



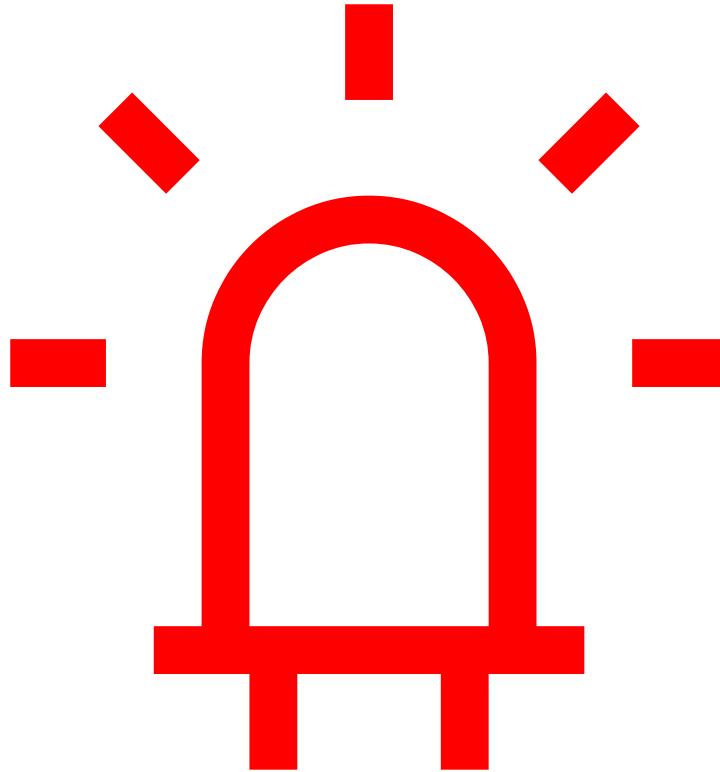
Usos da linguagem R na arqueologia: ferramenta e abordagem para libertação dos dados



Fortaleza

3. Jun. 2022

IGOR PEDROZA
PPGArq | UFPE - DS | UNI7



Apresentação realizada no VI SER UFF em Maio de 2022 e
modificada pelo autor para exibição no evento Cerveja com
Dados, em Fortaleza-CE, em 3 de junho de 2022.



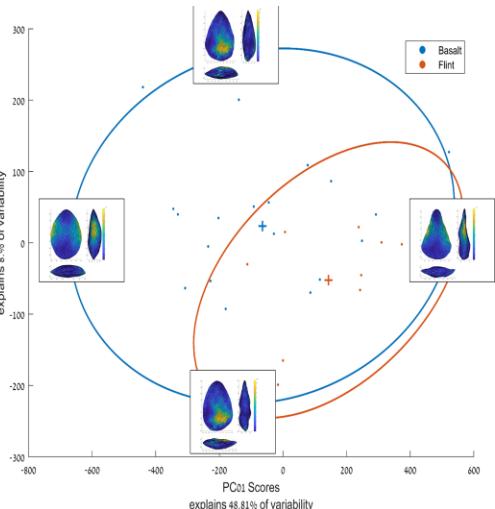
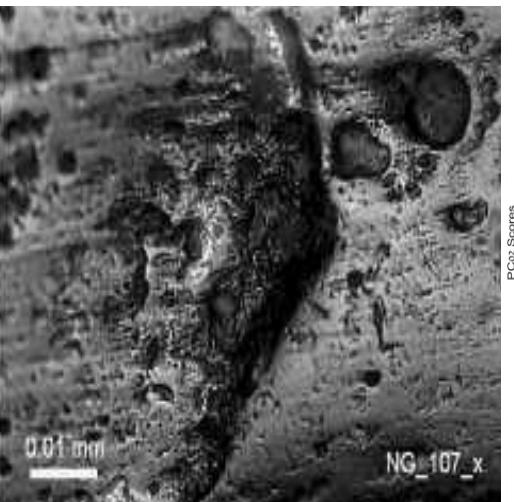
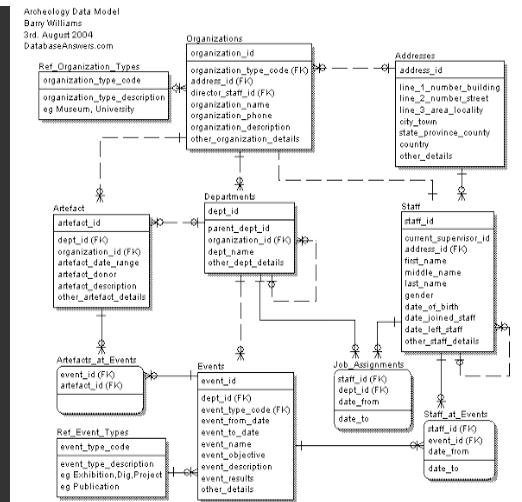
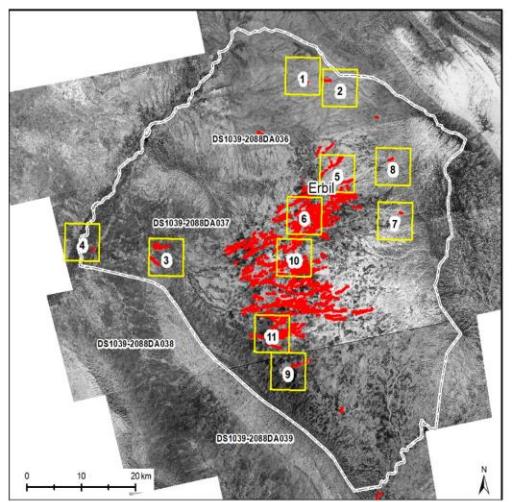
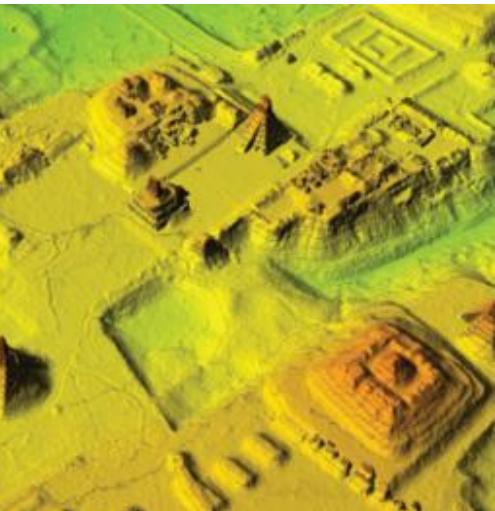




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?



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Science of sampling the cultural past

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BETA-4675	Urucum	4.850	30	Concha	C14	Rad	-6.253645	-31.523641	Camada 12
MC-3456	Leteiro	12.560	100	Sementes	C14	Rad	-4.521478	-28.412563	Fogueira 2
DATAÇÃO-123	Passagem	980	120	Cerâmica	TL	SAR	-3.528596	-19.785412	Urna 3

COD_LAB	SÍTIO	IDADE	ERRO	AMOSTRA	MÉTODO	TÉCNICA	LAT	LONG	CONTEXTO
GIF-1234	Papagaio	1.250	40	Carvão	C14	AMS	-4.852365	-35.412514	Urna 17
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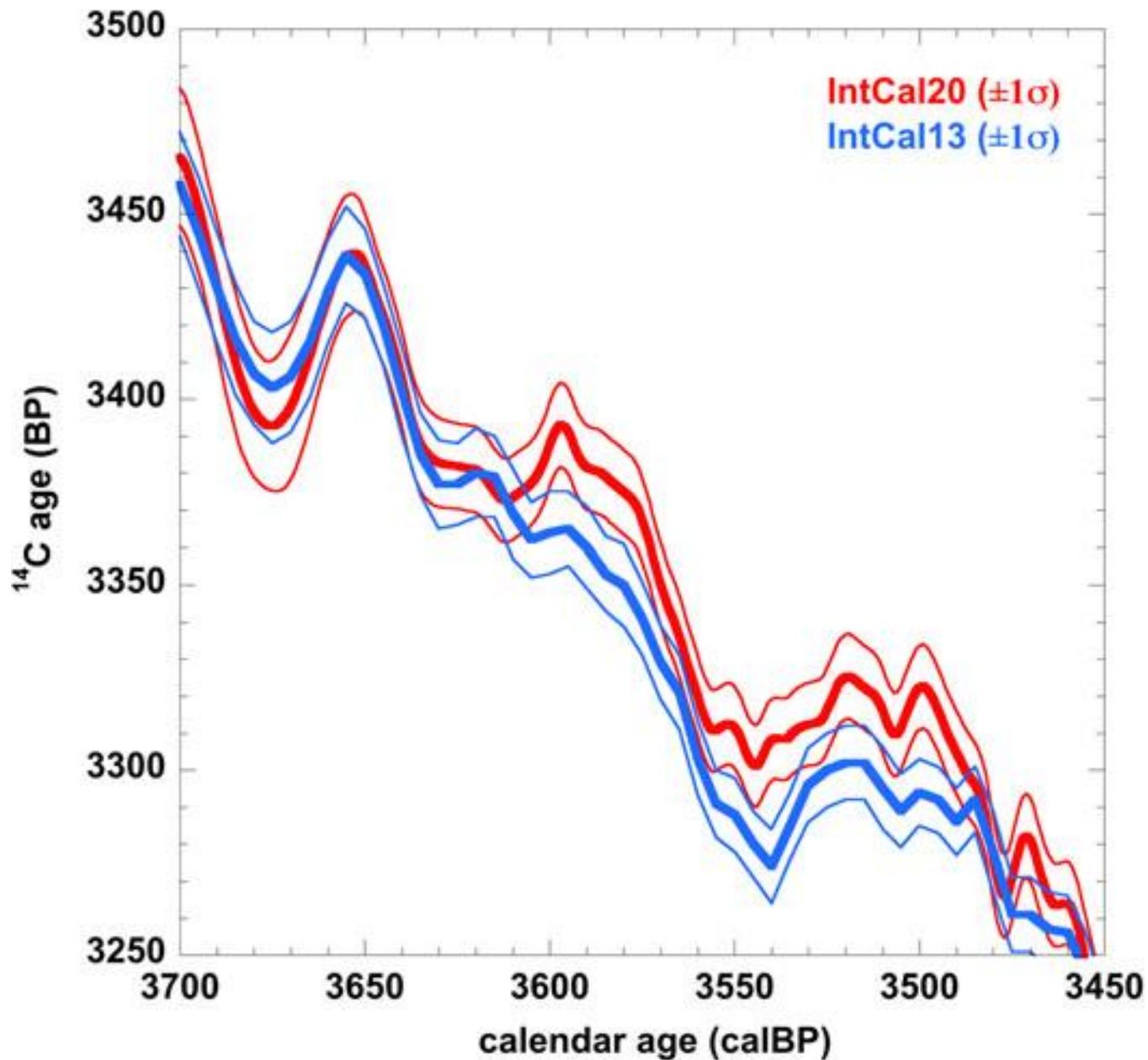
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	Urucum	4.850	30	Concha	C14	Rad			
MC-3456	Passagem	12.560	100	Sementes	C14	Rad			Fogueira 2
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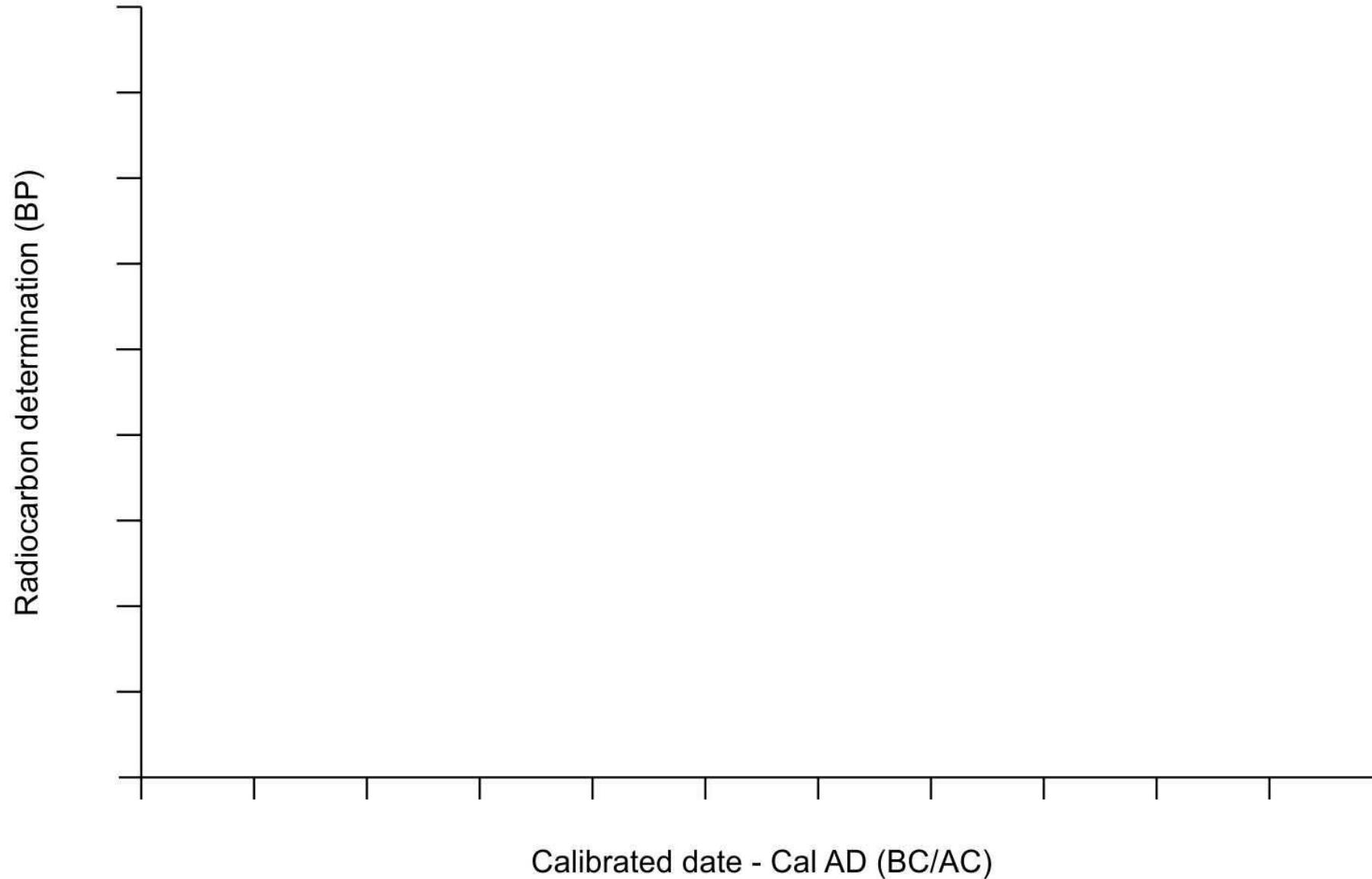


