Radiocarbon dating archaeobotanical remains from Botolph Bridge

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Between 1999 and 2000, development-led excavations at Botolph Bridge, Orton Longueville (Peterborough) by CAM ARC – now Oxford Archaeology East – discovered the archaeological remains of a deserted medieval village. Excavated evidence revealed an occupation sequence running continuously from the eighth century through to the post-medieval period, divided by the excavator into five periods (Spoerry and Atkins 2015):

- **Period 1: Middle to Late Saxon** (*c*. 700–900)
- **Period 2: Late Saxon to Saxo-Norman** (*c*. 1000–1200)
  - ***Period 2.1: Late Saxon*** (*c*. 1000–1150)
  - ***Period 2.2: Saxo-Norman*** (*c*. 1150–1200)
- **Period 3: Medieval** (*c*. 1200–1350)
  - ***Period 3.1: 13th century*** (*c*. 1200–1250)
  - ***Period 3.2: 14th century*** (*c*. 1250–1350)
- **Period 4: Late Medieval** (*c*. 1350–1500)
- **Period 5: Post-Medieval** (*c*. 1500–1650)

Post-excavation assessment of environmental samples found that 29 of these, from pits and ditches of all phases, were found to be sufficiently abundant in charred plant remains to warrant full analysis (Clapham 2015). These samples, specifically those dating from between the eighth and thirteenth centuries, were of interest to the Feeding Anglo-Saxon England project (FeedSax), which aimed to investigate developments in Anglo-Saxon and medieval arable farming from a bioarchaeological perspective. Accurate dating of the charred plant remains was essential to the FeedSax project, to support the discernment of diachronic patterns.

FeedSax therefore submitted charred grains from ten samples – selected to ensure that Periods 1–3 (the key periods of interest to the project) were all represented – to the Oxford Radiocarbon Accelerator Unit for radiocarbon dating. These cereal grains, all identified as free-threshing wheat (*Triticum* L. free-threshing type), were originally analysed by Alan Clapham as part of the post-excavation programme (Clapham 2015). Those grains submitted for dating were selected from the archive and photographed by the author at the University of Oxford; the photographs are included in the project 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 figures at the end of this report.

Results

sample	feature	grains	laboratory no.	original phase	age BP	calibrated dates AD (confidence)
156	Pit 4	3 x wheat	OxA-37634	700–900	866±24	1156–1229 (89.8%)
79	Ditch 1	3 x wheat	OxA-37635	1000–1150	1111±26	885–995 (95.4%)
194	Ditch 3	3 x wheat	OxA-37636	1000–1150	926±25	1035–1176 (94.7%)
97	Ditch 8	3 x wheat	OxA-39429	1000–1150	962±17	1077–1155 (73.9%)
18	Ditch 26	3 x wheat	OxA-39545	1200–1250	680±18	1278–1306 (65.0%), 1364–1384 (30.4%)
59	Ditch 48	3 x wheat	OxA-39547	1200–1250	867±18	1161–1222 (95.4%)
78	Ditch 27	3 x wheat	OxA-39546	1200–1250	869±18	1160–1222 (95.4%)
24	Ditch 68	3 x wheat	OxA-39548	1200–1250	900±18	1046–1084 (32.7%), 1148–1217 (59.8%)
49	Ditch 29	3 x wheat	OxA-39576	1200–1250	943±20	1036–1158 (95.4%)
145	Ditch 42	3 x wheat	OxA-39577	1250–1350	1015±20	991–1042 (94.2%)

Sample 156 derives from Pit 4, originally dated to Phase 1 (*c.* 700–900) with the comment: 'Its upper fill contained Late Saxon pottery, but this deposit was probably confused with the subsequent long hearth sequence of that date which occupied the same position in a later phase' (Spoerry and Atkins 2015, 25). This multi-phase hearth was represented by a sequence of deposits apparently spanning Period 2.1 (*c.* 1000–1150) and Period 2.2 (*c.* 1150–1200) (Spoerry and Atkins 2015, 30–37). The new calibrated radiocarbon date range for sample 156, cal. AD 1151–1225 (with 83.9% confidence), suggests that there is indeed confusion between Pit 4's upper fill and the overlying hearth deposits. The sample should in fact be dated to Period 2.2, raising the possibility that the hearth sequence as a whole could belong to that phase.

Sample 79 from Ditch 1, by contrast, was originally dated to Period 2.1 (*c.* 1000–1150), but the new calibrated radiocarbon date range shows that it most probably dates from the tenth century, or at least the late ninth century (cal. AD 885–995, with 95.4% confidence). This is a significant result, as the excavators reported an 'absence of new dated activity' between the ninth and eleventh centuries, hence the hiatus between Periods 1 and 2; tenth-century activity 'at a low level' was only inferred from the continuity of some features (Spoerry and Atkins 2015, 9). The new date now supports this inference of tenth-century activity, and suggests that Ditch 1 – the only such ditch in the southern part of the excavated area – belongs to this elusive period.

Sample 194 from Ditch 3 has returned a radiocarbon date broadly consistent with its originally assigned phase, Period 2.1 (*c.* 1000–1150). Sample 97 derives from Ditch 8, which is dated to Period 1 in the main text (Spoerry and Atkins 2015, 25) but to Period 2.1 in the archaeobotanical report (Clapham 2015, 122). The new radiocarbon date range confirms that it in fact belongs to Period 2.1, and in particular to the later part of that period.

