
Section 8 Radiocarbon Dating

8.1 Introduction

Twenty-eight charcoal samples (Table 264 and Table 265) of identified short-lived native Hawaiian plant species or *kukui* (*Aleurites moluccana*) nut shell or coconut (*niu*, *Cocos nucifera*) shell were sent to Beta Analytic, Inc. of Miami, Florida for carbon dating. Carbon samples from contexts including post-Contact artifacts or typically post-Contact wood (conifer and temperate hard wood) were excluded from selection for dating. Hence there was a clear bias in sample selection for what were believed as more likely to be pre-Contact deposits.

The samples were analyzed using the Accelerator Mass Spectrometer method. The conventional radiocarbon age data and analysis determined by Beta Analytic, Inc. are reported for each carbon date at the end of this section (presented in order of Beta Analytic Sample #). These data have then been calibrated to calendar ages using the OxCal calibration program, Version 4.1, developed by the University of Oxford Radiocarbon Accelerator Unit and available as share-ware over the internet, with the results reported for each dated sample as a companion graphic analysis for each reported date (at the end of this section).

Of the 28 samples, 20 (71 percent) yielded carbon dates with 2-sigma date ranges extending into the twentieth century. These 20 “late” dates typically span the past three centuries with stronger probabilities for nineteenth- and twentieth-century calendar ages. Unfortunately, these inconclusive results are common for radiocarbon analysis on samples dating to the last three centuries, making chronological distinctions between archaeological features and deposits dating from this period difficult. This challenge is due to the configuration of the radiocarbon calibration curve, which is derived from the radiocarbon dating of tree-ring samples of known ages and reflects the changes in the actual amount of ¹⁴C circulating in the global environment over time. The radiocarbon calibration curve for the period between AD 1650 and 1950 has little slope. This results in multiple calibration curve intercepts and accompanying calibrated calendar ages that largely span the last three centuries.

This very large percentage of “late” dates is suggested to reflect the extraordinary growth of the greater Honolulu area in the early post-Contact period, particularly following the conquest of O‘ahu by Kamehameha I in 1795 and his encouragement of Honolulu as a center of commerce.

All [six] of the exclusively pre-Contact dates overlapped and had date ranges that clustered relatively tightly in the AD 1440–1660 period. It was somewhat surprising that no earlier dates were acquired. The oldest date range was AD 1440–630.

A more detailed presentation of the project’s carbon dates is presented in the next section, followed by a brief review of previously reported carbon dates along the study corridor with a summary discussion.

8.2 Carbon Dating Results from the Present Corridor Study

The 28 charcoal samples dated were not evenly distributed along the HHCTCP City Center Section study corridor (Table 264 and Figure 75):

- Two were from the West Kalihi Geographic Zone.
- Twenty-two were from the West Kaka'ako Geographic Zone.
- Four were from the Kaka'ako Makai Geographic Zone.

This geographically uneven distribution was driven by where appropriate samples for carbon dating were observed.

8.2.1 West Kalihi Geographic Zone

Two relatively early dates (in terms of the radiocarbon dating results for the City Center AIS investigation) were recovered from two neighboring test excavations (T-020 and T-020A).

T-020 was located in the right lane of the eastbound lanes of Kamehameha Highway, directly *mauka* of the O'ahu Community Correctional Center (OCCC). The remnants of an earth oven or *imu* feature (SIHP #50-80-14-7425), were observed 0.3 m from the base of Stratum II (2.35–2.50 mbs). The feature contained large charcoal deposits and 11 small to medium water-rounded basalt cobbles. A charcoal sample identified as from *'ūlei* yielded an indicated date range of AD 1440–1640 with a 61.6 percent probability of a date in the range of AD 1440–1530.

T-020A was an additional test excavation to explore the extent of the *imu* remnant observed in adjacent T-020. T-020A was also located in the right lane of the eastbound lanes of Kamehameha Highway adjacent to OCCC and across from the Marukai Wholesale Market. Stratum II had a charcoal lens at approximately 2.30 mbs in the southeast corner. A charcoal sample identified as from *pūkiawe* yielded an indicated date range of AD 1480–1650 with a 68.2 percent probability of a date in the range of AD 1510–1640.