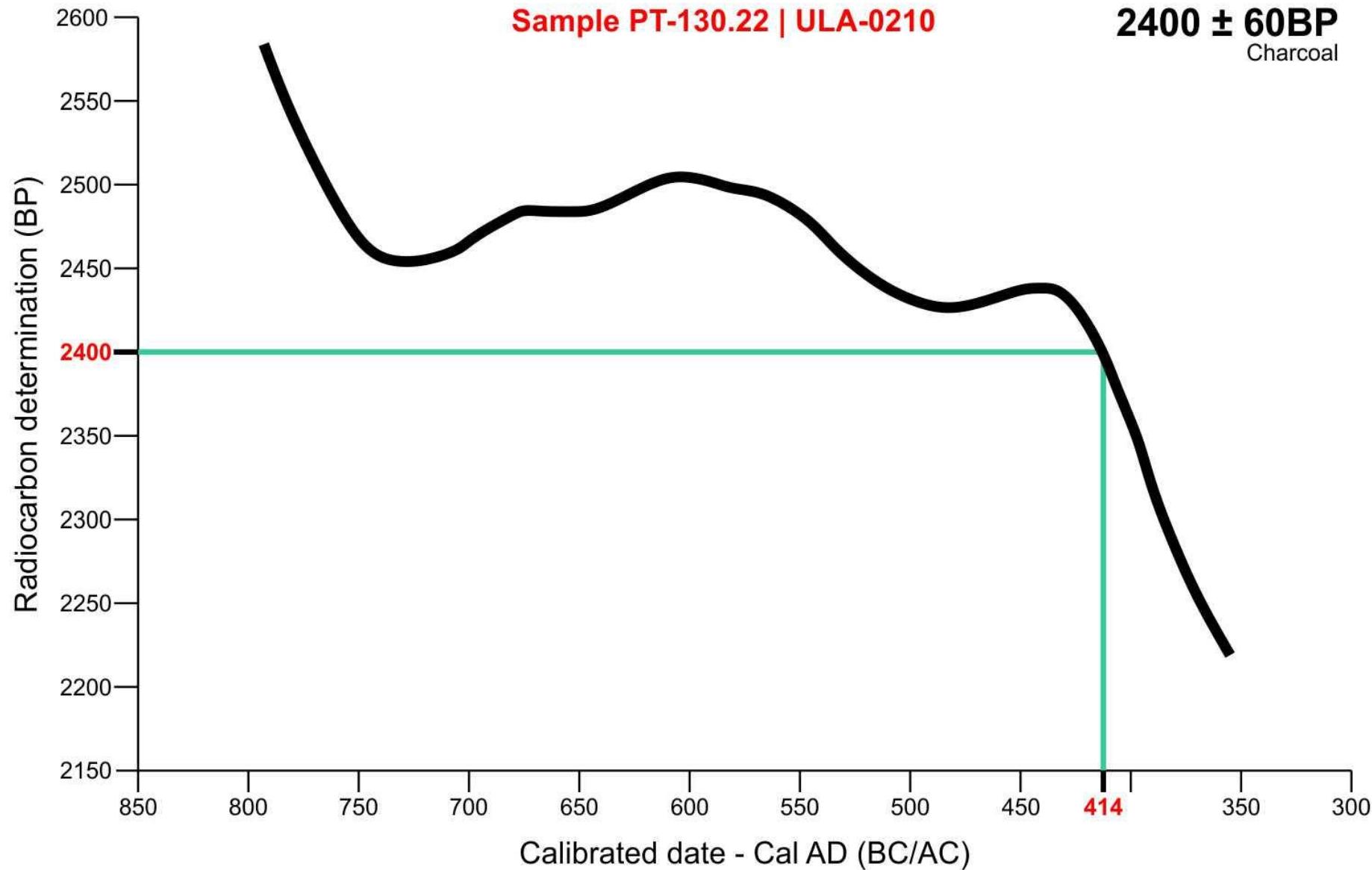


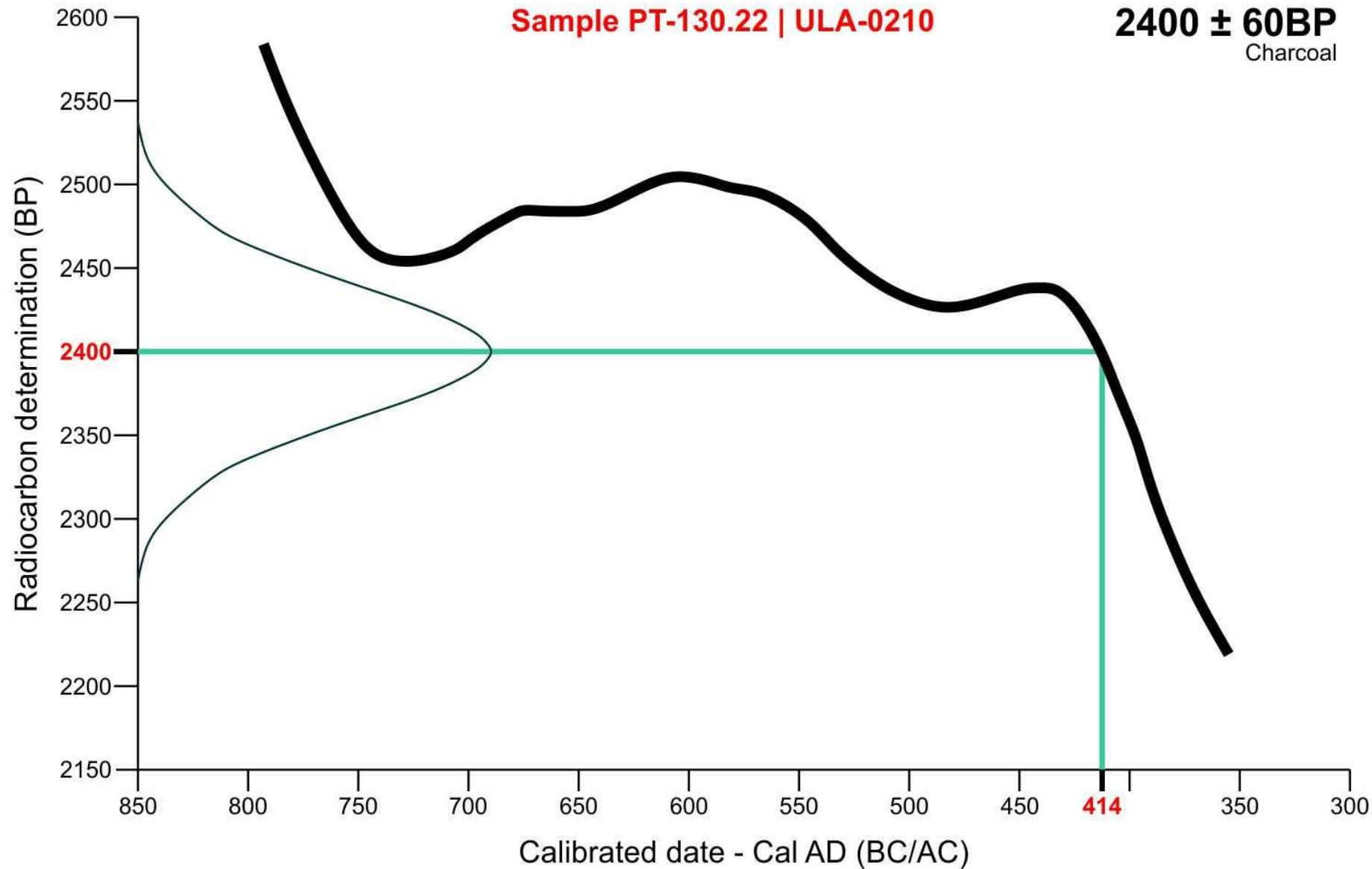


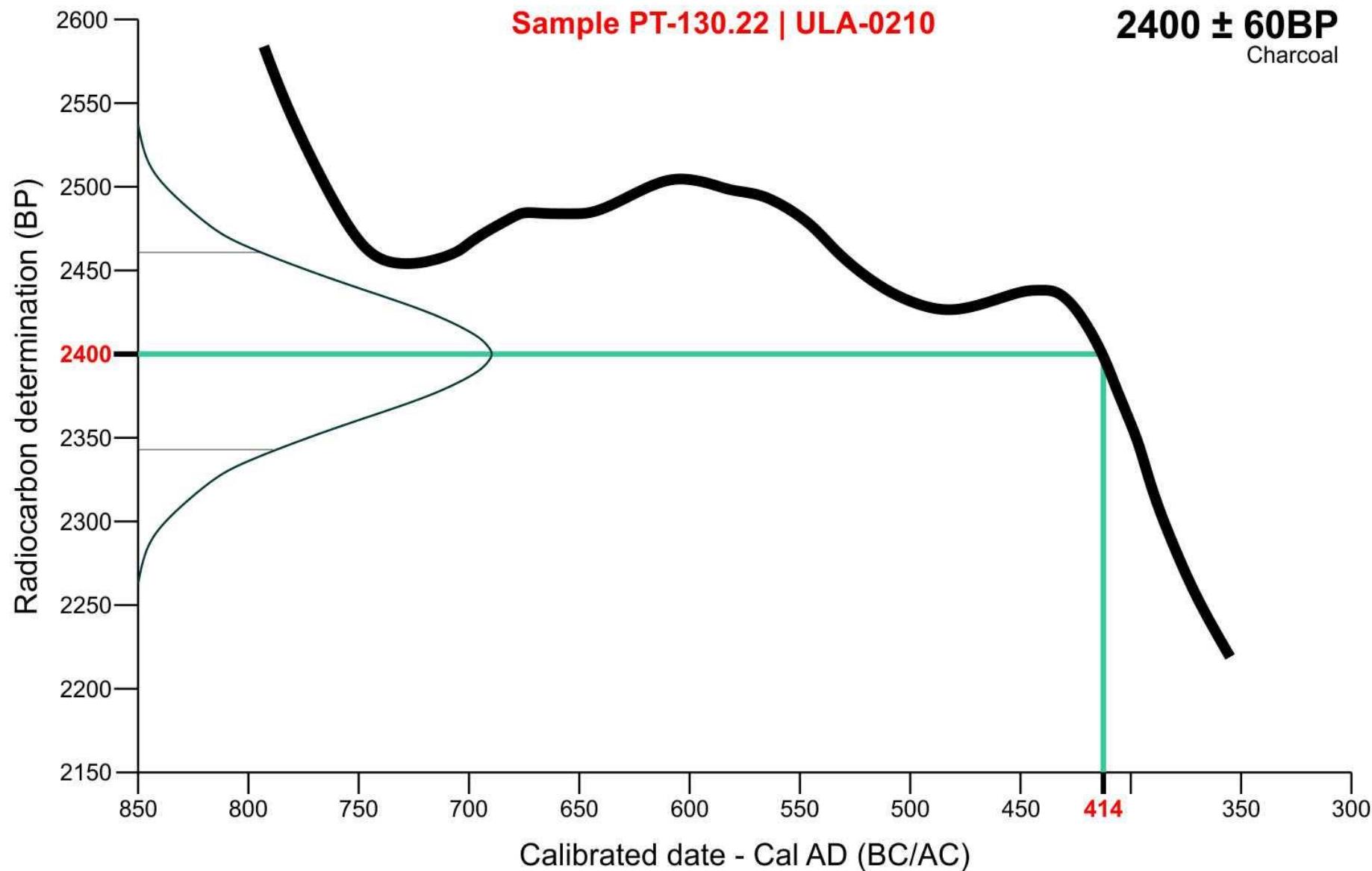


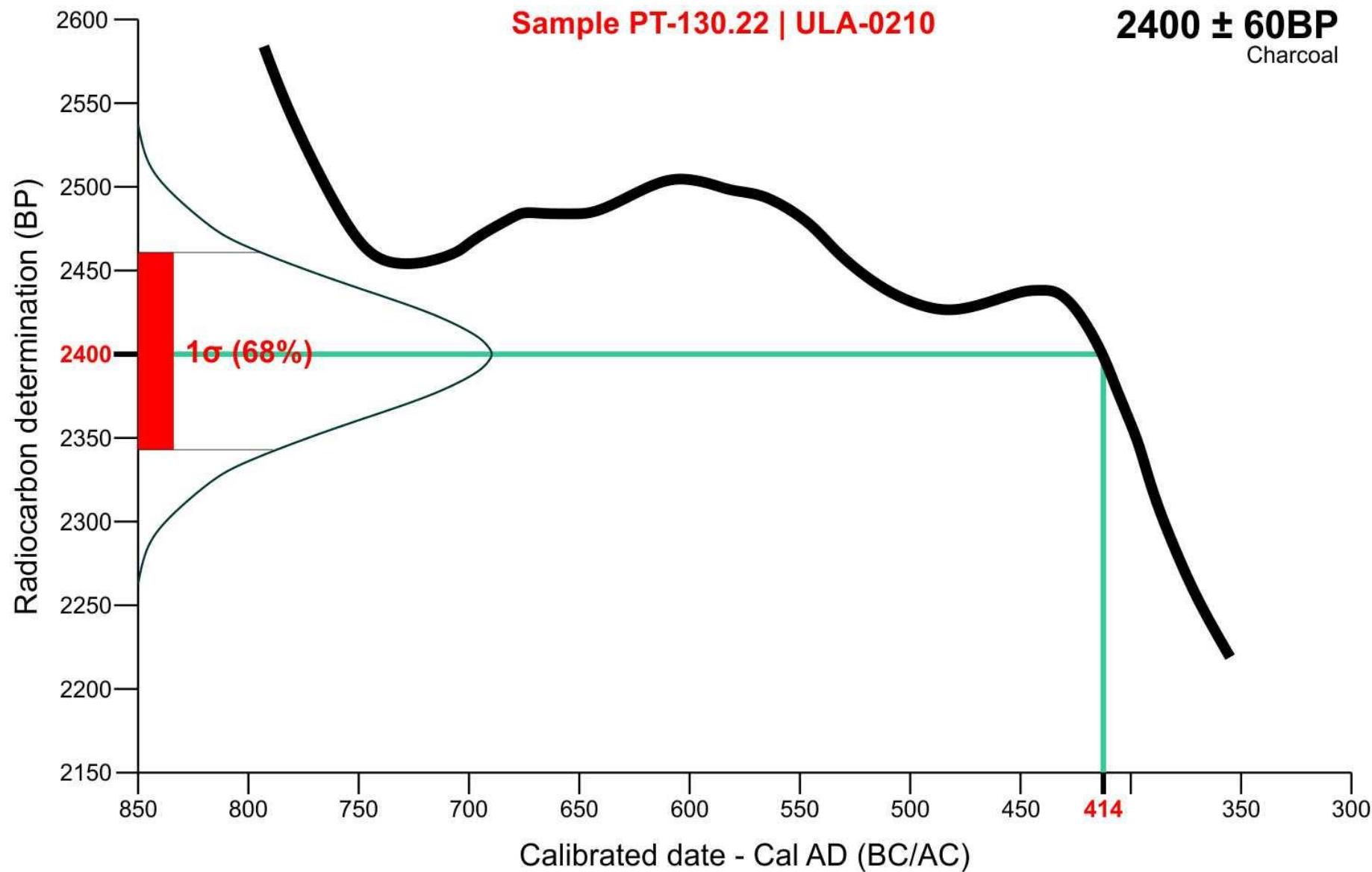


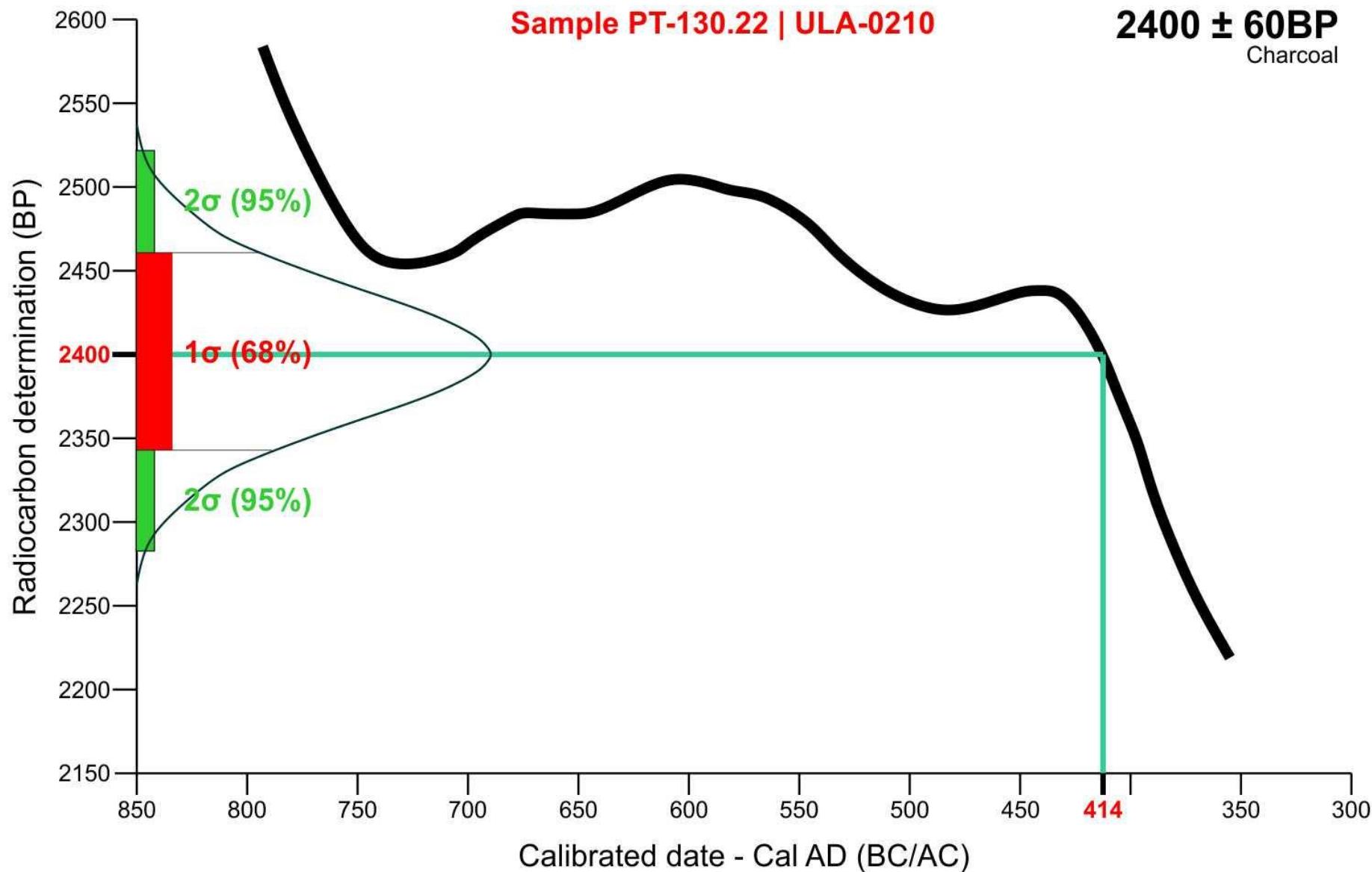


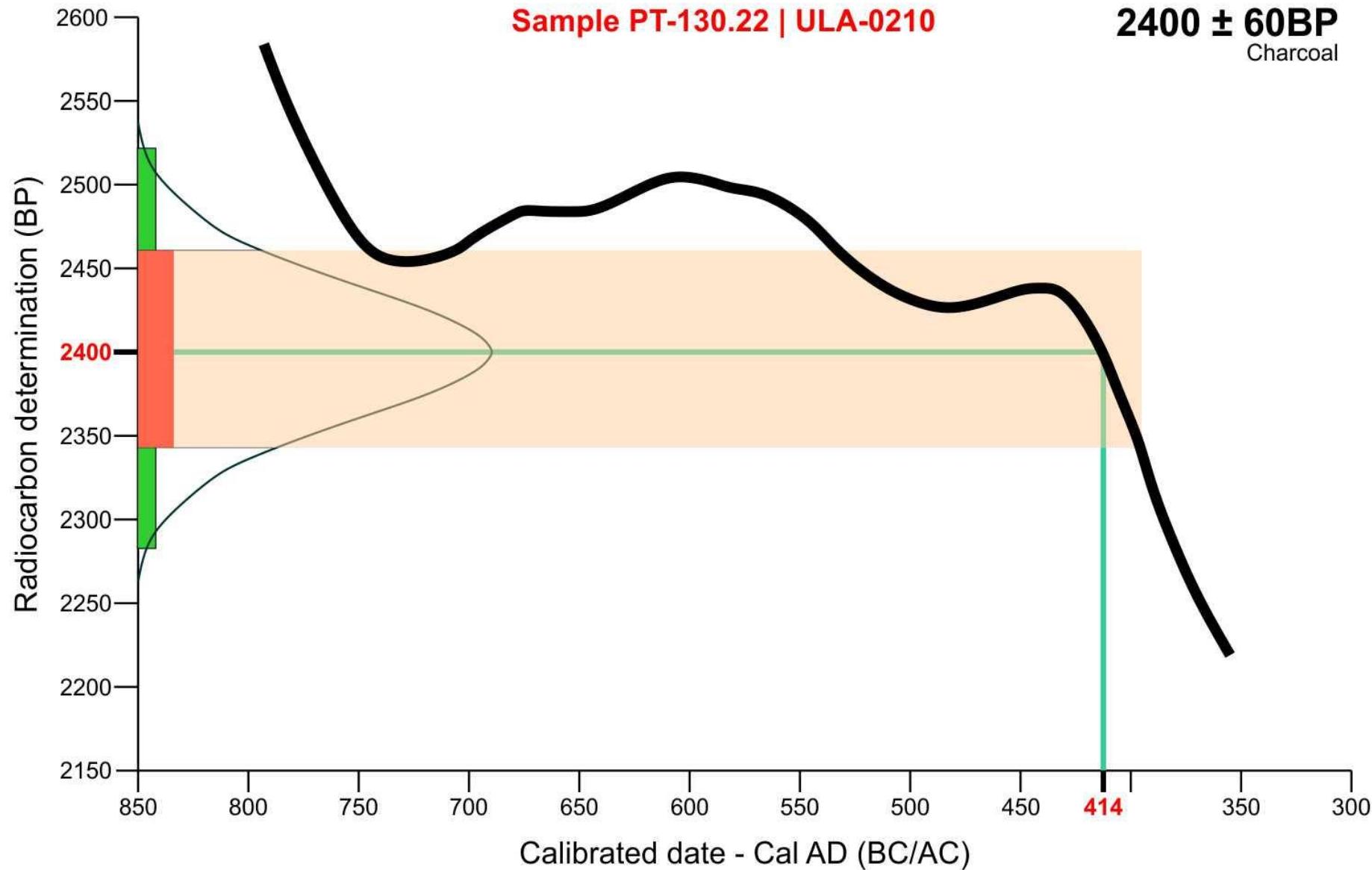


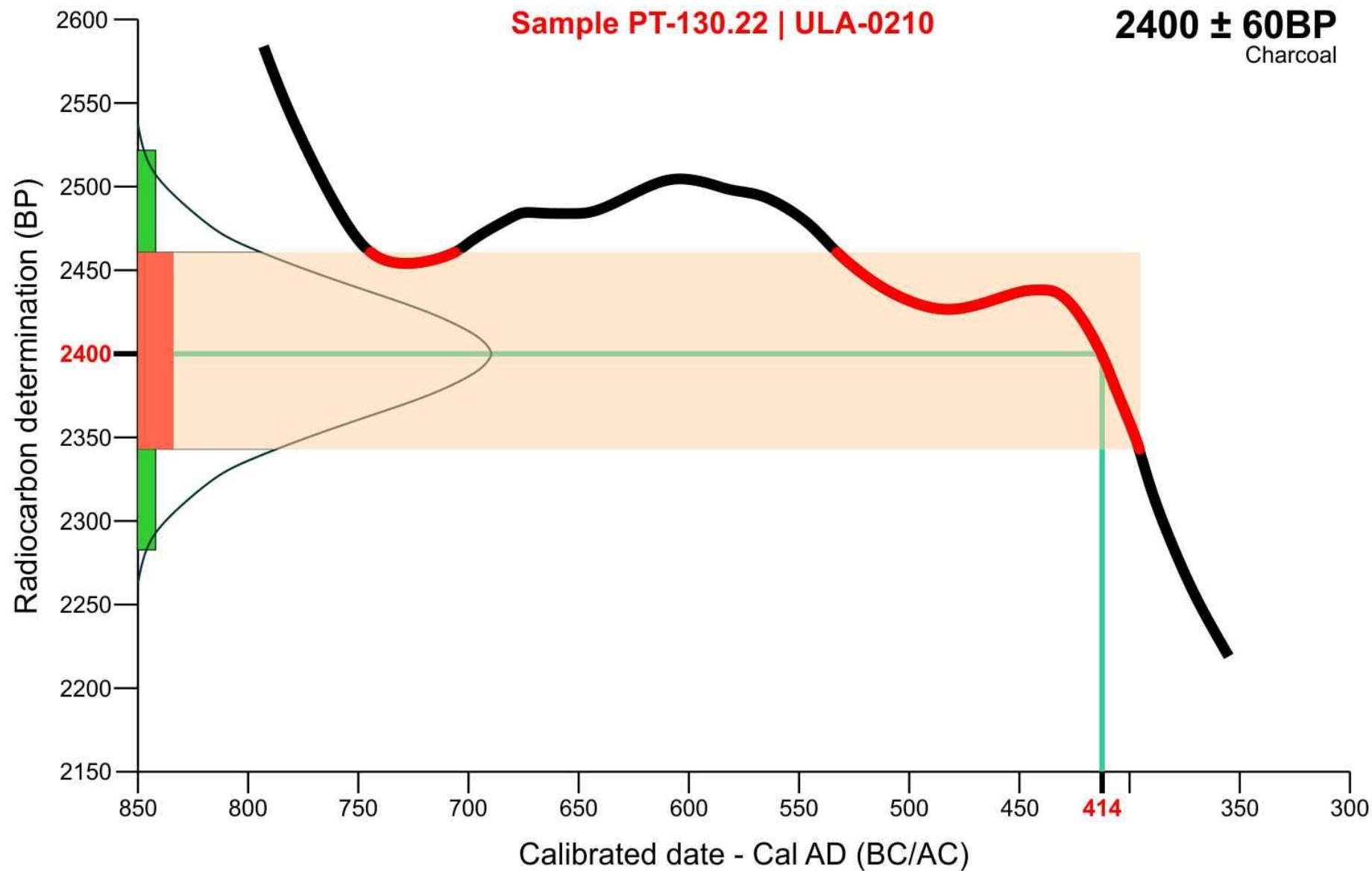


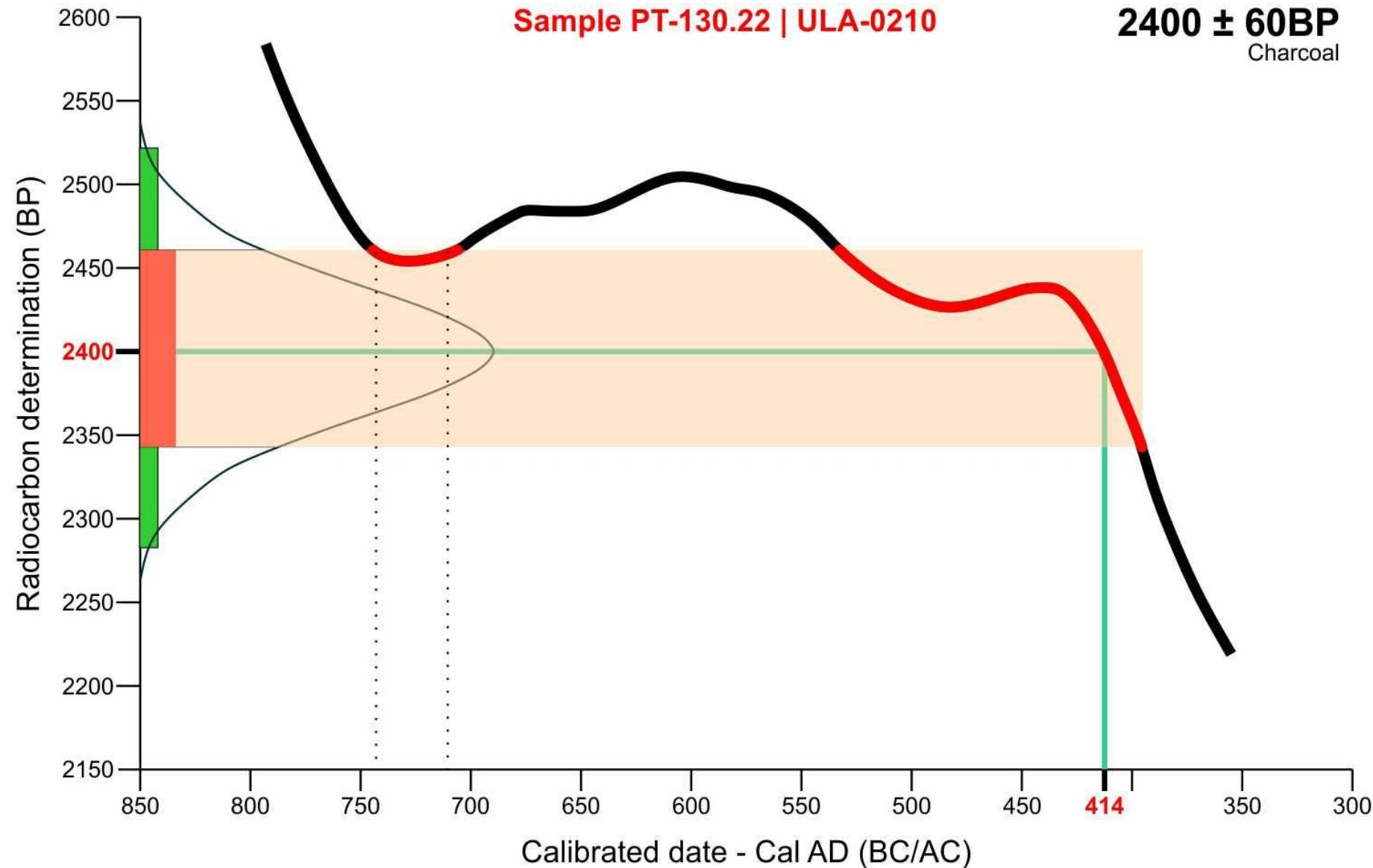


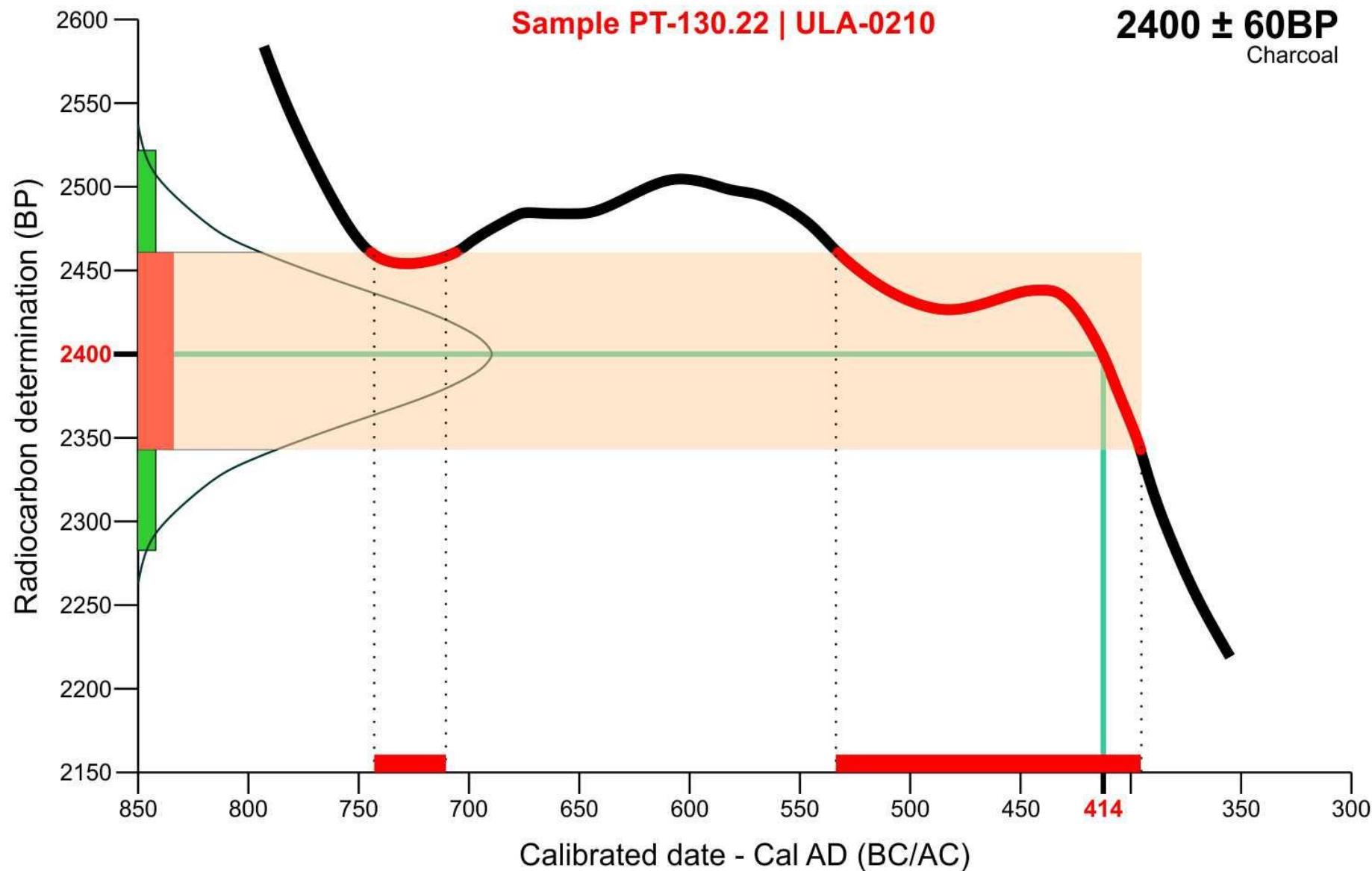


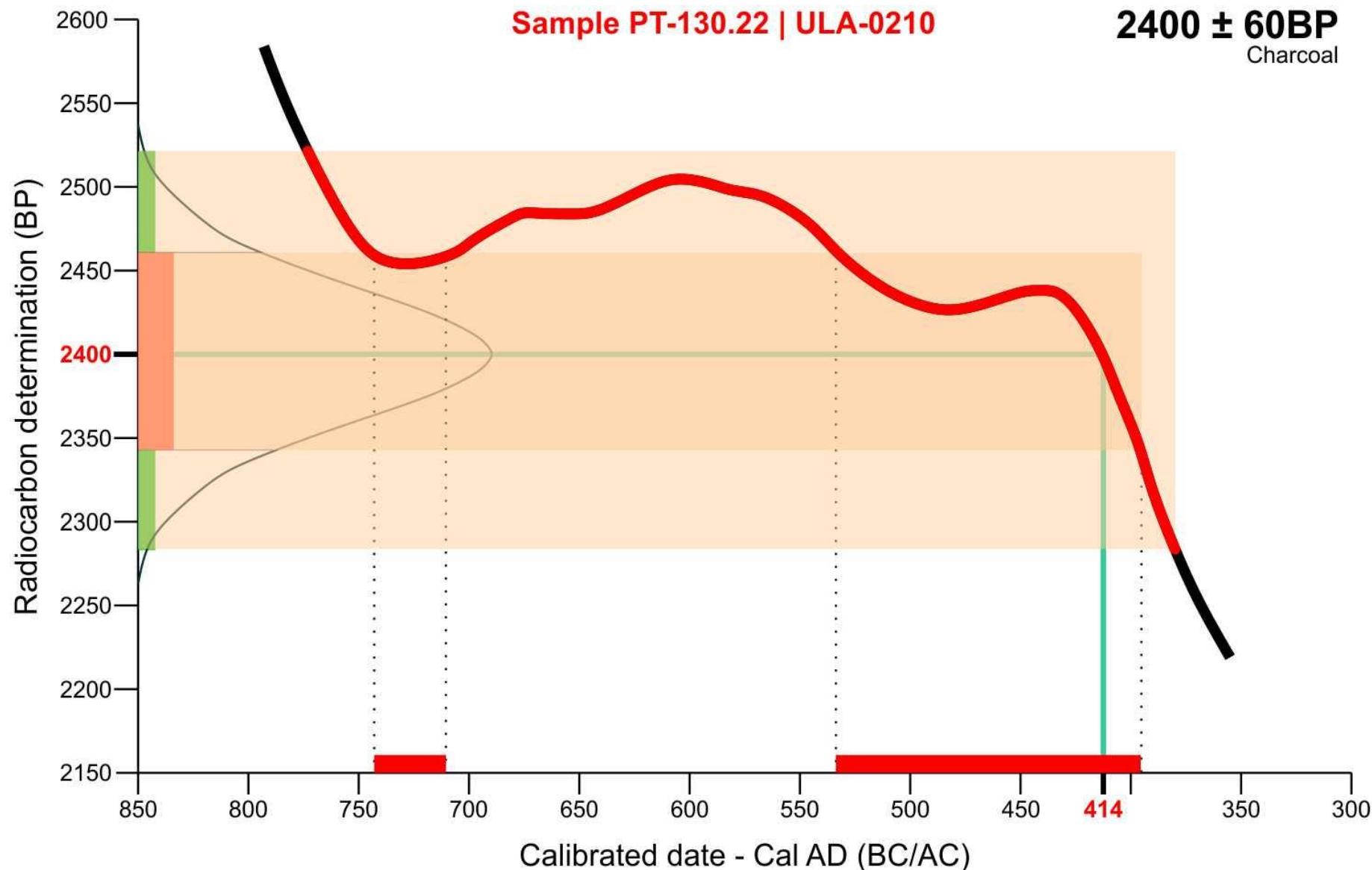


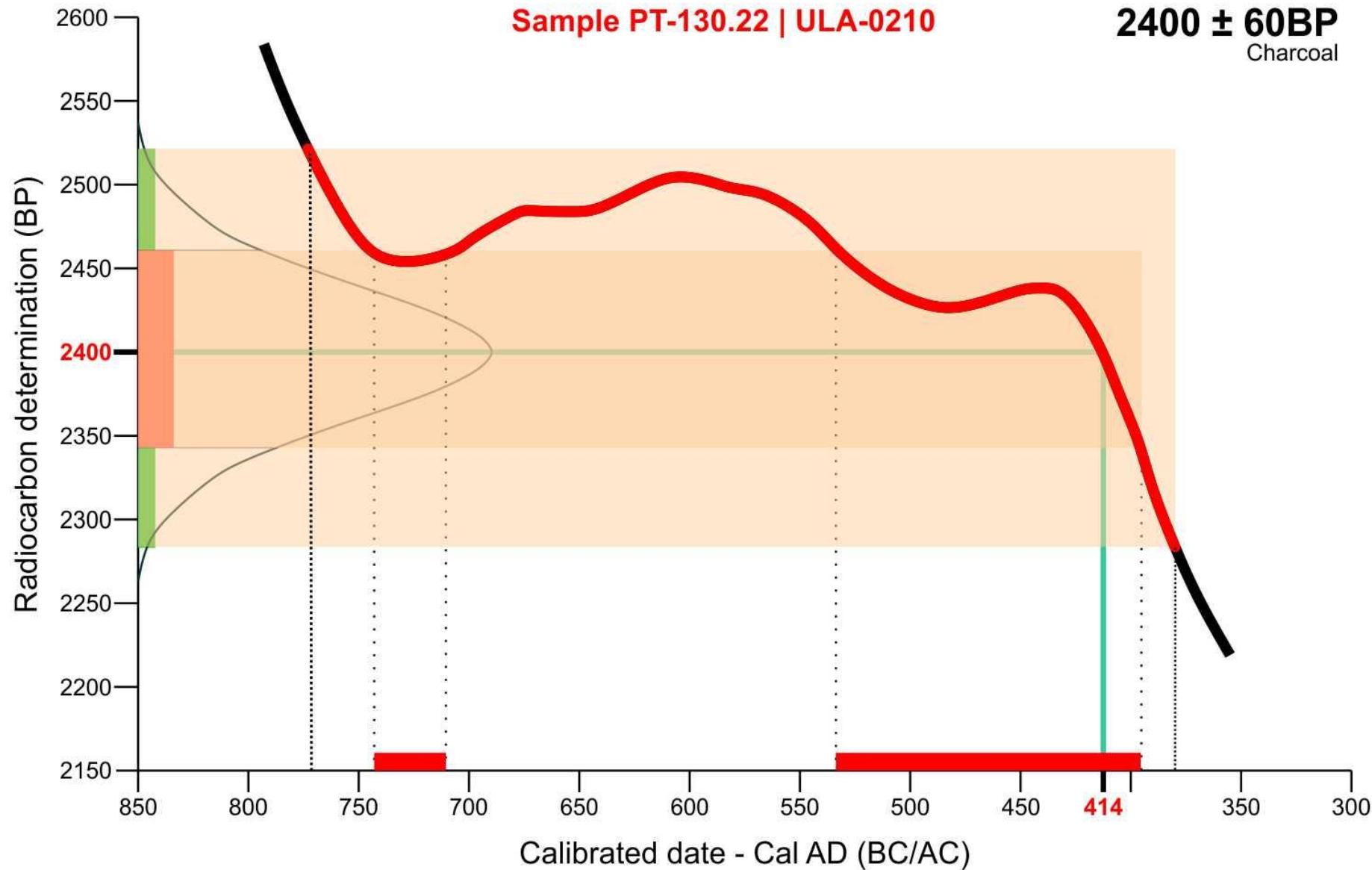


