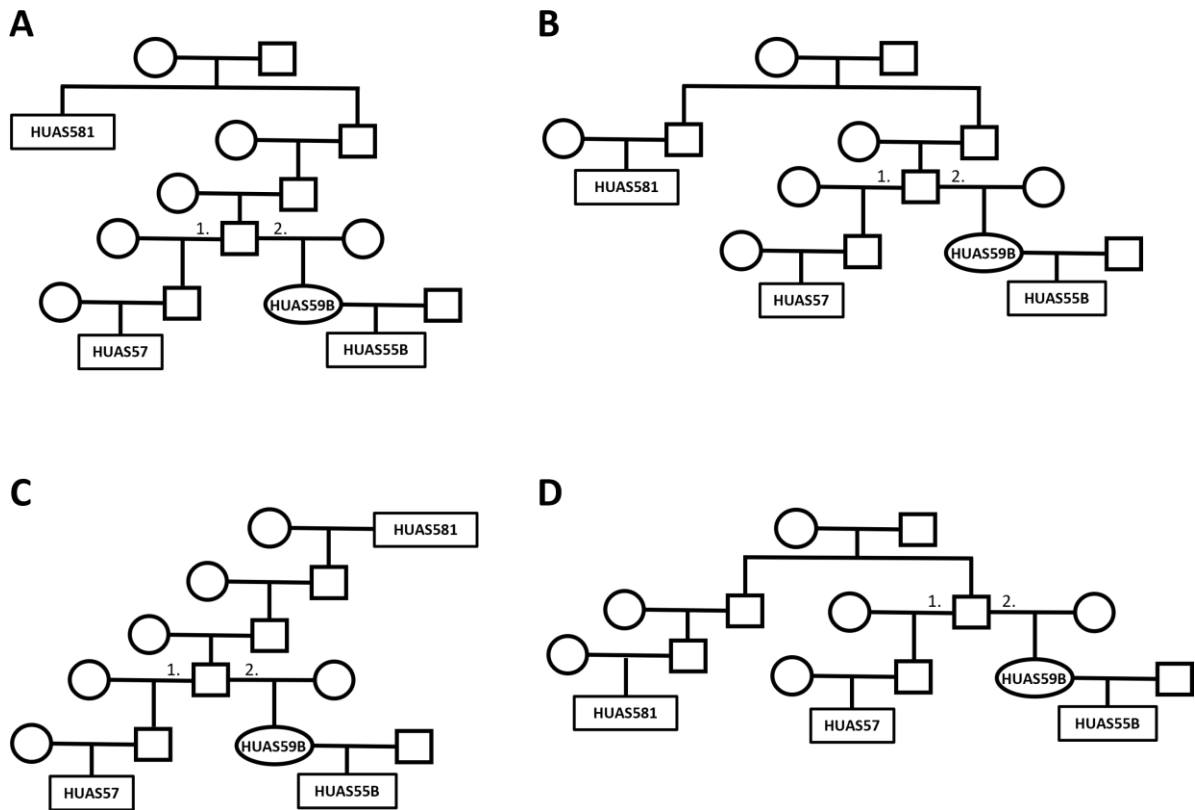


Supplemental information

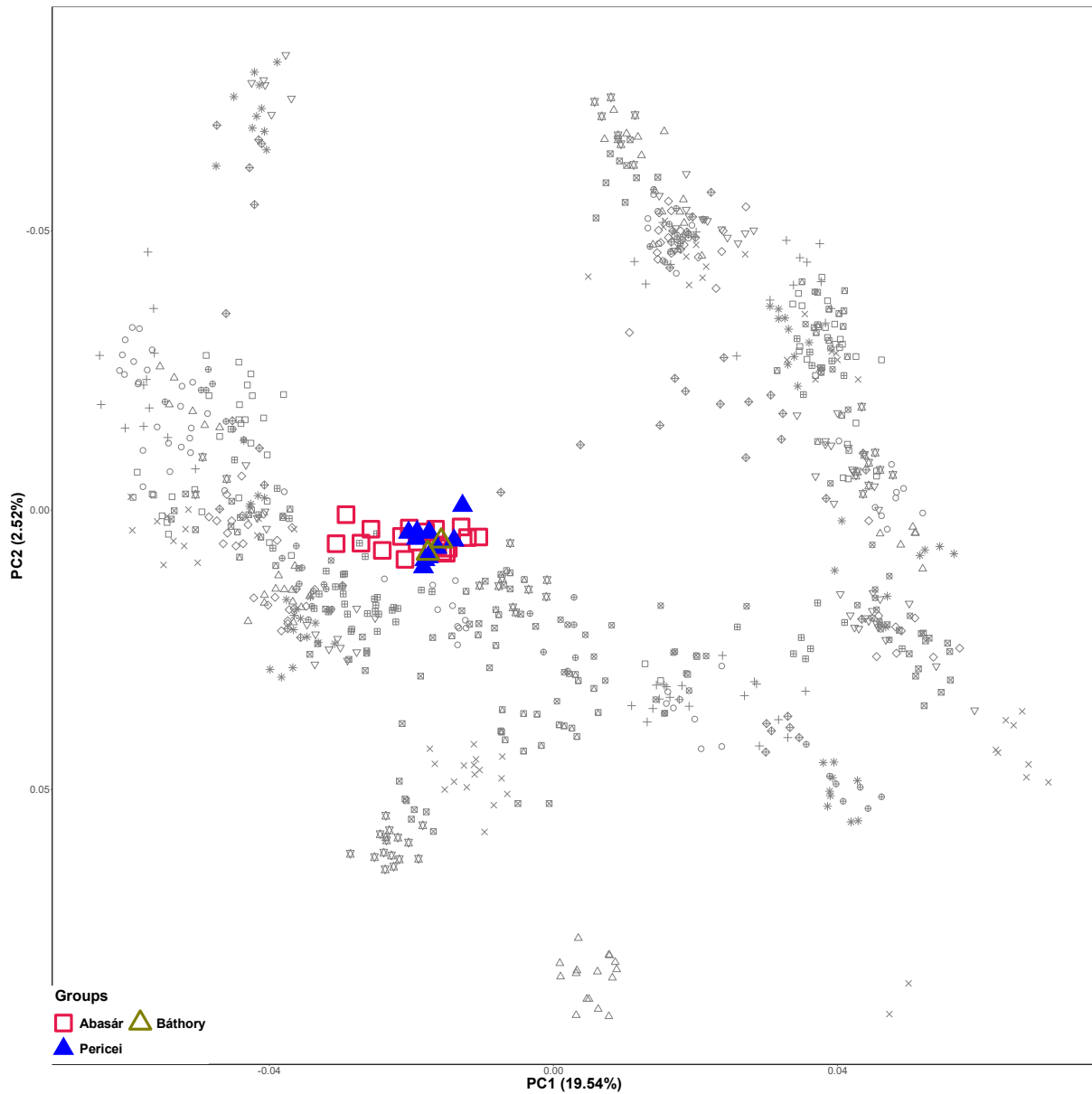
**Archaeogenetic analysis revealed East Eurasian
paternal origin to the Aba royal family of Hungary**

Gergely I.B. Varga, Zoltán Maróti, Oszkár Schütz, Kitti Maár, Emil Nyerki, Balázs Tihanyi, Orsolya Anna Váradi, Alexandra Gînguță, Bence Kovács, Petra Kiss, Monika Dosztig, Zsolt Gallina, Tibor Török, János B. Szabó, Miklós Makoldi, and Endre Neparáczki

