Radiocarbon dating archaeobotanical remains from West Fen Road, Ely (Ashwell site)

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Between 1999 and 2000, extensive development-led excavations by the Cambridge Archaeological Unit at West Fen Road, Ely, discovered a settlement with substantial ditched enclosures which was continuously occupied between the early eighth and fifteenth centuries AD (Mortimer *et al*. 2005). The recovery and analysis of 89 bulk environmental samples produced a large assemblage of charred plant remains, principally dated to between the mid-ninth and thirteenth centuries, but with a small number of earlier and later samples (Ballantyne 2005). The abundance, diversity and broad chronological spread of this archaeobotanical assemblage drew the attention of the Feeding Anglo-Saxon England project (FeedSax), which aimed to investigate developments in early medieval farming using bioarchaeological evidence such as charred plant remains.

Since one of the main attractions of the assemblage was its broad date range – potentially apt for elucidating changes in crop husbandry over time – chronological precision was deemed to be very important. The FeedSax project therefore submitted charred grains from nine samples to the Oxford Radiocarbon Accelerator Unit for radiocarbon dating. These cereal grains – rye (*Secale cereale* L.) in one case, but otherwise free-threshing wheat (*Triticum* L. free-threshing type) – were selected and photographed at the University of Oxford by the author; the photographs are included in the project's photographic archive (McKerracher *et al.* in prep.).

The radiocarbon determinations obtained for these samples have been calibrated using IntCal20 (Reimer *et al.* 2020) and OxCal 4.4.2 (Bronk Ramsey 2009) as shown in the table below and the figures at the end of this report.

Results

sample	context	grains	laboratory no.	original phase	age BP	calibrated dates AD (confidence)
16	1834	3 x wheat	OxA-37220	C8–9	1215±23	772–885 (89.7%)
71	2642	3 x rye	OxA-37302	C8–9	1133±25	877–993 (91.2%)
165	7162	3 x wheat	OxA-37532	C8–9	915±27	1039–1181 (87.6%)
35	2220	3 x wheat	OxA-37622	C9–11	1195±28	771–894 (91.0%)
225	9821	3 x wheat	OxA-37726	C9–11	1050±25	973–1032 (88.2%)
22	2027	3 x wheat	OxA-37666 OxA-37667	C12	954±26 925±26	1030–1158 (95.4%) 1035–1177 (93.8%)
147	6202	3 x wheat	OxA-37668	C12	1030±26	976–1043 (93.4%)
148	6238	3 x wheat	OxA-37623	C13	929±25	1034–1175 (95.4%)
166	7733	3 x wheat	OxA-37318	C13	967±24	1024–1054 (24.1%), 1064–1157 (71.3%)

The new radiocarbon dates for three of the samples – 16, 225 and 22 – are broadly consistent with their originally assigned phases. For sample 16, we can now specify a date between late eighth and late ninth centuries. The new result for sample 225 provides a more precise date range than could hitherto be demonstrated, between the later tenth and early eleventh centuries. For sample 22, a

slightly earlier date range between the early eleventh and mid/late twelfth centuries can now be assigned.

The new date ranges returned for the remaining six samples, however, did not correspond well with the original phasing. Sample 71, originally thought to be of eighth- to ninth-century date, in fact dates from between the late ninth and late tenth centuries), whereas sample 35, originally deemed Late Saxon, can now be dated to between the late eighth and ninth centuries. Another presumed Mid Saxon sample, 165, can now be dated to between the early eleventh and mid/late twelfth centuries, along with samples 148 and 166, which had originally been assigned to the thirteenth century. Finally, sample 147 can now be dated to between the later tenth and early/mid-eleventh centuries, rather than to the twelfth century as previously thought.

Given the continuity and complexity of the settlement sequence at this site, some degree of chronological revision is not in itself unexpected, and need not necessitate a wider revision of the overall site chronology. However, the fact that the original phasing of six out of nine samples turned out to be mistaken does raise the possibility that other samples in the West Fen Road assemblage may originally have been assigned to the wrong period.

Acknowledgements

I would like to thank Ben Donnelly-Symes for providing access to the archive material, and for permitting its use in these analyses.

References

Ballantyne, R. (2005). ‘Plants and seeds’, in Mortimer, R., Regan, R. and Lucy, S. *The Saxon and Medieval Settlement at West Fen Road, Ely: The Ashwell Site* (Cambridge: Cambridge Archaeological Unit), pp.100–112.

Bronk Ramsey, C. (2009). ‘Bayesian analysis of radiocarbon dates’, *Radiocarbon* 51(1), pp.337–360.

McKerracher, M., Bogaard, A., Bronk Ramsey, C., Charles, M., Forster, E., Hamerow, H., Holmes, M., Hodgson, J., Neil, S., Roushannafas, T., Stroud, E. and Thomas, R. (in prep.). ‘Feeding Anglo-Saxon England (FeedSax): the Haystack bioarchaeological database and digital archives’, *Internet Archaeology*.

