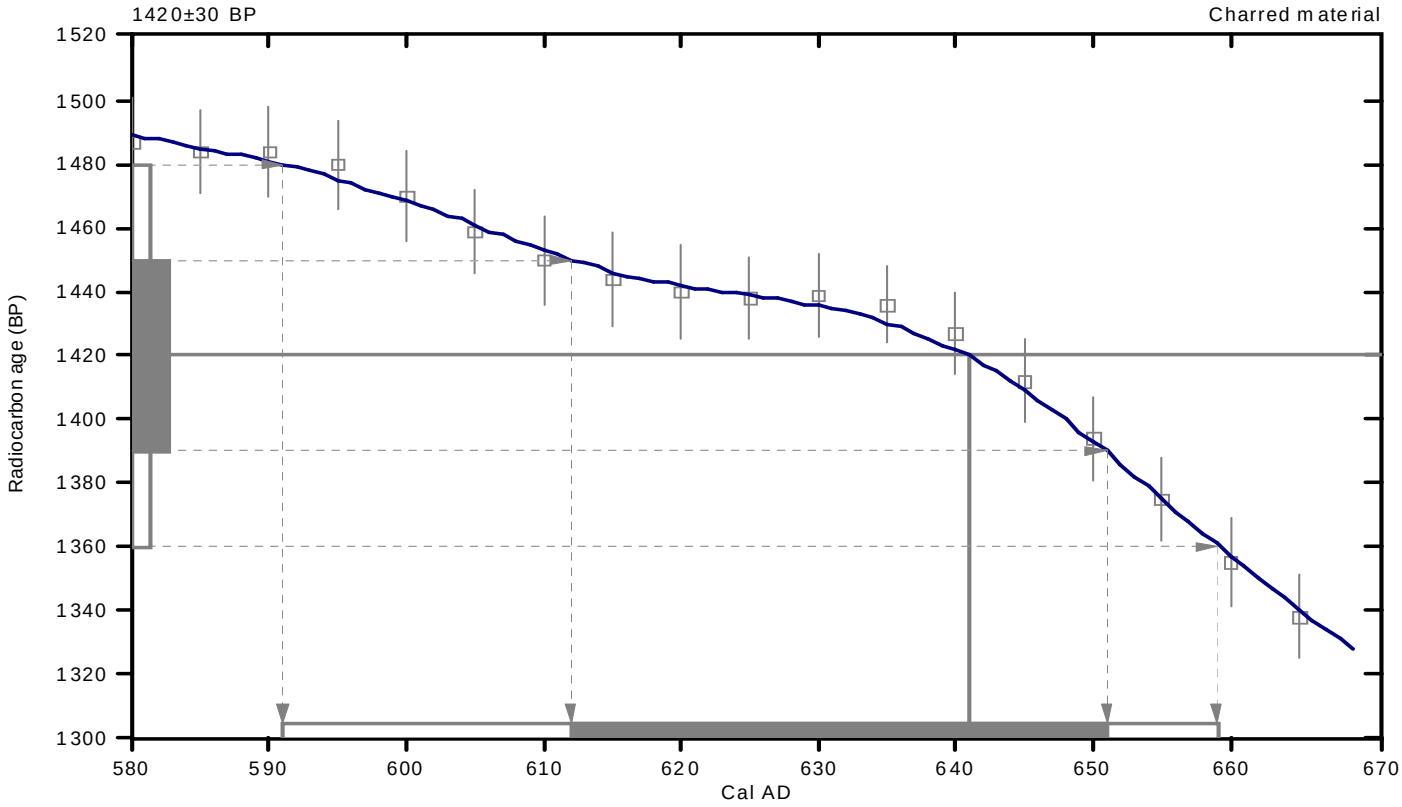
Conventional radiocarbon age: **1420±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 590 to 660 (Cal BP 1360 to 1290)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 640 (Cal BP 1310)

1 Sigma calibrated result: (68% probability) Cal AD 610 to 650 (Cal BP 1340 to 1300)



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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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number: **Beta-299604**