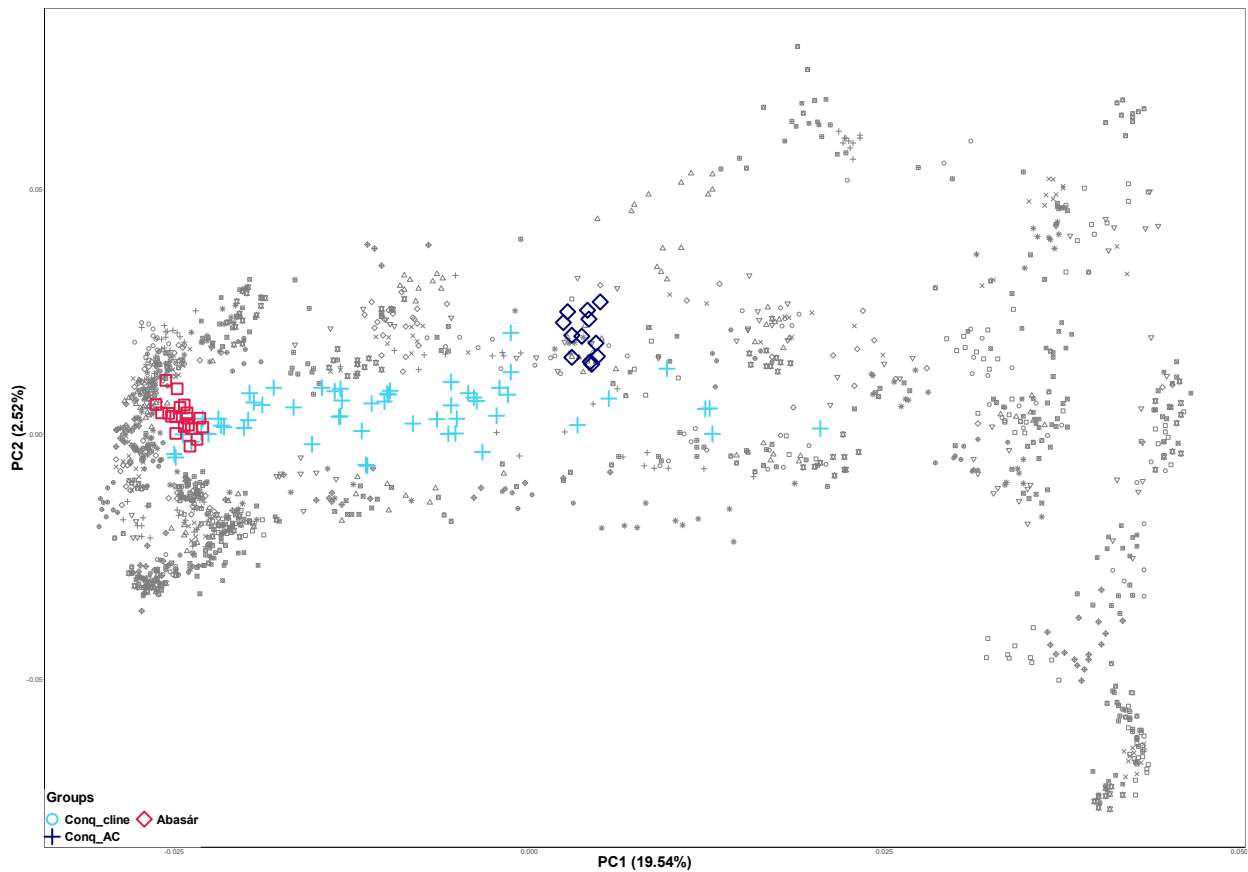
Supplementary figures



Supplementary figure 1. Reconstructed family trees of the larger family from Abasár Bolt-tető site based on the results with correctKin, related to STAR Methods. In the arrangement best fitting to our estimated relationships HUAS57 is the son of HUAS59B's half-sibling, and HUAS581 has four equally possible positions in the tree (A-D). Due to the potential uncertainty in estimating kinship coefficients for fourth-degree or higher relationships, the connections between HUAS581-HUAS57 and HUAS581-HUAS59B are ambiguous. Therefore, other possible arrangements should also be considered.



Supplementary figure 3. European PCA of Abasár samples (red squares) supplemented with the individuals from the Báthory cemetery at Pericei site (blue triangles) and the two Báthory family members (green triangles), related to Figure 4. The overlap between the two cemeteries indicates similar genome pattern for the two medieval Hungarian aristocratic group.



Supplementary figure 4. Eurasian_PCA of Abasár samples supplemented with the Conqueror cline (Conq_cline, light blue crosses) and Conqueror Asia Core samples (Conq_AC, blue squares), related to Figure 4. The cluster of Abasár samples overlaps with the Conqueror cline, indicating minor Asian patterns within their genomes feasibly originating from the conquerors.

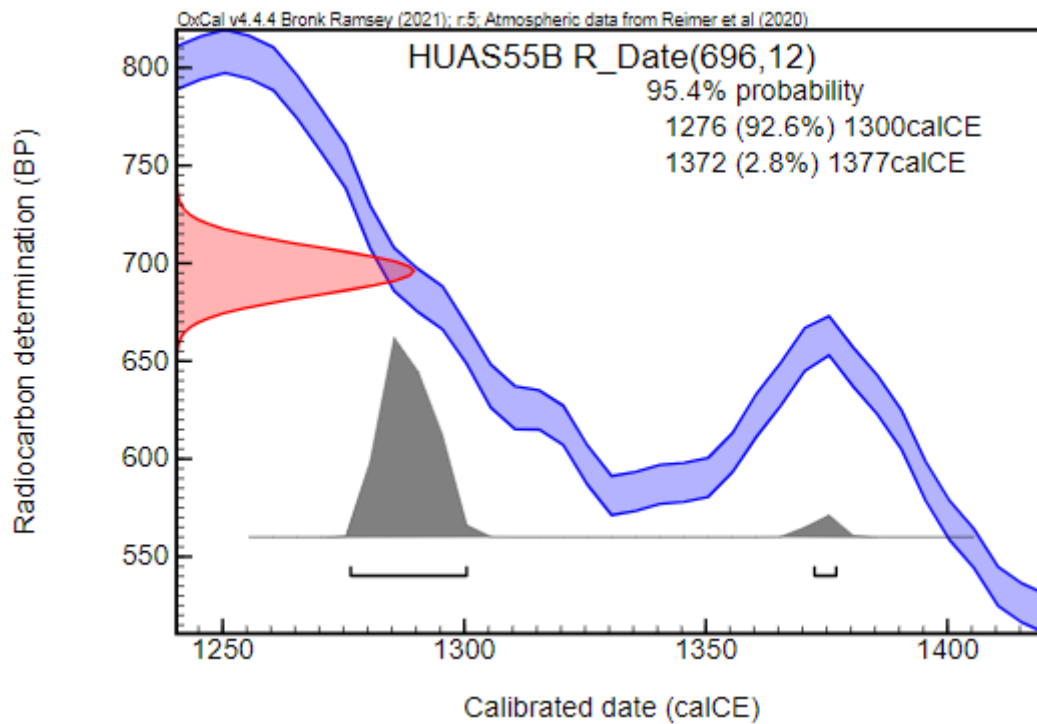
Supplementary table 1: Direct AMS radiocarbon dates from Individuals published in this study, related to Table 1.