The date ranges of these two neighboring charcoal samples substantially overlap, and they could have been roughly contemporaneous in the period from AD 1480 to 1640 with a particularly likely overlap date range in the timeframe of AD 1510 to 1530.

Background research indicates there are no prior radiocarbon dates in this vicinity. These dates come from an area indicated by Land Commission Award data to have been well-populated along both margins of Kalihi Stream. This area is likely to have been relatively well-populated by the sixteenth century.

Both of these relatively early West Kalihi dates are shown to be in the immediate vicinity of a land area traditionally known as Hāunapō (although it should be noted that there are other places named “Haunapo” in the vicinity) (Figure 76). “Hāuna-pō” (lit., “night striking”) was the name of a temple (*heiau*) of human sacrifice in the vicinity (Pukui et al. 1974:42). Other place names in the vicinity such as 'Umi (Pukui et al. 1974:42:215) also appear to relate to this *heiau*. It may not be a coincidence that the direct descendants of Hewahewa, the *kahuna nui*, or highest priest in the archipelago under Kamehameha I, claimed lands between 'Umi and the Hāunapō parcels. There is no reason to believe that the dated deposits relate directly to the Hāunapō *heiau*. It may be the case, however, that factors such as the proximity to Kalihi Stream, fishponds, habitations,

and agricultural lands made this a favorable area for relatively early, relatively intensive settlement (Figure 76).

8.2.2 West Kaka'ako Geographic Zone

The West Kaka'ako Zone, extending along Halekauwila Street from Richards Street on the west end to Ward Avenue on the east end, yielded 22 of the 28 carbon dates (79 percent of all of the dates) acquired. Carbon dates were recovered from nine different test excavations from three different archaeological cultural resources (from SIHP #50-80-14-7428: T-119A, T-120, and T-120A; from SIHP #50-80-14-2963: T-124; from SIHP #50-80-14-5820: T-142, T-145, T-146A, T-150, and T-151). This density of features in and of itself indicates a high level of activity in this area.

It may not be a coincidence that four of the six carbon dates with ranges entirely within the pre-Contact period (from SIHP #50-80-14-2963: T-124; from SIHP #50-80-14-5820: T-142, T-146A, and T-151) lie within a 500 m stretch of the central portion of the West Kaka'ako Zone. This indicated density of relatively-early activity (circa AD 1440 to 1650) appears to be localized around "Pu'unui" [large hill, or big hill]. Pu'unui may have been a higher area of dry land in the midst of a relatively marshy area that would have been attractive for a variety of habitation activities (Figure 77).

8.2.3 Kaka'ako Makai Zone

The Kaka'ako Makai Zone designates an additional utility re-location route that extends approximately 1,250 m forming a *makai* loop off of the main transit alignment. Where the main transit line heads off onto Halekauwila Street approximately 100 m southeast of the Downtown Station, the utility re-location route continues to head south on Nimitz Highway. The utility re-location route makes a sharp turn heading *mauka* (northeast) off of Nimitz Highway onto Punchbowl Street and then turns southeast on Pohukaina Street running parallel and one block *makai* of the main transit route on Halekauwila Street. The utility re-location route then re-connects with the main alignment by turning *mauka* (northeast) on Cooke Street to rejoin the main transit alignment at the intersection of Halekauwila Street and Cooke Street. The four carbon dates were recovered from two test excavations within a single archaeological cultural resource (SIHP #50-80-14-2918: three dates from T-226B and one date from T-227A). At the 2-sigma calibration each of the four dates spans approximately 300 years from AD 1650 to 1950.