Sample 18 from Ditch 26 was originally dated to Period 3.1 (c. 1200–1250), but according to the new radiocarbon date, the sample should in fact be assigned to Period 3.2 (*c.* 1250–1350), and more precisely the earlier part of this phase. This revision is all the more surprising given that sample 59 from Ditch 48 – said to run parallel to Ditch 26, and thus originally assigned to the same Period 3.1 (Clapham 2015, 123) – has returned a comparatively early date, more compatible with Period 2.2 (cal. AD 1153–1220, with 92.3% confidence). Little stratigraphic information about these two ditches could be found within the published report, so it remains possible that one or other of these contains intrusive or residual material. It is also possible that, despite running parallel to each other, the ditches

were not perfectly contemporary; or else that both ditches were open for an extended time, spanning Periods 2.2 to 3.2, and accumulating fills of different date throughout this period. The latter scenario is preferred here since, in the absence of additional stratigraphic detail, it is deemed to offer the simplest explanation for the discrepancy.

Sample 78 from Ditch 68 repeats the pattern of sample 59 from Ditch 48: originally dated to Period 3.1 (*c.* 1200–1250) but a better fit with Period 2.2 (1150–1200).

The next two samples, 24 and 49 from Ditches 68 and 29 respectively, have returned calibrated radiocarbon date ranges earlier than their originally assigned date in Period 3.1 (*c.* 1200–1250). Ditch 29 is said to be a recut of Ditch 68 (Spoerry and Atkins 2015, 47), so if the dated charred plant remains genuinely belong to their parent contexts, then both ditches can now be reassigned to Period 2.1 (*c.* 1000–1150). More specifically, Ditch 68 (sample 24) most probably dates from the latter half of the eleventh century, and was recut as Ditch 29 (sample 49) in the earlier half of the twelfth century.

Finally, sample 145 derives from Ditch 42, which formed part of the manorial enclosure boundary and was originally dated to Period 3.2 (*c.* 1250–1350). The new calibrated radiocarbon date range is considerably earlier than this: cal. AD 991–1042 (with 94.2% confidence). Given that the feature also contained fourteenth-century artefacts, and that the adjacent, contemporary Ditch 21 contained some Late Saxon pottery, it is likely that the ditches are genuinely of thirteenth- to fourteenth-century date and that the charred plant remains represent residual Late Saxon material.

The new radiocarbon dates have necessitated some revisions to the expected chronology of the environmental samples. The ‘Mid-Late Saxon’ sample 156 is in fact post-Conquest, leaving the eighth to ninth centuries even more poorly represented in the archaeobotanical assemblage (only sample 211 remains). Conversely, samples from several ditches have turned out to be earlier than anticipated, such that Ditch 1 may represent a hitherto elusive tenth-century phase, and some others may have been dug earlier – and accumulated fills for longer – than had previously been thought.