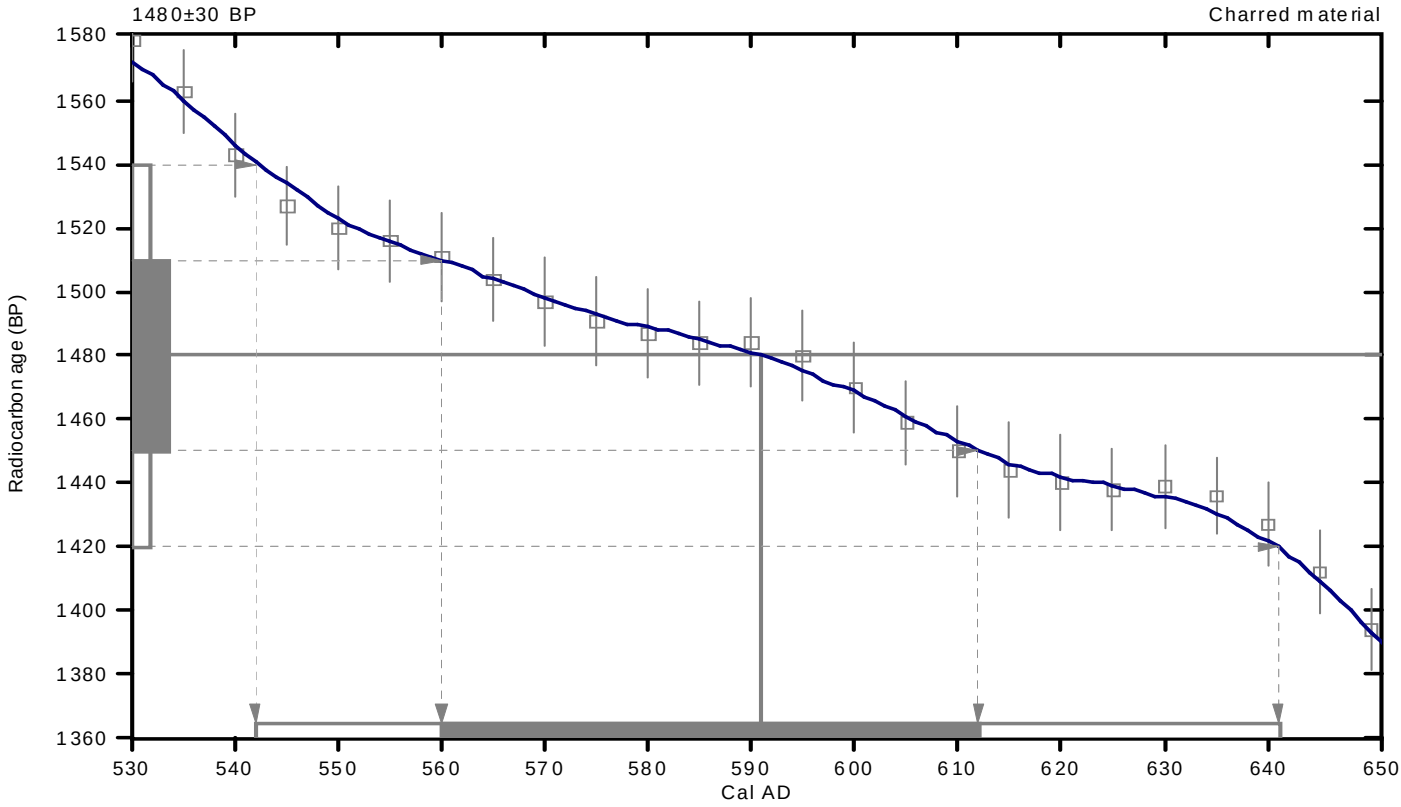
Conventional radiocarbon age: **1480±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 540 to 640 (Cal BP 1410 to 1310)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 590 (Cal BP 1360)

1 Sigma calibrated result: (68% probability) Cal AD 560 to 610 (Cal BP 1390 to 1340)



References:

Database used

INTCAL04

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.1:lab. mult=1)