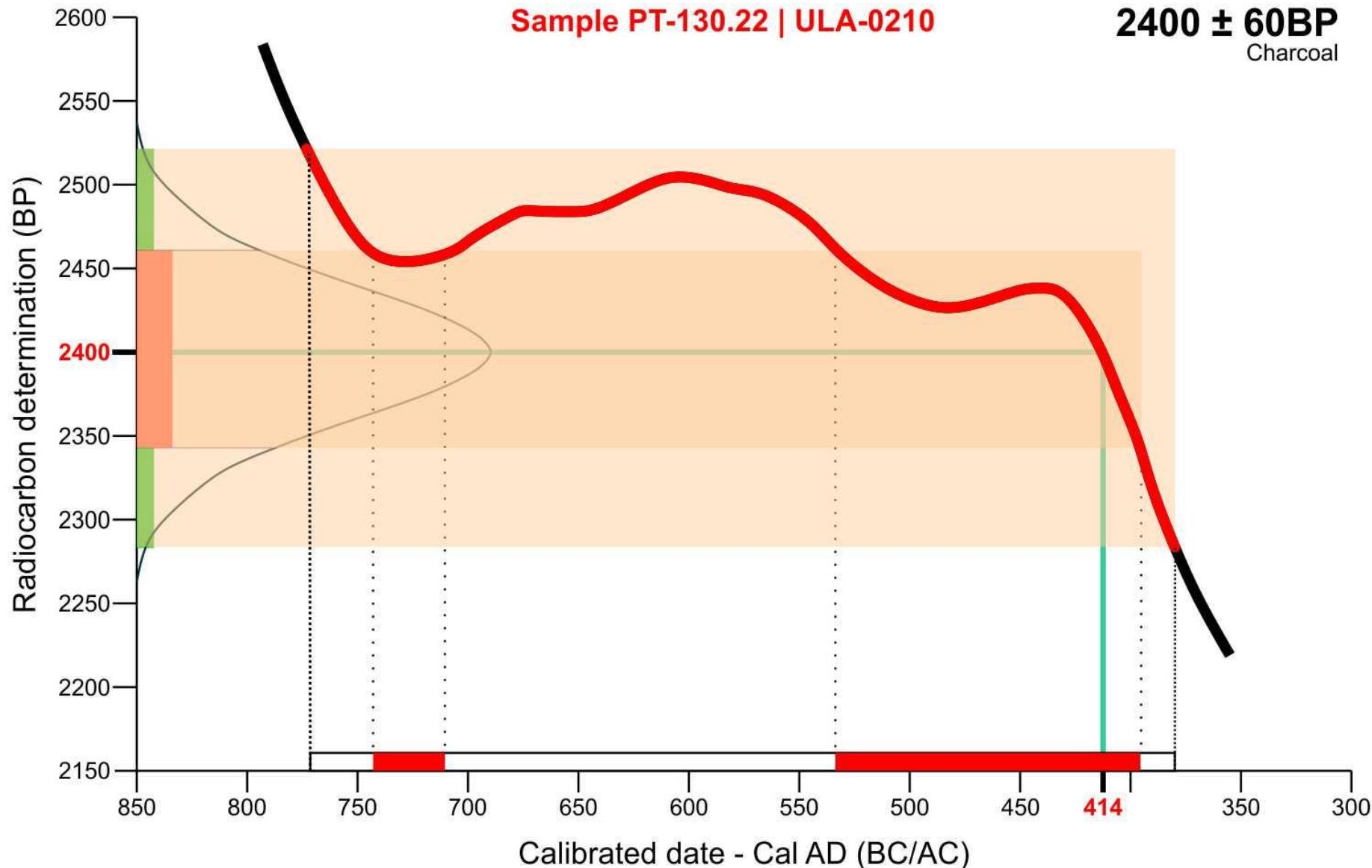


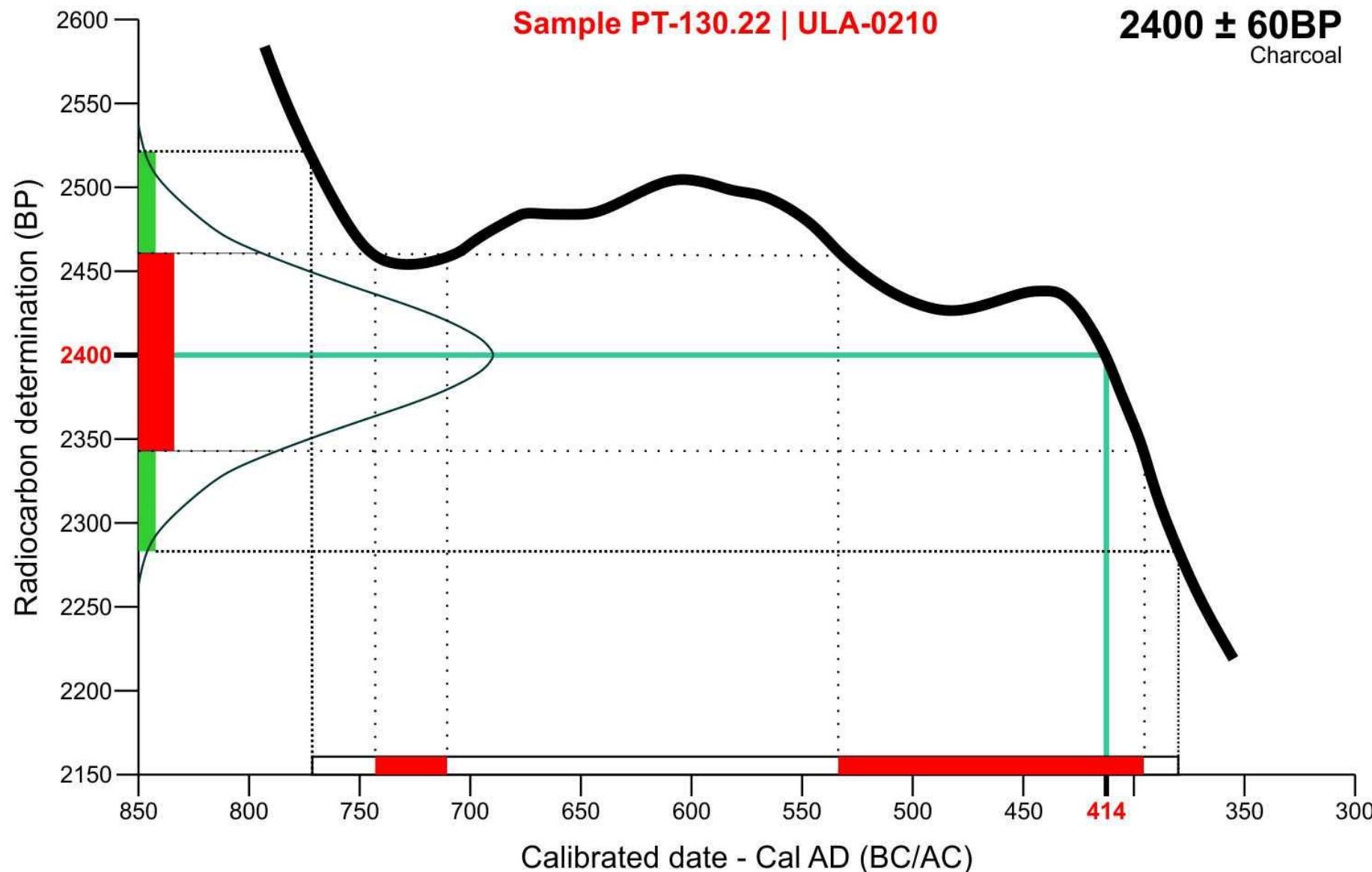


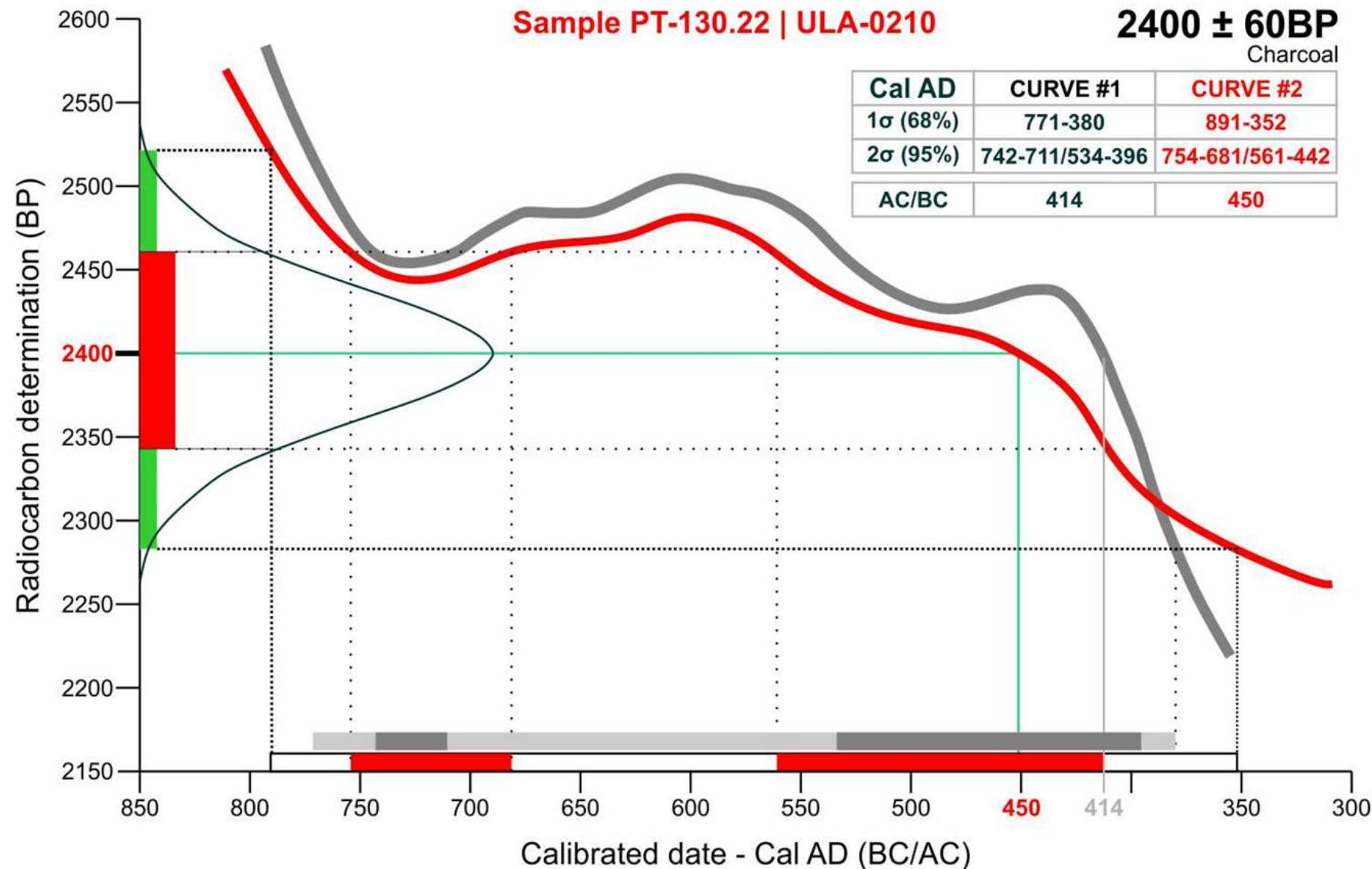






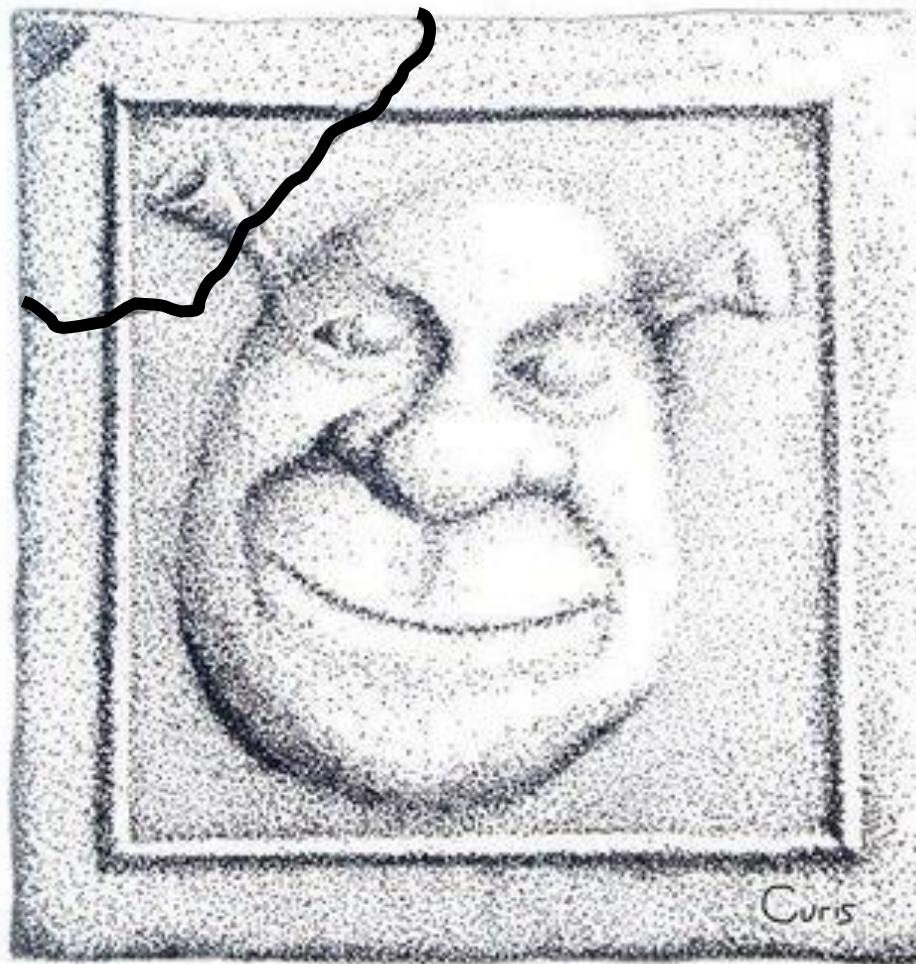






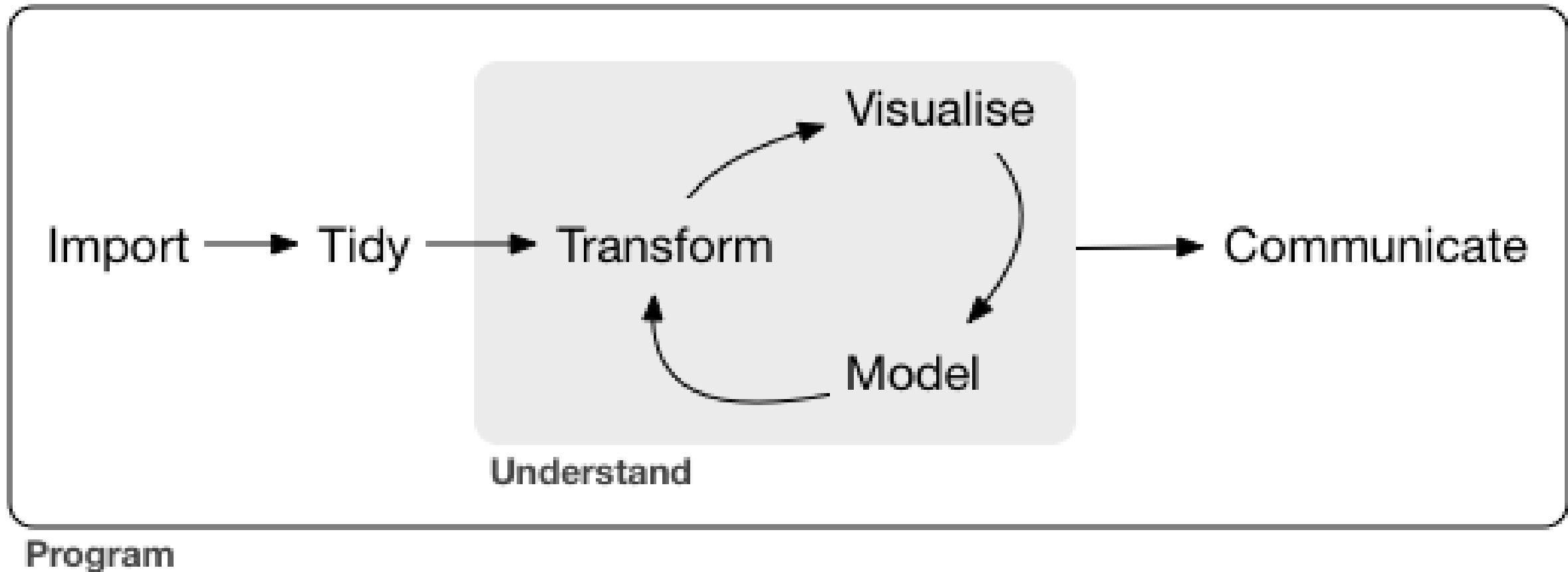


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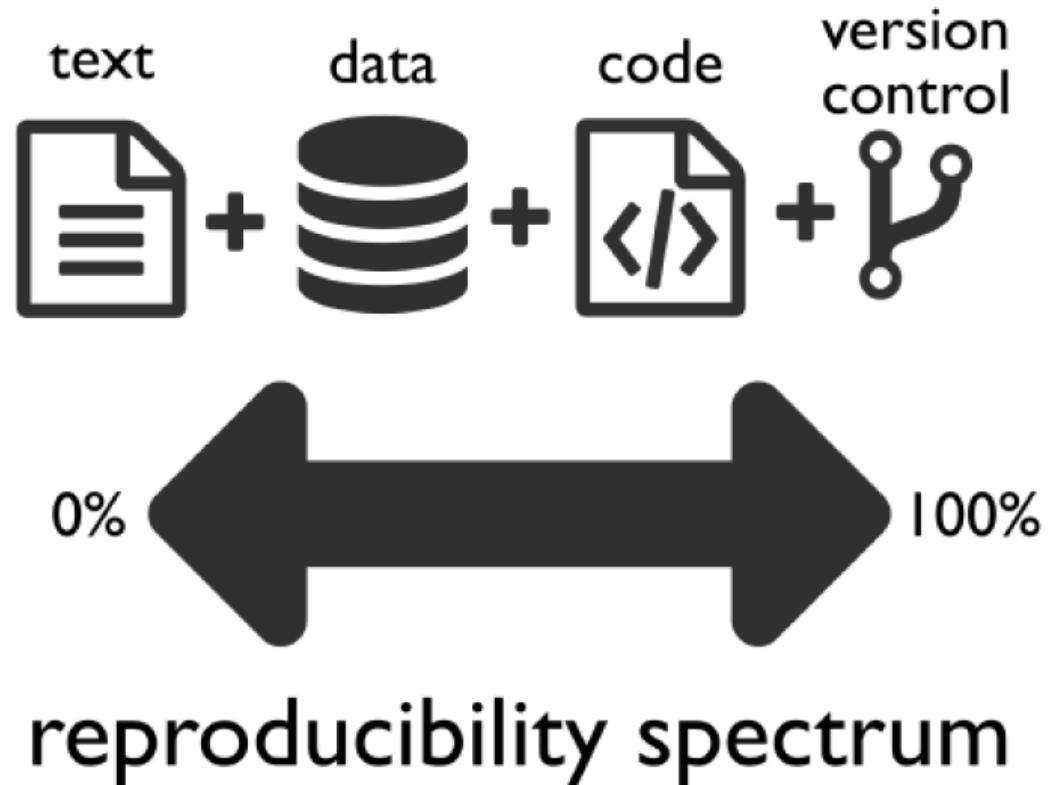


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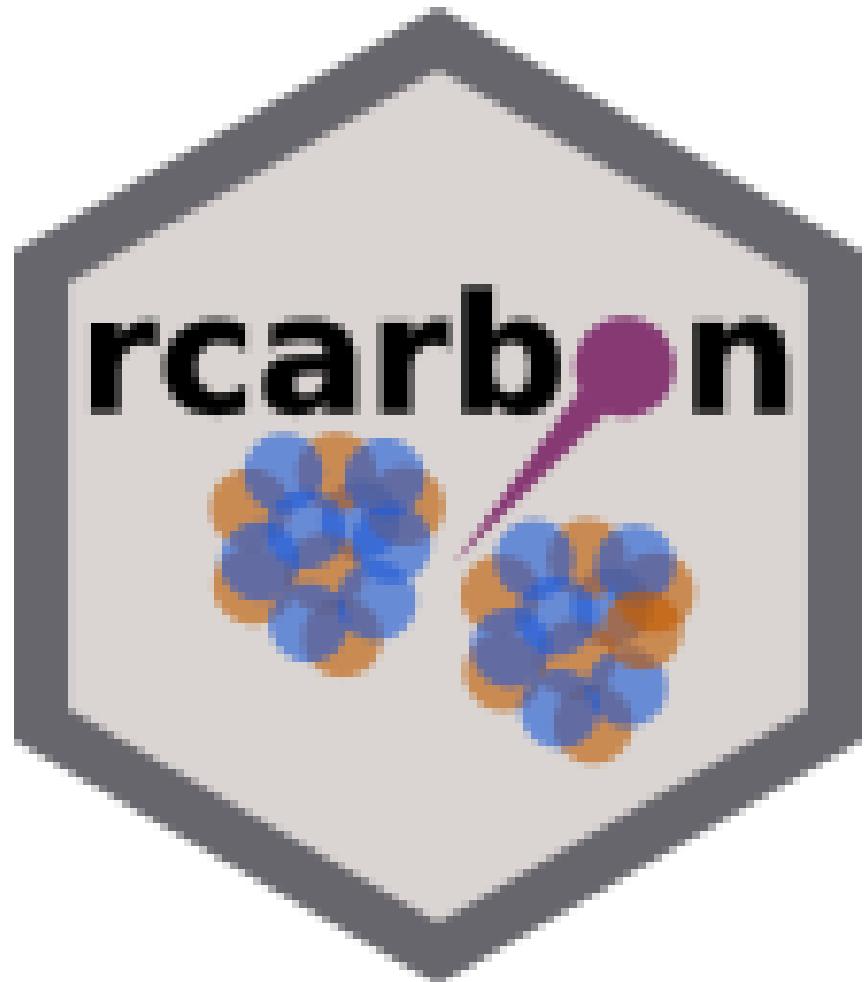


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Enrico Crema

[@er_crema](https://twitter.com/er_crema)