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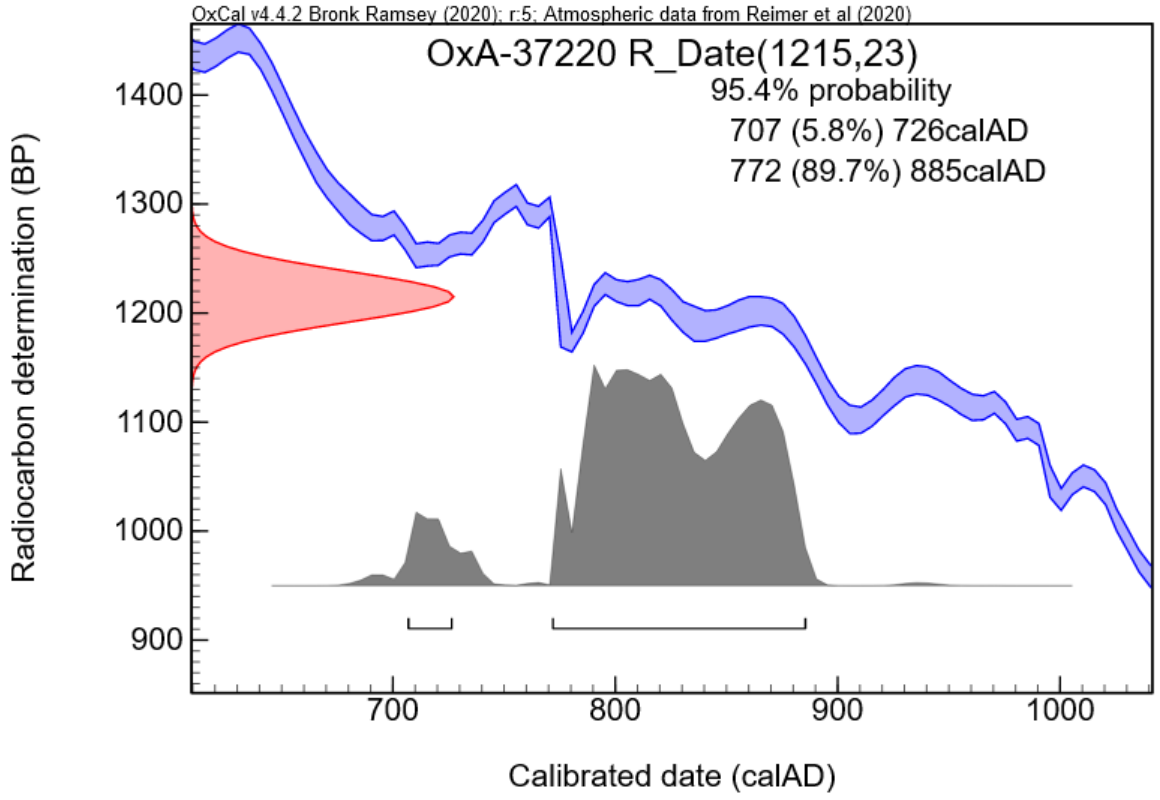
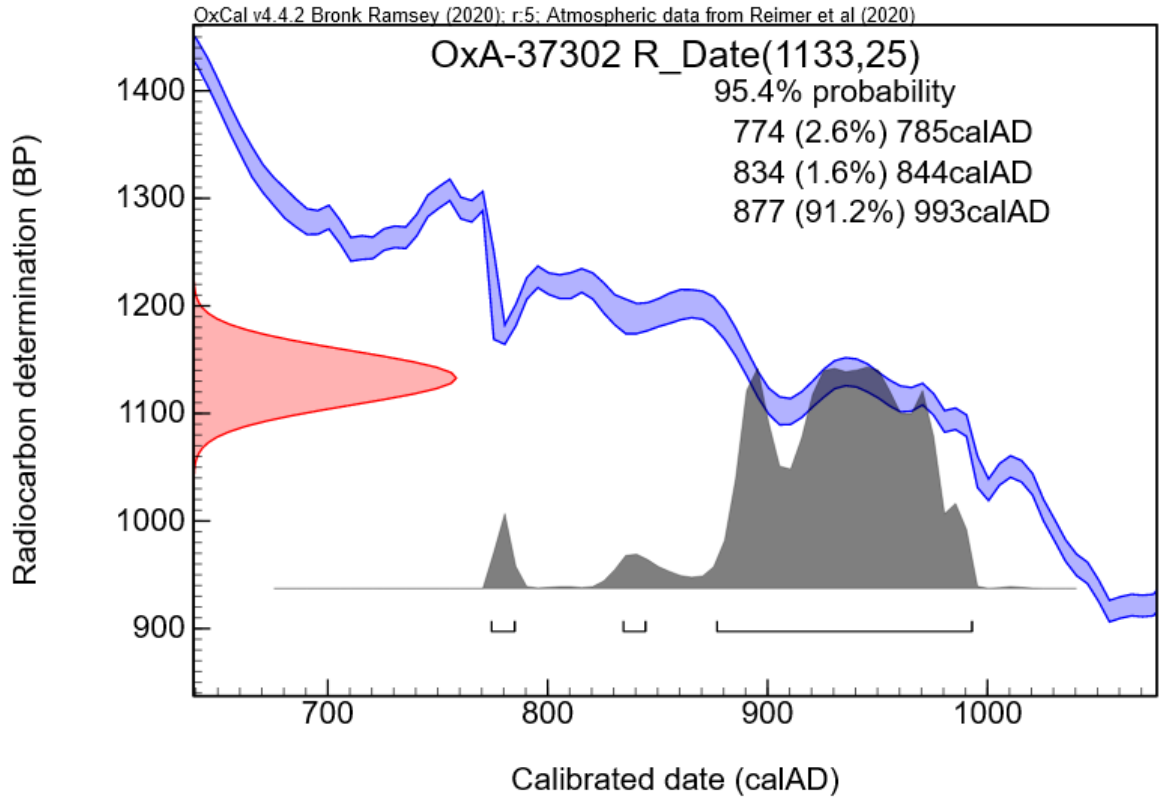