Laboratory number: **Beta-299605**

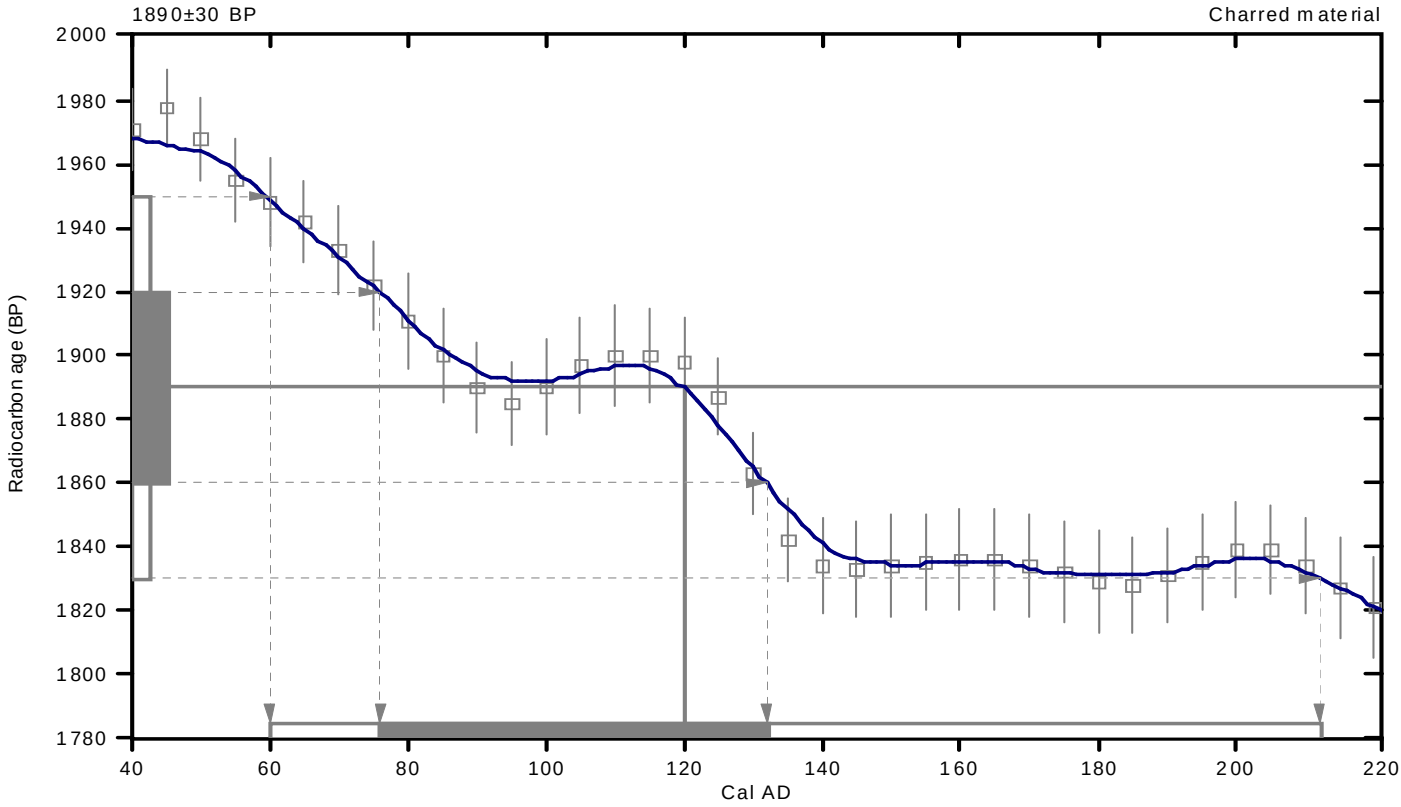
Conventional radiocarbon age: **1890±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 60 to 210 (Cal BP 1890 to 1740)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 120 (Cal BP 1830)

1 Sigma calibrated result: (68% probability) Cal AD 80 to 130 (Cal BP 1870 to 1820)



References:

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-22.4:lab. mult=1)