Table 264. Summary Table of Carbon Dates from along the HHCTCP City Center Section Study Corridor

Provenience	WIDL #	Plant	Beta # (Beta -)	Measured Radiocarbon Age (BP)	13C/12C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration (and likely range)
T-020. Str. II, Feat. A, 235–250 cmbs	1223-4	<i>Ūlei</i>	342683	400 +/- 30	-26.2 _{0/00}	380 +/- 30	AD 1440–1640 (61.6% probability AD 1440– 1530)
T-020A Str. II, 230– 234 cmbs	1302-2	<i>Pūkiawe</i>	342818	320 +/- 30	-25.3 _{0/00}	320 +/- 30	AD 1480–1650 (68.2% probability AD 1510– 1640)
T-119A Str. IIa, 80–93 cmbs	1302-14	<i>Kukui</i> (nutshell)	342819	110 +/- 30	-22.8 _{0/00}	150 +/- 30	AD 1660–1960 (78.2% probability 1660–1890)
T-119A Str. IIa/b, 125–150 cmbs	1302-21	<i>Kukui</i> (nutshell)	342820	110 +/- 30	-25.0 _{0/00}	110 +/- 30	AD 1680–1940 (49.2% probability AD 1810– 1920)
T-120, Str. II, Feat. C, 112–126 cmbs	1228-1	<i>Kukui</i> (nutshell)	342684	130 +/- 30	-25.5 _{0/00}	120 +/- 30	AD 1670–1940 (62.7% probability AD 1790– 1940)
T-120, Str. II, Feat. D, 110–118 cmbs	1228-20	<i>Kukui</i> (nutshell)	342685	50 +/- 30	-25.7 _{0/00}	40 +/- 30	AD 1690–post-1960 (67.1% probability AD 1810–1920)
T-120, Str. II, Feat. F, 104–107 cmbs	1228-103	<i>Kukui</i> (nutshell)	342686	90 +/- 30	-24.7 _{0/00}	90 +/- 30	AD 1680–1930 (68.9% probability AD 1800– 1930)

Provenience	WIDL #	Plant	Beta # (Beta -)	Measured Radiocarbon Age (BP)	13C/12C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration (and likely range)
T-120A Str. II, 110–118 cmbs	1302-33	Kukui (nutshell)	342824	140 +/- 30	-24.3 _{0/00}	150 +/- 30	AD 1660–1960 (78.2% probability AD 1660– 1890)
T-120A, Str. II, Feat. 1, 128–136 cmbs	1302-42	<i>Pilo</i>	342821	150 +/- 30	-24.4 _{0/00}	160 +/- 30	AD 1660–1960 (77.3% probability AD 1660– 1890)
T-120A, Str. II, Feat. 2, 125–137 cmbs	1302-45	<i>Kukui</i> (nutshell)	342822	150 +/- 30	-24.5 _{0/00}	160 +/- 30	AD 1660–1960 (77.3% probability AD 1660– 1890)
T-120A, Str. II, Feat. 4, 128–132 cmbs	1302-50	<i>Akoko</i>	342823	100.7 +/- 0.4 pMC	-10.8 _{0/00}	170 +/- 30	AD 1650–1960 (50.7% prob. AD 1720–1820)
T-124, Str. IIa Feat. 1, 138–144 cmbs	1228-34	<i>‘Āheahea</i>	342687	70 +/- 30	-26.7 _{0/00}	40 +/- 30	AD 1690–1960 (67.1% probability 1810–1920)
T-124, Str. IIa, Feat. 2, 118–125 cmbs	1228-55	<i>‘Ilima</i>	342688	150 +/- 30	-25.4 _{0/00}	140 +/- 30	AD 1660–1950 (52.5% prob. 1790–1950)
T-124, Str. IIb, Feat. 5, 140–163 cmbs	1223-11	<i>‘Āheahea</i>	342689	290 +/- 30	-25.9 _{0/00}	280 +/- 30	AD 1490–1800 (93.1% probability AD 1490– 1670)
T-124, Str. IIb, Feat. 11, 120–132 cmbs	1223-6	<i>Lama</i>	342690	350 +/- 30	-24.6 _{0/00}	360 +/- 30	AD 1450–1640 (68.2% probability AD 1460– 1630)

