10.1.9 Radiocarbon Dates by Beta Analytic, Inc.

Beta Analytic Inc.
4985 SW 74 Court
Miami, Florida 33155 USA
Tel: 305 667 5167
Fax: 305 663 0964
Beta@radiocarbon.com
www.radiocarbon.com

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

Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

September 13, 2011

Dr. Melissa Diamanti
Archaeological and Historical
Consultants, Incorporated
101 North Pennsylvania Avenue
P.O. Box 482
Centre Hall, PA 16828
USA

RE: Radiocarbon Dating Results For Samples Fea. 9 AS 391, Fea 180 AS 1053, Fea 185 AS 440, Fea 195 AS 770, Fea 279 AS 468, Fea 295 AS 1077, Fea 330 AS 905, Fea 341 AS 755, Fea 371 AS 523, Fea 376 AS 605

Dear Dr. Diamanti:

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.

The cost of the analysis was charged to the American Express card provided. A receipt is enclosed with the mailed report copy. Thank you. 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
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. Melissa Diamanti

Report Date: 9/13/2011

Archaeological and Historical Consultants, Incorporated

Material Received: 8/31/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 304996 SAMPLE : Fea. 9 AS 391 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 1260 to 1000 (Cal BP 3210 to 2940)	2920 +/- 40 BP	-25.5 o/oo	2910 +/- 40 BP
Beta - 304997 SAMPLE : Fea 180 AS 1053 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 1430 to 1310 (Cal BP 3380 to 3260)	3130 +/- 30 BP	-27.1 o/oo	3100 +/- 30 BP
Beta - 304998 SAMPLE : Fea 185 AS 440 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 2870 to 2570 (Cal BP 4820 to 4520)	4130 +/- 40 BP	-25.5 o/oo	4120 +/- 40 BP
Beta - 304999 SAMPLE : Fea 195 AS 770 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 1020 to 840 (Cal BP 2980 to 2790)	2790 +/- 40 BP	-25.3 o/oo	2790 +/- 40 BP

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. Melissa Diamanti

Report Date: 9/13/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 305000	1180 +/- 30 BP	-25.9 o/oo	1170 +/- 30 BP

SAMPLE : Fea 279 AS 468
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal AD 780 to 900 (Cal BP 1170 to 1050) AND Cal AD 920 to 960 (Cal BP 1040 to 990)

Beta - 305001	1180 +/- 30 BP	-25.8 o/oo	1170 +/- 30 BP

SAMPLE : Fea 295 AS 1077
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal AD 780 to 900 (Cal BP 1170 to 1050) AND Cal AD 920 to 960 (Cal BP 1040 to 990)

Beta - 305002	3740 +/- 30 BP	-25.8 o/oo	3730 +/- 30 BP

SAMPLE : Fea 330 AS 905
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal BC 2200 to 2030 (Cal BP 4150 to 3980)

Beta - 305003	3730 +/- 40 BP	-24.7 o/oo	3730 +/- 40 BP

SAMPLE : Fea 341 AS 755
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal BC 2280 to 2250 (Cal BP 4230 to 4200) AND Cal BC 2220 to 2020 (Cal BP 4160 to 3970)

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. Melissa Diamanti

Report Date: 9/13/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 305004	3750 +/- 30 BP	-25.6 o/oo	3740 +/- 30 BP

SAMPLE : Fea 371 AS 523
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal BC 2260 to 2260 (Cal BP 4220 to 4210) AND Cal BC 2210 to 2110 (Cal BP 4160 to 4060)
Cal BC 2100 to 2040 (Cal BP 4050 to 3990)

Beta - 305005	3420 +/- 40 BP	-26.3 o/oo	3400 +/- 40 BP

SAMPLE : Fea 376 AS 605
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal BC 1860 to 1850 (Cal BP 3810 to 3800) AND Cal BC 1770 to 1610 (Cal BP 3720 to 3560)

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.

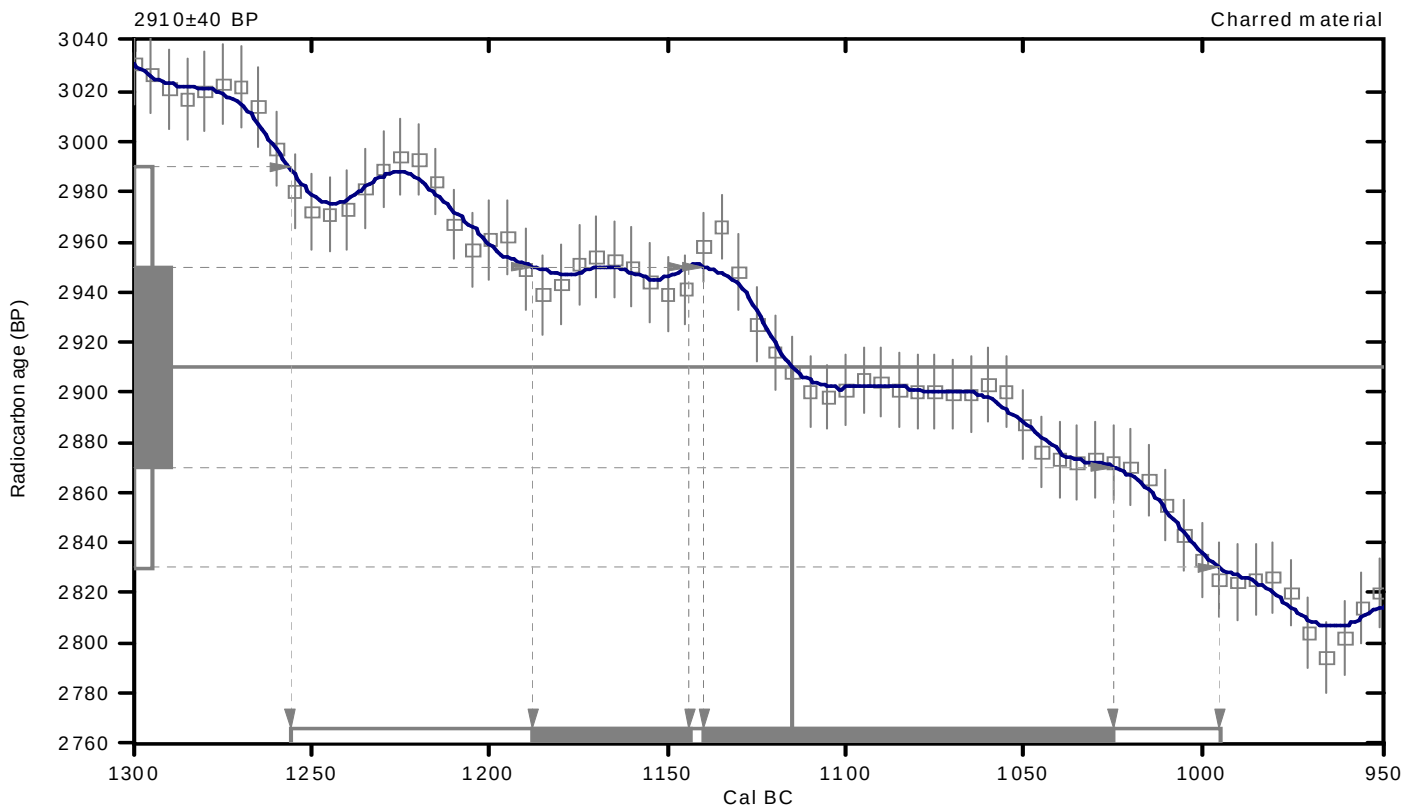
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.5:lab. mult=1)

Laboratory number:	**Beta-304996**
Conventional radiocarbon age:	**2910±40 BP**
2 Sigma calibrated result: (95% probability)	**Cal BC 1260 to 1000 (Cal BP 3210 to 2940)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 1120 (Cal BP 3060)
1 Sigma calibrated results: (68% probability)	Cal BC 1190 to 1140 (Cal BP 3140 to 3090) and Cal BC 1140 to 1020 (Cal BP 3090 to 2980)



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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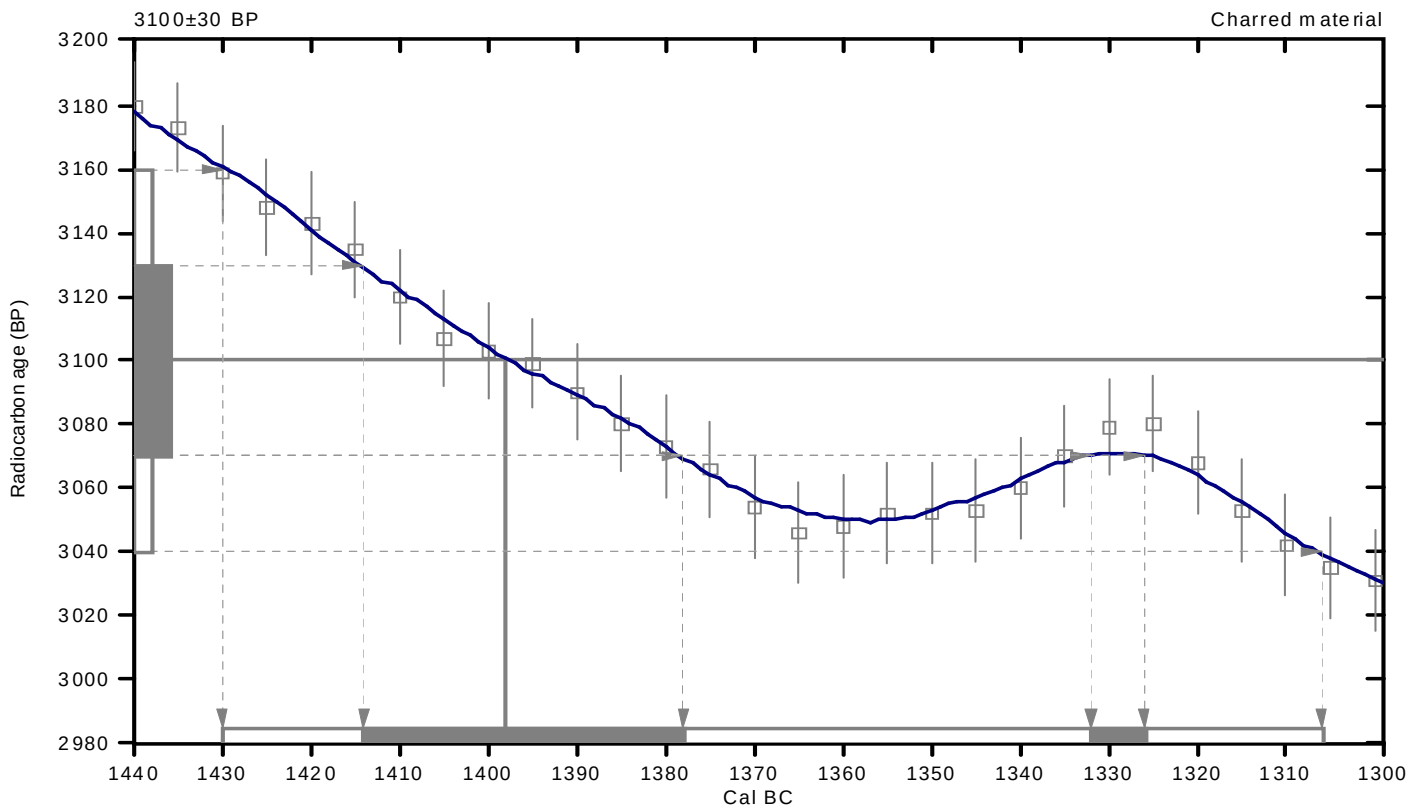
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-27.1:lab. mult=1)

Laboratory number:	**Beta-304997**
Conventional radiocarbon age:	**3100±30 BP**
2 Sigma calibrated result: (95% probability)	**Cal BC 1430 to 1310 (Cal BP 3380 to 3260)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 1400 (Cal BP 3350)
1 Sigma calibrated results: (68% probability)	Cal BC 1410 to 1380 (Cal BP 3360 to 3330) and Cal BC 1330 to 1330 (Cal BP 3280 to 3280)



References:

Database used

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Mathematics

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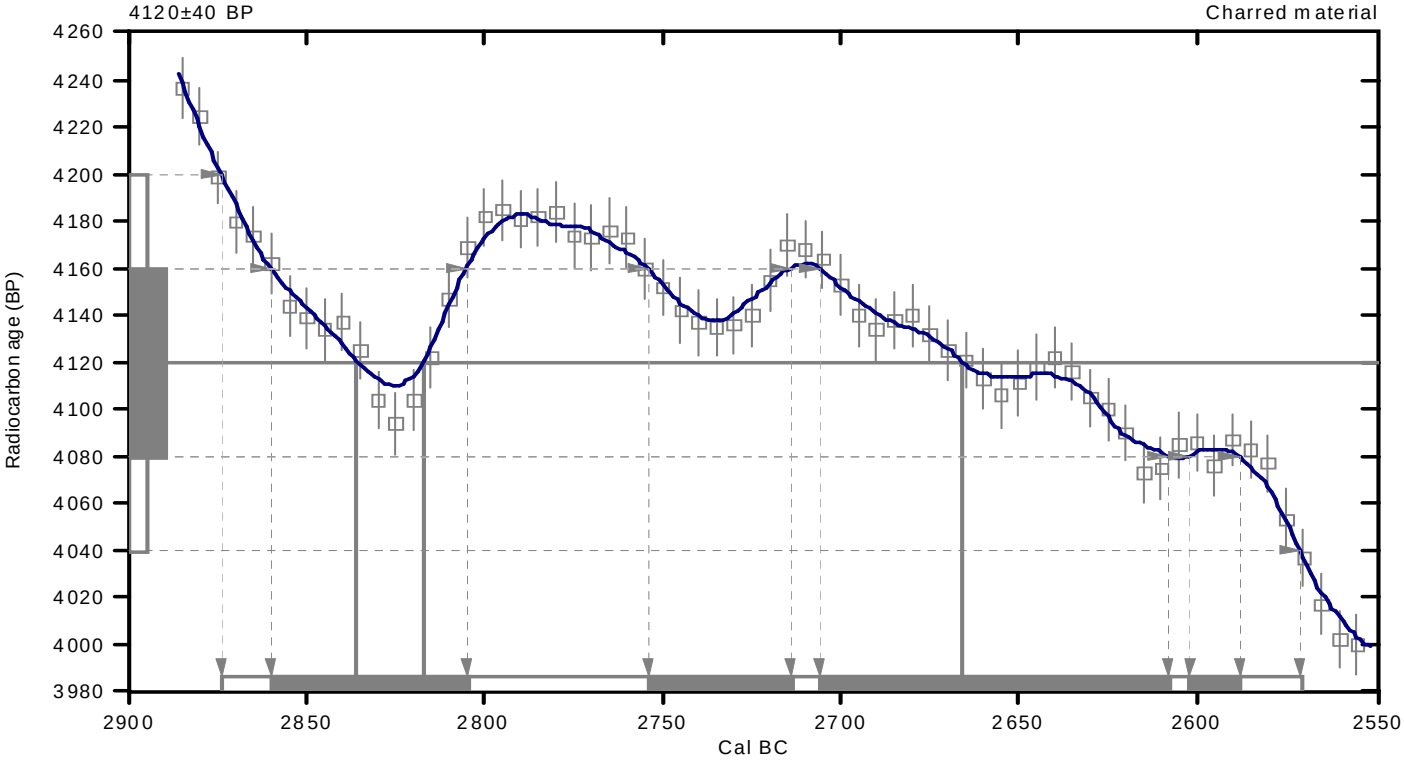
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.5:lab. mult=1)

Laboratory number:	**Beta-304998**
Conventional radiocarbon age:	**4120±40 BP**
2 Sigma calibrated result: (95% probability)	**Cal BC 2870 to 2570 (Cal BP 4820 to 4520)**

Intercept data

Intercepts of radiocarbon age with calibration curve:	Cal BC 2840 (Cal BP 4790) and Cal BC 2820 (Cal BP 4770) and Cal BC 2670 (Cal BP 4620)
1 Sigma calibrated results: (68% probability)	Cal BC 2860 to 2800 (Cal BP 4810 to 4760) and Cal BC 2750 to 2710 (Cal BP 4700 to 4660) and Cal BC 2710 to 2610 (Cal BP 4660 to 4560) and Cal BC 2600 to 2590 (Cal BP 4550 to 4540)



References:

Database used

INTCAL04

Calibration Database

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

Mathematics

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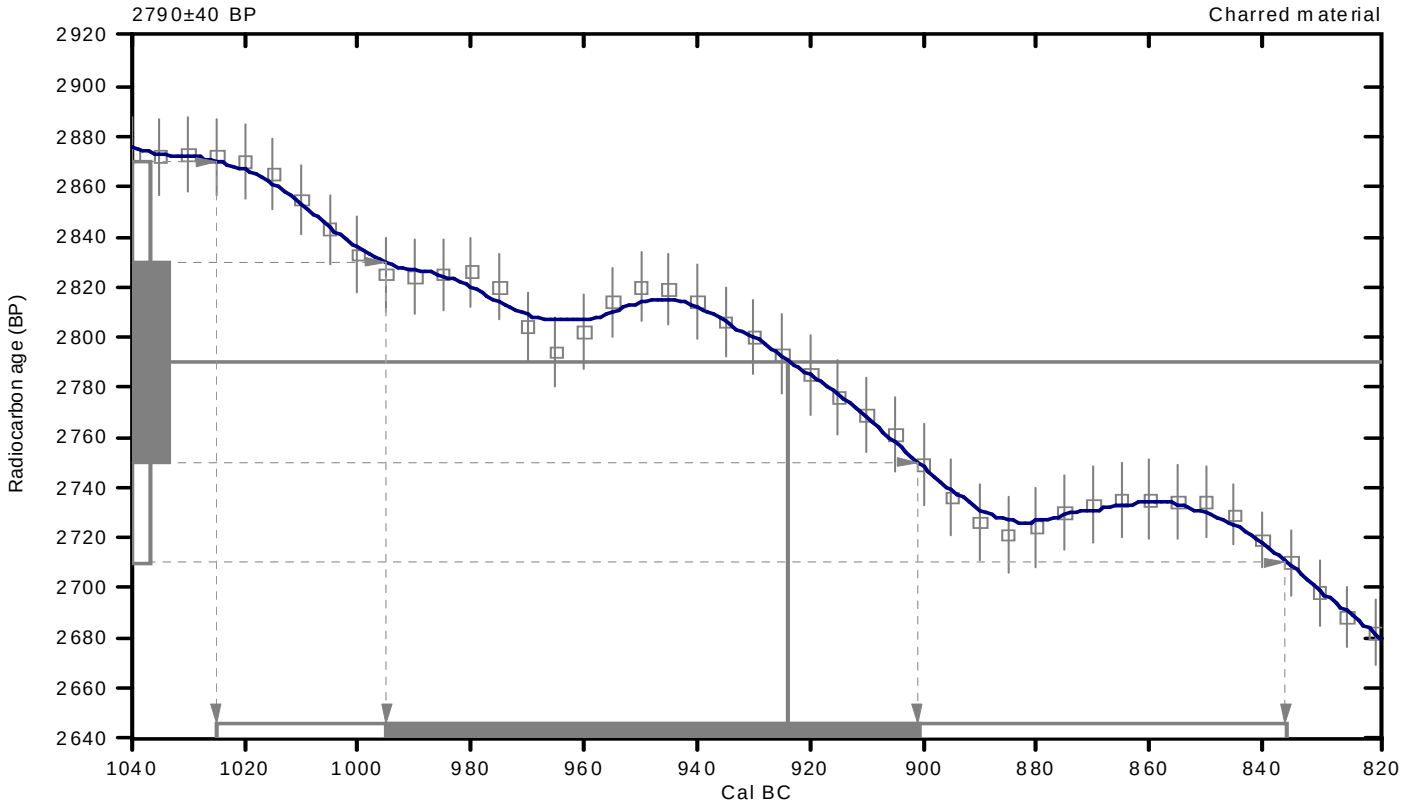
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.3:lab. mult=1)

Laboratory number:	**Beta-304999**
Conventional radiocarbon age:	**2790±40 BP**
2 Sigma calibrated result: (95% probability)	**Cal BC 1020 to 840 (Cal BP 2980 to 2790)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 920 (Cal BP 2870)
1 Sigma calibrated result: (68% probability)	Cal BC 1000 to 900 (Cal BP 2940 to 2850)



References:

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Mathematics

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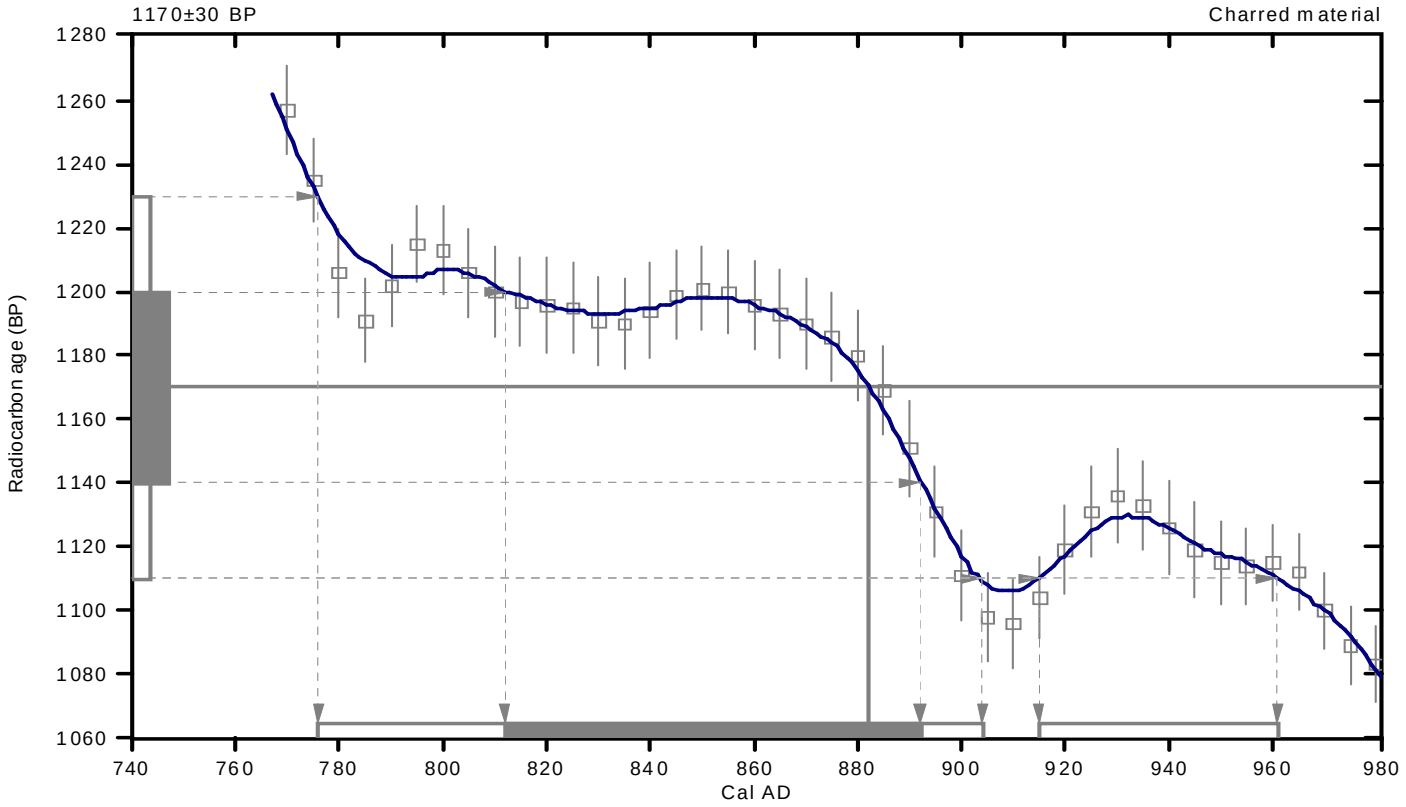
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number:	**Beta-305000**
Conventional radiocarbon age:	**1170±30 BP**
2 Sigma calibrated results: (95% probability)	**Cal AD 780 to 900 (Cal BP 1170 to 1050) and Cal AD 920 to 960 (Cal BP 1040 to 990)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal AD 880 (Cal BP 1070)
1 Sigma calibrated result: (68% probability)	Cal AD 810 to 890 (Cal BP 1140 to 1060)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

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Mathematics

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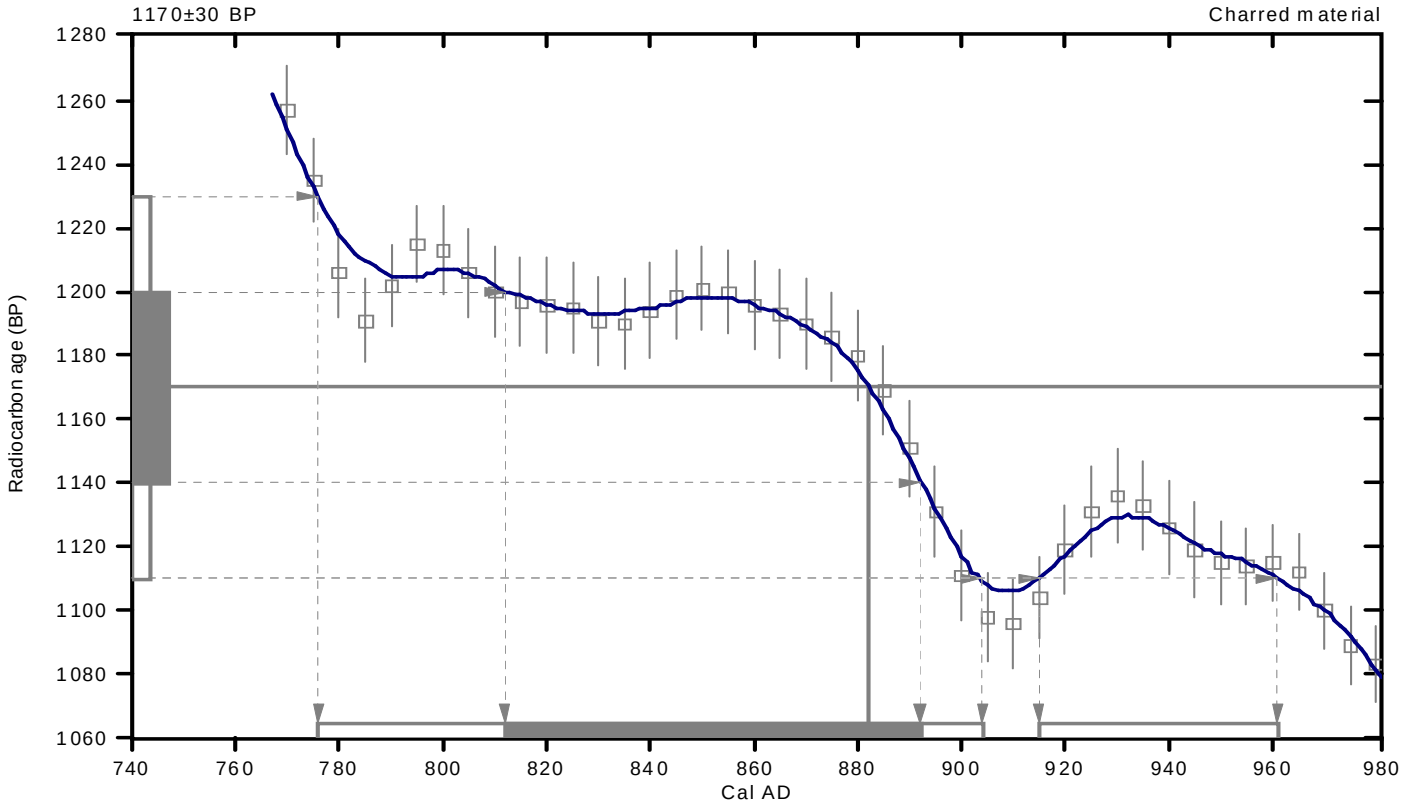
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.8:lab. mult=1)

Laboratory number:	**Beta-305001**
Conventional radiocarbon age:	**1170±30 BP**
2 Sigma calibrated results: (95% probability)	**Cal AD 780 to 900 (Cal BP 1170 to 1050) and Cal AD 920 to 960 (Cal BP 1040 to 990)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal AD 880 (Cal BP 1070)
1 Sigma calibrated result: (68% probability)	Cal AD 810 to 890 (Cal BP 1140 to 1060)



References:

Database used

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Mathematics

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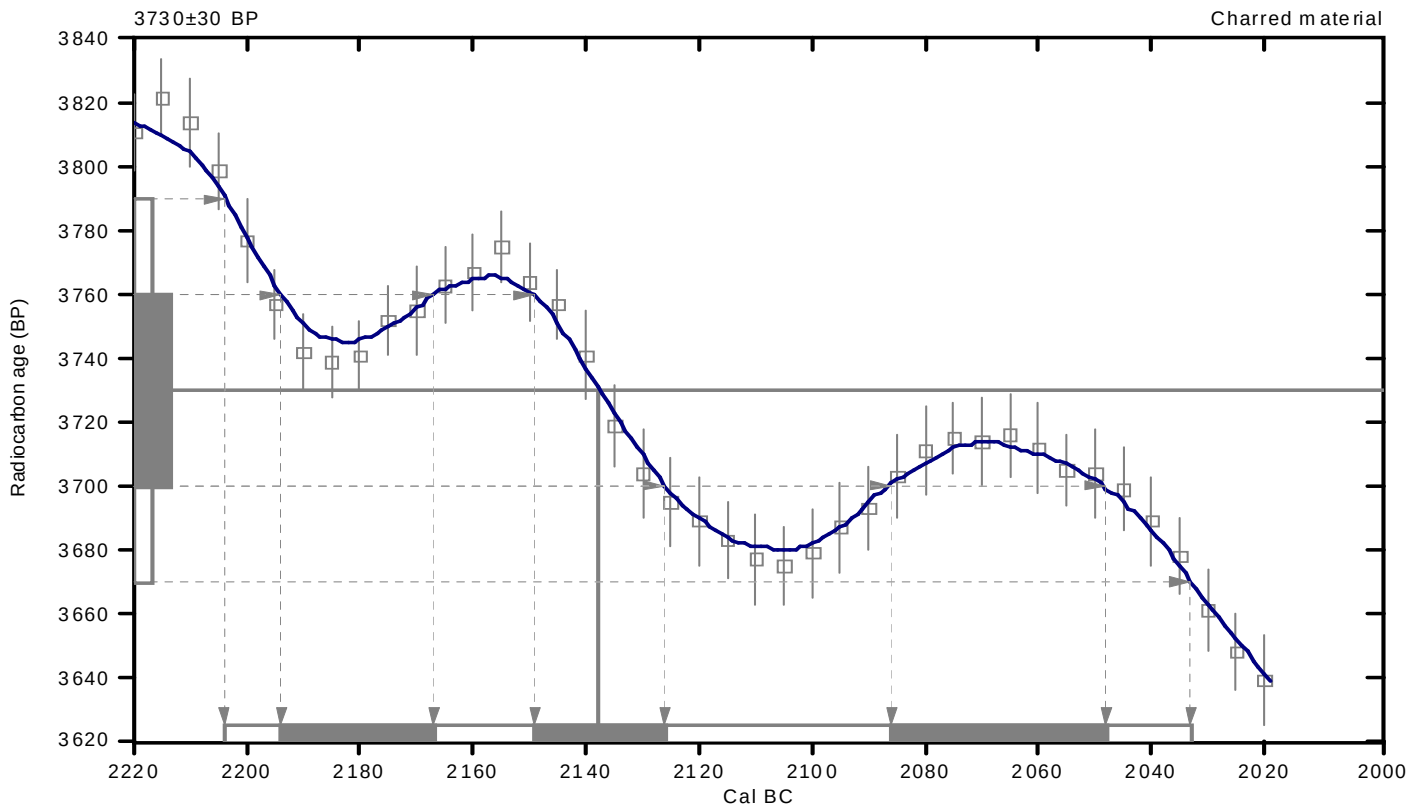
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.8:lab. mult=1)

Laboratory number:	**Beta-305002**
Conventional radiocarbon age:	**3730±30 BP**
2 Sigma calibrated result: (95% probability)	**Cal BC 2200 to 2030 (Cal BP 4150 to 3980)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 2140 (Cal BP 4090)
1 Sigma calibrated results: (68% probability)	Cal BC 2190 to 2170 (Cal BP 4140 to 4120) and Cal BC 2150 to 2130 (Cal BP 4100 to 4080) and Cal BC 2090 to 2050 (Cal BP 4040 to 4000)



References:

Database used

INTCAL04

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Mathematics

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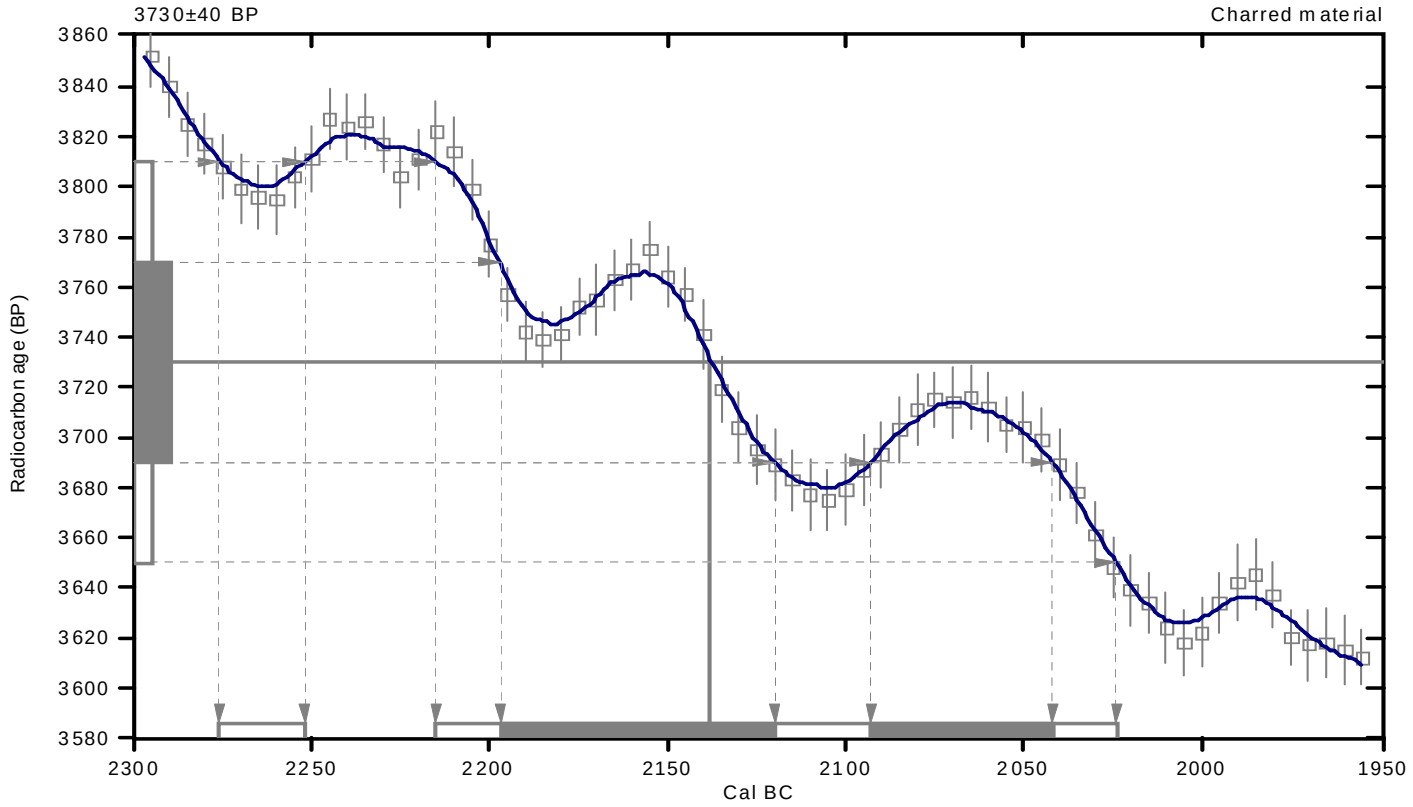
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.7:lab. mult=1)

Laboratory number:	**Beta-305003**
Conventional radiocarbon age:	**3730±40 BP**
2 Sigma calibrated results: **(95% probability)**	**Cal BC 2280 to 2250 (Cal BP 4230 to 4200) and Cal BC 2220 to 2020 (Cal BP 4160 to 3970)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 2140 (Cal BP 4090)
1 Sigma calibrated results: (68% probability)	Cal BC 2200 to 2120 (Cal BP 4150 to 4070) and Cal BC 2090 to 2040 (Cal BP 4040 to 3990)



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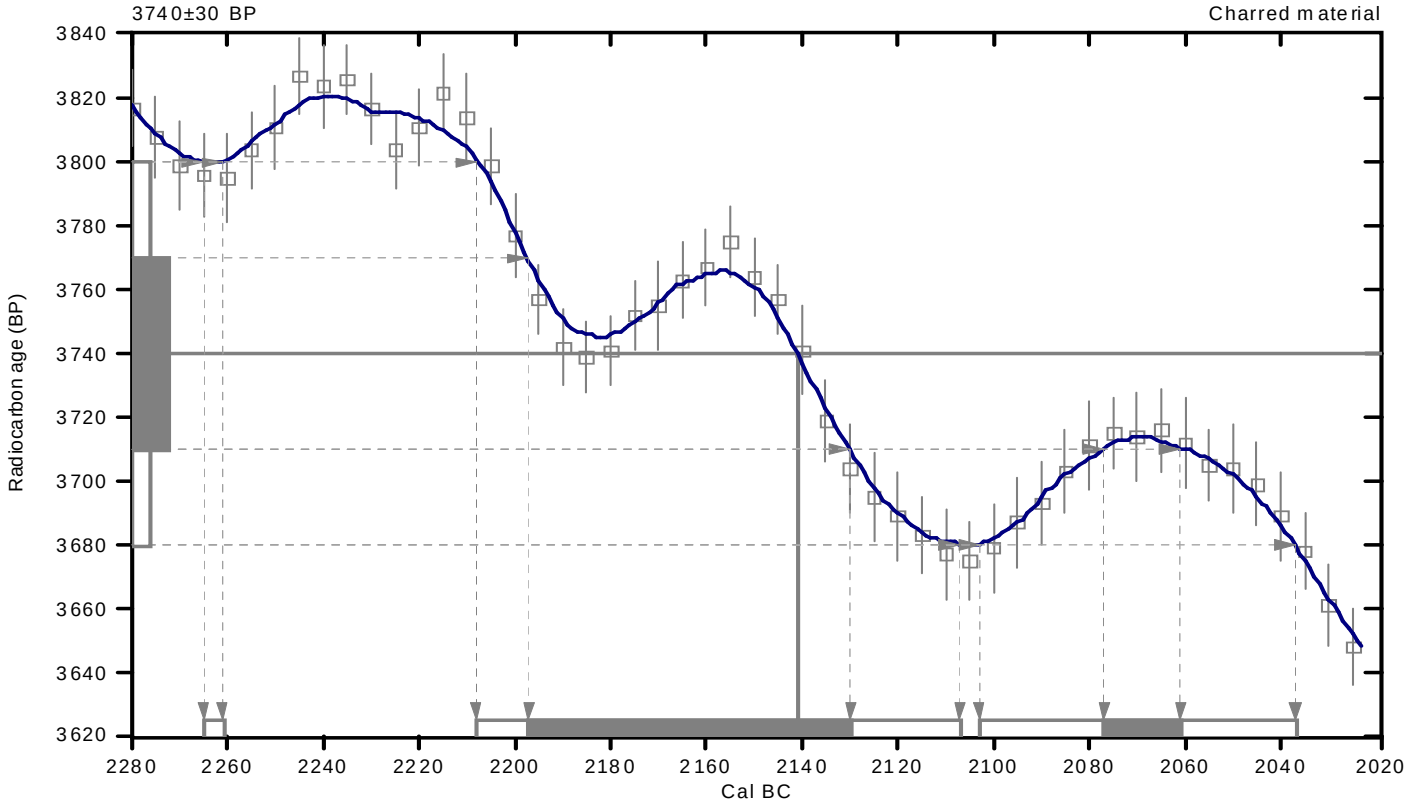
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number:	**Beta-305004**
Conventional radiocarbon age:	**3740±30 BP**
2 Sigma calibrated results: **(95% probability)**	**Cal BC 2260 to 2260 (Cal BP 4220 to 4210) and** **Cal BC 2210 to 2110 (Cal BP 4160 to 4060) and** **Cal BC 2100 to 2040 (Cal BP 4050 to 3990)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 2140 (Cal BP 4090)
1 Sigma calibrated results: (68% probability)	Cal BC 2200 to 2130 (Cal BP 4150 to 4080) and Cal BC 2080 to 2060 (Cal BP 4030 to 4010)



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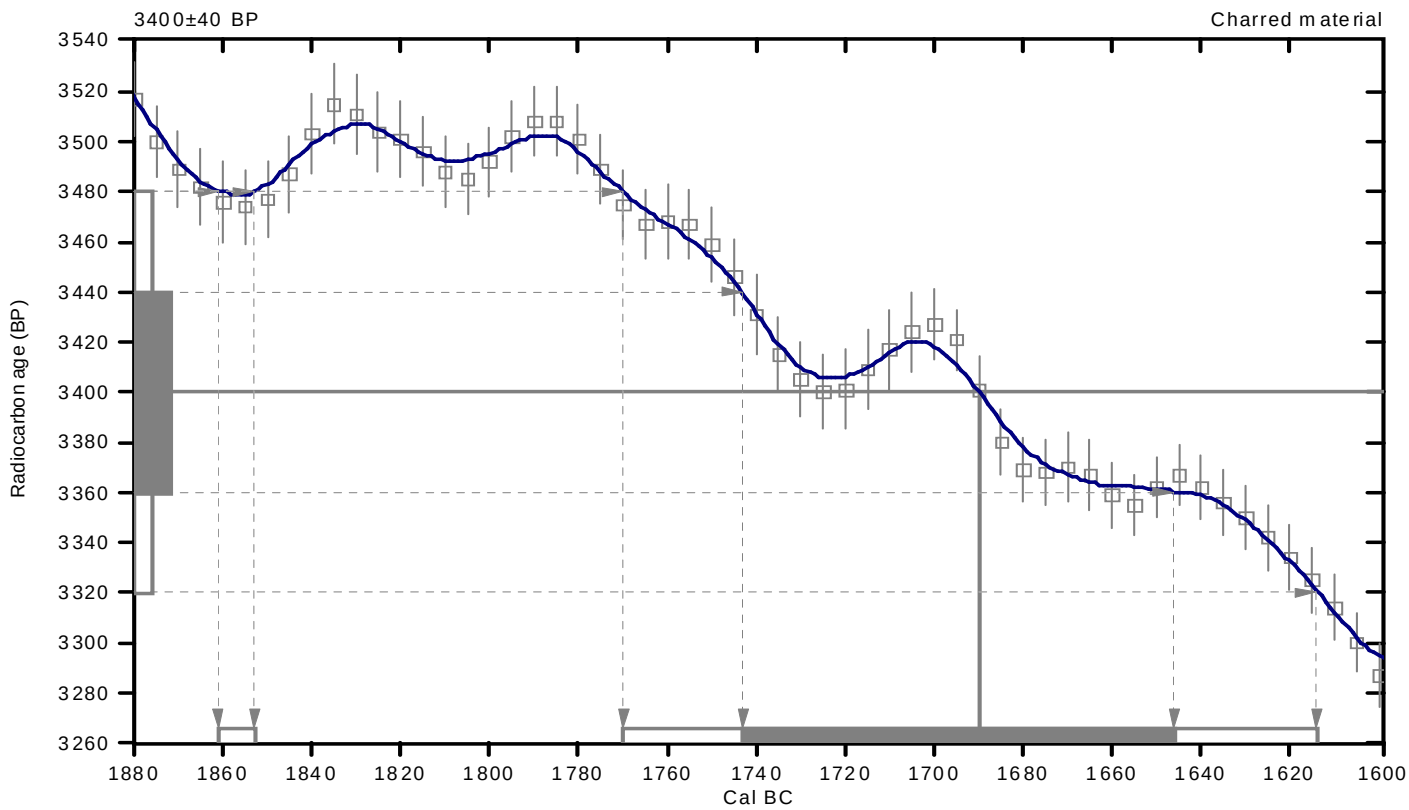
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number:	**Beta-305005**
Conventional radiocarbon age:	**3400±40 BP**
2 Sigma calibrated results: (95% probability)	**Cal BC 1860 to 1850 (Cal BP 3810 to 3800) and Cal BC 1770 to 1610 (Cal BP 3720 to 3560)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 1690 (Cal BP 3640)
1 Sigma calibrated result: (68% probability)	Cal BC 1740 to 1650 (Cal BP 3690 to 3600)



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

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

Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

October 20, 2011

Dr. Melissa Diamanti
Archaeological and Historical Consultants,
Incorporated
101 North Pennsylvania Avenue
P.O. Box 482
Centre Hall, PA 16828
USA

RE: Radiocarbon Dating Results For Samples Fea 10 AS 364, Fea 10 Bag 402, Fea 23 AS 382, Fea 227 AS 495, Fea 233 AS 501, Fea 376 Bag 983, Fea 419 AS 603, Fea 178 AS 680, Fea 331 AS 802

Dear Dr. Diamanti:

Enclosed are the radiocarbon dating results for nine 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 American Express 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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beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Melissa Diamanti

Report Date: 10/20/2011

Archaeological and Historical Consultants, Incorporated

Material Received: 10/11/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 307300	330 +/- 30 BP	-24.7 o/oo	330 +/- 30 BP
SAMPLE : Fea 10 AS 364			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1460 to 1650 (Cal BP 490 to 300)			
Beta - 307301	410 +/- 30 BP	-1.8 o/oo	790 +/- 30 BP
SAMPLE : Fea 10 Bag 402			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (shell): acid etch			
2 SIGMA CALIBRATION : Cal AD 1470 to 1560 (Cal BP 480 to 390)			
Beta - 307302	3770 +/- 30 BP	-24.0 o/oo	3790 +/- 30 BP
SAMPLE : Fea 23 AS 382			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 2290 to 2140 (Cal BP 4240 to 4090)			
Beta - 307303	2780 +/- 30 BP	-24.3 o/oo	2790 +/- 30 BP
SAMPLE : Fea 227 AS 495			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 1010 to 890 (Cal BP 2960 to 2840) AND Cal BC 880 to 850 (Cal BP 2820 to 2800)			

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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beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Melissa Diamanti

Report Date: 10/20/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 307304	3280 +/- 30 BP	-25.6 o/oo	3270 +/- 30 BP
SAMPLE : Fea 233 AS 501			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 1620 to 1490 (Cal BP 3570 to 3440) AND Cal BC 1470 to 1460 (Cal BP 3420 to 3410)			
Beta - 307305	100.5 +/- 0.4 pMC	-1.4 o/oo	350 +/- 30 BP
SAMPLE : Fea 376 Bag 983			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (shell): acid etch			
2 SIGMA CALIBRATION : Cal AD Post 1950			
Beta - 307306	3410 +/- 30 BP	-24.9 o/oo	3410 +/- 30 BP
SAMPLE : Fea 419 AS 603			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 1770 to 1630 (Cal BP 3720 to 3580)			
Beta - 307307	260 +/- 30 BP	-24.6 o/oo	270 +/- 30 BP
SAMPLE : Fea 178 AS 680			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1520 to 1570 (Cal BP 430 to 380) AND Cal AD 1590 to 1590 (Cal BP 360 to 360) Cal AD 1630 to 1670 (Cal BP 320 to 280) AND Cal AD 1780 to 1800 (Cal BP 170 to 160) AND Cal AD 1950 to 1950 (Cal BP 0 to 0)			

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. Melissa Diamanti

Report Date: 10/20/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 307308	3660 +/- 30 BP	-24.6 o/oo	3670 +/- 30 BP

SAMPLE : Fea 331 AS 802
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid
2 SIGMA CALIBRATION : Cal BC 2140 to 1950 (Cal BP 4090 to 3900)

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.

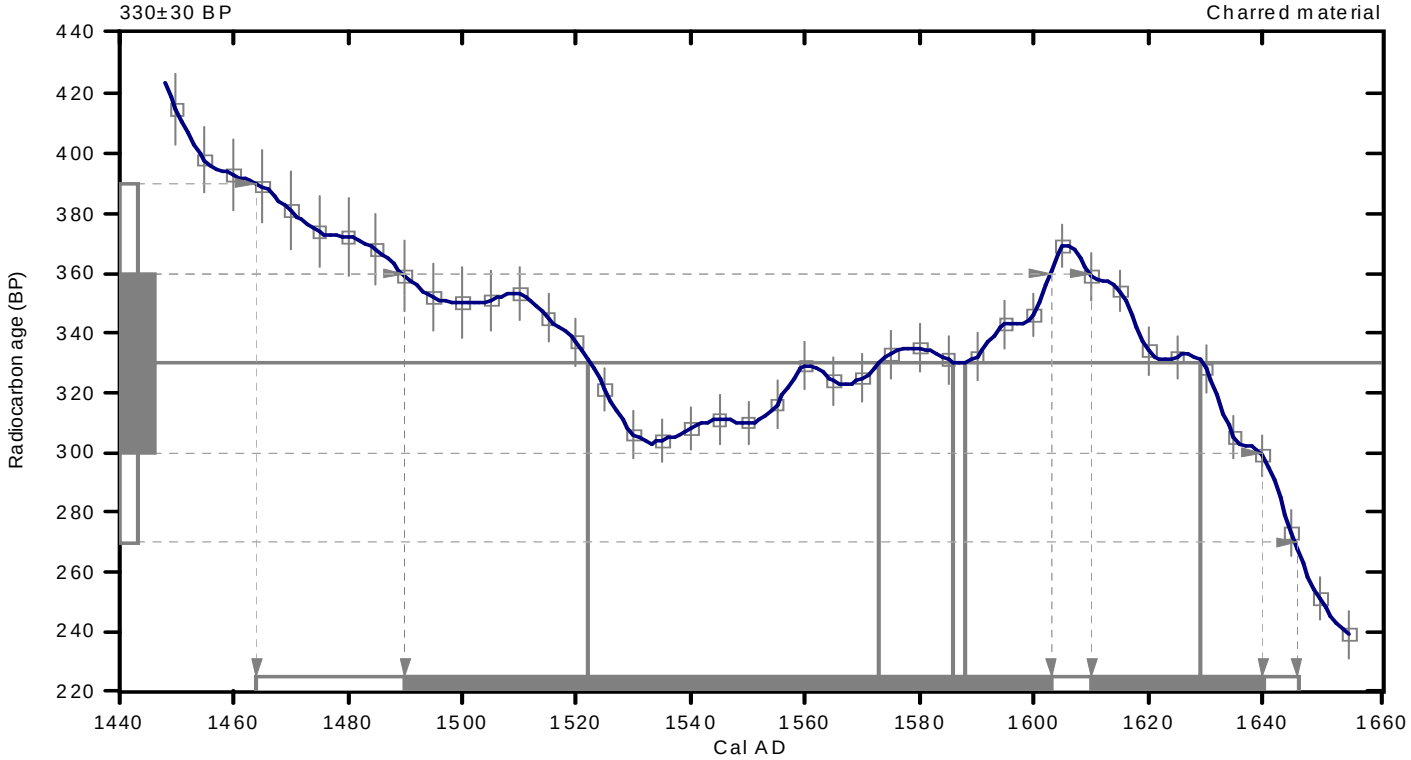
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.7:lab. mult=1)