Laboratory number: **Beta-299606**

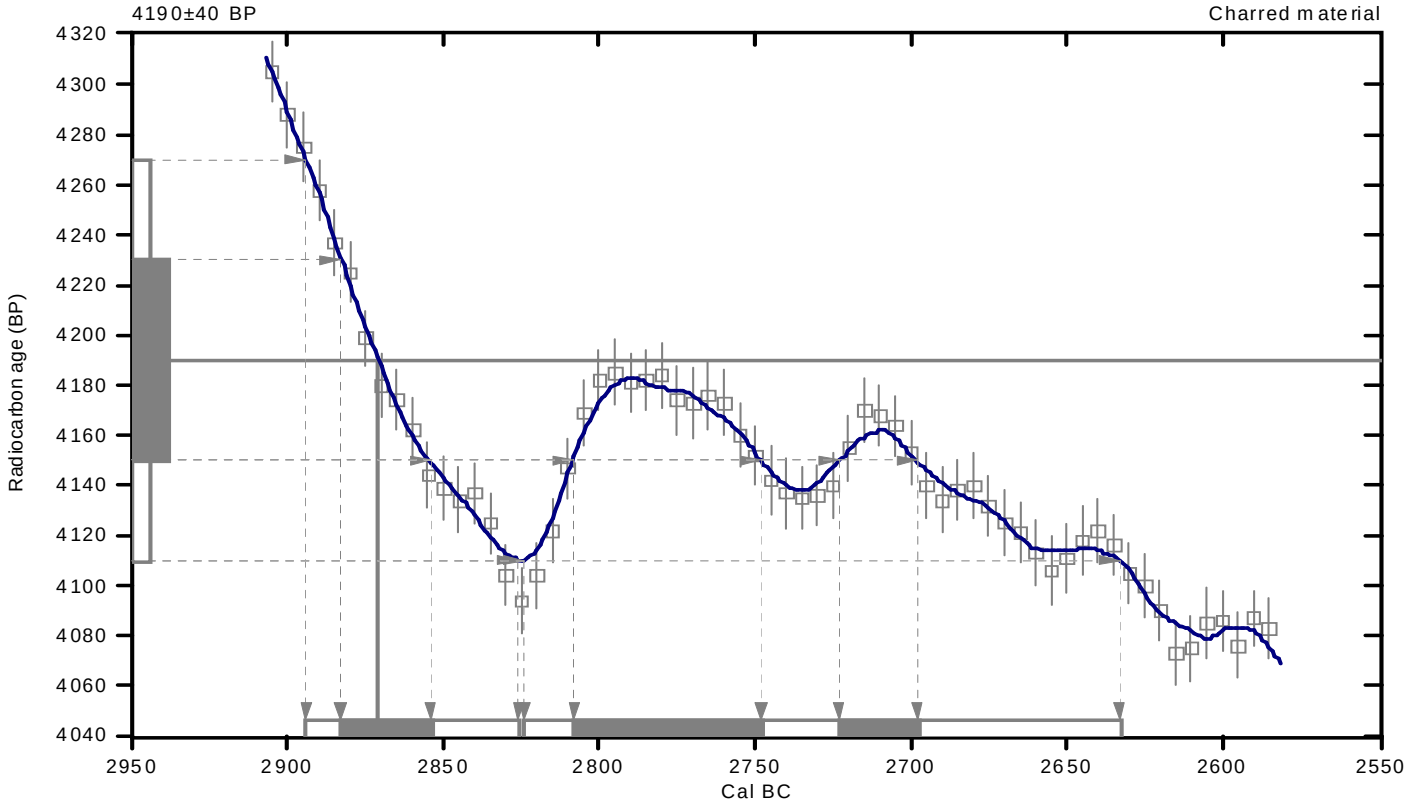
Conventional radiocarbon age: **4190±40 BP**

2 Sigma calibrated results: (95% probability) **Cal BC 2890 to 2830 (Cal BP 4840 to 4780) and Cal BC 2820 to 2630 (Cal BP 4770 to 4580)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 2870 (Cal BP 4820)

1 Sigma calibrated results: (68% probability) Cal BC 2880 to 2850 (Cal BP 4830 to 4800) and Cal BC 2810 to 2750 (Cal BP 4760 to 4700) and Cal BC 2720 to 2700 (Cal BP 4670 to 4650)



References:

Database used

INTCAL04

Calibration Database

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Mathematics

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.3:lab. mult=1)

