

10-31-2020

Radiocarbon Analysis of Artifacts from Burns (8BR85) (3)

University of Central Florida Brevard County Archaeology

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May 13, 2019

Dr. Sarah Barber
UCF
4000 Central Florida Blvd.
Orlando, FL 32816
United States

RE: Radiocarbon Dating Results

Dear Dr. Barber,

Enclosed is the radiocarbon dating result for one sample recently sent to us. The report sheet contains the Conventional Radiocarbon Age (BP), the method used, material type, and applied pretreatments, any sample specific comments and, where applicable, the two-sigma calendar calibration range. The Conventional Radiocarbon age has been corrected for total isotopic fractionation effects (natural and laboratory induced).

All results (excluding some inappropriate material types) which fall within the range of available calibration data are calibrated to calendar years (cal BC/AD) and calibrated radiocarbon years (cal BP). Calibration was calculated using one of the databases associated with the 2013 INTCAL program (cited in the references on the bottom of the calibration graph page provided for each sample.) Multiple probability ranges may appear in some cases, due to short-term variations in the atmospheric ¹⁴C contents at certain time periods. Looking closely at the calibration graph provided and where the BP sigma limits intercept the calibration curve will help you understand this phenomenon.

Conventional Radiocarbon Ages and sigmas are rounded to the nearest 10 years per the conventions of the 1977 International Radiocarbon Conference and consistent with all past Beta Analytic radiocarbon dates. When counting statistics produce sigmas lower than +/- 30 years, a conservative +/- 30 BP is cited for the result. The reported $\delta^{13}C$ was measured separately in an IRMS (isotope ratio mass spectrometer). It is NOT the AMS $\delta^{13}C$ which would include fractionation effects from natural, chemistry and AMS induced sources.

All work on this sample was performed in our laboratories in Miami under strict chain of custody and quality control under ISO/IEC 17025:2005 Testing Accreditation PJLA #59423 accreditation protocols. Sample, modern and blanks were all analyzed in the same chemistry lines by professional technicians using identical reagents and counting parameters within our own particle accelerators. A quality assurance report is posted to your directory for each result.

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 us.

Sincerely,

Digital signature on file

Ronald E. Hatfield Director



REPORT OF RADIOCARBON DATING ANALYSES

Sarah Barber

Report Date: May 13, 2019

UCF

Material Received: April 29, 2019

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes	
		Calendar Calibrated Results: 95.4 % Probability High Probability Density Range Method (HPD)	

Beta - 524136

5555

910 +/- 30 BP

IRMS δ13C: -26.4 o/oo

**(94.0%)
(1.4%)**

**1033 - 1190 cal AD
1198 - 1204 cal AD**

**(917 - 760 cal BP)
(752 - 746 cal BP)**

Submitter Material: Charcoal
 Pretreatment: (charred material) acid/alkali/acid
 Analyzed Material: Charred material
 Analysis Service: AMS-Standard delivery
 Percent Modern Carbon: 89.29 +/- 0.33 pMC
 Fraction Modern Carbon: 0.8929 +/- 0.0033
 D14C: -107.10 +/- 3.33 o/oo
 Δ14C: -114.52 +/- 3.33 o/oo(1950:2,019.00)
 Measured Radiocarbon Age: (without d13C correction): 930 +/- 30 BP
 Calibration: BetaCal3.21: HPD method: INTCAL13

Results are ISO/IEC-17025:2005 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB-1. References for calendar calibrations are cited at the bottom of calibration graph pages.

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL13)

(Variables: $\delta^{13}\text{C} = -26.4$ o/oo)

Laboratory number **Beta-524136**

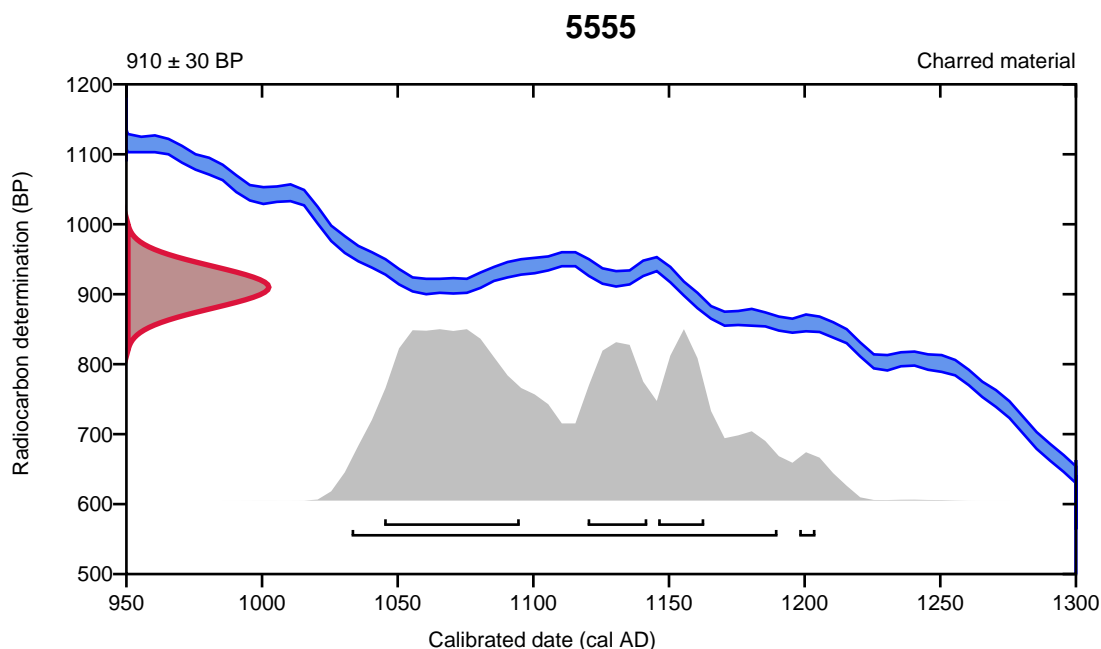
Conventional radiocarbon age **910 ± 30 BP**

95.4% probability

(94%)	1033 - 1190 cal AD	(917 - 760 cal BP)
(1.4%)	1198 - 1204 cal AD	(752 - 746 cal BP)

68.2% probability

(39.7%)	1045 - 1095 cal AD	(905 - 855 cal BP)
(16.1%)	1120 - 1142 cal AD	(830 - 808 cal BP)
(12.4%)	1146 - 1163 cal AD	(804 - 787 cal BP)



Database used
INTCAL13

References

References to Probability Method

Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. *Radiocarbon*, 51(1), 337-360.

References to Database INTCAL13

Reimer, et.al., 2013, *Radiocarbon*55(4).



Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NIST SRM-4990B and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date: May 13, 2019
Submitter: Dr. Sarah Barber

QA MEASUREMENTS

Reference 1

Expected Value: 129.41 +/- 0.06 pMC

Measured Value: 129.64 +/- 0.35 pMC

Agreement: Accepted

Reference 2

Expected Value: 96.69 +/- 0.50 pMC

Measured Value: 96.97 +/- 0.28 pMC

Agreement: Accepted

Reference 3

Expected Value: 0.42 +/- 0.04

Measured Value: 0.43 +/- 0.03 pMC

Agreement: Accepted

COMMENT: All measurements passed acceptance tests.

Validation:


Digital signature on file

Date: May 13, 2019