Laboratory number:	**Beta-307300**
Conventional radiocarbon age:	**330±30 BP**
2 Sigma calibrated result: (95% probability)	**Cal AD 1460 to 1650 (Cal BP 490 to 300)**

Intercept data

Intercepts of radiocarbon age with calibration curve:	Cal AD 1520 (Cal BP 430) and Cal AD 1570 (Cal BP 380) and Cal AD 1590 (Cal BP 360) and Cal AD 1590 (Cal BP 360) and Cal AD 1630 (Cal BP 320)
1 Sigma calibrated results: (68% probability)	Cal AD 1490 to 1600 (Cal BP 460 to 350) and Cal AD 1610 to 1640 (Cal BP 340 to 310)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-1.8:Delta-R=0±0:Glob res=-200 to 500:lab. mult=1)

Laboratory number: **Beta-307301**

Conventional radiocarbon age: **790±30 BP**

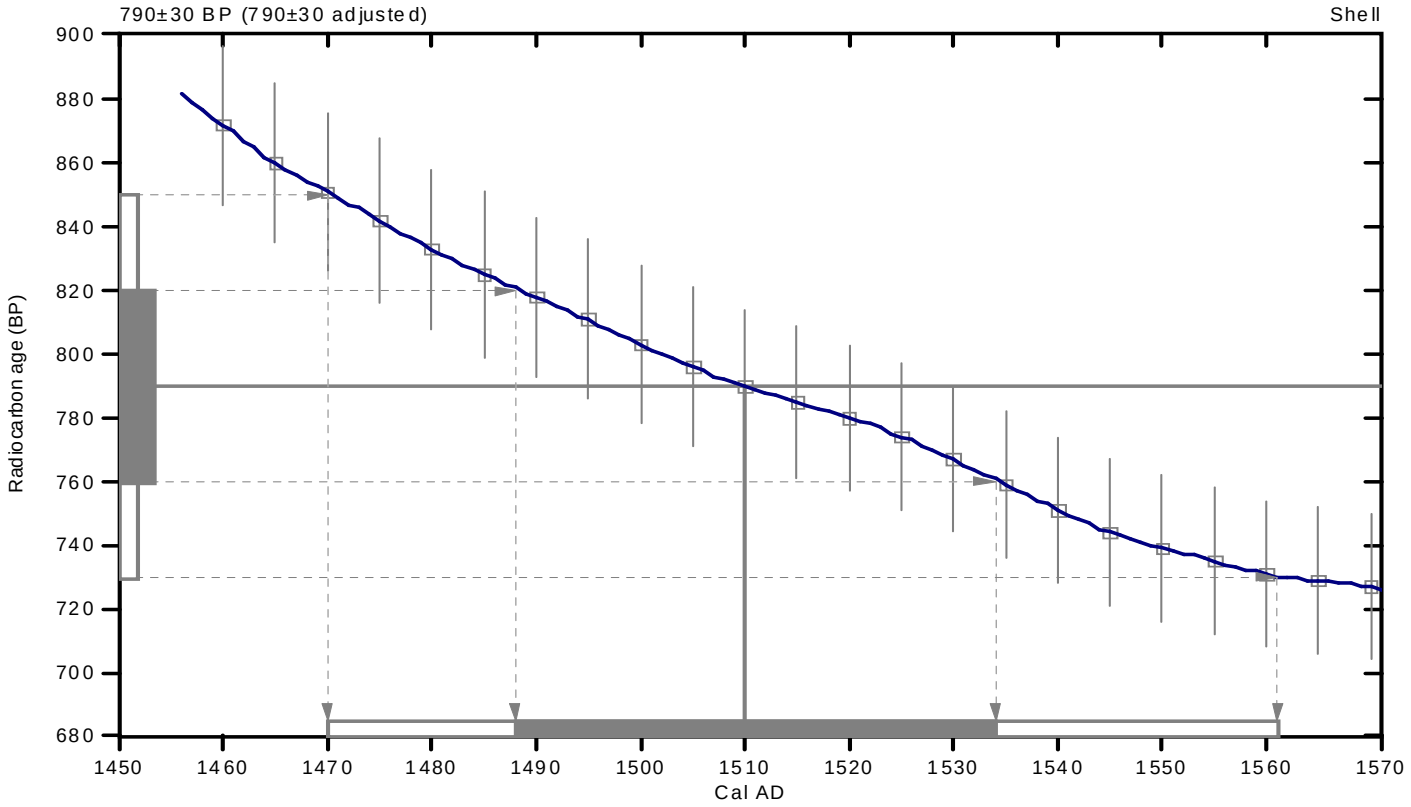
(local reservoir correction not applied)

2 Sigma calibrated result: **Cal AD 1470 to 1560 (Cal BP 480 to 390)**
(95% probability)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1510 (Cal BP 440)

1 Sigma calibrated result: Cal AD 1490 to 1530 (Cal BP 460 to 420)
(68% probability)



References:

Database used

MARINE09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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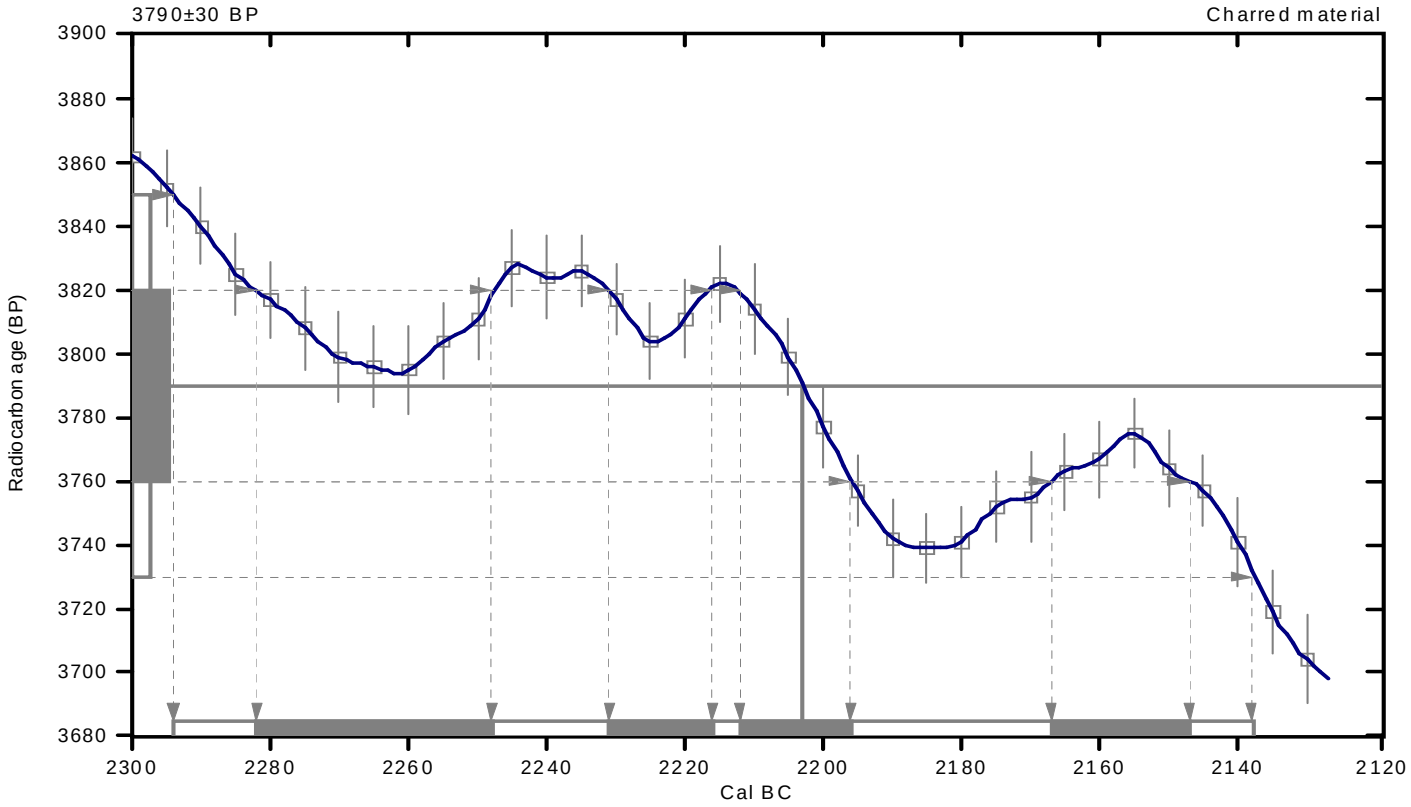
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24:lab. mult=1)

Laboratory number:	**Beta-307302**
Conventional radiocarbon age:	**3790±30 BP**
2 Sigma calibrated result: (95% probability)	**Cal BC 2290 to 2140 (Cal BP 4240 to 4090)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 2200 (Cal BP 4150)
1 Sigma calibrated results: (68% probability)	Cal BC 2280 to 2250 (Cal BP 4230 to 4200) and Cal BC 2230 to 2220 (Cal BP 4180 to 4170) and Cal BC 2210 to 2200 (Cal BP 4160 to 4150) and Cal BC 2170 to 2150 (Cal BP 4120 to 4100)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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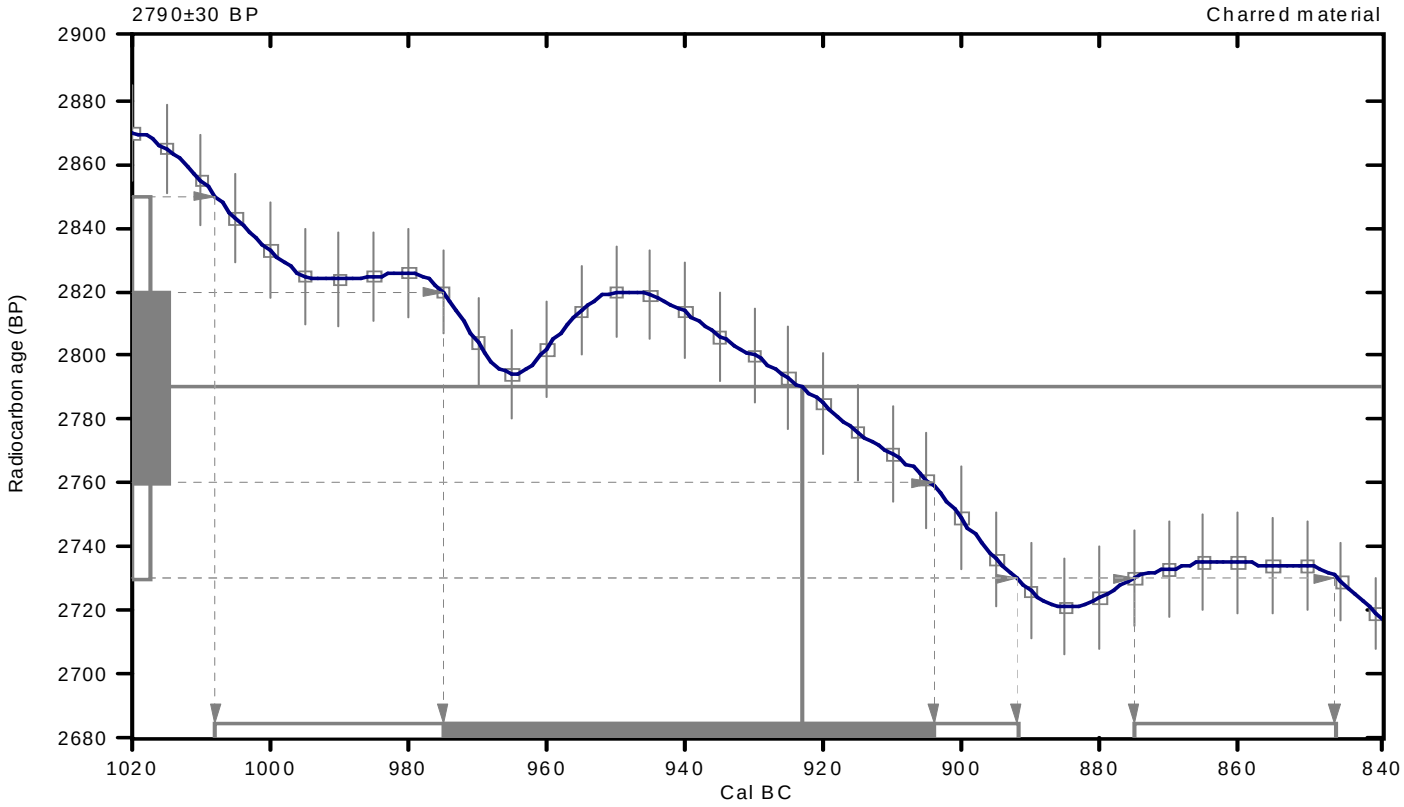
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number:	**Beta-307303**
Conventional radiocarbon age:	**2790±30 BP**
2 Sigma calibrated results: (95% probability)	**Cal BC 1010 to 890 (Cal BP 2960 to 2840) and Cal BC 880 to 850 (Cal BP 2820 to 2800)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 920 (Cal BP 2870)
1 Sigma calibrated result: (68% probability)	Cal BC 980 to 900 (Cal BP 2920 to 2850)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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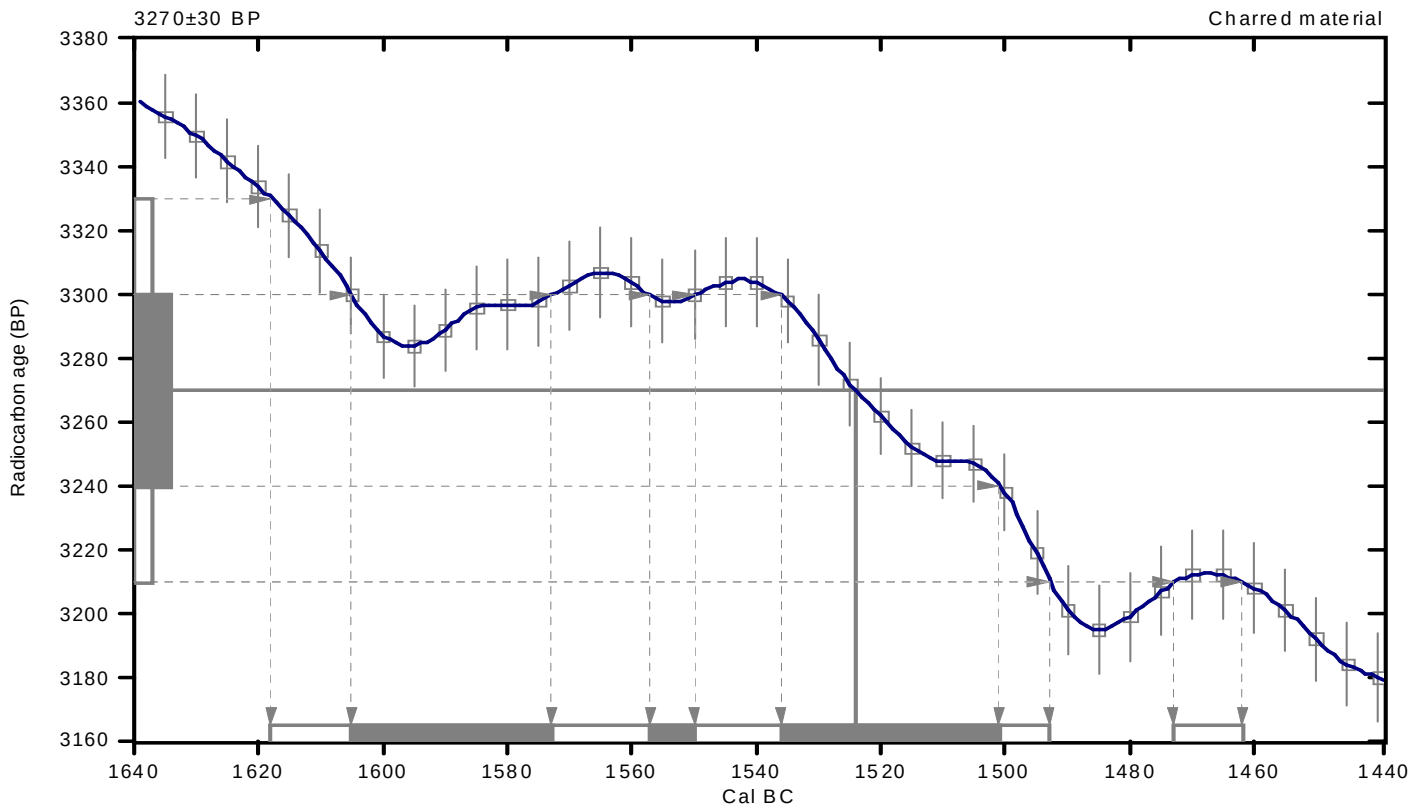
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number:	**Beta-307304**
Conventional radiocarbon age:	**3270±30 BP**
2 Sigma calibrated results: **(95% probability)**	**Cal BC 1620 to 1490 (Cal BP 3570 to 3440) and** **Cal BC 1470 to 1460 (Cal BP 3420 to 3410)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 1520 (Cal BP 3470)
1 Sigma calibrated results: (68% probability)	Cal BC 1600 to 1570 (Cal BP 3560 to 3520) and Cal BC 1560 to 1550 (Cal BP 3510 to 3500) and Cal BC 1540 to 1500 (Cal BP 3490 to 3450)