Acknowledgements

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References

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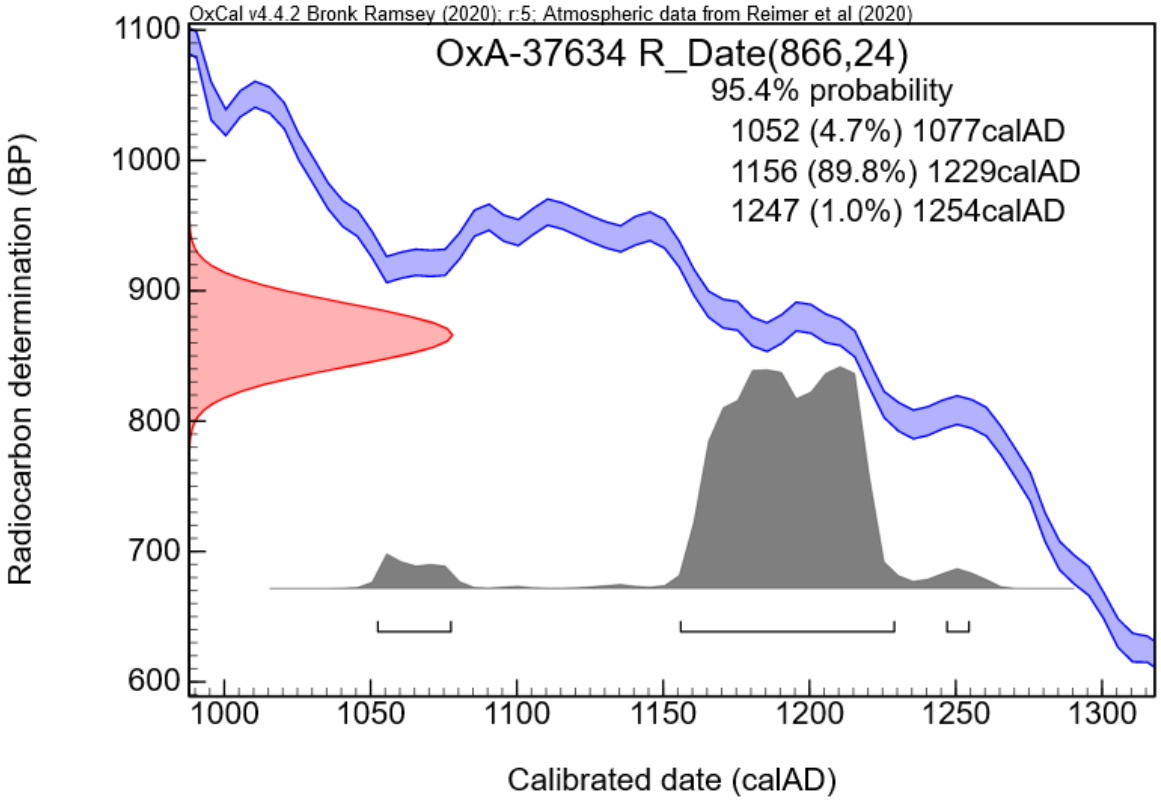
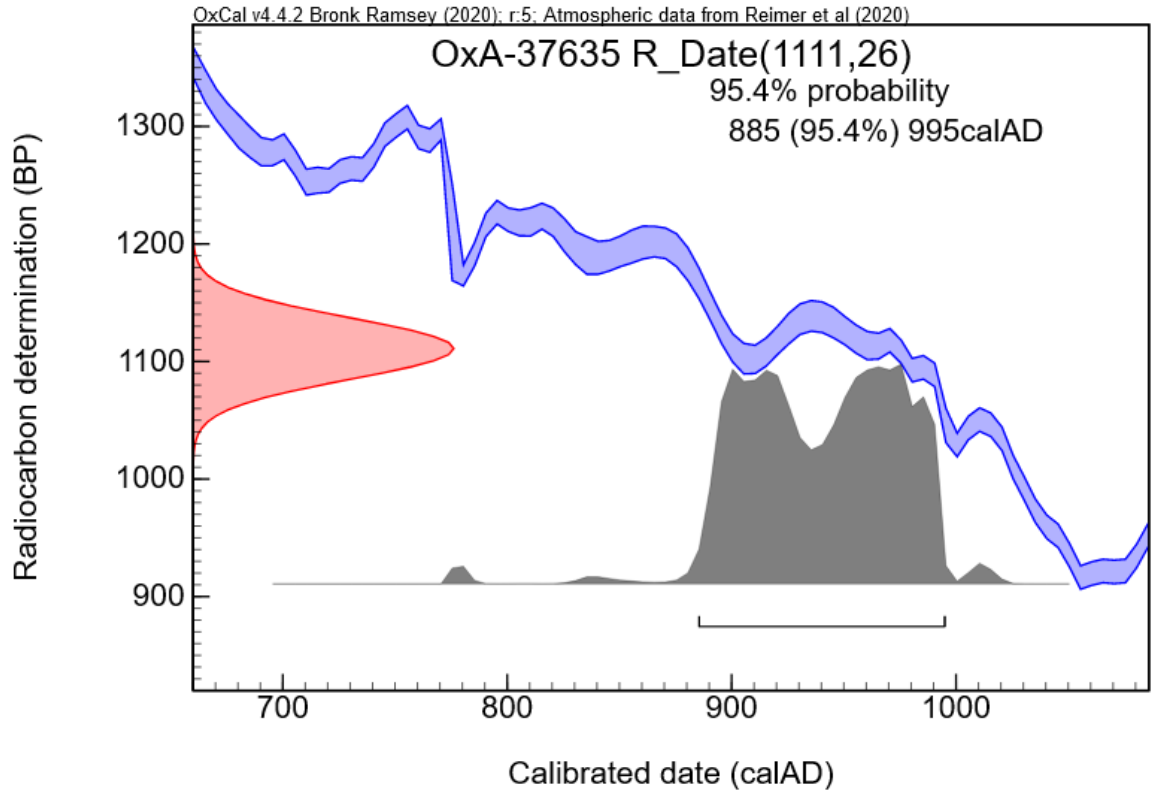
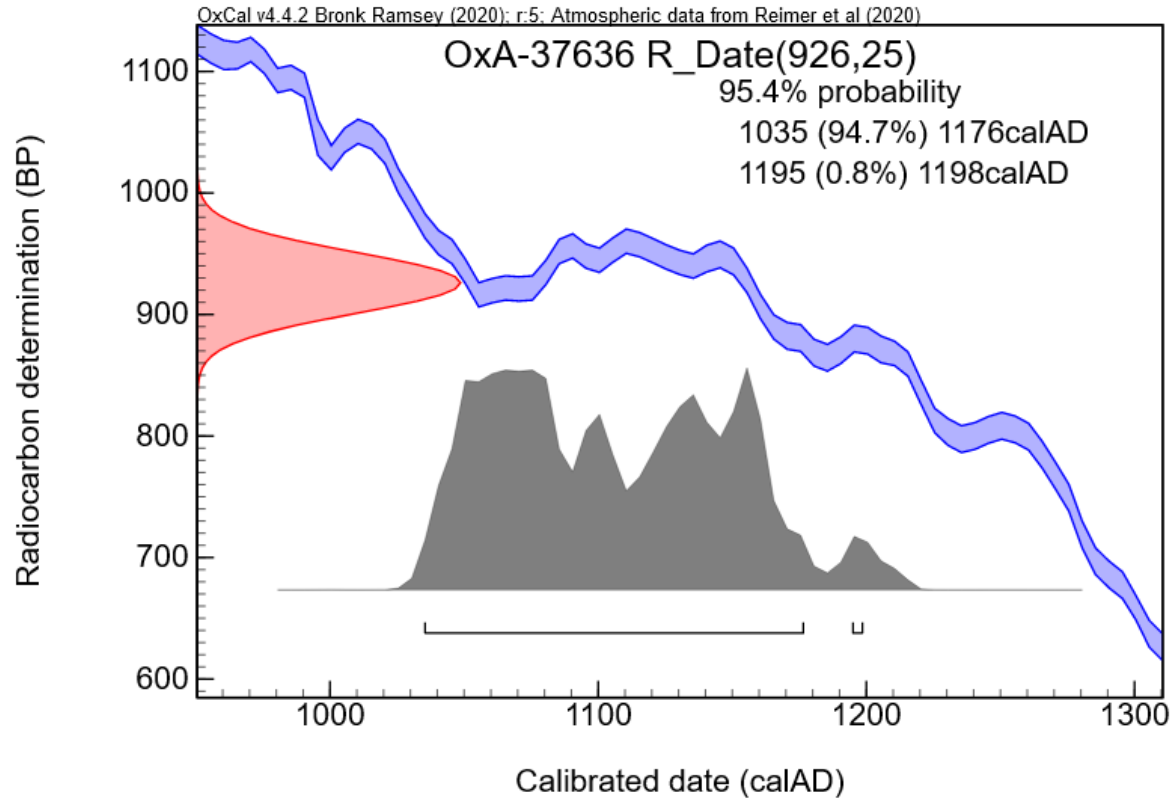