Lab ID	Site	Grave number	Type of sample	Uncalibrated BP	±	OxCal ¹ 95% cal (CE)	Measuring Laboratory ²	AMS Lab ID
HUAS55B	Abasár-Bolt-tető	S55B	rib fragment	696	12	1276-1300 (92,6%); 1372-1377 (2,8%)	INR Debrecen	DeA-39137
HUAS57	Abasár-Bolt-tető	S57	tooth	686	14	1279-1303 (79%); 1368-1379 (16,4%)	INR Debrecen	DeA-39135
HUAS59B	Abasár-Bolt-tető	S59B	rib fragment	628	12	1300-1325 (43,7%); 1352-1395 (51,7%)	INR Debrecen	DeA-39138
HUAS261	Abasár-Bolt-tető	S261	tooth	692	13	1277-1301 (88,4%); 1371-1378 (7%)	INR Debrecen	DeA-39129
HUAS262	Abasár-Bolt-tető	S262	tooth	690	12	1278-1301 (87,8%); 1371-1378 (7,6%)	INR Debrecen	DeA-39130
HUAS309	Abasár-Bolt-tető	S309	tooth	608	13	1305-1365 (76,6%); 1383-1398 (18,9%)	INR Debrecen	DeA-39131
HUAS341	Abasár-Bolt-tető	S341	tooth	383	12	1455-1505 (78,8%); 1596-1618 (16,6%)	INR Debrecen	DeA-39132
HUAS390	Abasár-Bolt-tető	S390	tooth	858	13	1169-1222 (95,4%)	INR Debrecen	DeA-39133
HUAS450	Abasár-Bolt-tető	S450	tooth	618	12	1301-1329 (43,8%); 1341-1369 (29,3%); 1379-1396 (22,3%)	INR Debrecen	DeA-39134

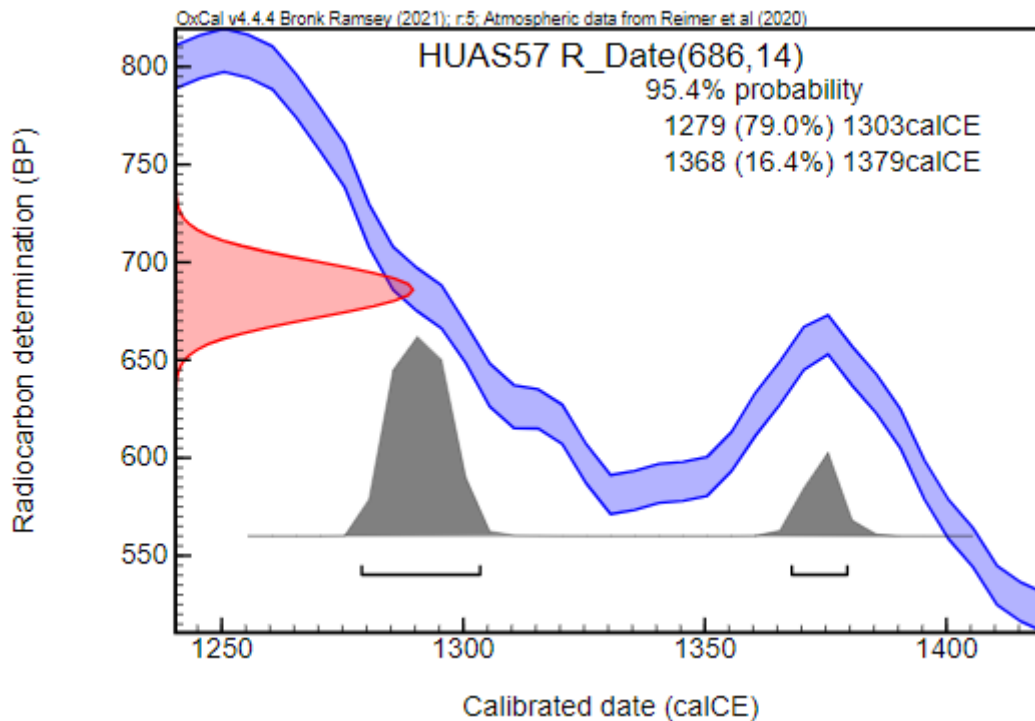
Notes:

¹Software and settings: OxCal 4.4.4, IntCal20

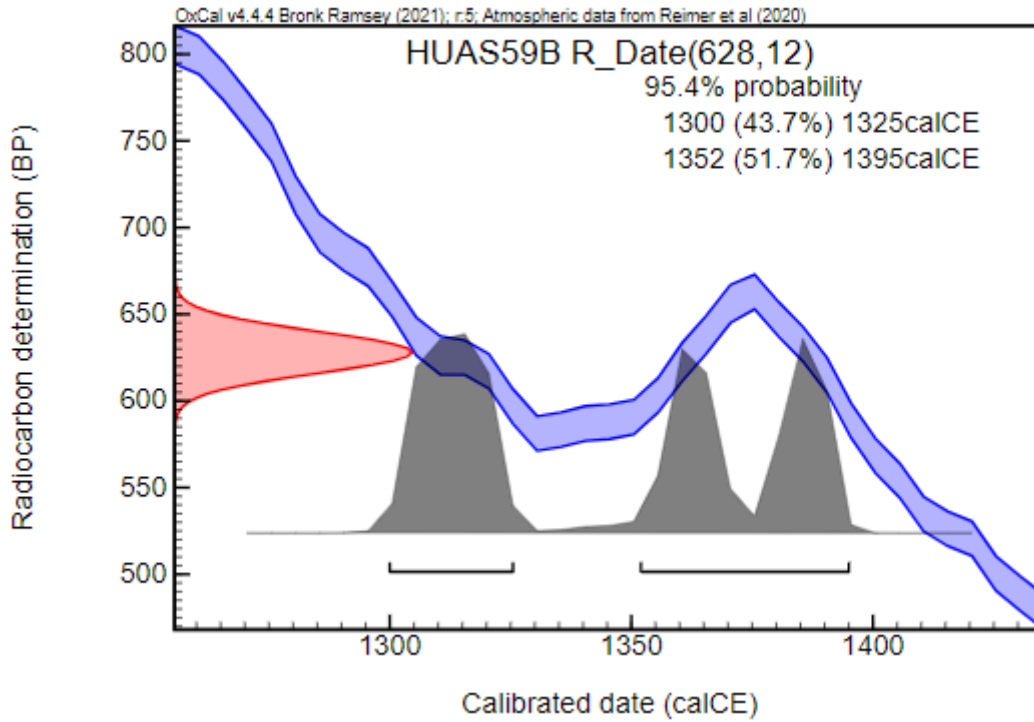
²Measuring labs: INR Debrecen: AMS laboratory of the Institute for Nuclear Research, Hungarian Academy of Sciences, Debrecen, Hungary



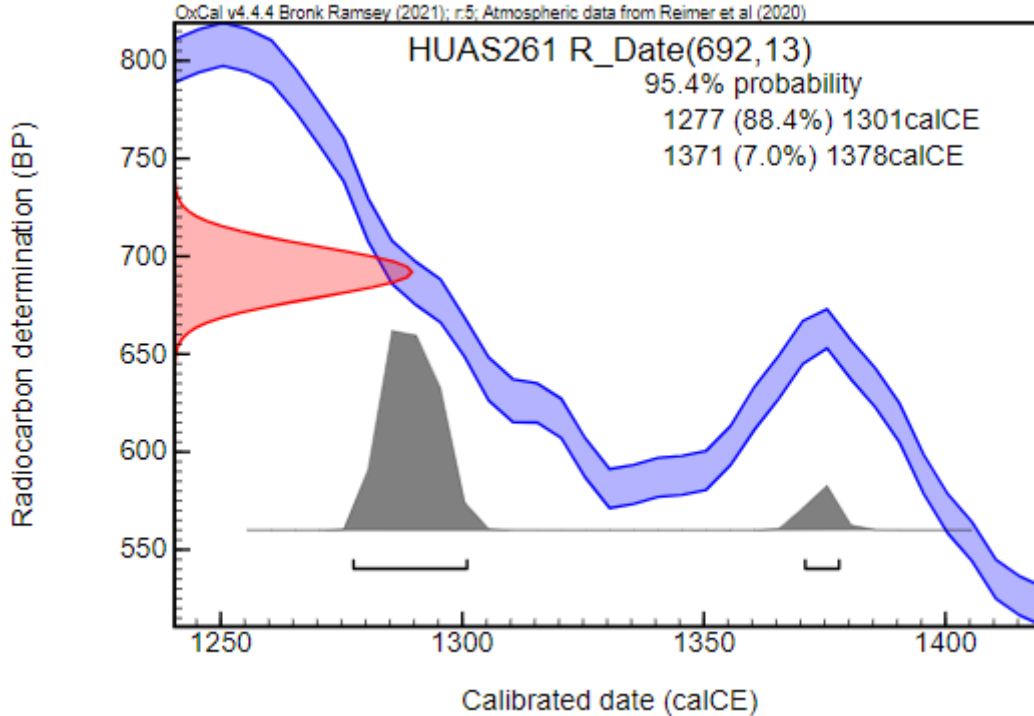
Supplementary figure 5. Calibration graph of the HUAS55B sample radiocarbon data (Oxcal 4.4.4 software with IntCal20 settings), related to Table 1 and Supplementary table 1.