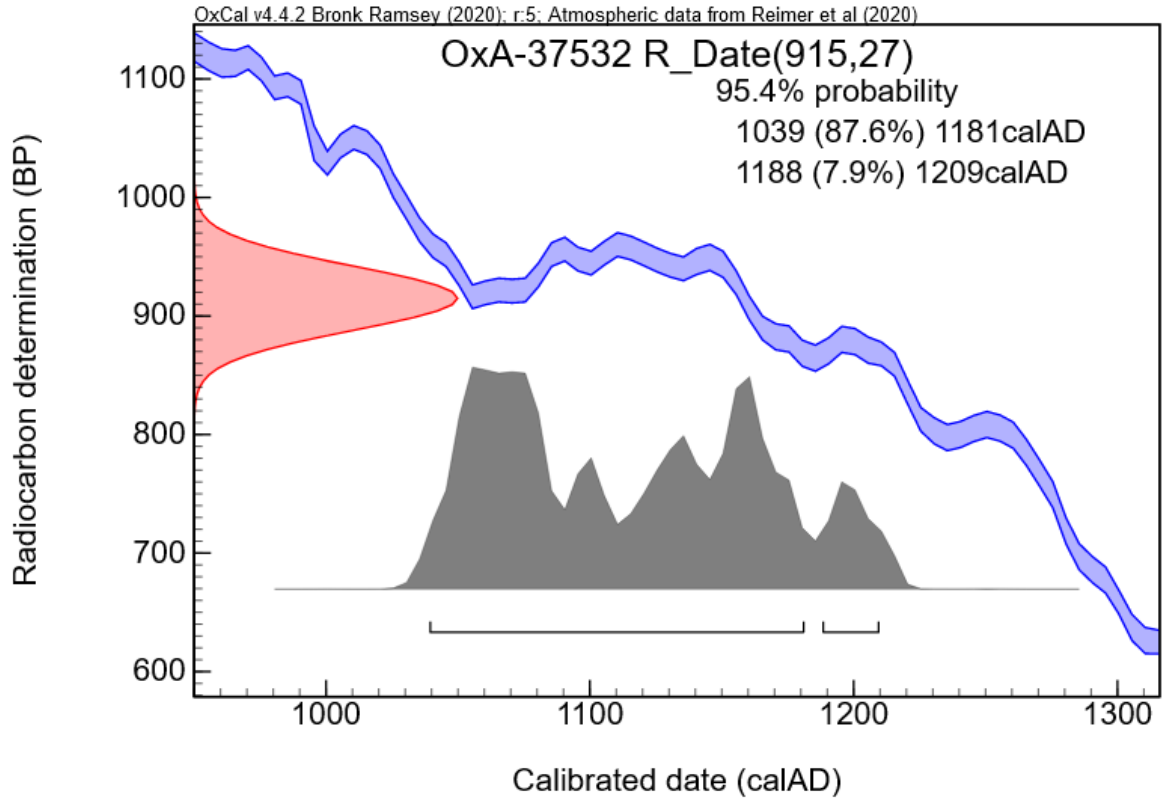
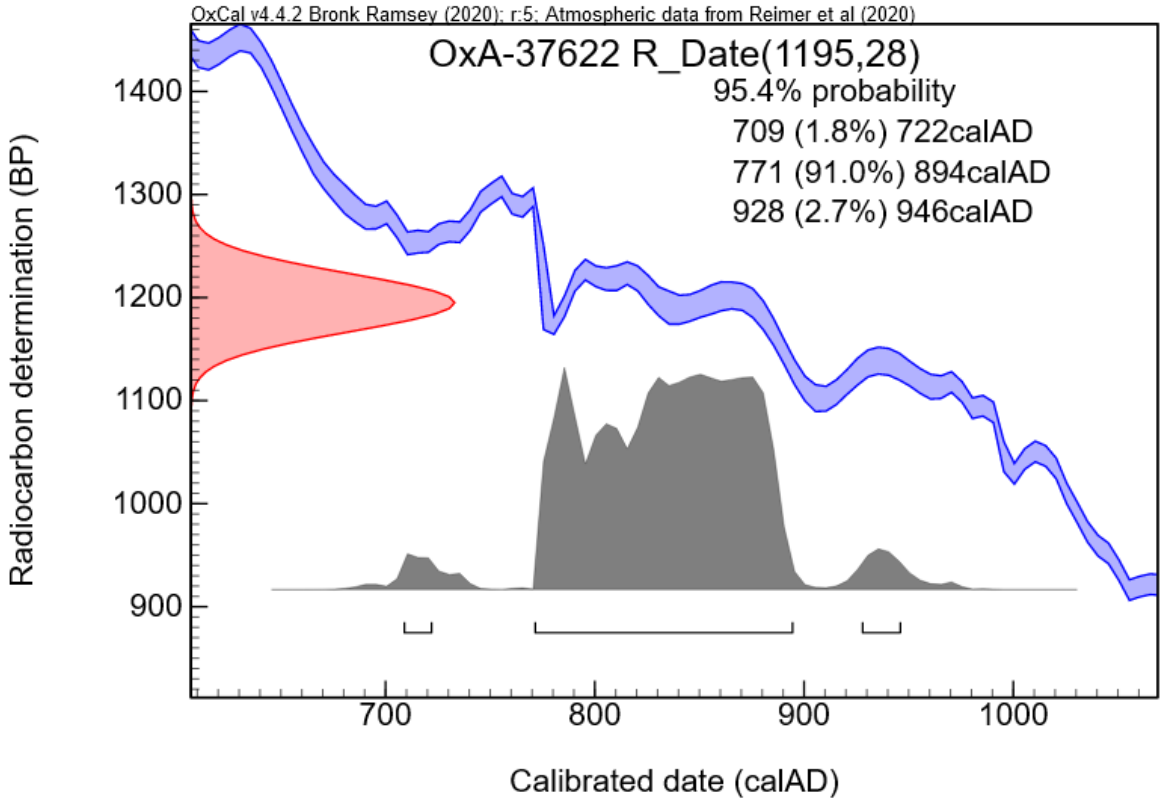
Reimer, P., Austin, W., Bard, E., Bayliss, A., Blackwell, P., Bronk Ramsey, C., … Talamo, S. (2020). ‘The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0–55 cal kBP)’, *Radiocarbon* 62(4), pp.725–757.