Provenience	WIDL #	Plant	Beta # (Beta -)	Measured Radiocarbon Age (BP)	13C/12C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration (and likely range)
T-142, Str. IIa, Feat. 6, 55–70 cmbs	1228-61	<i>Kukui</i> (nutshell)	342691	270 +/- 30	-24.8 ^{0/00}	270 +/- 30	AD 1510–1800 (68.2% probability AD 1520– 1670)
T-145, Str. IIa Feat. 1, 81–95 cmbs	1228-67	<i>'Ilima</i>	342984	320 +/- 30	-24.8 ^{0/00}	320 +/- 30	AD 1480–1650 (53.3% probability AD 1510– 1600)
T-146A, Str. IIa, Feat. 2, 75–90 cmbs	1302-62	<i>Niu</i> (nutshell)	342985	220 +/- 30	-23.6 ^{0/00}	240 +/- 30	AD 1520–1960 (51.3% probability AD 1630– 1690)
T-146A, Str. IIa, Feat. 3, 83–94 cmbs	1302-72	<i>Kukui</i> (nutshell)	342826	220 +/- 30	-23.9 ^{0/00}	240 +/- 30	AD 1520–1960 (51.3% probability AD 1630– 1690)
T-146A, Str. IIa, Feat. 4, 85–95 cmbs	1302-76	<i>Niu</i> (nutshell)	342827	250 +/- 30	-22.4 ^{0/00}	290 +/- 30	AD 1490–1670 (45.7% probability AD 1520– 1580)
T-146A, Str. IIa, Feat. 5, 81–92 cmbs	1302-81	<i>Pilo</i>	342828	180 +/- 30	-24.1 ^{0/00}	190 +/- 30	AD 1640–1960 (53.5% probability AD 1720– 1820)
T-150, Str. II, Feat. 2, 70–75 cmbs	1228-74	<i>Kukui</i> (nutshell)	342692	20 +/- 30	-23.8 ^{0/00}	40 +/- 30	AD 1690–1960 (67.1% probability 1810–1920)
T-150, Str. II, Feat. 3, 90–130 cmbs	1228-83	<i>Kukui</i> (nutshell)	342693	230 +/- 30	-24.5 ^{0/00}	240 +/- 30	AD 1520–1960 (51.3% probability 1630–1690)

Provenience	WIDL #	Plant	Beta # (Beta -)	Measured Radiocarbon Age (BP)	13C/12C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration (and likely range)
T-151, Str. IIa, Feat. 6, 86–108 cmbs	1228-86	<i>Ko'oko'o lau</i>	342694	290 +/- 30	-24.5 _{0/00}	300 +/- 30	AD 1480–1660 (50.1% probability AD 1520– 1590)
T-226B, Str. II, Feat. 3, 82–93 cmbs	1304-15	<i>Kukui</i> (nutshell)	343422	190 +/- 30	-25.4 _{0/00}	180 +/- 30	AD 1650–1960 (52.2% probability AD 1720– 1820)
T-226B, Str. II, Feat. 5, 76–90 cmbs	1304-24	<i>Niu</i> (nutshell)	343423	200 +/- 30	-23.0 _{0/00}	230 +/- 30	AD 1630–1960 (44.7% probability AD 1630– 1690)
T-226B, Str. II, Feat. 8, 78–94 cmbs	1304-43	<i>Niu</i> (nutshell)	343424	160 +/- 30	-24.0 _{0/00}	180 +/- 30	AD 1650–1960 (52.2% probability AD 1720– 1820)
T-227A, Str. IIa, Feat. 2, 108–131 cmbs	1302-146	<i>Kōpiko</i>	342829	190 +/- 30	-24.6 _{0/00}	200 +/- 30	AD 1640–1960 (51.6% probability 1720–1810)