Last Version 1.3.2

Crema ER, Bevan A (2021). “Inference from large sets of radiocarbon dates: software and methods.” *Radiocarbon*, 63, 23-39.
<https://dx.doi.org/10.1017/RDC.2020.95>.

Analysing radiocarbon dates using the rcarbon package

Enrico Crema, Andrew Bevan

2022-02-17

- Introduction
 - Installing and loading the *rcarbon* package
- Calibrating ^{14}C Dates
 - Normalisation
- Aggregating ^{14}C Dates: Summed Probability Distributions (SPD)
 - Binning
 - Visualising Bins
 - Thinning
 - Composite Kernel Density Estimates (CKDE)
- Hypothesis Testing
 - Testing against theoretical growth models
 - Testing against custom growth models
 - Testing Local Growth Rates
 - Point-to-Point Test
 - Comparing empirical SPDs against each other
 - Spatial Analysis
 - Spatio-Temporal Kernel Density Estimates
 - Spatial Permutation Test
- References

Introduction

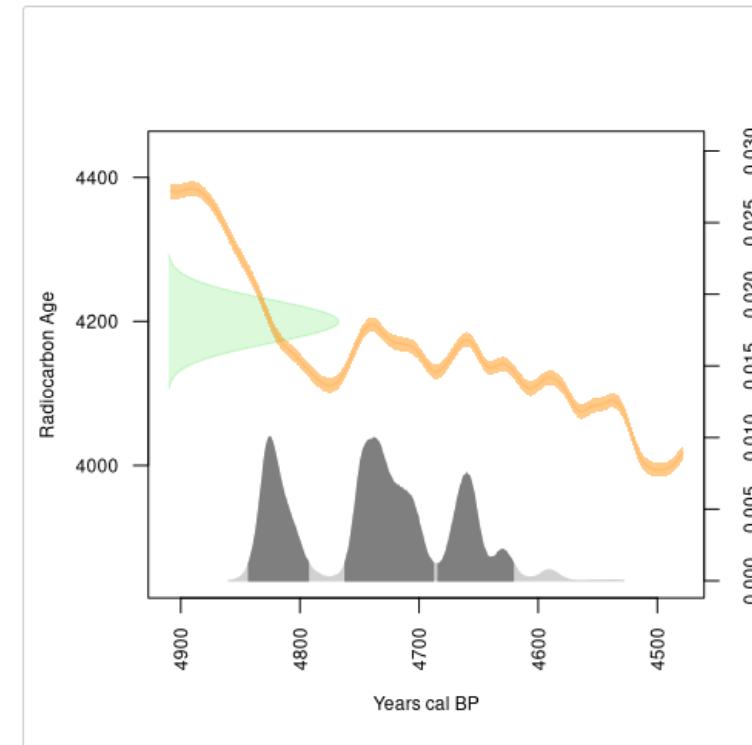
A seminal paper by John Rick some 30 years ago (1987) first introduced the idea of using the frequency of archaeological radiocarbon dates through time as a proxy for highs and lows in human population. The increased availability of large collections of archaeological (especially anthropogenic) radiocarbon dates has dramatically pushed this research agenda forward in recent years. New case studies from across the globe are regularly being published, stimulating the development of new techniques to tackle specific methodological and interpretative issues.