References:

Database used

INTCAL09

References to INTCAL09 database

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Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-1.4:Delta-R=0±0:Glob res=-200 to 500:lab. mult=1)

Laboratory number: **Beta-307305**

Conventional radiocarbon age: **350±30 BP**

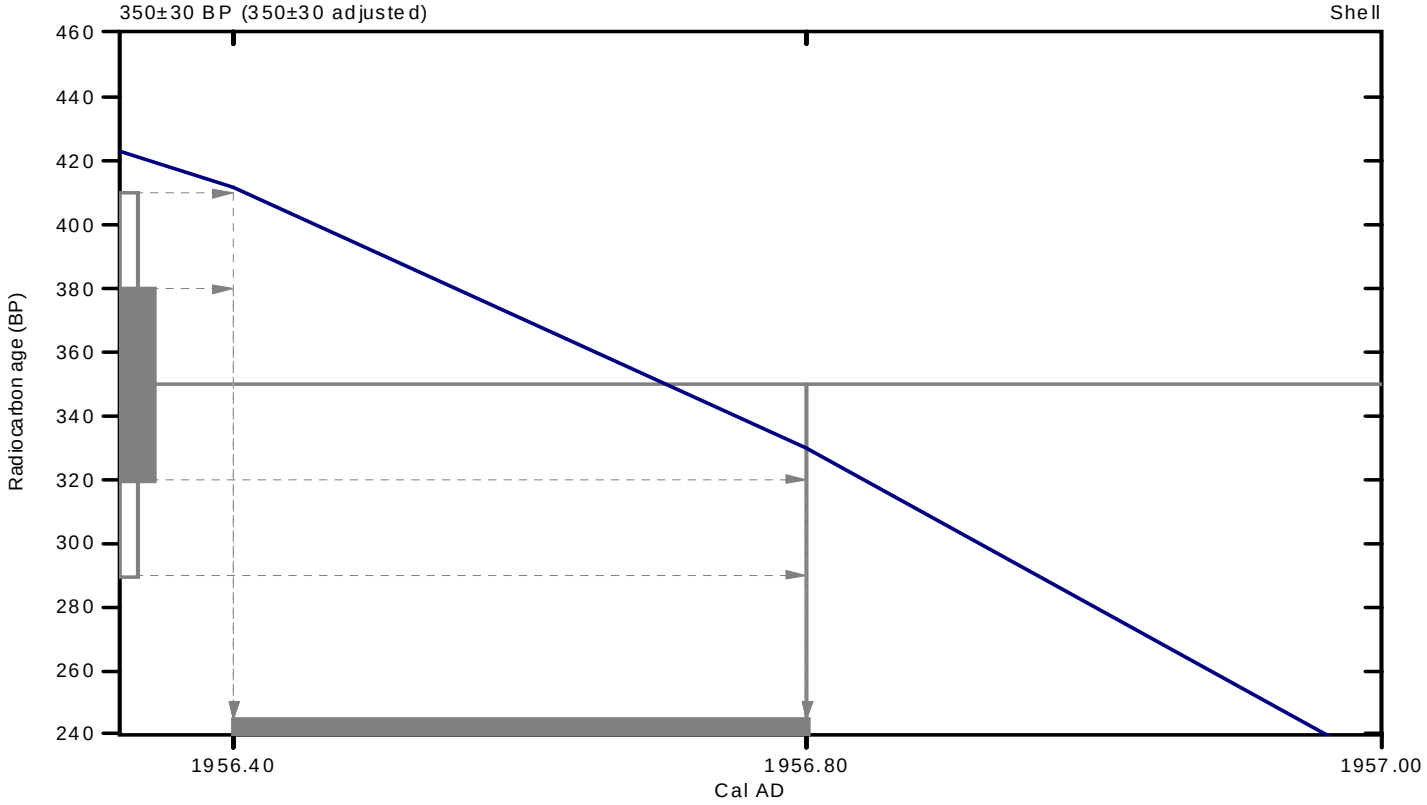
(local reservoir correction not applied)

2 Sigma calibrated result: **Cal AD Post 1950**
(95% probability)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD Post 1950

1 Sigma calibrated result: Cal AD Post 1950
(68% probability)



References:

Database used

MARINE09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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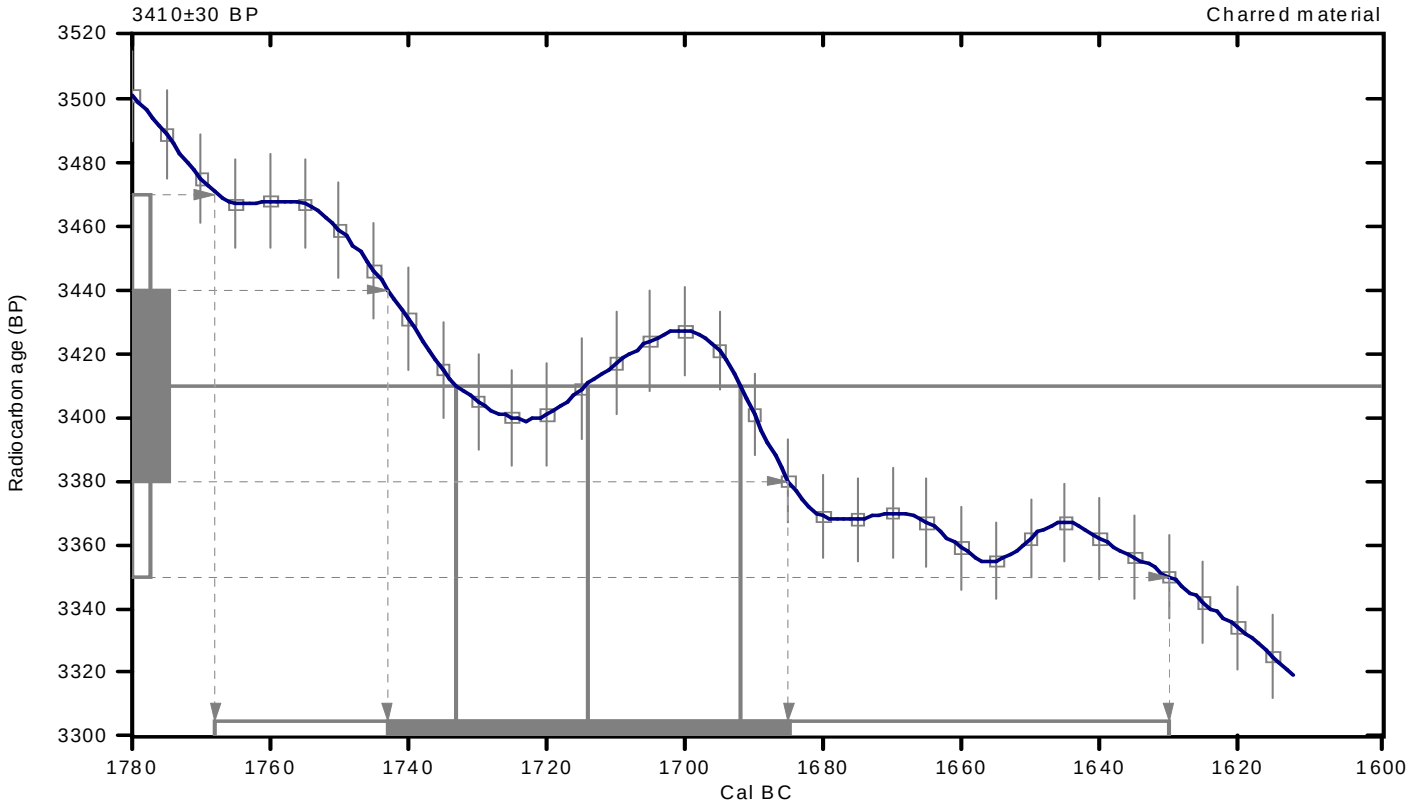
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.9:lab. mult=1)

Laboratory number:	**Beta-307306**
Conventional radiocarbon age:	**3410±30 BP**
2 Sigma calibrated result: (95% probability)	**Cal BC 1770 to 1630 (Cal BP 3720 to 3580)**

Intercept data

Intercepts of radiocarbon age with calibration curve:	Cal BC 1730 (Cal BP 3680) and Cal BC 1710 (Cal BP 3660) and Cal BC 1690 (Cal BP 3640)
1 Sigma calibrated result: (68% probability)	Cal BC 1740 to 1680 (Cal BP 3690 to 3640)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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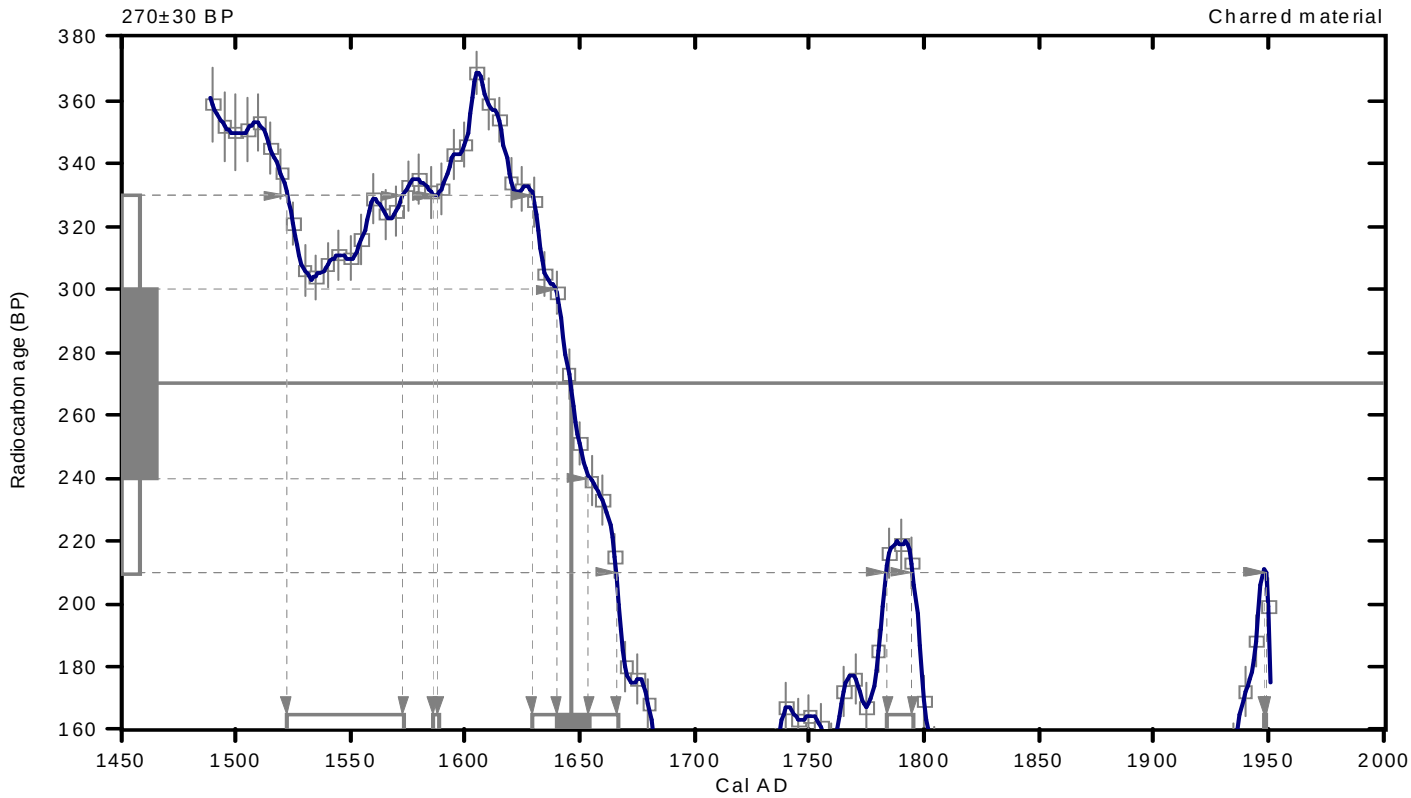
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.6:lab. mult=1)

Laboratory number:	**Beta-307307**
Conventional radiocarbon age:	**270±30 BP**
2 Sigma calibrated results: (95% probability)	**Cal AD 1520 to 1570 (Cal BP 430 to 380) and Cal AD 1590 to 1590 (Cal BP 360 to 360) and Cal AD 1630 to 1670 (Cal BP 320 to 280) and Cal AD 1780 to 1800 (Cal BP 170 to 160) and Cal AD 1950 to 1950 (Cal BP 0 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 1650 (Cal BP 310 to 300)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

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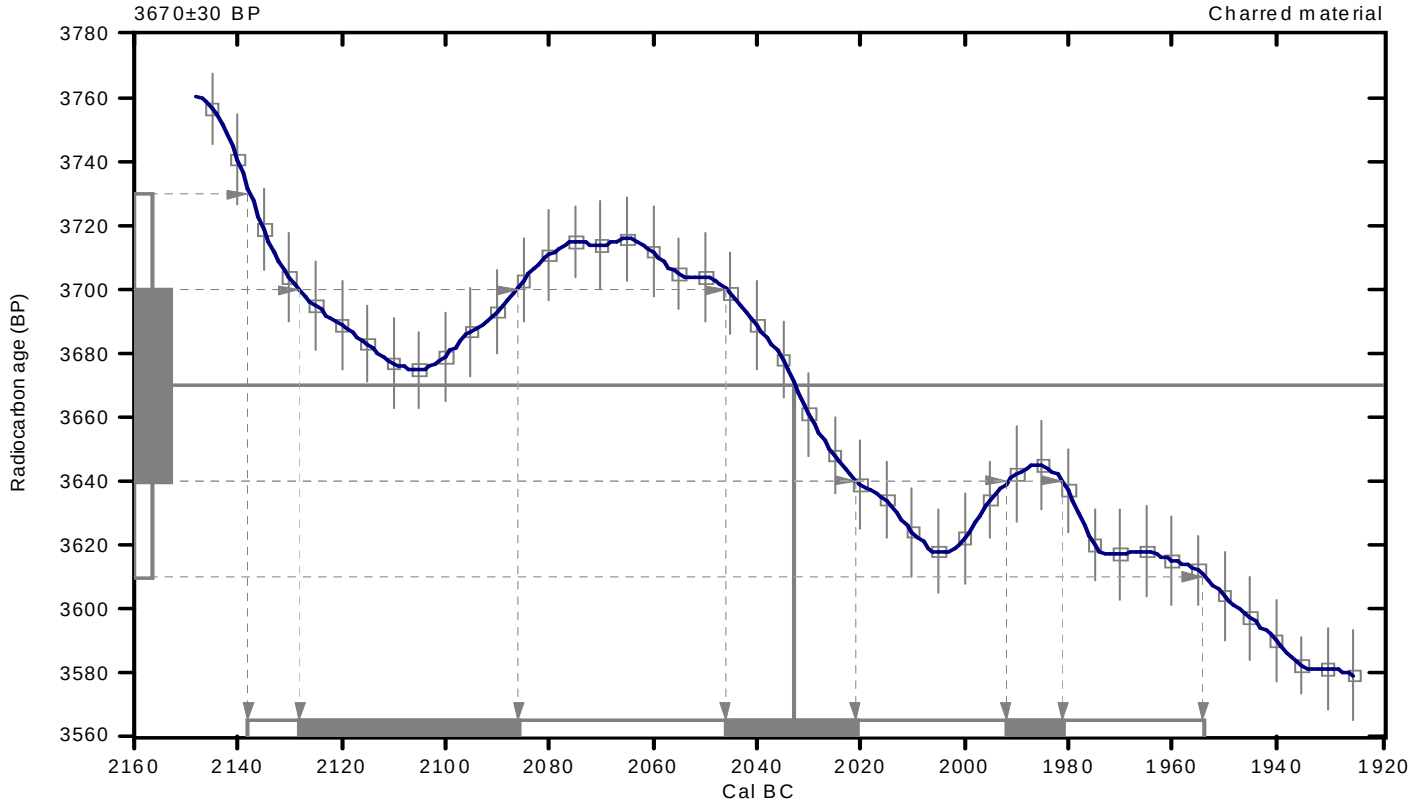
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.6:lab. mult=1)

Laboratory number:	**Beta-307308**
Conventional radiocarbon age:	**3670±30 BP**
2 Sigma calibrated result: (95% probability)	**Cal BC 2140 to 1950 (Cal BP 4090 to 3900)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 2030 (Cal BP 3980)
1 Sigma calibrated results: (68% probability)	Cal BC 2130 to 2090 (Cal BP 4080 to 4040) and Cal BC 2050 to 2020 (Cal BP 4000 to 3970) and Cal BC 1990 to 1980 (Cal BP 3940 to 3930)



References:

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References to INTCAL09 database

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Mathematics used for calibration scenario

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Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

November 1, 2011

Dr. Melissa Diamanti
Archaeological and Historical Consultants,
Incorporated
101 North Pennsylvania Avenue
P.O. Box 482
Centre Hall, PA 16828
USA

RE: Radiocarbon Dating Results For Samples Fea12 V1UT, Fea195 V3SI

Dear Dr. Diamanti:

Enclosed are the radiocarbon dating results for two 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 American Express card provided. A receipt is enclosed with the mailed report copy. Thank you. 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
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Melissa Diamanti

Report Date: 11/1/2011

Archaeological and Historical Consultants, Incorporated

Material Received: 10/17/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 307655	2980 +/- 30 BP	-27.8 o/oo	2930 +/- 30 BP

SAMPLE : Fea12 V1UT
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (bulk sherd organics): acid washes
2 SIGMA CALIBRATION : Cal BC 1260 to 1230 (Cal BP 3210 to 3180) AND Cal BC 1220 to 1020 (Cal BP 3170 to 2970)

Beta - 307657	2930 +/- 30 BP	-27.3 o/oo	2890 +/- 30 BP

SAMPLE : Fea195 V3SI
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (bulk sherd organics): acid washes
2 SIGMA CALIBRATION : Cal BC 1190 to 1180 (Cal BP 3140 to 3130) AND Cal BC 1160 to 1140 (Cal BP 3110 to 3090)
Cal BC 1130 to 1000 (Cal BP 3080 to 2950)

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.