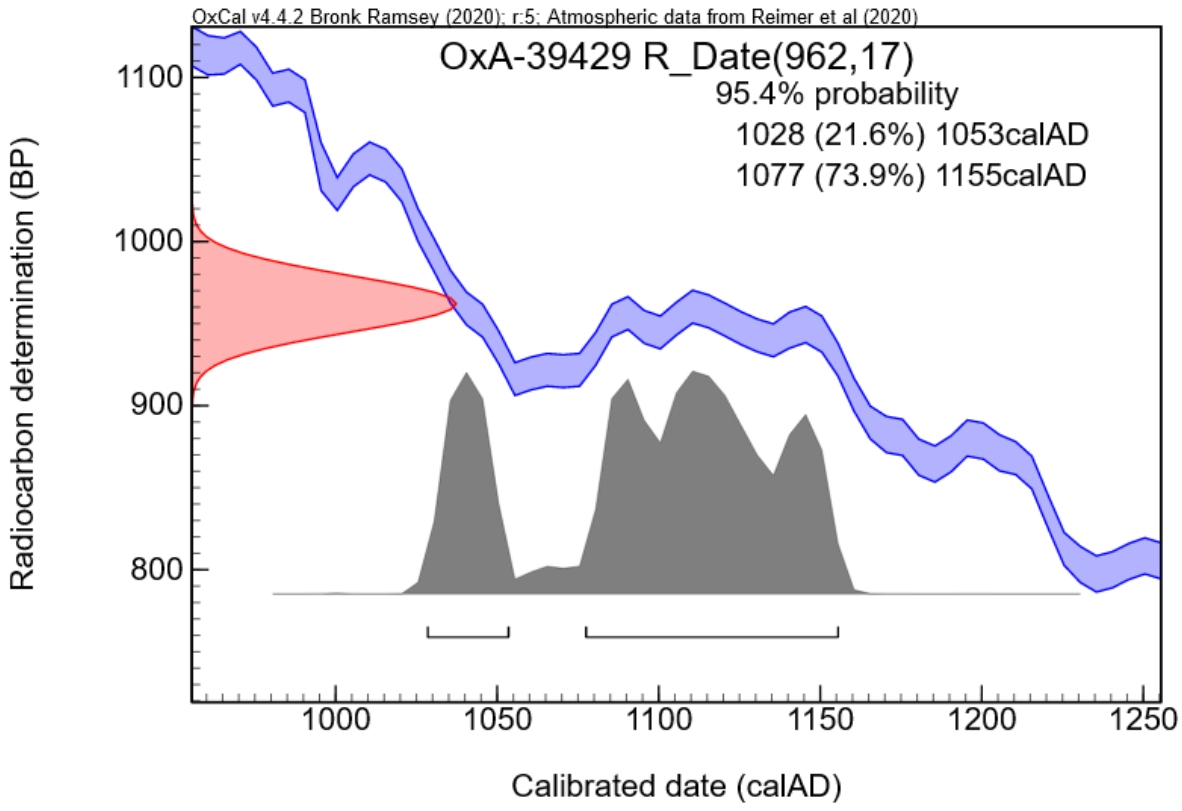
Spoerry, P. and Atkins, R. (2015). *A Late Saxon Village and Medieval Manor: Excavations at Botolph Bridge, Orton Longueville, Peterborough*, East Anglian Archaeology Report No. 153 (Bar Hill: Oxford Archaeology East).