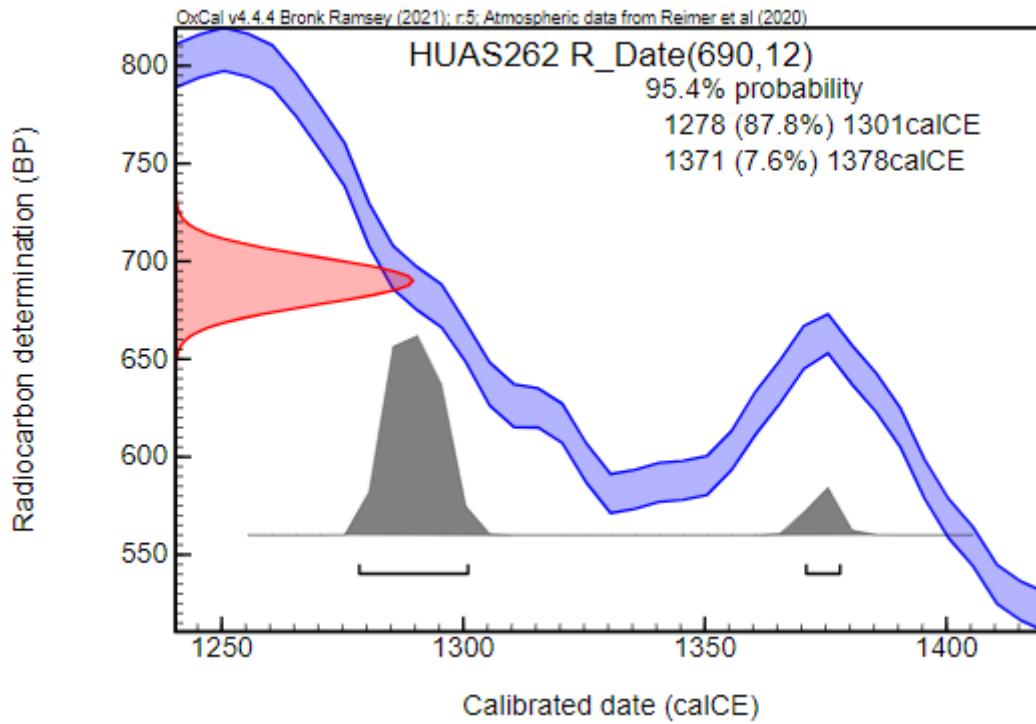
Supplementary figure 6. Calibration graph of the HUAS57 sample radiocarbon data (Oxcal 4.4.4 software with IntCal20 settings), related to Table 1 and Supplementary table 1.



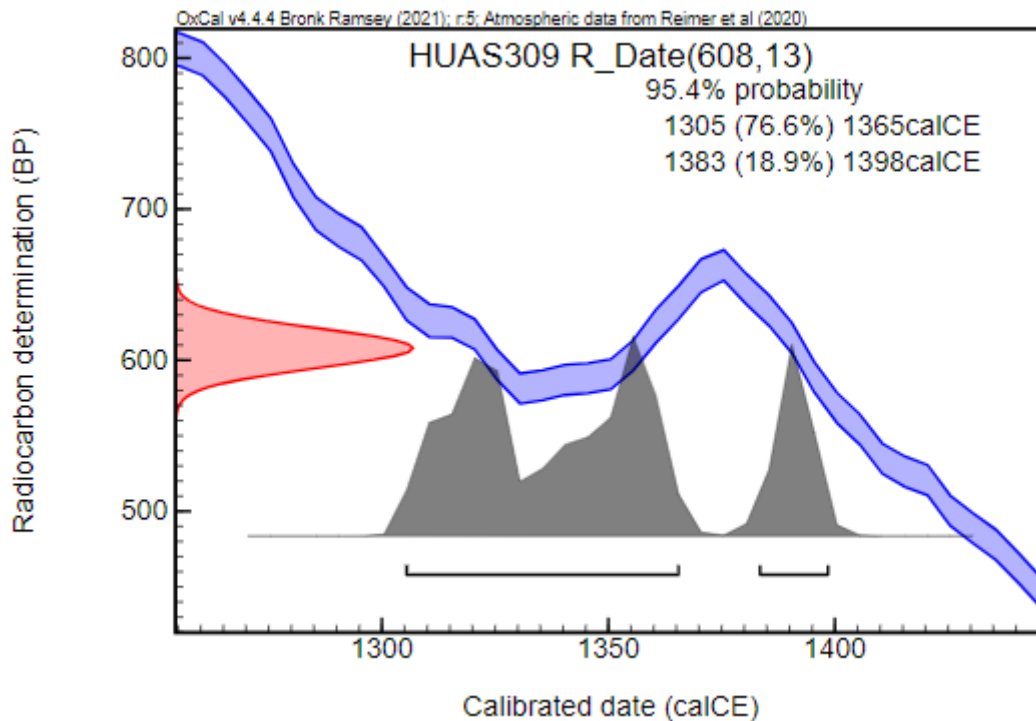
Supplementary figure 7. Calibration graph of the HUAS59B sample radiocarbon data (Oxcal 4.4.4 software with IntCal20 settings), related to Table 1 and Supplementary table 1.