Laboratory number: **Beta-299607**

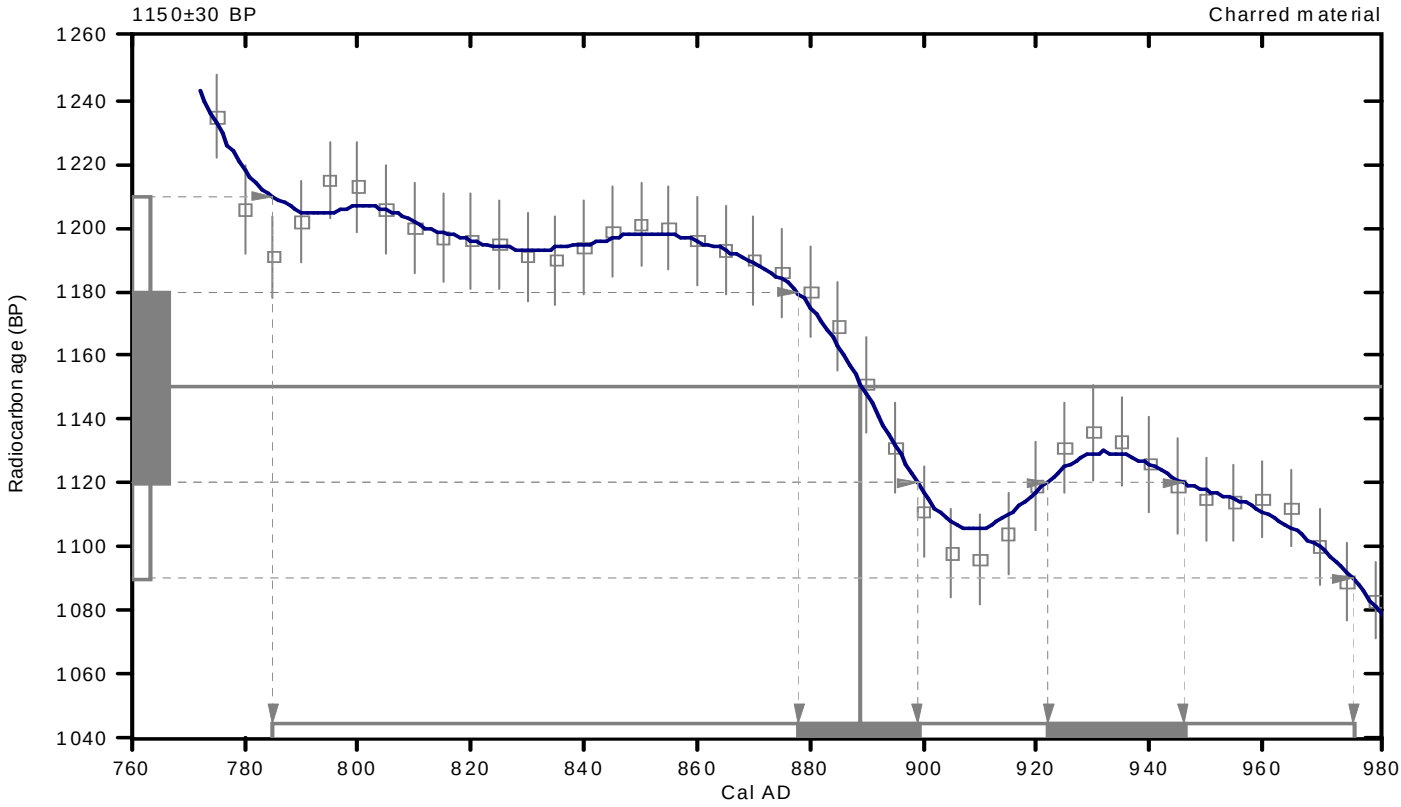
Conventional radiocarbon age: **1150±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 780 to 980 (Cal BP 1160 to 970)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 890 (Cal BP 1060)

1 Sigma calibrated results: (68% probability) Cal AD 880 to 900 (Cal BP 1070 to 1050) and Cal AD 920 to 950 (Cal BP 1030 to 1000)