rcarbon (Crema and Bevan 2020) is an R package for the analysis of large collections of radiocarbon dates, with particular emphasis on this “date as data” approach. It offers basic calibration functions as well as a suite of statistical tests for examining aggregated calibrated dates, using the method commonly referred to as summed probability distributions of radiocarbon dates (SPDs).

```
x <- calibrate(x=4200,errors=30,calCurves='intcal20')
```

The resulting object of class `calDates` can then be plotted using the basic `plot()` function (in the highlighting the 95% higher posterior density interval):

```
plot(x,HPD=TRUE,credMass=0.95)
```



Multiple dates can be calibrated by supplying a vector of numerical values (as well as other arguments, e.g. different calibration curves), and the `summary()` function can be used to retrieve one and the two sigma ranges as well as the median calibrated date:

```
xx <- calibrate(x=c(5700,4820,6450,7200),errors=c(30,40,40,30),calCurves='intcal20',ids=c('D001','D002','D003'))
summary(xx)

##   DateID MedianBP OneSigma_BP_1 OneSigma_BP_2 OneSigma_BP_3 TwoSigma_BP_1
```



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RESEARCH ARTICLE

Archaeological expansions in tropical South America during the late Holocene: Assessing the role of demic diffusion

Jonas Gregorio de Souza, Jonas Alcaina Mateos, Marco Madella

Published: April 27, 2020 • <https://doi.org/10.1371/journal.pone.0232367>

Article	Authors	Metrics	Comments	Media Coverage	Peer Review
▼					

Abstract

Introduction

Materials and methods

Results and discussion

Conclusions

Supporting information

Acknowledgments

References

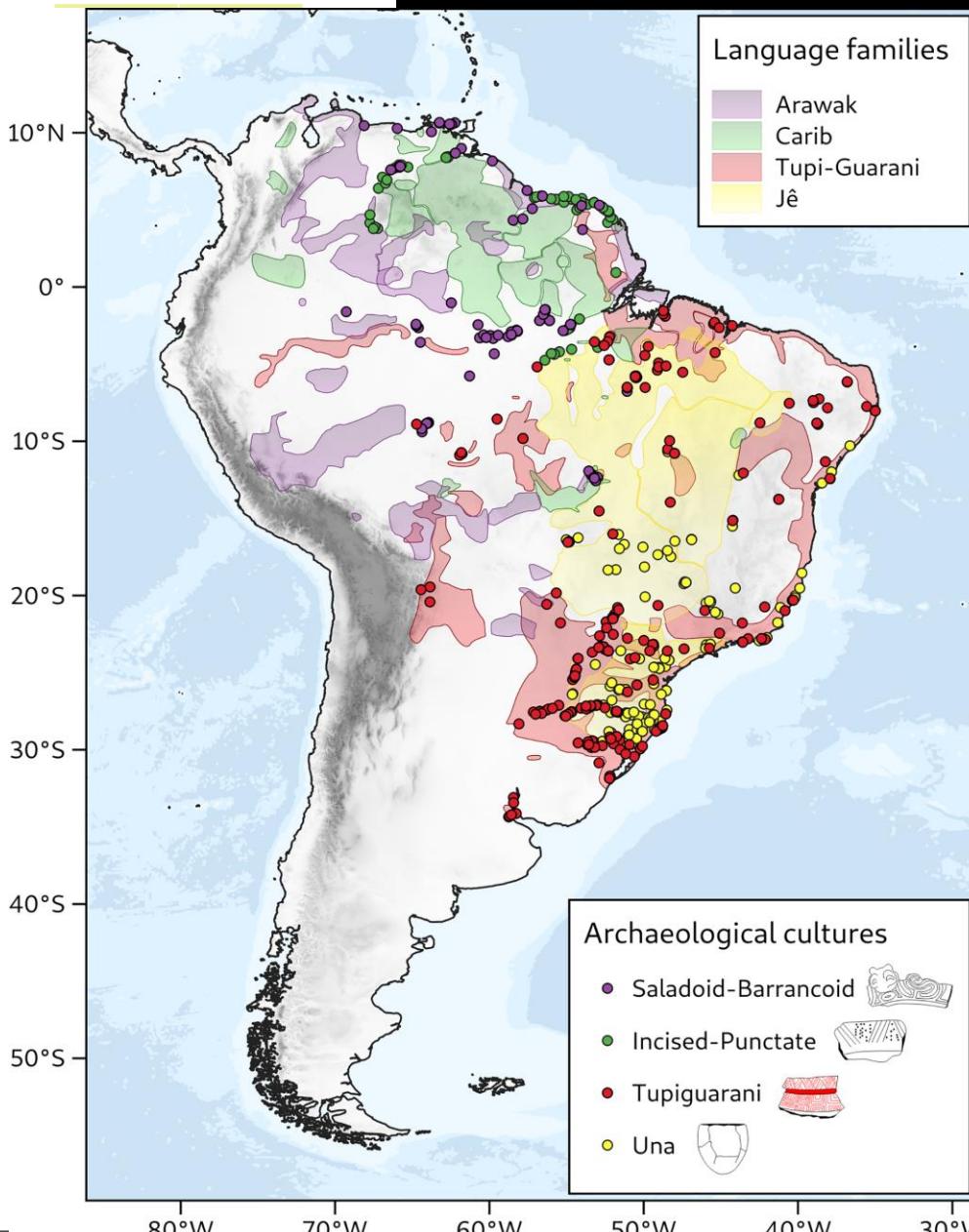
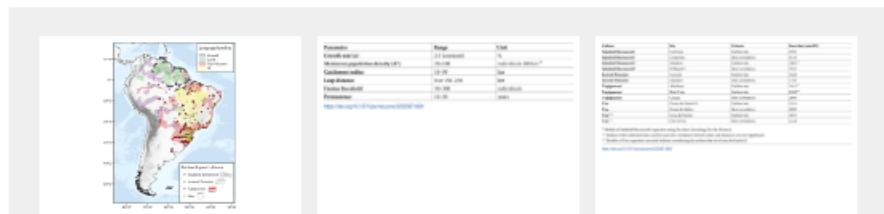
Reader Comments

Figures

Abstract

Human expansions motivated by the spread of farming are one of the most important processes that shaped cultural geographies during the Holocene. The best known example of this phenomenon is the Neolithic expansion in Europe, but parallels in other parts of the globe have recently come into focus. Here, we examine the expansion of four archaeological cultures of widespread distribution in lowland South America, most of which originated in or around the Amazon basin and spread during the late Holocene with the practice of tropical forest agriculture. We analyze spatial gradients in radiocarbon dates of each culture through space-time regressions, allowing us to establish the most likely geographical origin, time and speed of expansion. To further assess the feasibility of demic diffusion as the process behind the archaeological expansions in question, we employ agent-based simulations with demographic parameters derived from the ethnography of tropical forest farmers. We find that, while some expansions can be realistically modeled as demographic processes, others are not easily explainable in the same manner, which is possibly due to different processes driving their dispersal (e.g. cultural diffusion) or problematic/incomplete archaeological data.

Figures



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Please use the space provided to explain your answers to the questions above. You may also include additional comments for the author, including concerns about dual publication, research ethics, or publication ethics. (Please upload your review as an attachment if it exceeds 20,000 characters)

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<https://doi.org/10.1371/journal.pone.0232367.r003>

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.gitignore	update requirements	2 years ago
LICENSE	Create LICENSE	2 years ago
README.md	Update README.md	12 months ago
app.py	update app	2 years ago
model.py	clean code	2 years ago
requirements.txt	Update requirements.txt	8 months ago
utils.py	clean code	2 years ago
village.py	add memoization to optimize neighborhood and destination search times	2 years ago

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ExPaND

About

Agent-based model of demic expansions in South America during the late Holocene.

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Supporting information

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References

Reader Comments

Figures

Archaeological expansions in tropical South America during the late Holocene: Assessing the role of demic diffusion

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	A	B	C	D
1	Site	Culture	Original_affiliation	C14
2	La Gruta	Saladoid-Barrancoid	Saladoid (La Gruta)	4790
3	Boa Vista	Saladoid-Barrancoid	Pré-Pocó-Açutuba	4470
4	La Gruta	Saladoid-Barrancoid	Saladoid (La Gruta)	4090
5	La Gruta	Saladoid-Barrancoid	Saladoid (La Gruta)	4060
6	Agüerito	Saladoid-Barrancoid	Saladoid (La Gruta)	3980
7	La Gruta	Saladoid-Barrancoid	Saladoid (La Gruta)	3710
8	La Gruta	Saladoid-Barrancoid	Saladoid (La Gruta)	3660
9	Kaurikreek	Saladoid-Barrancoid	Saladoid (Ronquín)	3620

Dates



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Archaeological dates and coordinates used in the analysis.

(ODS)

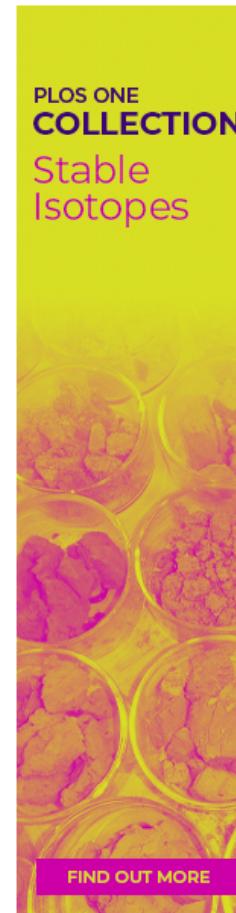
[S1 Table. Archaeological dates and coordinates used in the analysis.](#)

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(ODS)

[S2 Table. Results of the RMA regressions on dates versus distances from all sites considered as potential geographical origins of each archaeological culture.](#)

*Significant at the .05 level. **Significant at the .01 level. ***Regression performed using only dates of the short chronology for the Orinoco. ****Regression performed without the earliest





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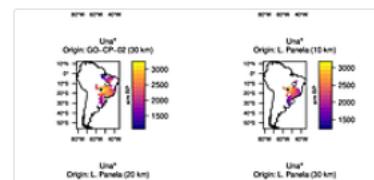
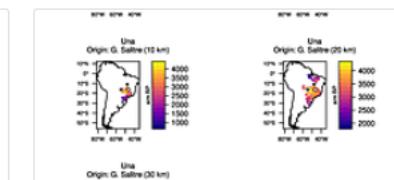
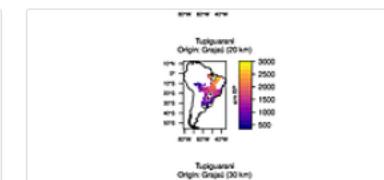
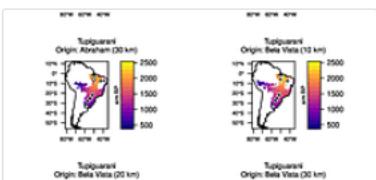
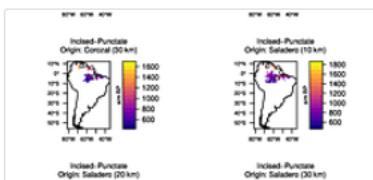
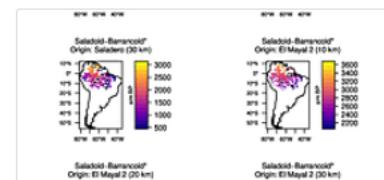
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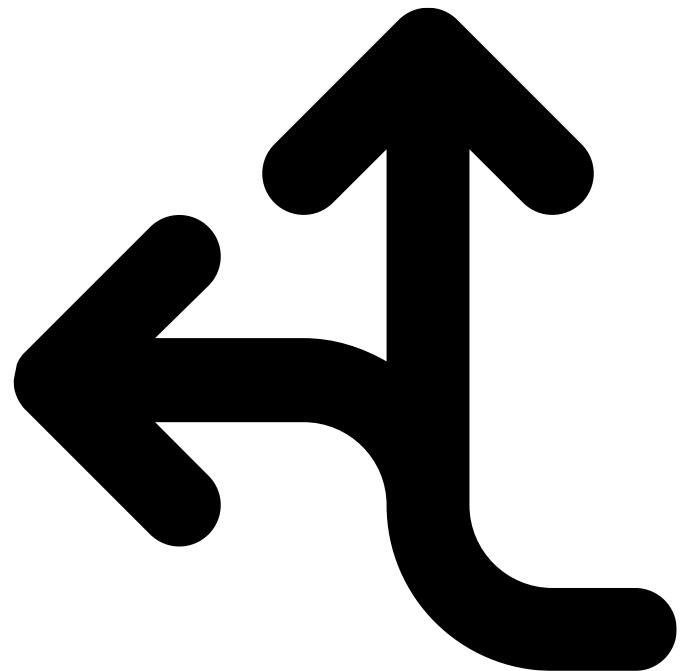
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Human expansions motivated by the spread of farming are one of the most important