Calibration of radiocarbon determinations






OxCal v4.4.2 Bronk Ramsey (2020); r:5; Atmospheric data from Reimer et al (2020)
OxA-37636 R_Date(926,25)
95.4% probability
1035 (94.7%) 1176calAD
1195 (0.8%) 1198calAD
Radiocarbon determination (BP)
1100
1000
900
800
700
600
1000
1100
1200
1300
Calibrated date (calAD)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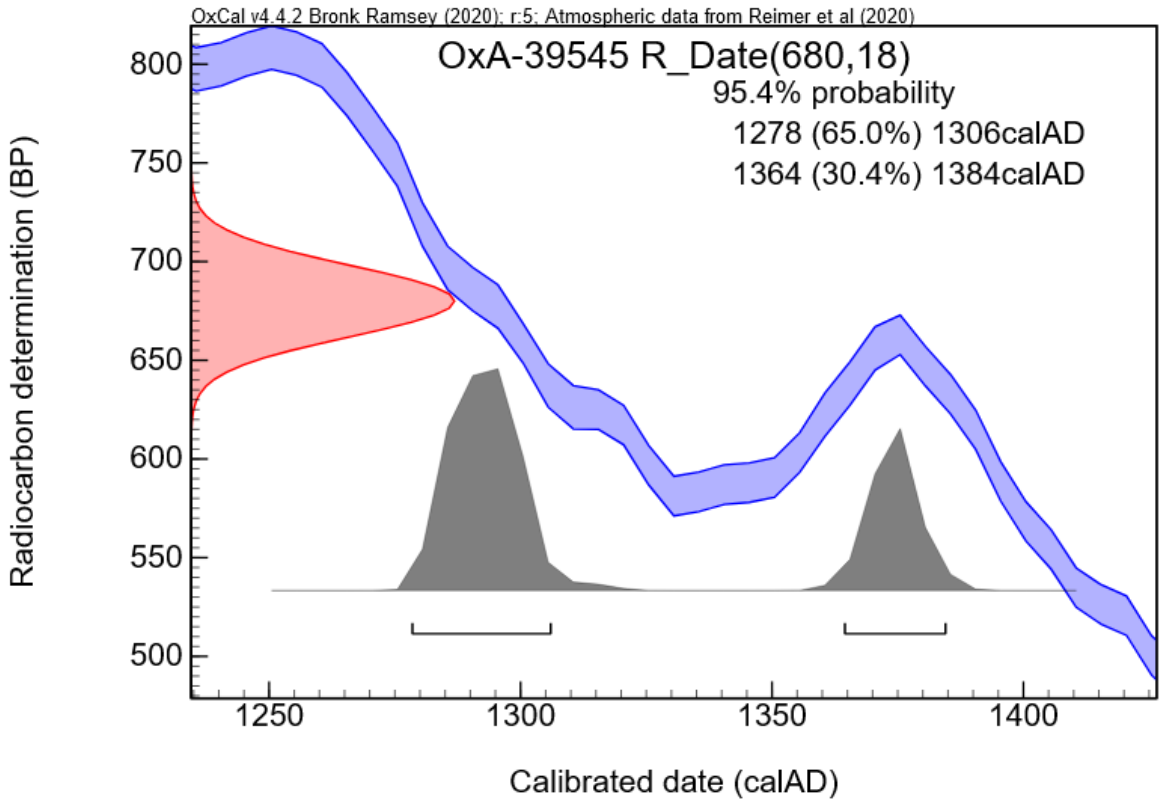
OxA-39429 R_Date(962,17)
95.4% probability
1028 (21.6%) 1053calAD
1077 (73.9%) 1155calAD
Radiocarbon determination (BP)
1100
1000
900
800
1000
1050
1100
1150