Calibration of radiocarbon determinations






OxCal v4.4.2 Bronk Ramsey (2020); r:5; Atmospheric data from Reimer et al (2020)
OxA-37532 R_Date(915,27)
95.4% probability
1039 (87.6%) 1181calAD
1188 (7.9%) 1209calAD
Radiocarbon determination (BP)
1100
1000
900
800
700
600
1000
1100
1200
1300
Calibrated date (calAD)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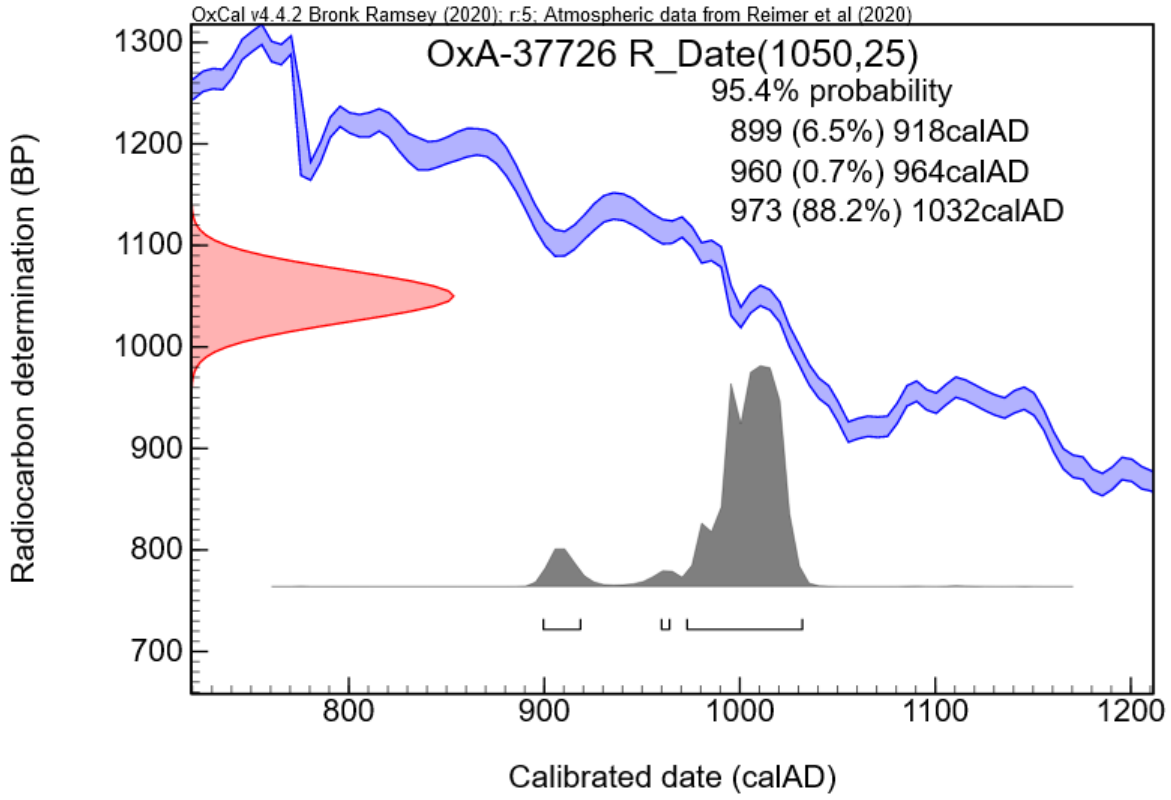
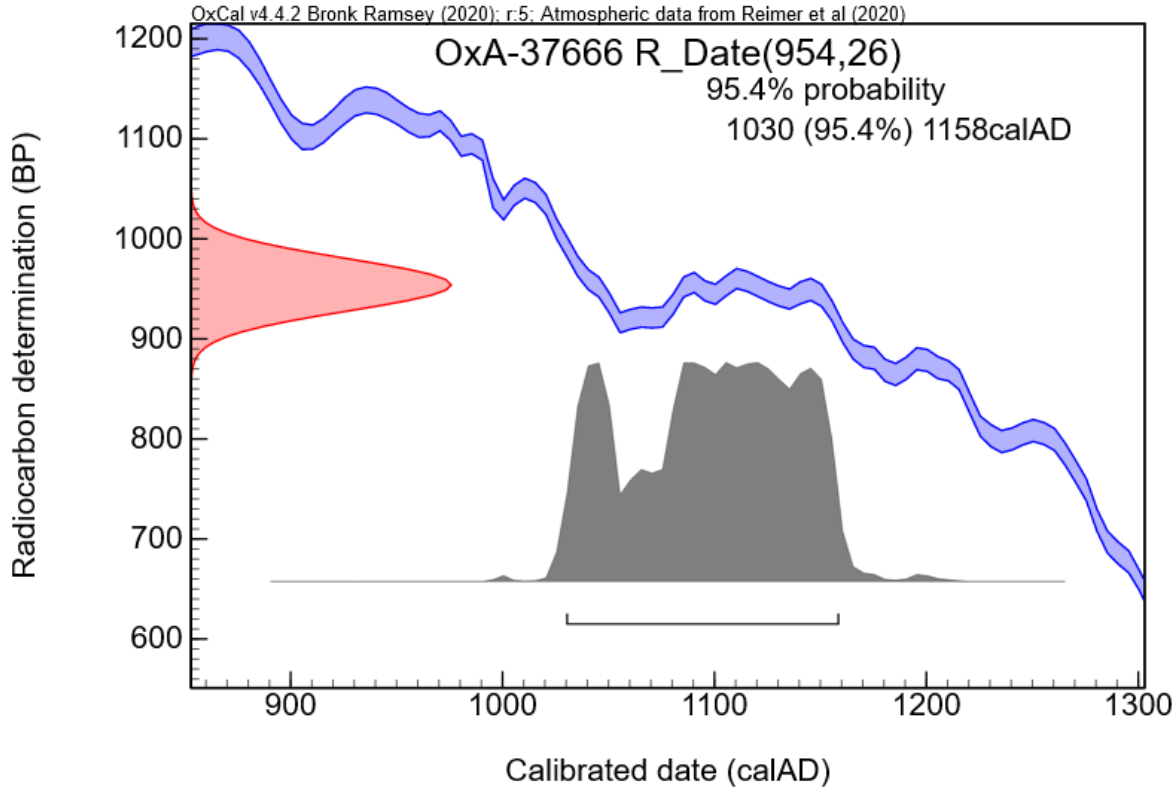
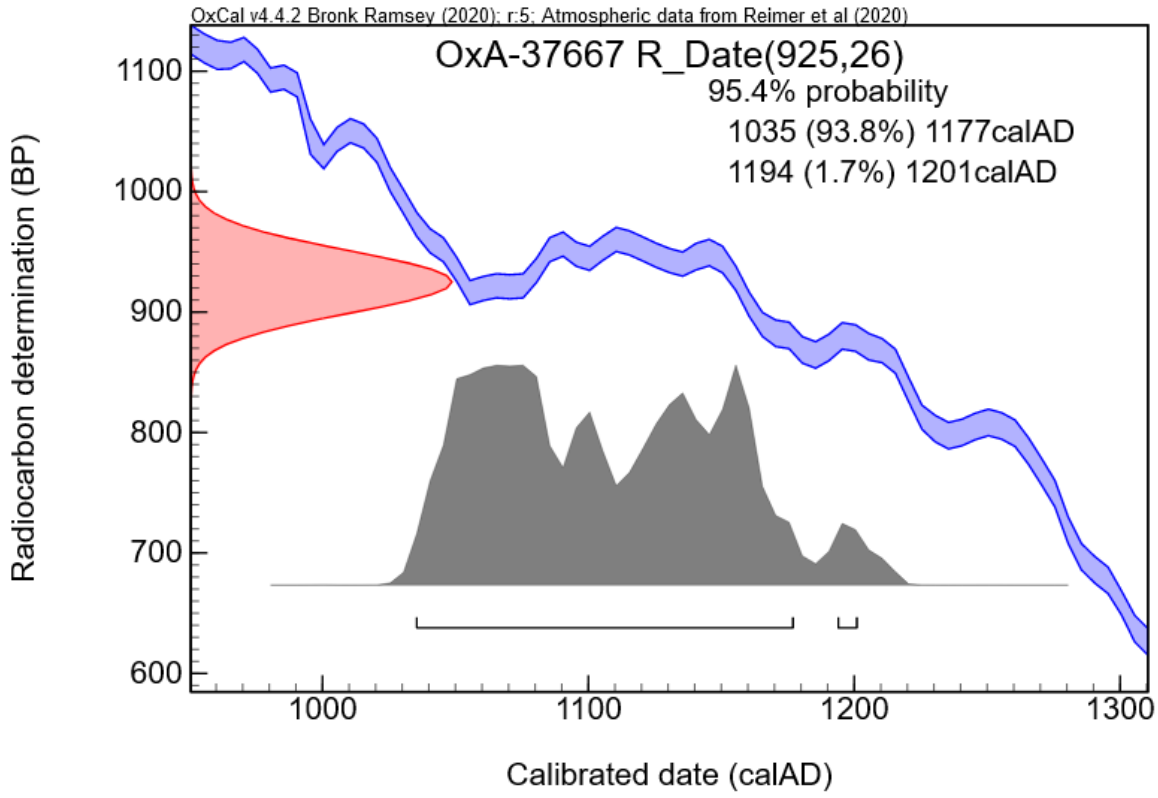
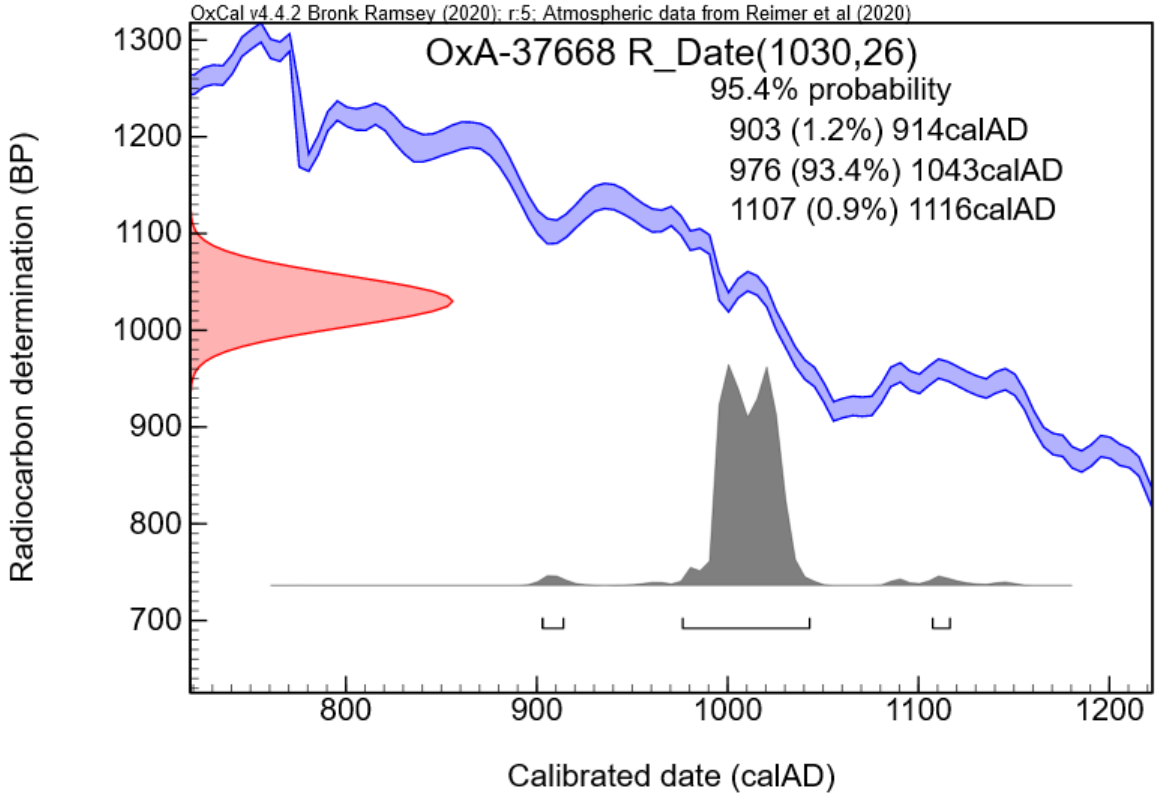