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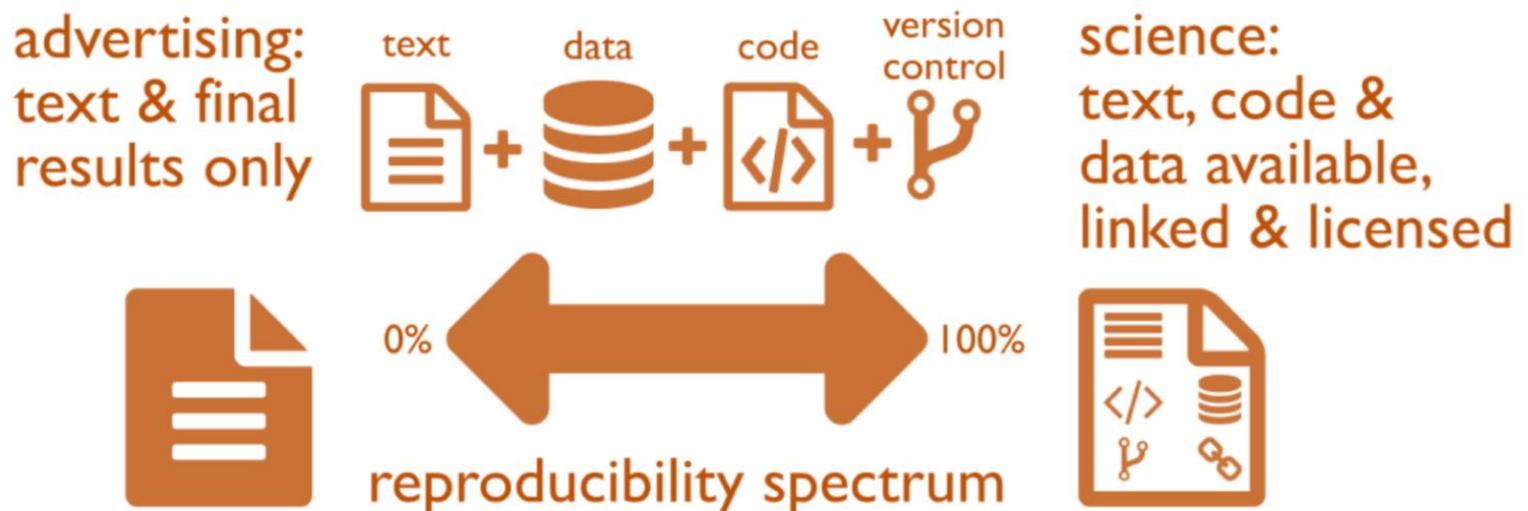
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VZBI 001	Sup.	-	ND	-	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	-
VZBI 007	Sup.	-	Sílex	21,2	40	40	15	Seixo	AUSENTE	INTEIRO	-	-	CORTICAL	2	PDPMD	-	-	Lasca	Acidente de Sint
VZBI 008	Sup.	-	Sílex	11,2	20	35	12	Seixo	AUSENTE	INTEIRO	-	-	CORTICAL	2	PDPMD	-	-	Lasca	-
VZBI 009	Sup.	-	Sílex	4,8	22	20	10	Seixo	<1/2	INTEIRO	-	-	CORTICAL	1	PDPMD	-	-	Lasca	-
VZBI 011	Sup.	-	ND	-	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	-
VZBI 012	Sup.	-	Sílex	5,3	-	-	-		-	-	-	-	-	-	-	-	-	Fragmento	Lasca fragmentada
VZBI 013	Sup.	-	Sílex	32,5	40	30	20	Seixo	AUSENTE	INTEIRO	-	-	CORTICAL	3	PDPMD	-	-	Lasca	-
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VZBI 021	Sup.	-	Sílex	11,4	-	-	-		-	-	-	-	-	-	-	-	-	Fragmento	Lasca fragmentada
VZBI 043	Sup.	-	Sílex	1,5	-	-	-		-	-	-	-	-	-	-	-	-	Fragmento	Fratura térmica
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VZBI 056	1	Sond. 1	ND	-	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	-
VZBI 057	1	Sond. 1	Sílex	1,1	-	-	-		-	-	-	-	-	-	-	-	-	Fragmento	Lasca fragmentada
VZBI 058	1	Sond. 1	Sílex	24,2	20	33	28	Seixo	<1/2	INTEIRO	-	-	LISO	2	PDPMD	-	-	Lasca	Bipolar(?)
VZBI 062	3	Sond. 1	Sílex	0,3	10	7	3	Seixo	AUSENTE	INTEIRO	-	-	LISO	1	PDPMD	-	-	Lasca	-
VZBI 063	1	Sond. 2	ND	-	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	-
VZBI 064	2	Sond. 2	ND	-	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	-
VZBI 066	1	A 1	Sílex	1,3	22	13	4	Seixo	AUSENTE	INTEIRO	-	-	AUSENTE	1	PDPMD	-	-	Lasca	-
VZBI 068	2	A 1	Sílex	1	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	Peca não numerada
VZBI 069	1	A 1	Sílex	4,4	20	25	8	Seixo	>1/2	INTEIRO	-	-	CORTICAL	1	PDPMD	-	-	Lasca	PDPMD (apesar do lúcio)
VZBI 070	1	A 1	Sílex	1	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	Peca não numerada
VZBI 071	1	A 1	Sílex	1,5	18	18	5	Seixo	<1/2	INTEIRO	-	-	LISO	2	PDPMD	-	-	Lasca	Fagonagem
VZBI 072	2	Sond. 2	Sílex	2,4	14	18	9	Seixo	AUSENTE	INTEIRO	-	-	LISO	2	PDPMD	-	-	Lasca	Bipolar(?)
VZBI 073	2	Sond. 2	ND	-	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	Peca não localizada
VZBI 074	2	Sond. 2	Sílex	1	6	10	3	Seixo	AUSENTE	INTEIRO	-	-	DIEDRO	1	PDPMD	-	-	Lasca	Talao diedro
VZBI 075	2	A 1	Sílex	1	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	Peca não numerada
VZBI 076	Sup.	-	ND	-	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	-
VZBI 077	2	Sond. 2	Sílex	1	6	10	2	Seixo	>1/2	INTEIRO	-	-	AUSENTE	1	PDPMD	-	-	Lasca	-
VZBI 078	2	Sond. 2	Quartzo	1	10	10	3	Seixo	AUSENTE	INTEIRO	-	-	LISO	2	PDPMD	-	-	Lasca	Quartzo Hialino
VZBI 079	2	A 1	Sílex	0,9	14	14	5	Seixo	AUSENTE	INTEIRO	-	-	PUNCTIFORME	2	PB	-	-	Lasca	-
VZBI 080	2	A 1	Sílex	1	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	Peca não numerada
VZBI 081	2	Sond. 2	Sílex	2,1	-	-	-		-	-	-	-	-	-	-	-	-	Fragmento	Lasca fragmentada
VZBI 082	2	Sond. 2	ND	-	-	-	-		-	-	-	-	-	-	-	-	-	Descarte	Peca não localizada
VZBI 083	2	Sond. 2	Sílex	1	-	-	-		-	-	-	-	-	-	-	-	-	Resíduo	-
VZBI 084	2	Sond. 2	Sílex	2,3	-	-	-		-	-	-	-	-	-	-	-	-	Resíduo	-
VZBI 085	2	Sond. 2	Quartzo	25,2	50	40	12	Seixo	<1/2	INTEIRO	-	-	CORTICAL	1	PDPMD	-	-	Lasca	-
VZBI 086	2	Sond. 2	Sílex	1	-	-	-		-	-	-	-	-	-	-	-	-	Resíduo	-
VZBI 087	2	A 1	Sílex	0,5	14	12	4	Seixo	AUSENTE	INTEIRO	-	-	LISO	1	PDPMD	-	-	Lasca	Acidente de Sint
VZBI 088	2	Sond. 2	Sílex	1	-	-	-		-	-	-	-	-	-	-	-	-	Resíduo	-



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Gabriela de Queiroz



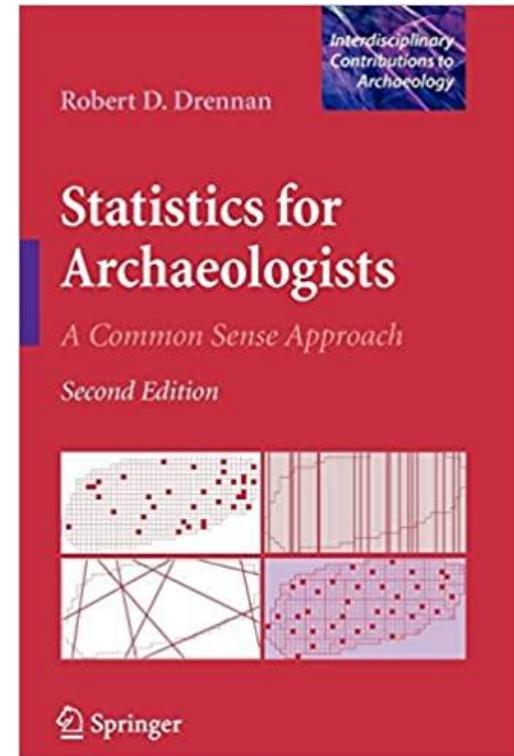
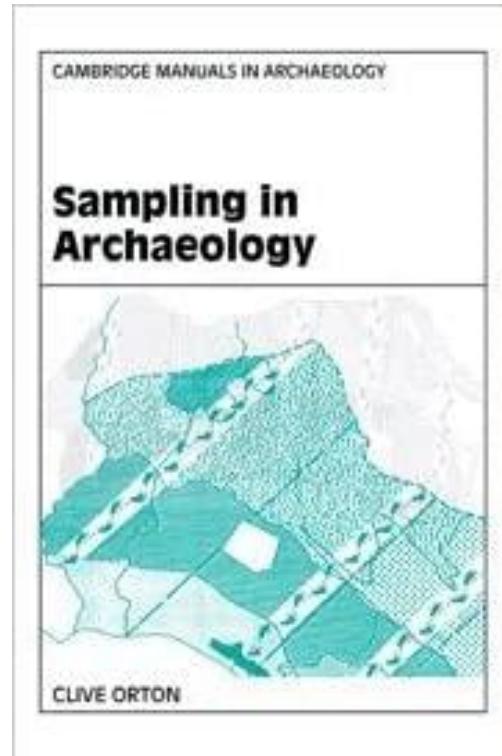
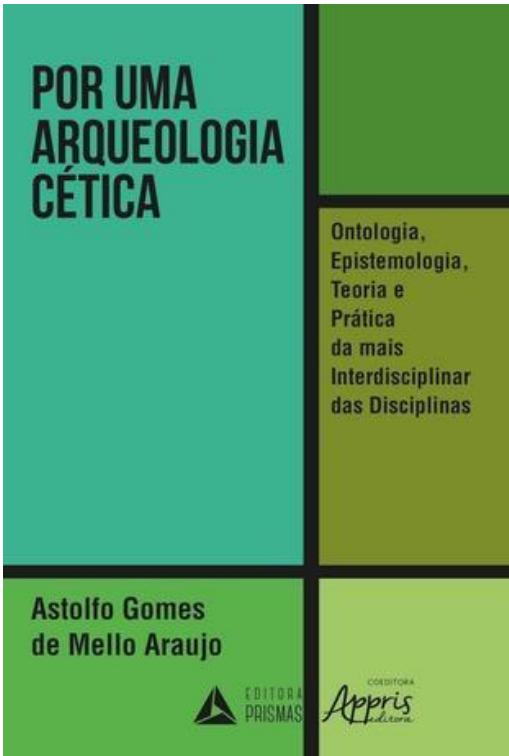
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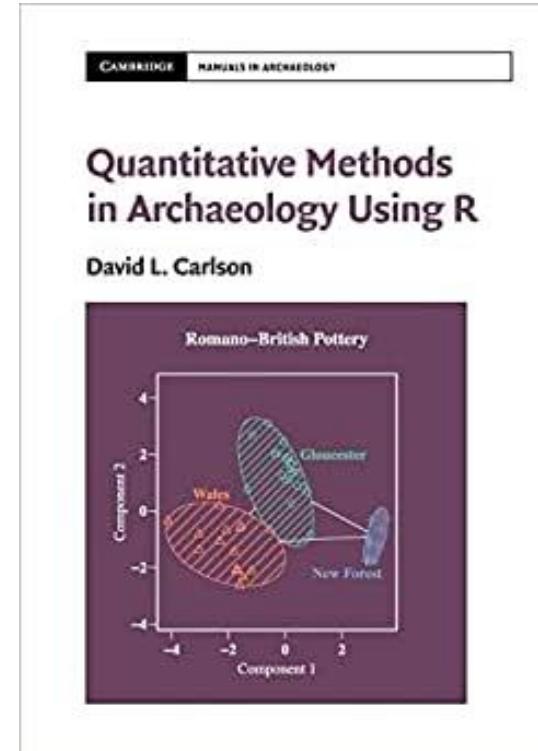
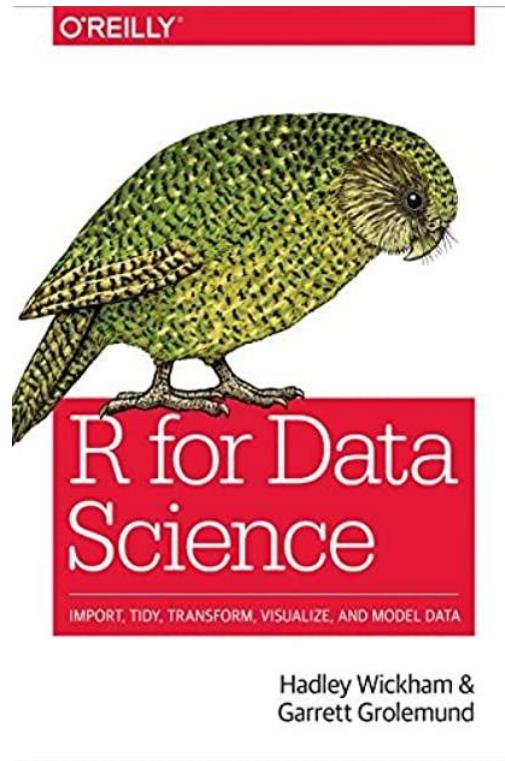


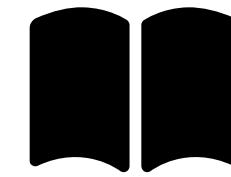
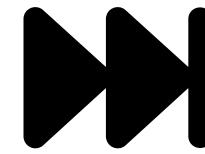
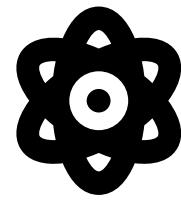
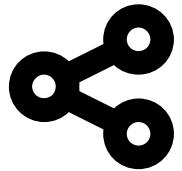
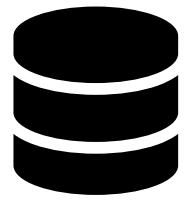
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