1200
1250
Calibrated date (calAD)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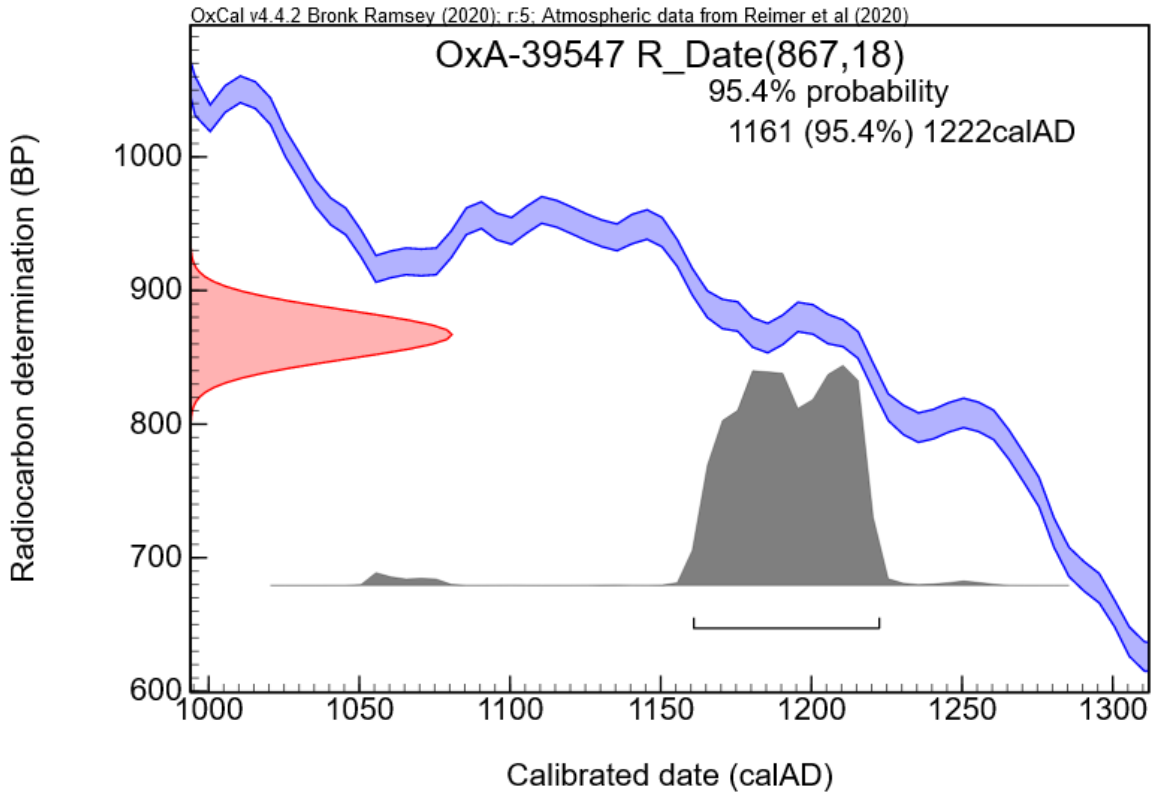
OxA-39545 R_Date(680,18)
95.4% probability
1278 (65.0%) 1306calAD
1364 (30.4%) 1384calAD
Radiocarbon determination (BP)
800
750
700
650
600
550
500
1250
1300
1350
1400
Calibrated date (calAD)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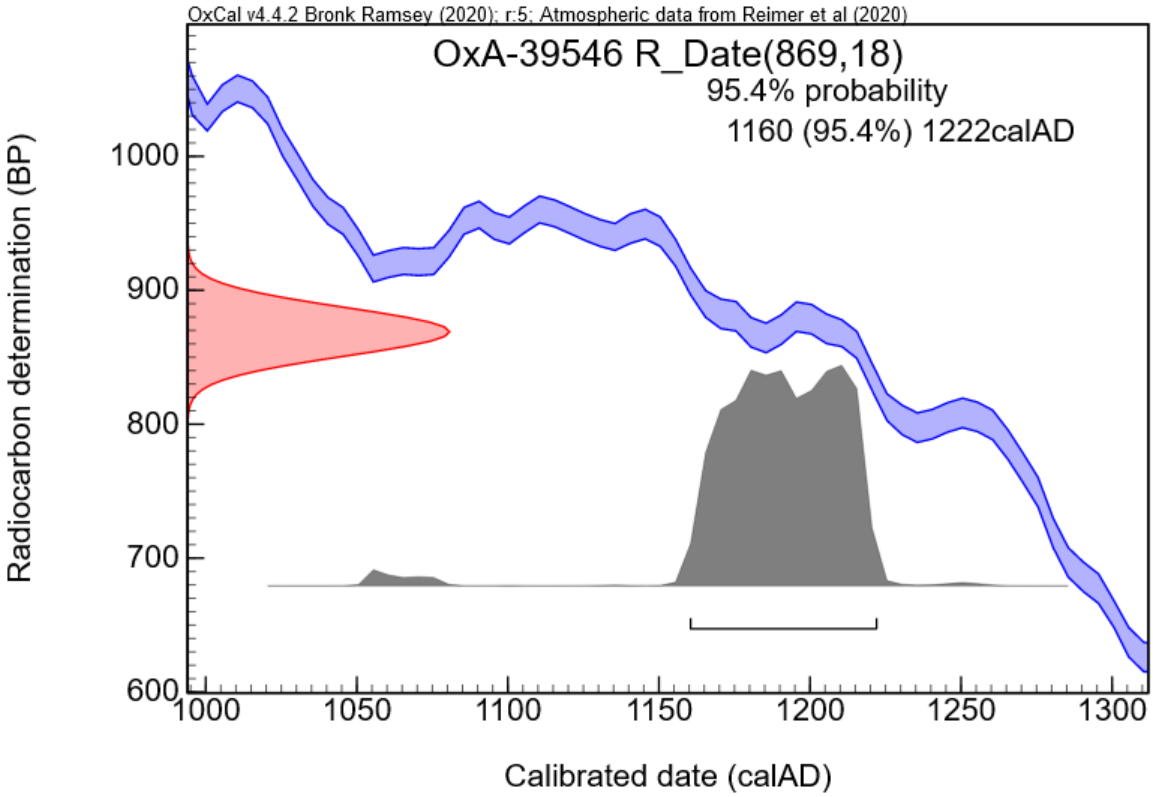
95.4% probability
1161 (95.4%) 1222calAD
Radiocarbon determination (BP)
1000
900
800
700
600
1000
1050
1100
1150
1200
1250
1300