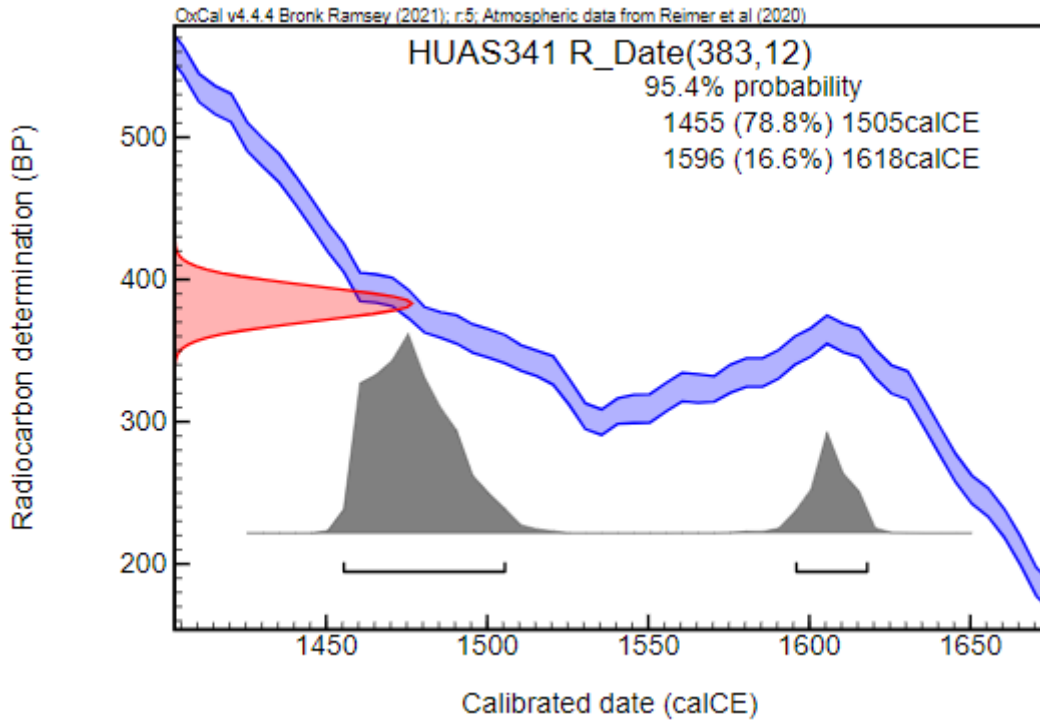
Supplementary figure 8. Calibration graph of the HUAS261 sample radiocarbon data (Oxcal 4.4.4 software with IntCal20 settings), related to Table 1 and Supplementary table 1.