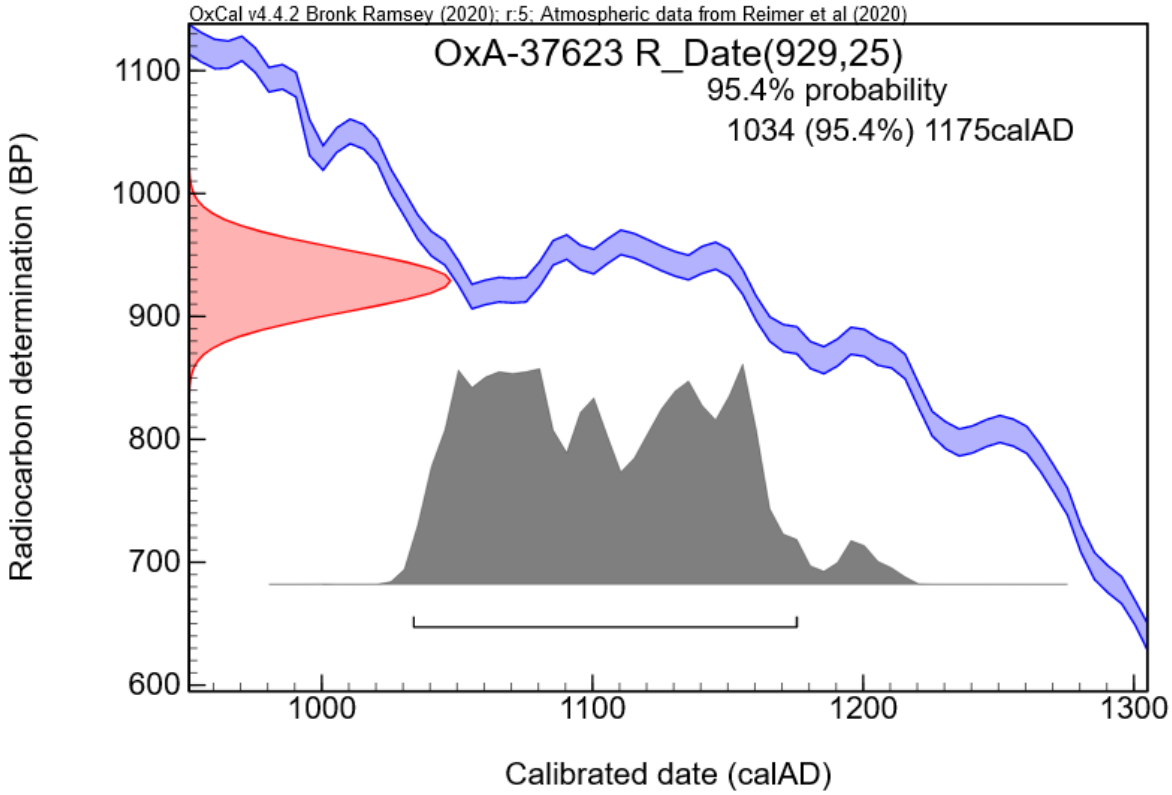
OxA-37622 R_Date(1195,28)
95.4% probability
709 (1.8%) 722calAD
771 (91.0%) 894calAD
928 (2.7%) 946calAD
Radiocarbon determination (BP)
1400
1300
1200
1100
1000
900
700
800
900
1000
Calibrated date (calAD)