Calibrated date (calAD)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95.4% probability
1160 (95.4%) 1222calAD
Radiocarbon determination (BP)
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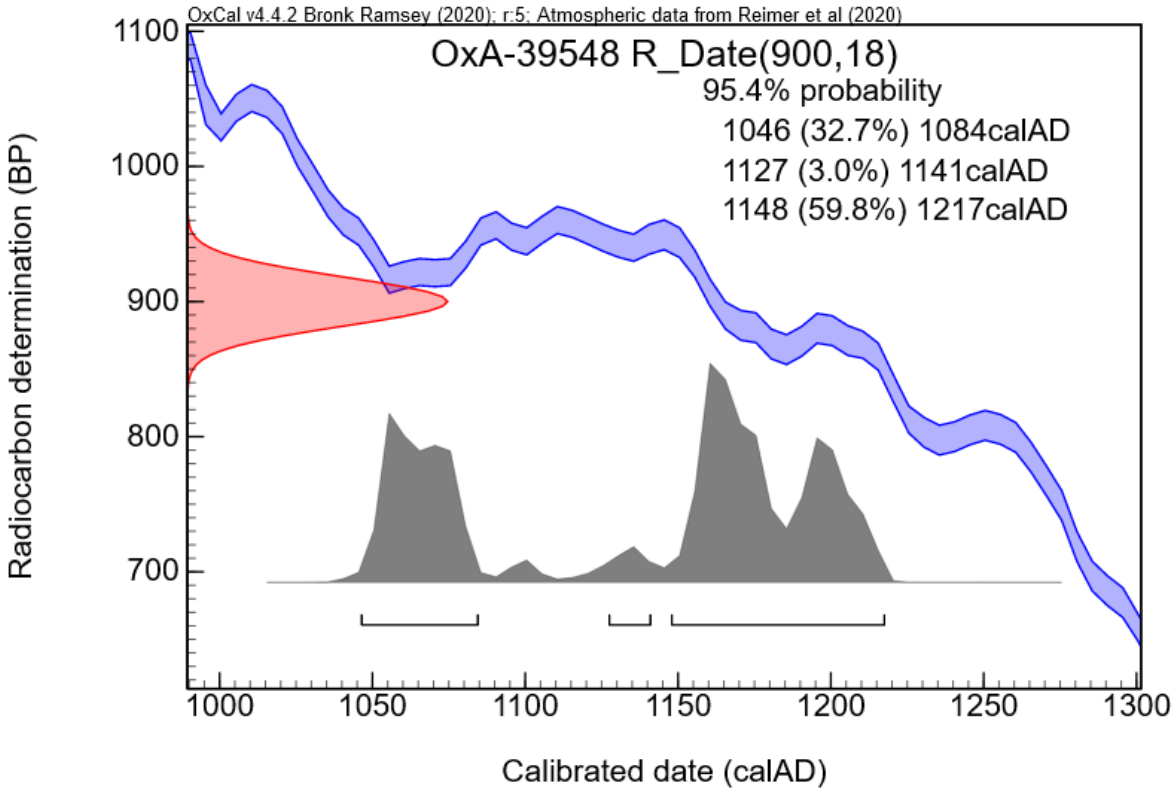
900
800
700
600
1000
1050
1100
1150
1200
1250
1300
Calibrated date (calAD)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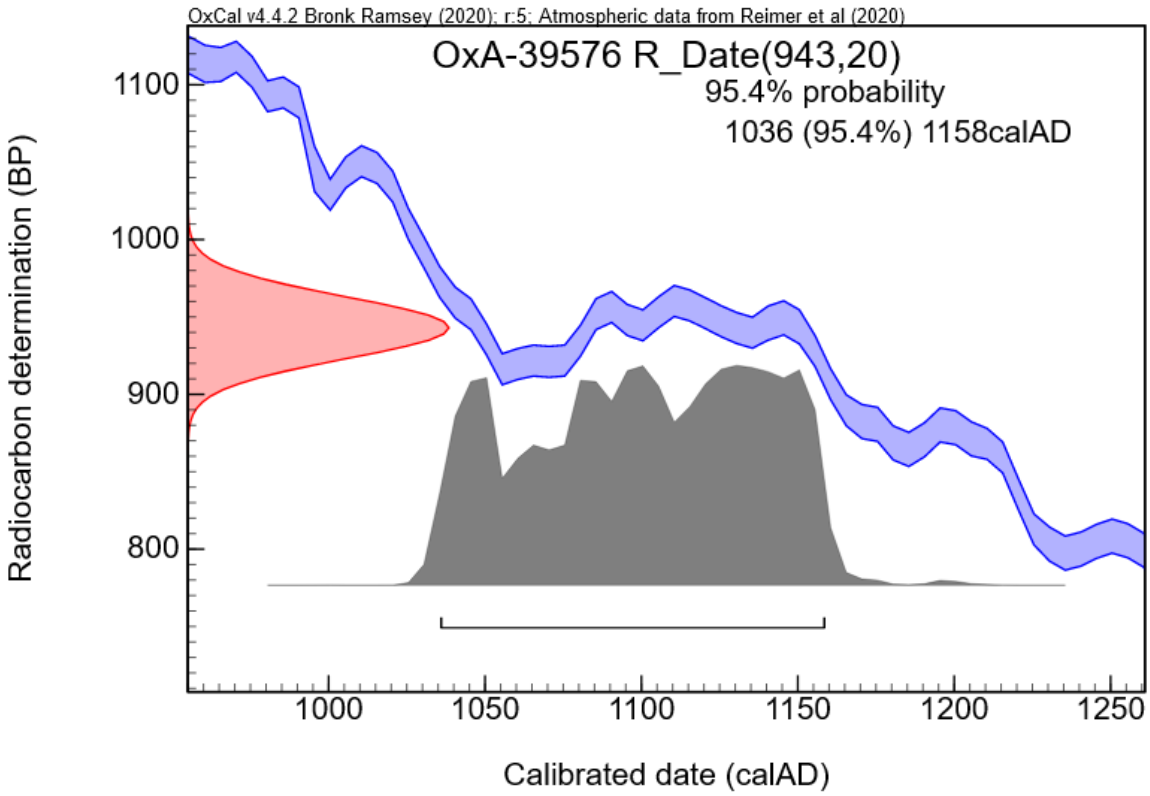
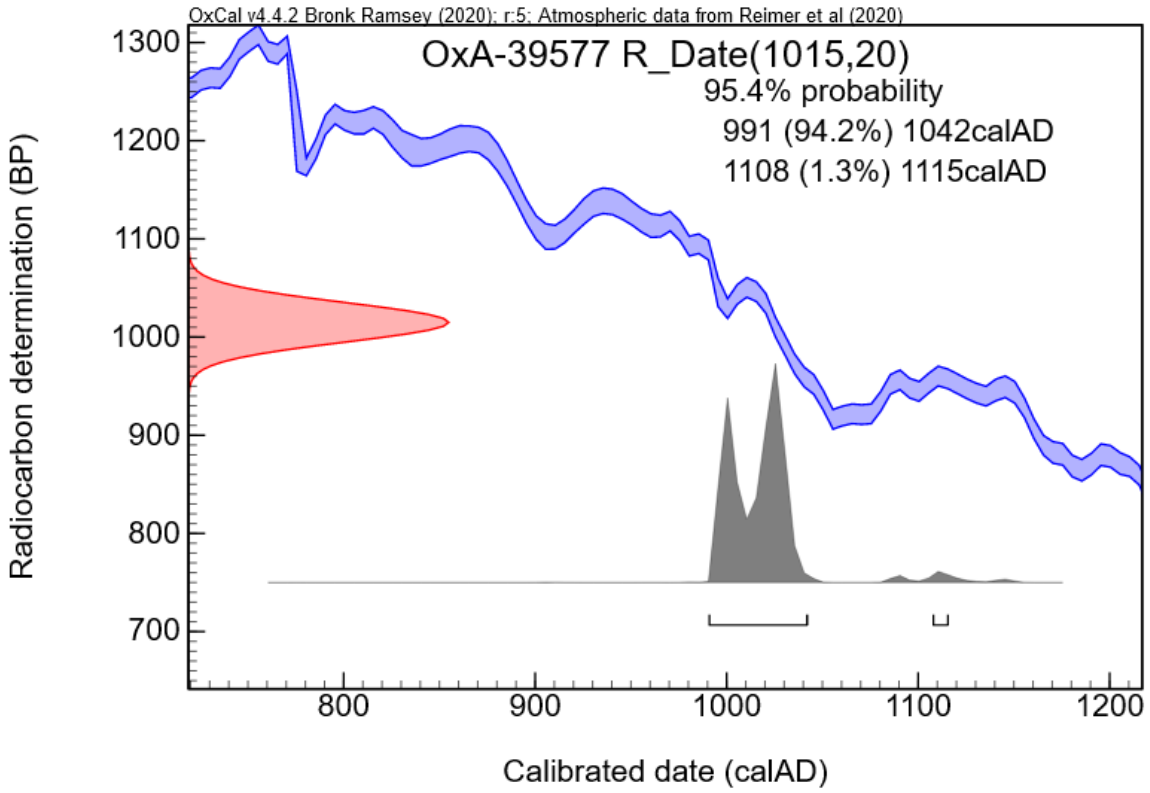
OxA-39548 R_Date(900,18)
95.4% probability
1046 (32.7%) 1084calAD
1127 (3.0%) 1141calAD
1148 (59.8%) 1217calAD
Radiocarbon determination (BP)
1100
1000
900
800
700
1000
1050
1100
1150
1200
1250
1300
Calibrated date (calAD)


OxCal v4.4.2 Bronk Ramsey (2020); r:5; Atmospheric data from Reimer et al (2020)
OxA-39576 R_Date(943,20)
95.4% probability
1036 (95.4%) 1158calAD
Radiocarbon determination (BP)
1100
1000
900
800
1000
1050
1100
1150
1200
1250
Calibrated date (calAD)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OxA-39577 R_Date(1015,20)
95.4% probability
991 (94.2%) 1042calAD
1108 (1.3%) 1115calAD
Radiocarbon determination (BP)
1300
1200
1100
1000
900
800
700
800
900
1000
1100
1200
Calibrated date (calAD)