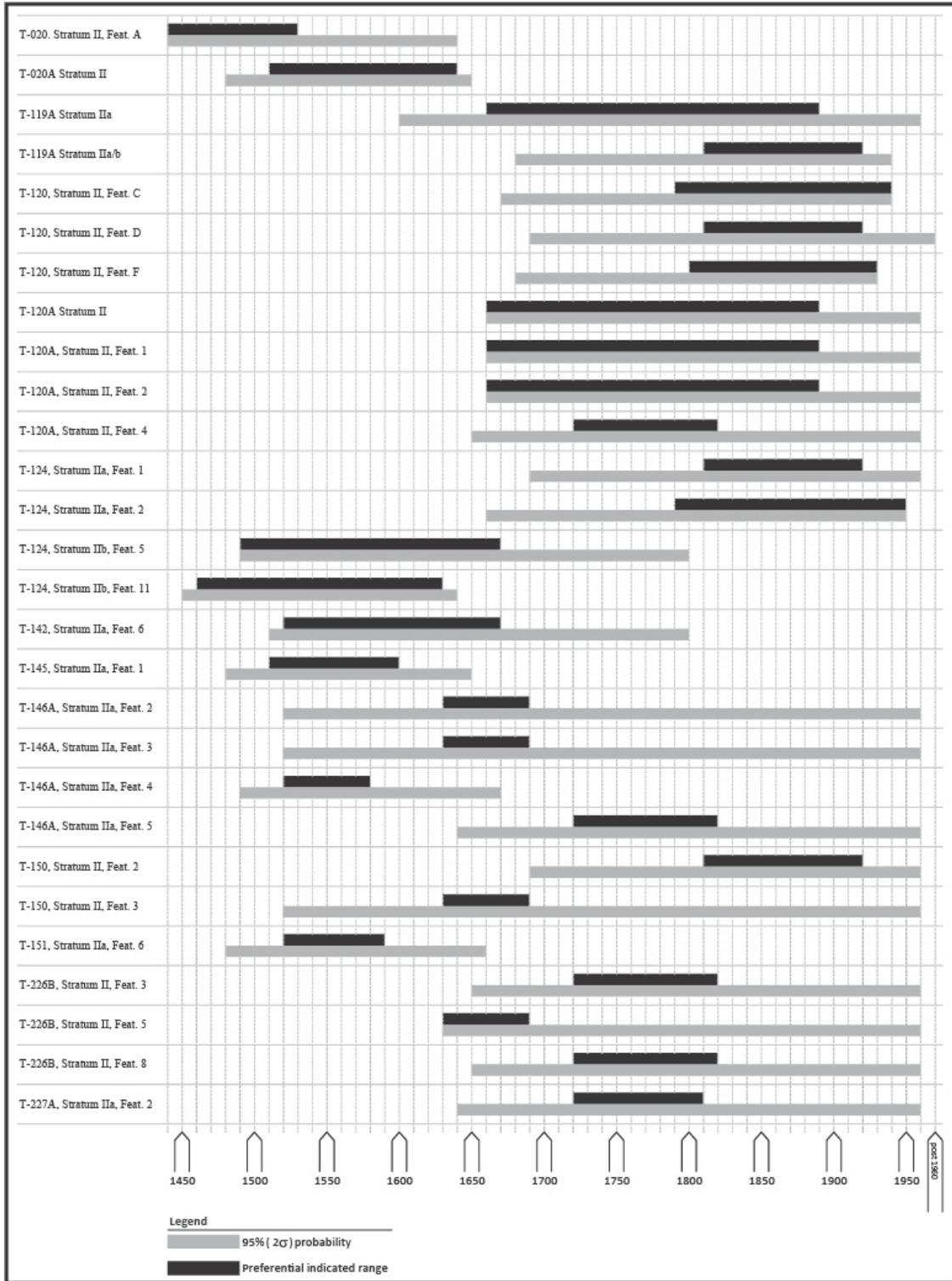


Figure 75. Bar Graph of HHCTCP Carbon Dating Results

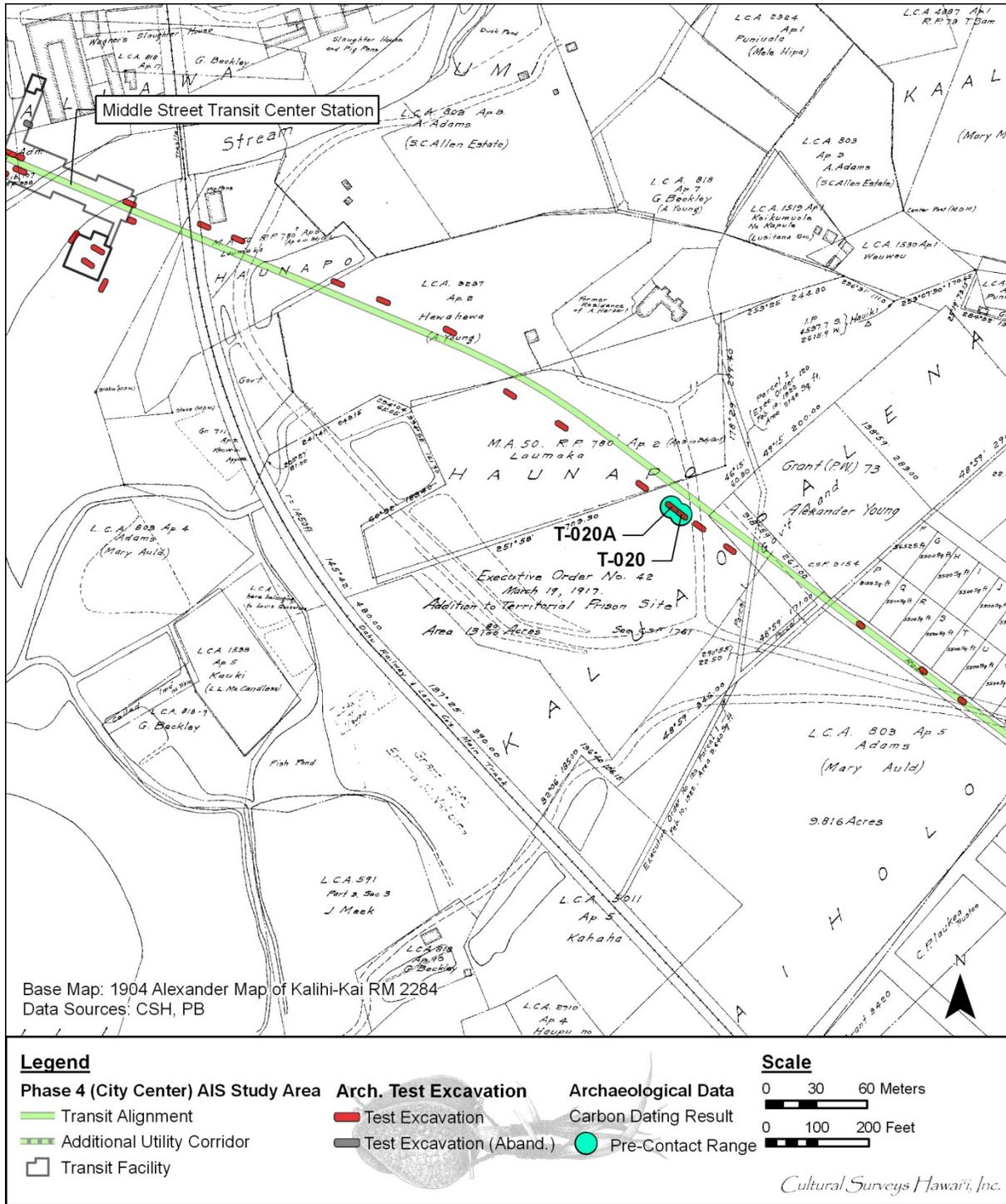


Figure 76. Location of two relatively early (95% probability ranges of AD 1440–1640 and 1480–1650) carbon dates from excavations T-020 and T-020A in West Kalihi overlain on the 1904 Alexander map (RM 2284) of Kalihi-Kai showing Kalihi Stream, LCAs, and place named “Haunapo”