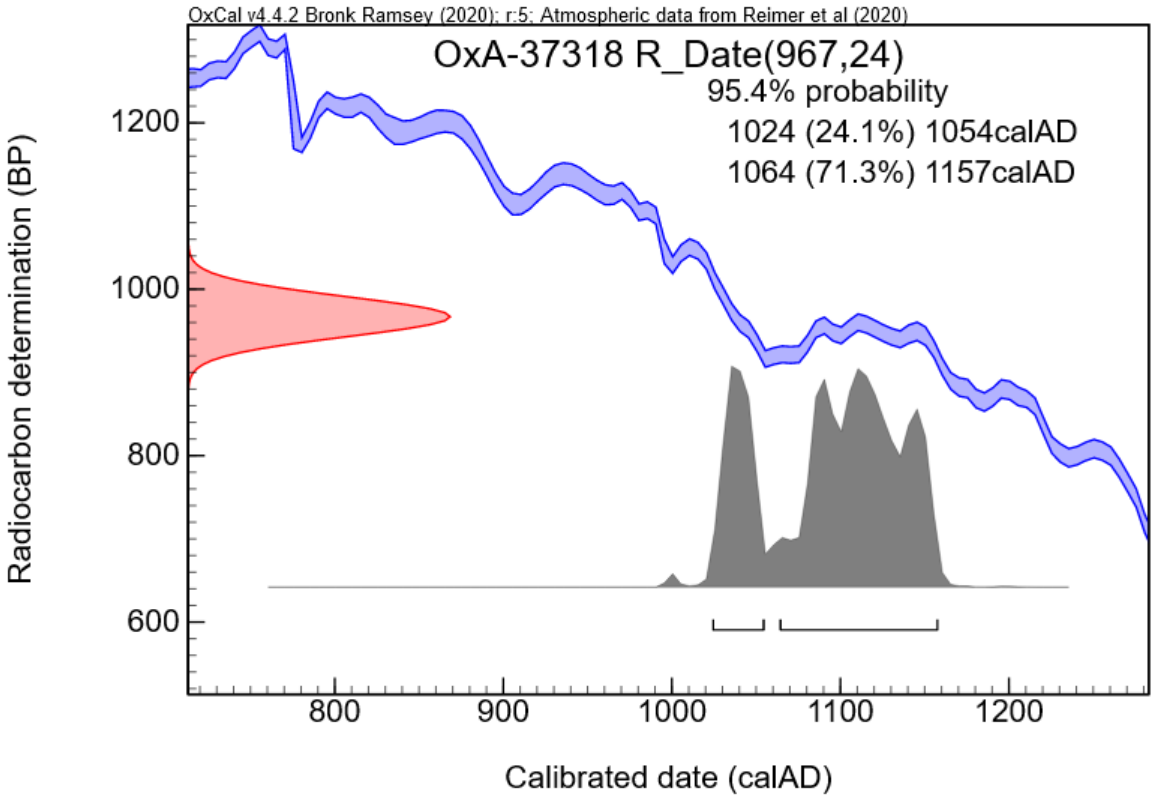

OxCal v4.4.2 Bronk Ramsey (2020); r:5; Atmospheric data from Reimer et al (2020)
OxA-37726 R_Date(1050,25)
95.4% probability
899 (6.5%) 918calAD
960 (0.7%) 964calAD
973 (88.2%) 1032calAD
Radiocarbon determination (BP)
Calibrated date (calAD)


OxCal v4.4.2 Bronk Ramsey (2020); r:5; Atmospheric data from Reimer et al (2020)
OxA-37666 R_Date(954,26)
95.4% probability
1030 (95.4%) 1158calAD
Radiocarbon determination (BP)
Calibrated date (calAD)


OxCal v4.4.2 Bronk Ramsey (2020); r:5; Atmospheric data from Reimer et al (2020)
OxA-37667 R_Date(925,26)
95.4% probability
1035 (93.8%) 1177calAD
1194 (1.7%) 1201calAD
Radiocarbon determination (BP)
1100
1000
900
800
700
600
1000
1100
1200
1300
Calibrated date (calAD)


OxCal v4.4.2 Bronk Ramsey (2020); r:5; Atmospheric data from Reimer et al (2020)
OxA-37668 R_Date(1030,26)
95.4% probability
903 (1.2%) 914calAD
976 (93.4%) 1043calAD
1107 (0.9%) 1116calAD
Radiocarbon determination (BP)
1300
1200
1100
1000
900
800
700
800
900
1000
1100
1200
Calibrated date (calAD)


OxCal v4.4.2 Bronk Ramsey (2020); r:5; Atmospheric data from Reimer et al (2020)
OxA-37623 R_Date(929,25)
95.4% probability
1034 (95.4%) 1175calAD
Radiocarbon determination (BP)
1100
1000
900
800
700
600
1000
1100
1200
1300
Calibrated date (calAD)


OxCal v4.4.2 Bronk Ramsey (2020); r:5; Atmospheric data from Reimer et al (2020)
OxA-37318 R_Date(967,24)
95.4% probability
1024 (24.1%) 1054calAD
1064 (71.3%) 1157calAD
Radiocarbon determination (BP)
1200
1000
800
600
800
900
1000
1100
1200
Calibrated date (calAD)