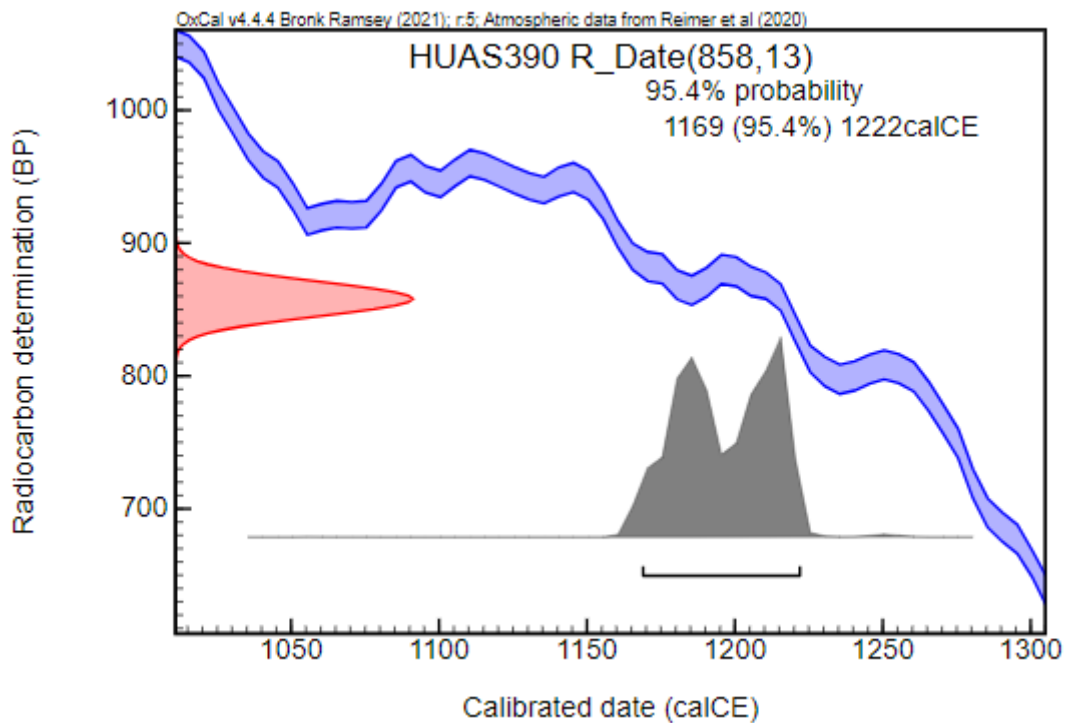
Supplementary figure 9. Calibration graph of the HUAS262 sample radiocarbon data (Oxcal 4.4.4 software with IntCal20 settings), related to Table 1 and Supplementary table 1.



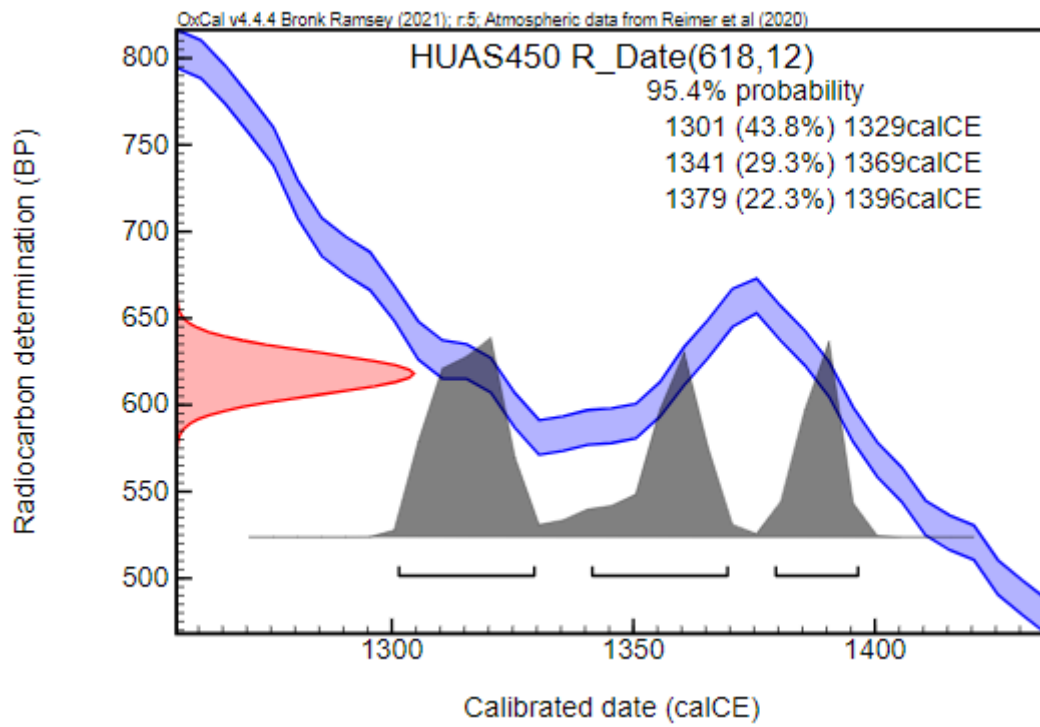
Supplementary figure 10. Calibration graph of the HUAS309 sample radiocarbon data (Oxcal 4.4.4 software with IntCal20 settings), related to Table 1 and Supplementary table 1.



Supplementary figure 11. Calibration graph of the HUAS341 sample radiocarbon data (Oxcal 4.4.4 software with IntCal20 settings), related to Table 1 and Supplementary table 1.



Supplementary figure 12. Calibration graph of the HUAS390 sample radiocarbon data (Oxcal 4.4.4 software with IntCal20 settings), related to Table 1 and Supplementary table 1.



Supplementary figure 13. Calibration graph of the HUAS450 sample radiocarbon data (Oxcal 4.4.4 software with IntCal20 settings), related to Table 1 and Supplementary table 1.