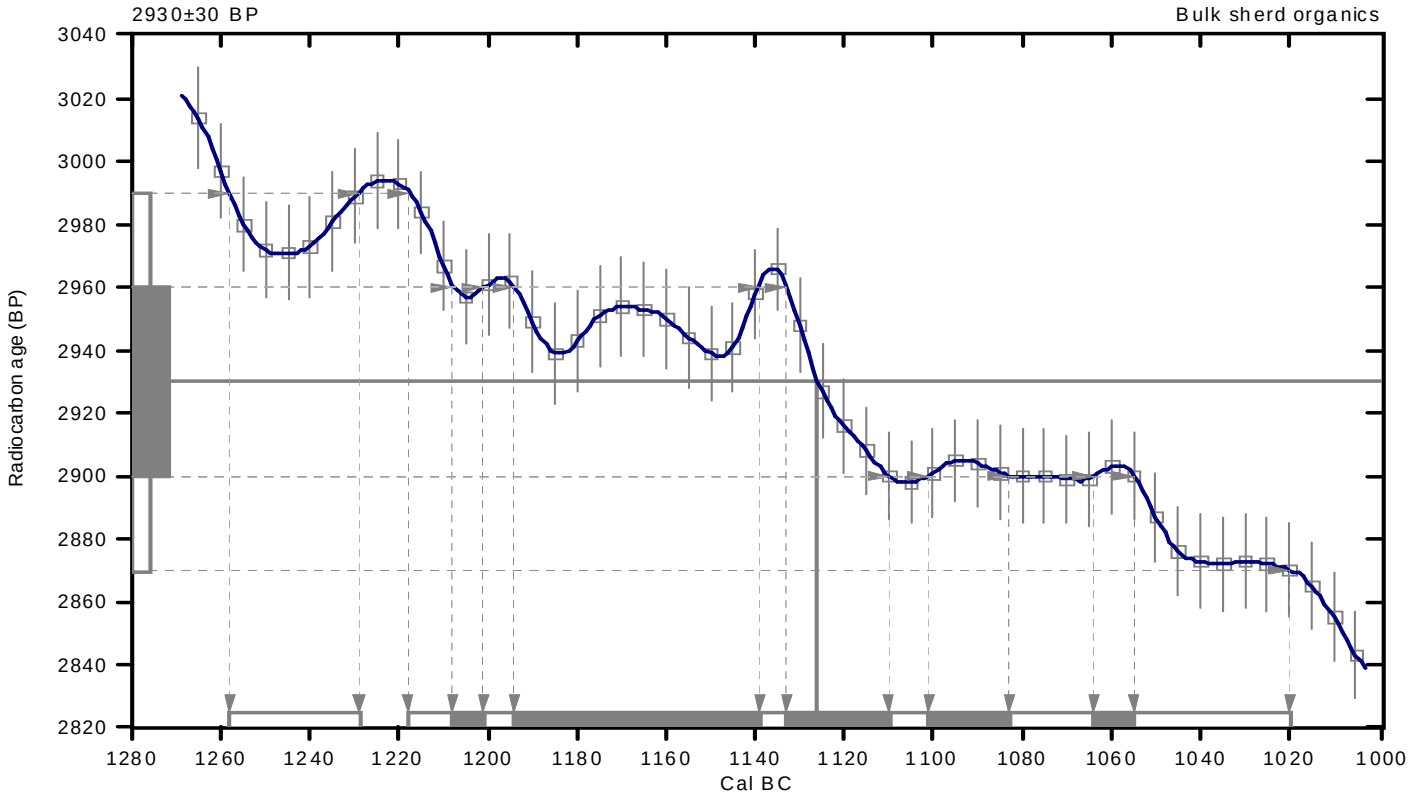
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-27.8:lab. mult=1)

Laboratory number:	**Beta-307655**
Conventional radiocarbon age:	**2930±30 BP**
2 Sigma calibrated results: **(95% probability)**	**Cal BC 1260 to 1230 (Cal BP 3210 to 3180) and** **Cal BC 1220 to 1020 (Cal BP 3170 to 2970)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 1130 (Cal BP 3080)
1 Sigma calibrated results: (68% probability)	Cal BC 1210 to 1200 (Cal BP 3160 to 3150) and Cal BC 1190 to 1140 (Cal BP 3140 to 3090) and Cal BC 1130 to 1110 (Cal BP 3080 to 3060) and Cal BC 1100 to 1080 (Cal BP 3050 to 3030) and Cal BC 1060 to 1060 (Cal BP 3010 to 3000)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • E-Mail: beta@radiocarbon.com

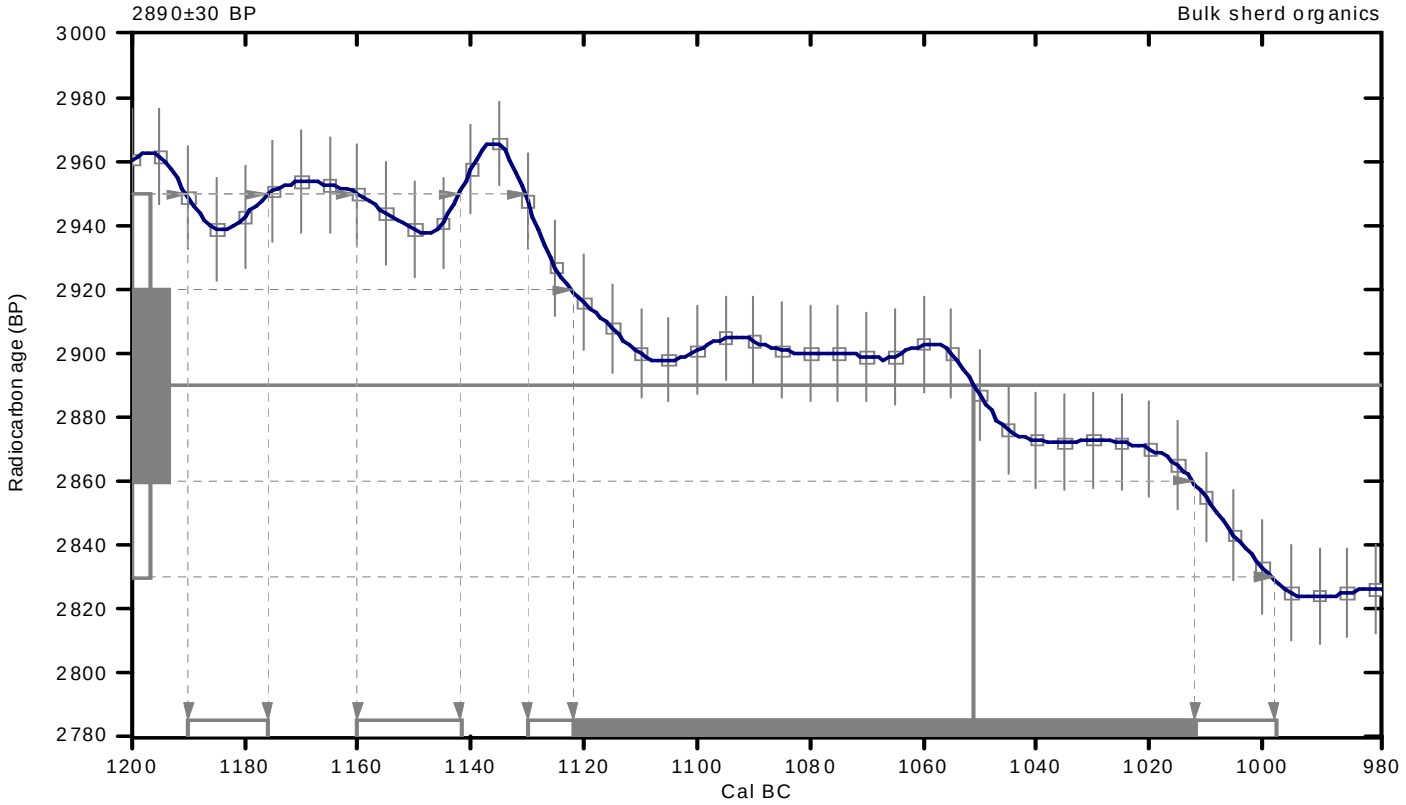
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-27.3:lab. mult=1)

Laboratory number:	**Beta-307657**
Conventional radiocarbon age:	**2890±30 BP**
2 Sigma calibrated results: (95% probability)	**Cal BC 1190 to 1180 (Cal BP 3140 to 3130) and Cal BC 1160 to 1140 (Cal BP 3110 to 3090) and Cal BC 1130 to 1000 (Cal BP 3080 to 2950)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 1050 (Cal BP 3000)
1 Sigma calibrated result: (68% probability)	Cal BC 1120 to 1010 (Cal BP 3070 to 2960)



References:

Database used

INTCAL09

References to INTCAL09 database

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Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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www.radiocarbon.com

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Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

November 14, 2011

Dr. Melissa Diamanti
Archaeological and Historical Consultants,
Incorporated
101 North Pennsylvania Avenue
P.O. Box 482
Centre Hall, PA 16828
USA

RE: Radiocarbon Dating Results For Samples Fea185 V1SI, TU38 V2MC

Dear Dr. Diamanti:

Enclosed are the radiocarbon dating results for two 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 American Express card provided. A receipt is enclosed with the mailed report copy. Thank you. 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
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. Melissa Diamanti

Report Date: 11/14/2011

Archaeological and Historical Consultants, Incorporated

Material Received: 10/17/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 307656	2720 +/- 30 BP	-25.5 o/oo	2710 +/- 30 BP
SAMPLE : Fea185 V1SI			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (bulk sherd organics): acid washes			
2 SIGMA CALIBRATION : Cal BC 910 to 810 (Cal BP 2860 to 2760)			
Beta - 307658	3270 +/- 30 BP	-25.6 o/oo	3260 +/- 30 BP
SAMPLE : TU38 V2MC			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (bulk sherd organics): acid washes			
2 SIGMA CALIBRATION : Cal BC 1610 to 1490 (Cal BP 3560 to 3440) AND Cal BC 1480 to 1450 (Cal BP 3430 to 3400)			

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.

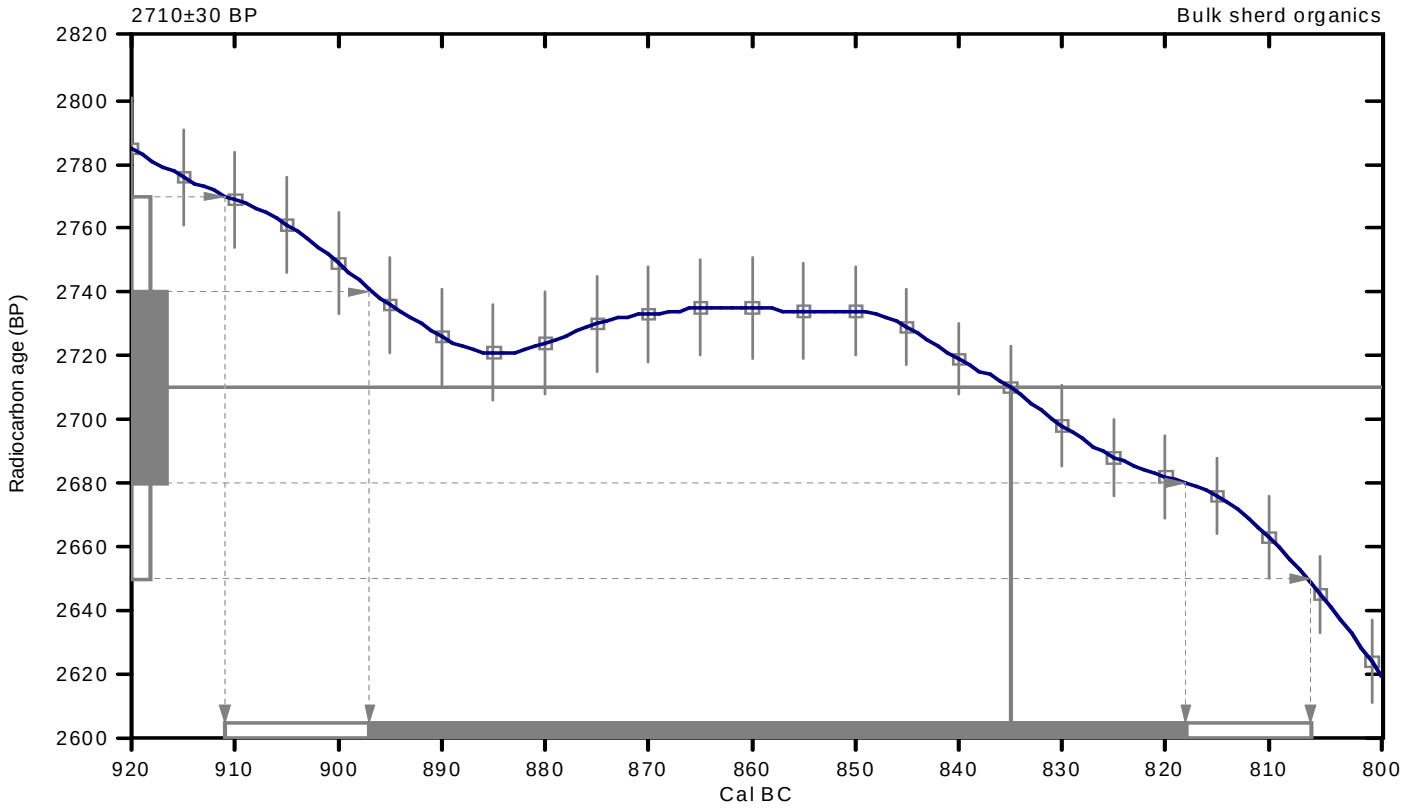
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.5:lab. mult=1)