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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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.2:lab. mult=1)

Laboratory number: **Beta-299608**

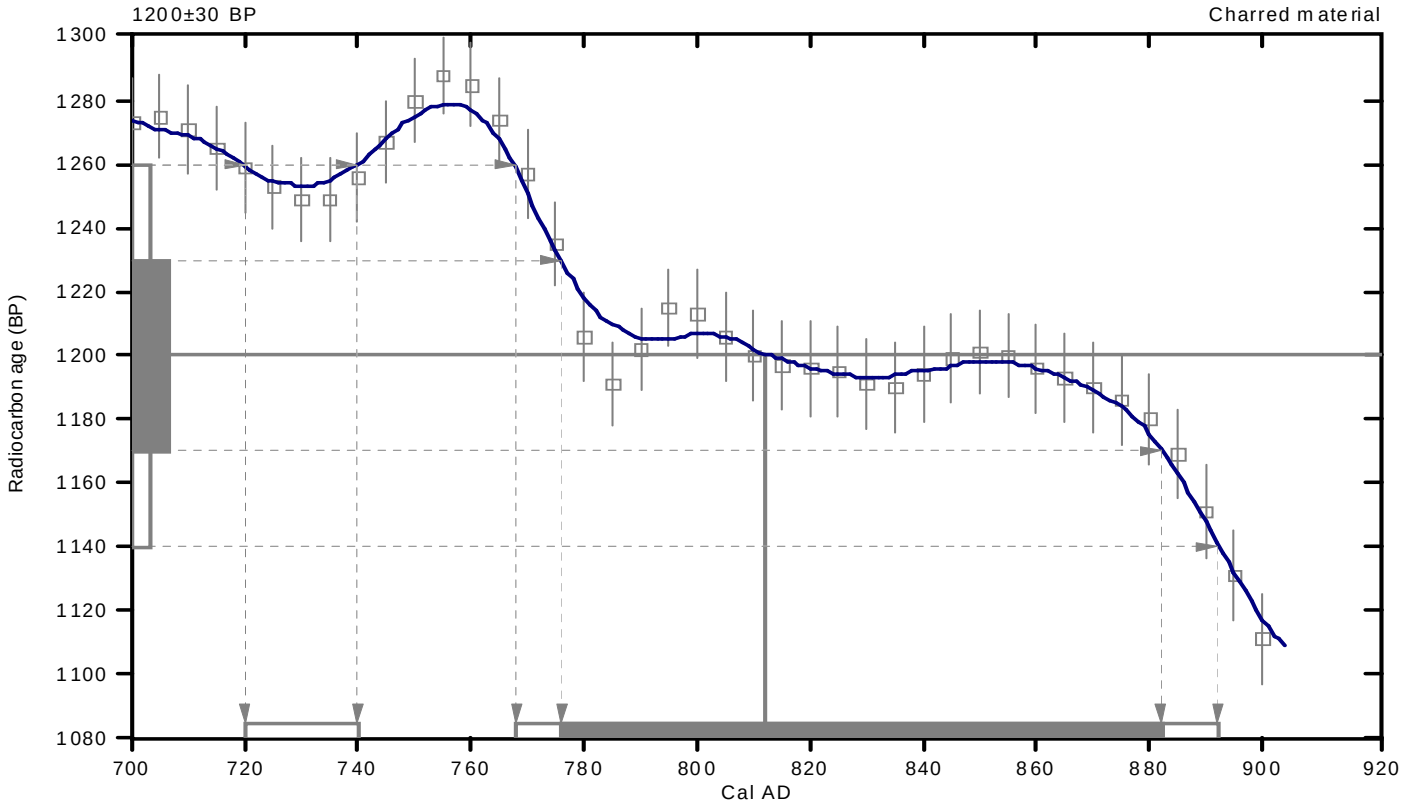
Conventional radiocarbon age: **1200±30 BP**

2 Sigma calibrated results: (95% probability) **Cal AD 720 to 740 (Cal BP 1230 to 1210) and Cal AD 770 to 890 (Cal BP 1180 to 1060)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 810 (Cal BP 1140)

1 Sigma calibrated result: (68% probability) Cal AD 780 to 880 (Cal BP 1170 to 1070)



References:

Database used

INTCAL04

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Mathematics

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-299609**

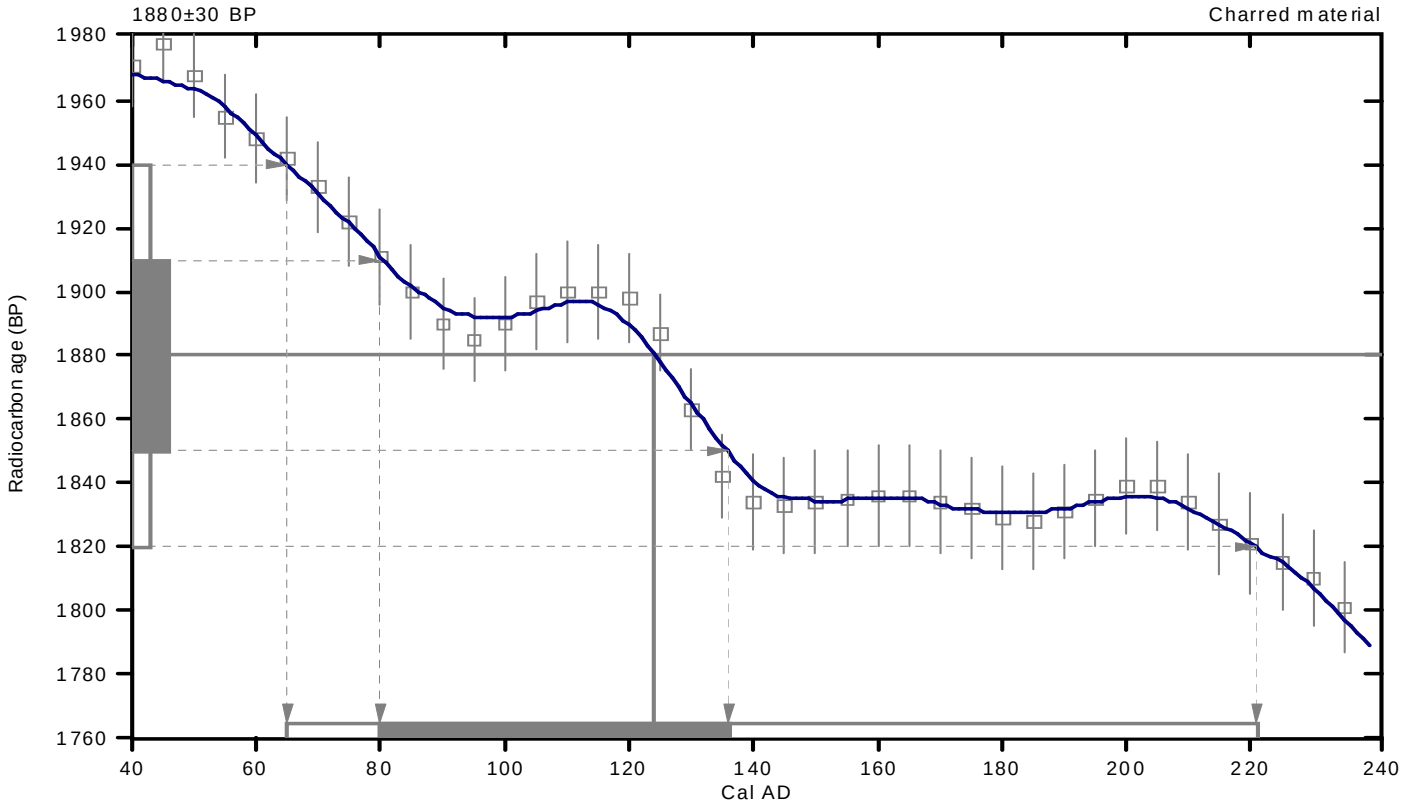
Conventional radiocarbon age: **1880±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 60 to 220 (Cal BP 1880 to 1730)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 120 (Cal BP 1830)

1 Sigma calibrated result: (68% probability) Cal AD 80 to 140 (Cal BP 1870 to 1810)



References:

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Mathematics

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