Laboratory number:	**Beta-307656**
Conventional radiocarbon age:	**2710±30 BP**
2 Sigma calibrated result: (95% probability)	**Cal BC 910 to 810 (Cal BP 2860 to 2760)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 840 (Cal BP 2780)
1 Sigma calibrated result: (68% probability)	Cal BC 900 to 820 (Cal BP 2850 to 2770)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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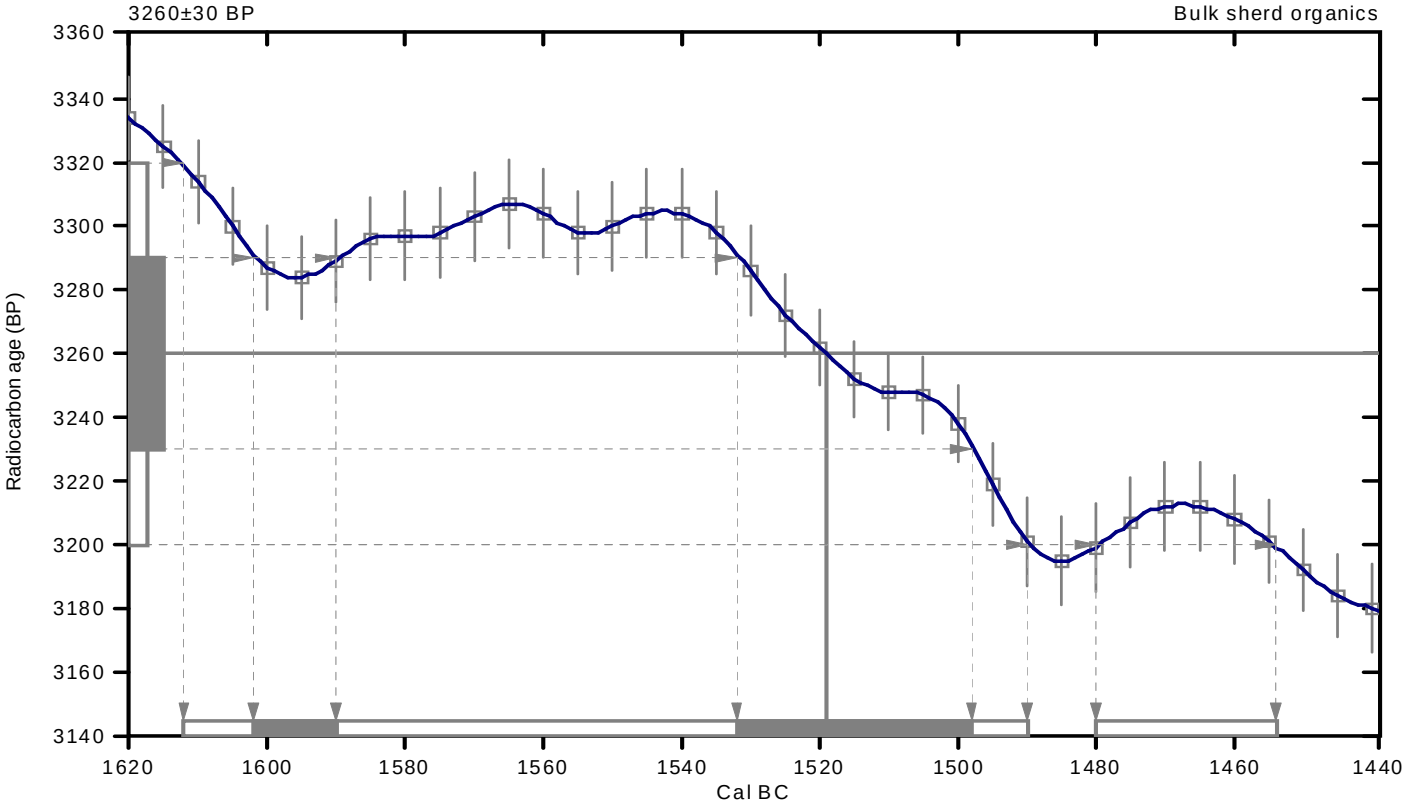
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number:	**Beta-307658**
Conventional radiocarbon age:	**3260±30 BP**
2 Sigma calibrated results: **(95% probability)**	**Cal BC 1610 to 1490 (Cal BP 3560 to 3440) and Cal BC 1480 to 1450 (Cal BP 3430 to 3400)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 1520 (Cal BP 3470)
1 Sigma calibrated results: (68% probability)	Cal BC 1600 to 1590 (Cal BP 3550 to 3540) and Cal BC 1530 to 1500 (Cal BP 3480 to 3450)



References:

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Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

November 22, 2011

Dr. Melissa Diamanti
Archaeological and Historical Consultants,
Incorporated
101 North Pennsylvania Avenue
P.O. Box 482
Centre Hall, PA 16828
USA

RE: Radiocarbon Dating Results For Samples FEA3AS1071, FEA5AS10741075, FEA184AS1059, FEA197AS448, FEA236AS774, FEA305AS610, FEA348AS1065

Dear Dr. Diamanti:

Enclosed are the radiocarbon dating results for seven 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 American Express card provided. A receipt is enclosed with the mailed report copy Thank you. 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
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Melissa Diamanti

Report Date: 11/22/2011

Archaeological and Historical Consultants, Incorporated

Material Received: 11/8/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 309416	1160 +/- 30 BP	-26.3 o/oo	1140 +/- 30 BP
SAMPLE : FEA3AS1071			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT :	(charred material): acid/alkali/acid		
2 SIGMA CALIBRATION :	Cal AD 780 to 790 (Cal BP 1170 to 1160) AND Cal AD 810 to 850 (Cal BP 1140 to 1100) Cal AD 850 to 980 (Cal BP 1100 to 970)		
Beta - 309417	3790 +/- 30 BP	-27.0 o/oo	3760 +/- 30 BP
SAMPLE : FEA5AS10741075			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT :	(charred material): acid/alkali/acid		
2 SIGMA CALIBRATION :	Cal BC 2280 to 2250 (Cal BP 4230 to 4200) AND Cal BC 2230 to 2220 (Cal BP 4180 to 4170) Cal BC 2210 to 2130 (Cal BP 4160 to 4080) AND Cal BC 2090 to 2050 (Cal BP 4040 to 4000)		
Beta - 309418	820 +/- 30 BP	-24.7 o/oo	820 +/- 30 BP
SAMPLE : FEA184AS1059			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT :	(charred material): acid/alkali/acid		
2 SIGMA CALIBRATION :	Cal AD 1160 to 1270 (Cal BP 790 to 680)		
Beta - 309419	2190 +/- 30 BP	-26.6 o/oo	2160 +/- 30 BP
SAMPLE : FEA197AS448			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT :	(charred material): acid/alkali/acid		
2 SIGMA CALIBRATION :	Cal BC 350 to 290 (Cal BP 2300 to 2240) AND Cal BC 230 to 160 (Cal BP 2180 to 2110) Cal BC 130 to 110 (Cal BP 2080 to 2060)		

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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beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Melissa Diamanti

Report Date: 11/22/2011

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 309420	860 +/- 30 BP	-25.7 o/oo	850 +/- 30 BP
SAMPLE : FEA236AS774			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1160 to 1260 (Cal BP 800 to 690)			
Beta - 309421	870 +/- 30 BP	-25.1 o/oo	870 +/- 30 BP
SAMPLE : FEA305AS610			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1050 to 1090 (Cal BP 900 to 860) AND Cal AD 1120 to 1140 (Cal BP 830 to 810) Cal AD 1150 to 1220 (Cal BP 800 to 730)			
Beta - 309422	160 +/- 30 BP	-26.1 o/oo	140 +/- 30 BP
SAMPLE : FEA348AS1065			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1670 to 1780 (Cal BP 280 to 170) AND Cal AD 1800 to 1890 (Cal BP 150 to 60) Cal AD 1900 to 1950 (Cal BP 50 to 0) AND Cal AD 1950 to post 1950 (Cal BP 0 to post 1950)			

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.

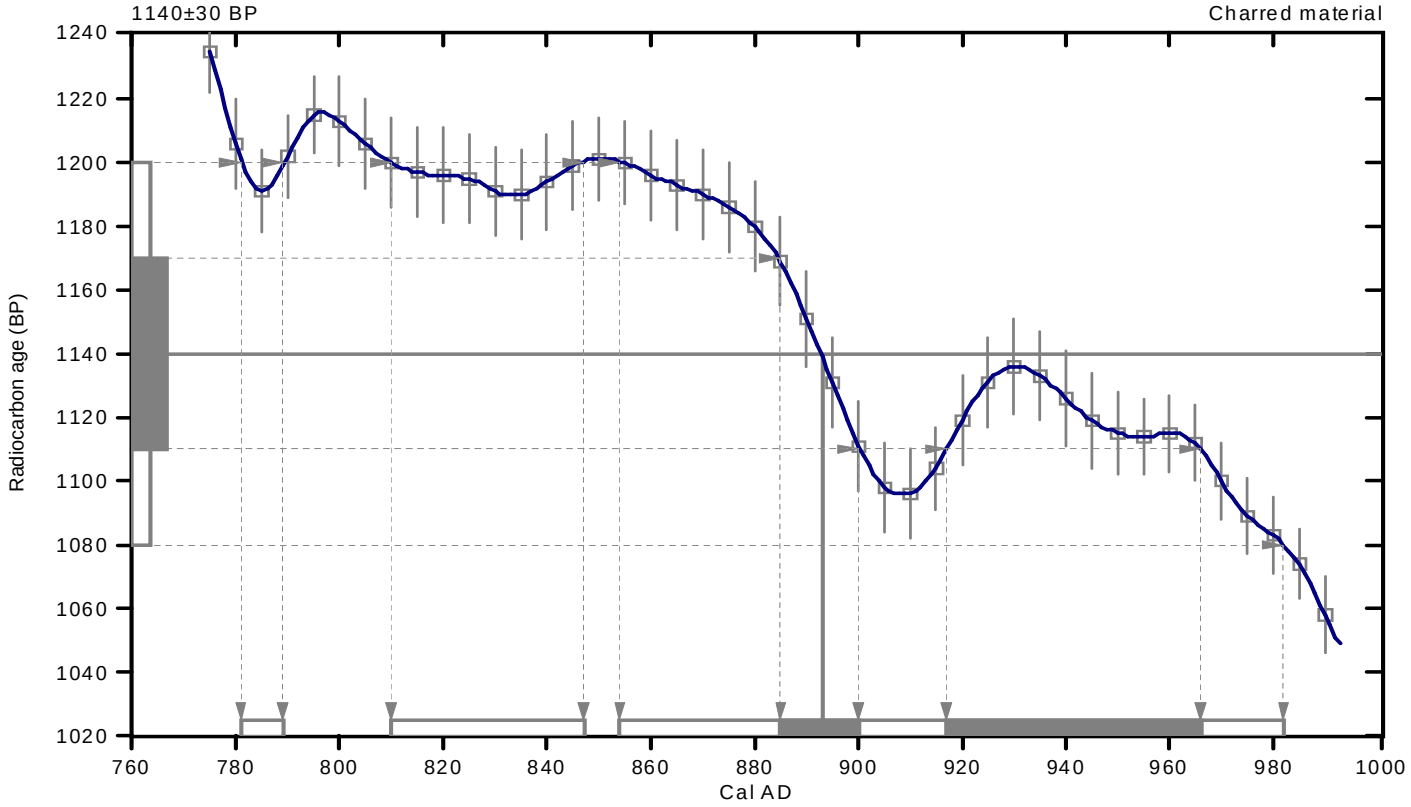
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number:	**Beta-309416**
Conventional radiocarbon age:	**1140±30 BP**
2 Sigma calibrated results: **(95% probability)**	**Cal AD 780 to 790 (Cal BP 1170 to 1160) and** **Cal AD 810 to 850 (Cal BP 1140 to 1100) and** **Cal AD 850 to 980 (Cal BP 1100 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 1060 to 1050) and Cal AD 920 to 970 (Cal BP 1030 to 980)



References:

Database used

INTCAL09

References to INTCAL09 database

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Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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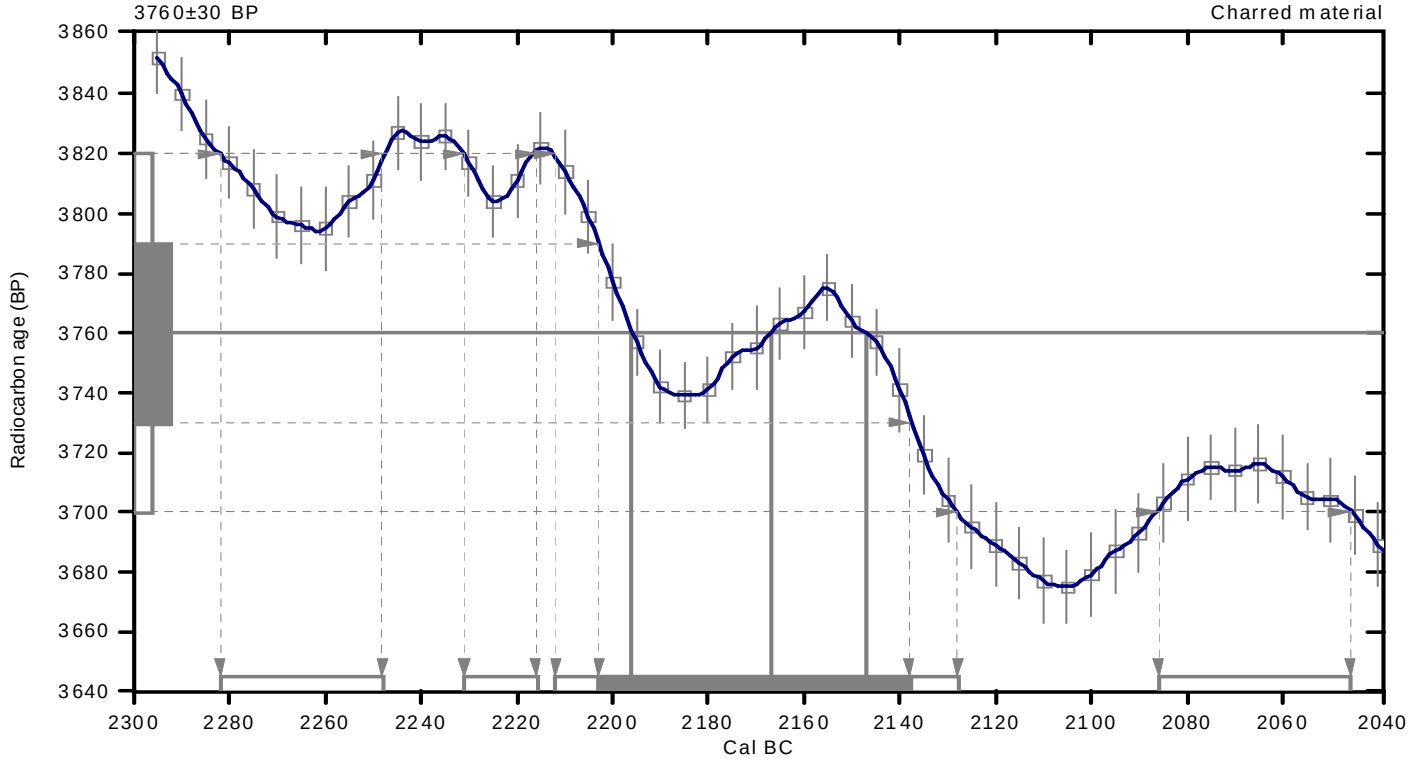
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-27:lab. mult=1)

Laboratory number:	**Beta-309417**
Conventional radiocarbon age:	**3760±30 BP**
2 Sigma calibrated results: **(95% probability)**	**Cal BC 2280 to 2250 (Cal BP 4230 to 4200) and** **Cal BC 2230 to 2220 (Cal BP 4180 to 4170) and** **Cal BC 2210 to 2130 (Cal BP 4160 to 4080) and** **Cal BC 2090 to 2050 (Cal BP 4040 to 4000)**

Intercept data

Intercepts of radiocarbon age with calibration curve:	Cal BC 2200 (Cal BP 4150) and Cal BC 2170 (Cal BP 4120) and Cal BC 2150 (Cal BP 4100)
1 Sigma calibrated result: (68% probability)	Cal BC 2200 to 2140 (Cal BP 4150 to 4090)



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Mathematics used for calibration scenario

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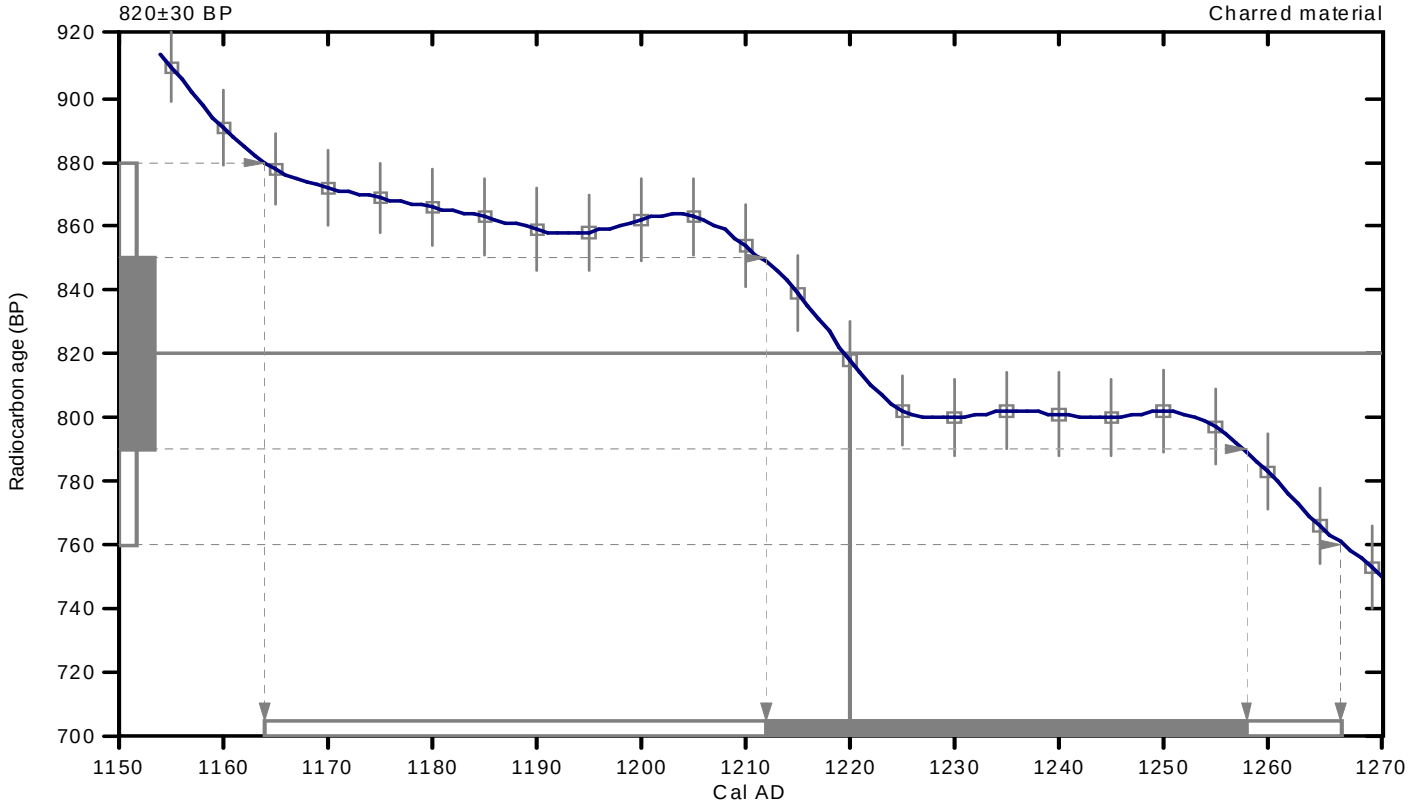
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.7:lab. mult=1)

Laboratory number:	**Beta-309418**
Conventional radiocarbon age:	**820±30 BP**
2 Sigma calibrated result: (95% probability)	**Cal AD 1160 to 1270 (Cal BP 790 to 680)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal AD 1220 (Cal BP 730)
1 Sigma calibrated result: (68% probability)	Cal AD 1210 to 1260 (Cal BP 740 to 690)



References:

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Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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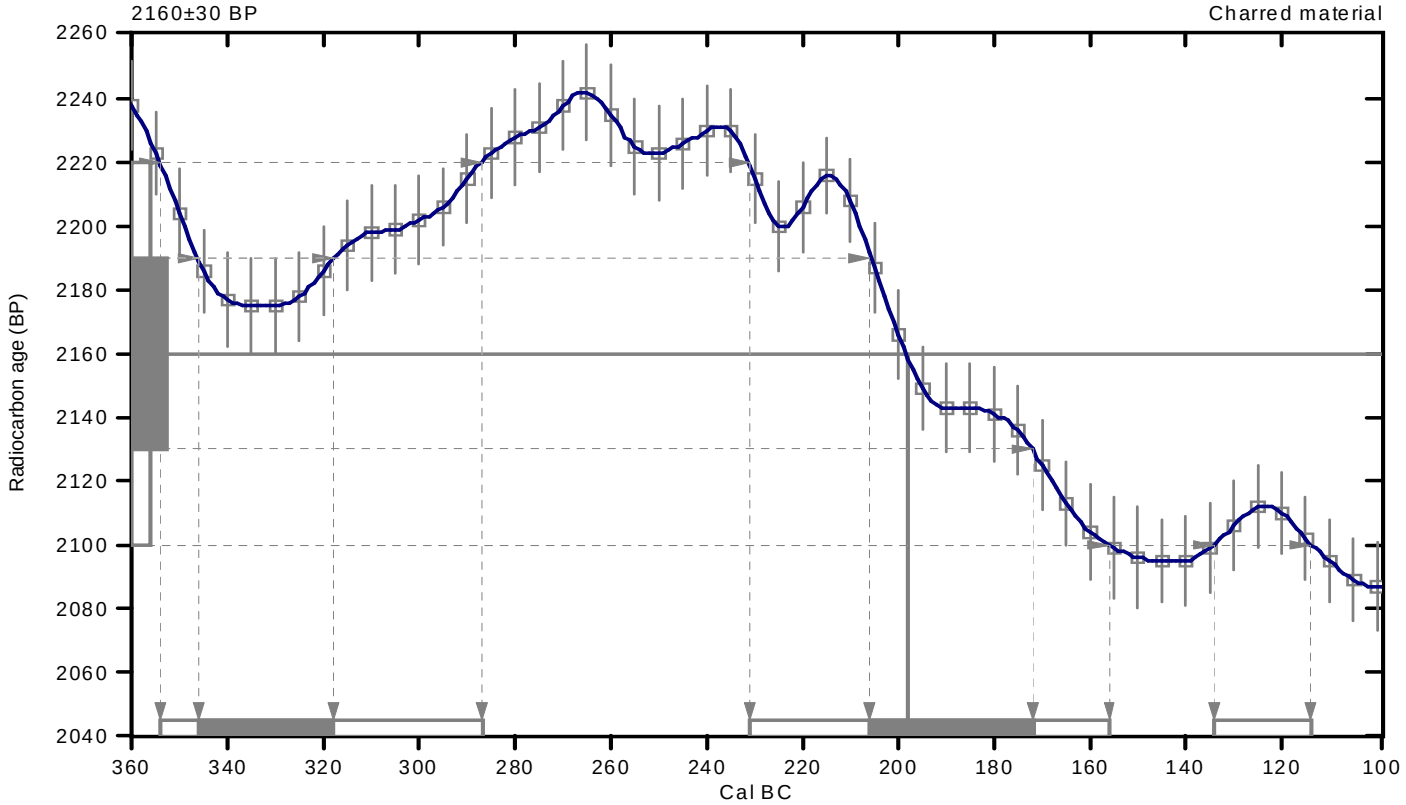
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number:	**Beta-309419**
Conventional radiocarbon age:	**2160±30 BP**
2 Sigma calibrated results: **(95% probability)**	**Cal BC 350 to 290 (Cal BP 2300 to 2240) and** **Cal BC 230 to 160 (Cal BP 2180 to 2110) and** **Cal BC 130 to 110 (Cal BP 2080 to 2060)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 200 (Cal BP 2150)
1 Sigma calibrated results: (68% probability)	Cal BC 350 to 320 (Cal BP 2300 to 2270) and Cal BC 210 to 170 (Cal BP 2160 to 2120)



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Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

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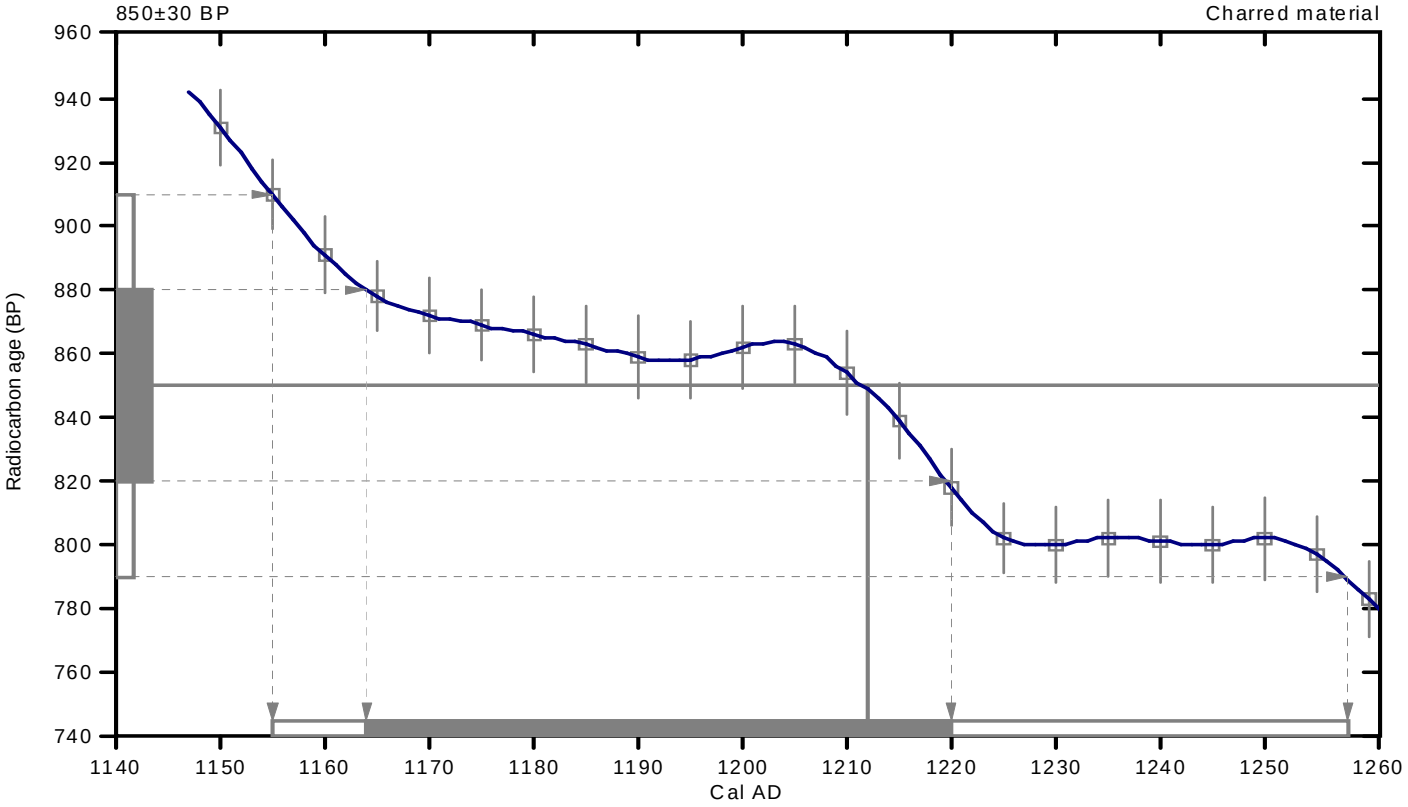
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number:	**Beta-309420**
Conventional radiocarbon age:	**850±30 BP**
2 Sigma calibrated result: (95% probability)	**Cal AD 1160 to 1260 (Cal BP 800 to 690)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal AD 1210 (Cal BP 740)
1 Sigma calibrated result: (68% probability)	Cal AD 1160 to 1220 (Cal BP 790 to 730)



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Mathematics used for calibration scenario

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Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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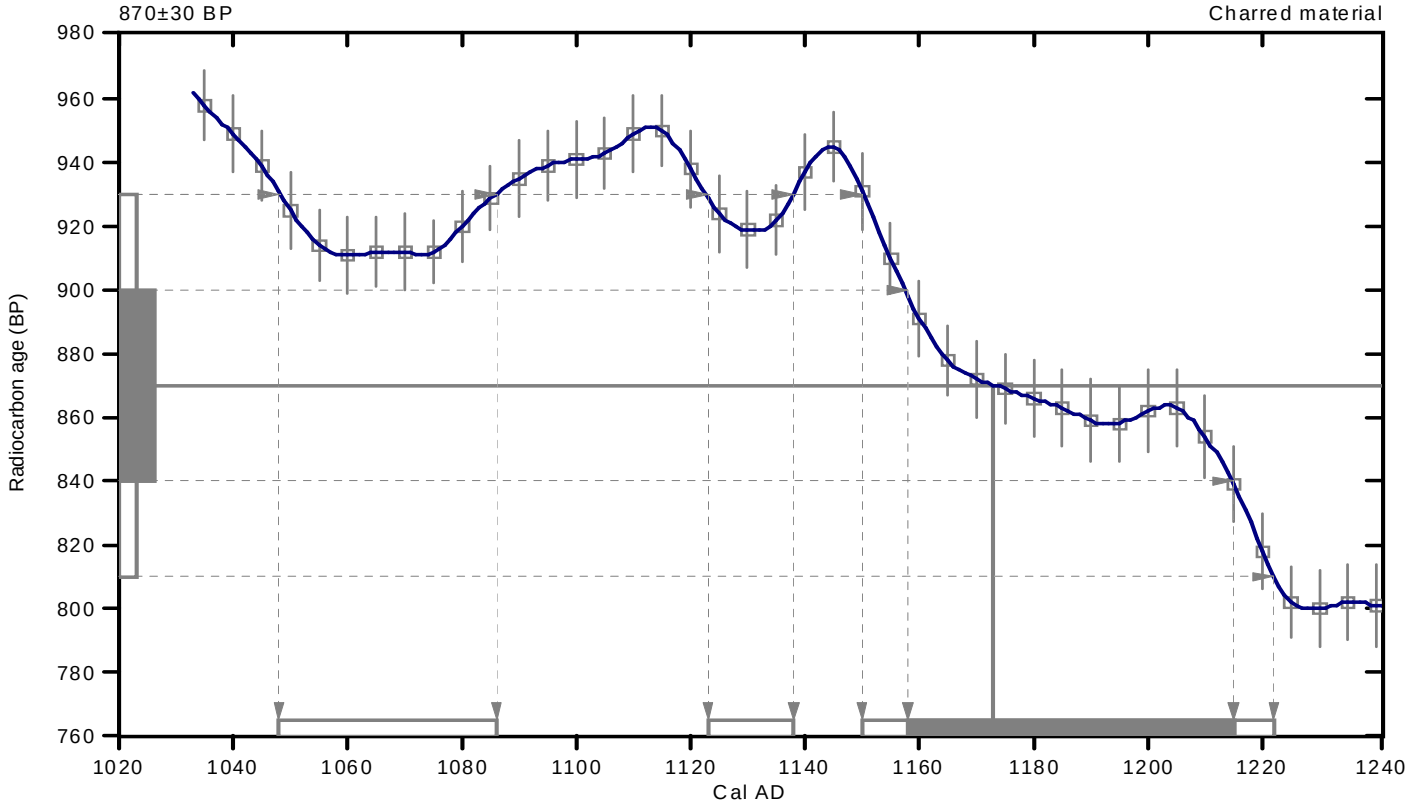
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

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

Laboratory number:	**Beta-309421**
Conventional radiocarbon age:	**870±30 BP**
2 Sigma calibrated results: (95% probability)	**Cal AD 1050 to 1090 (Cal BP 900 to 860) and Cal AD 1120 to 1140 (Cal BP 830 to 810) and Cal AD 1150 to 1220 (Cal BP 800 to 730)**

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal AD 1170 (Cal BP 780)
1 Sigma calibrated result: (68% probability)	Cal AD 1160 to 1220 (Cal BP 790 to 740)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

Beta Analytic Radiocarbon Dating Laboratory

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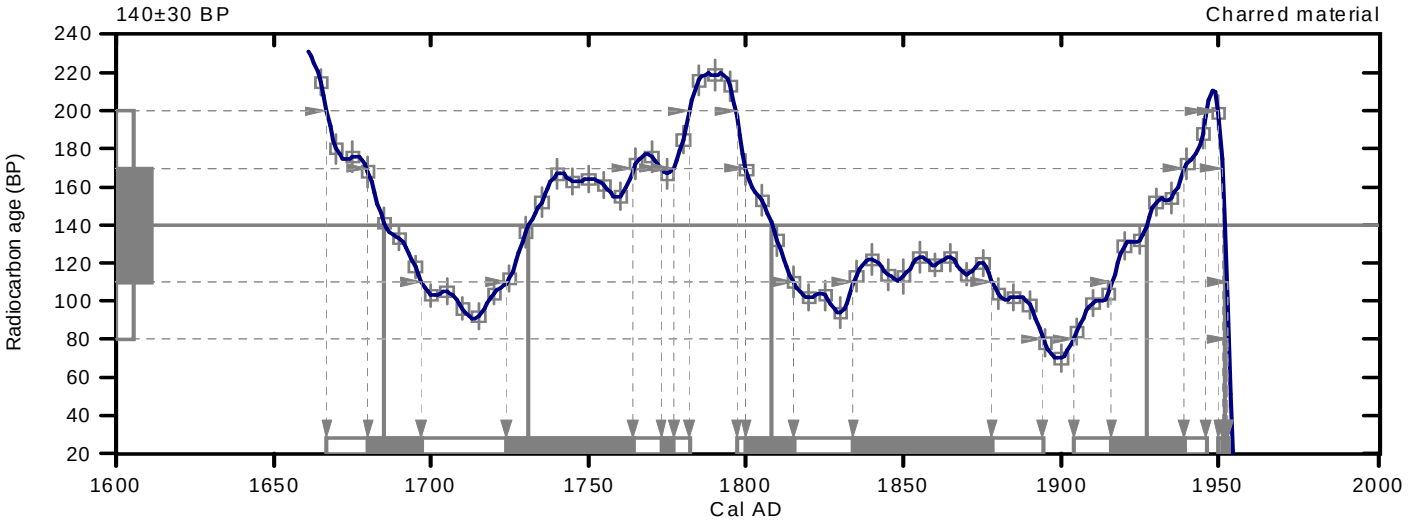
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.1:lab. mult=1)

Laboratory number:	**Beta-309422**
Conventional radiocarbon age:	**140±30 BP**
2 Sigma calibrated results: **(95% probability)**	**Cal AD 1670 to 1780 (Cal BP 280 to 170) and** **Cal AD 1800 to 1890 (Cal BP 150 to 60) and** **Cal AD 1900 to 1950 (Cal BP 50 to 0) and** **Cal AD 1950 to post 1950 (Cal BP 0 to post 1950)**

Intercept data

Intercepts of radiocarbon age with calibration curve:	Cal AD 1680 (Cal BP 260) and Cal AD 1730 (Cal BP 220) and Cal AD 1810 (Cal BP 140) and Cal AD 1930 (Cal BP 20) and Cal AD Post 1950
1 Sigma calibrated results: (68% probability)	Cal AD 1680 to 1700 (Cal BP 270 to 250) and Cal AD 1720 to 1760 (Cal BP 230 to 190) and Cal AD 1770 to 1780 (Cal BP 180 to 170) and Cal AD 1800 to 1820 (Cal BP 150 to 140) and Cal AD 1830 to 1880 (Cal BP 120 to 70) and Cal AD 1920 to 1940 (Cal BP 30 to 10) and Cal AD Post 1950



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