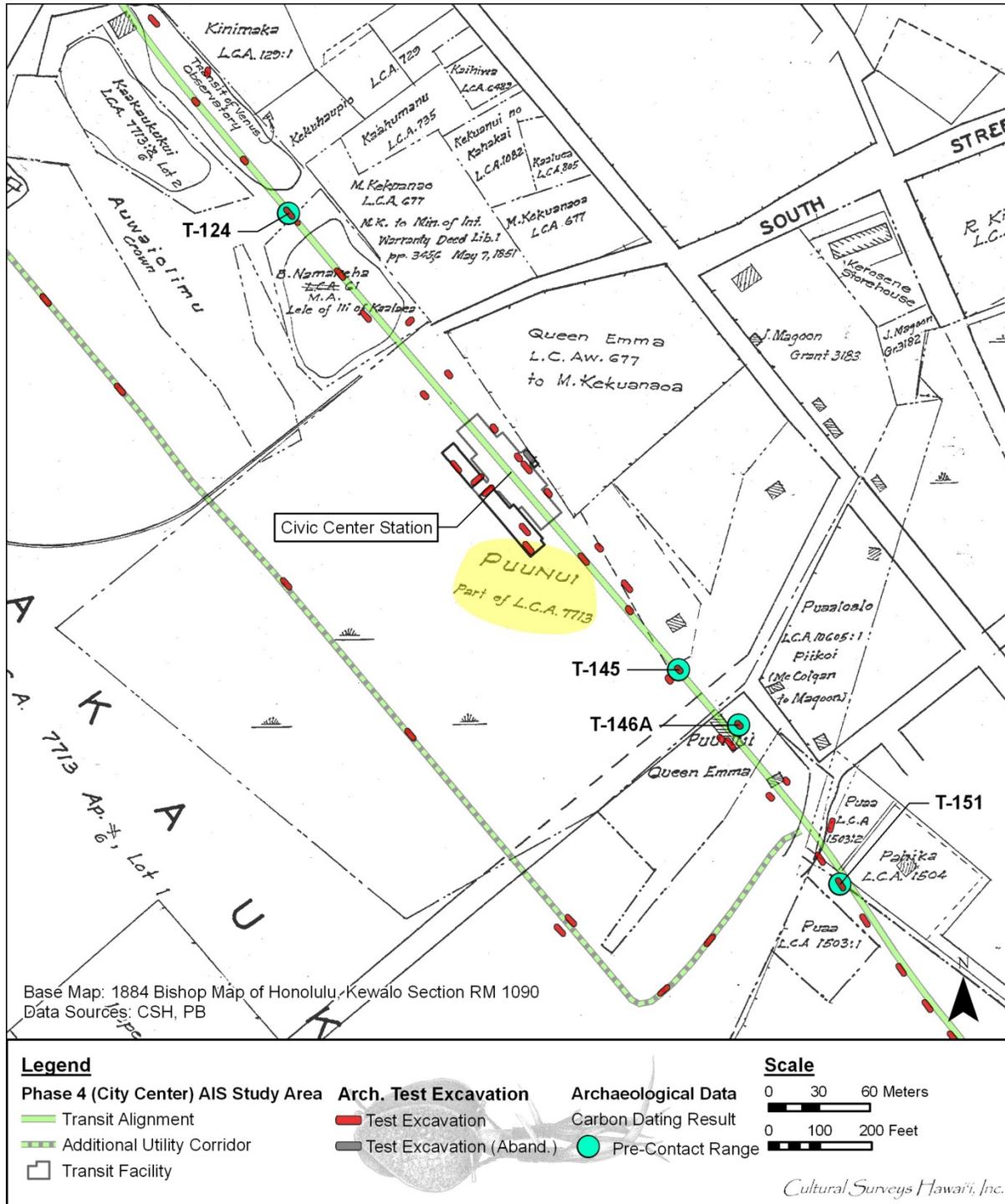


Figure 77. Location of four relatively early (95% probability ranges within AD 1450–1670) carbon dates from excavations T-124, T-145, T-146A, and T-151 in West Kaka‘ako overlain on the 1884 Bishop map (RM 1090) of Honolulu, Kewalo Section showing proximity to the “Pu‘unui” place name, later LCAs, ponds, etc.

8.3 Prior Carbon Dating Results from the HHCTCP City Center Vicinity

The majority of carbon dates reported from archaeological studies in the vicinity of the HHCTCP City Center project area have been from major projects in downtown Honolulu inland of the present study alignment. These dates are summarized in Table 265 with a brief review of projects that have produced radiocarbon dates near the corridor presented below (both organized chronologically by the date of the project). Discussions of the present carbon dating results in the context of our knowledge of the chronology in the vicinity of the HHCTCP City Center route and in the wider framework of Hawaiian cultural chronologies follow.

8.3.1 Makai Parking Garage Archaeological Monitoring (Clark 1987)

Stephen Clark, then of the Department of Anthropology at the Bishop Museum, prepared an archaeological monitoring report of the Makai Parking Garage at the *mauka*/Diamond Head corner of Punchbowl and Halekauwila Streets. Seven burials were identified at the designated historic property, SIHP #5 0-080-14-2963. Two radiocarbon dates are reported. A date of AD 1270–1410 is reported from charcoal in burial pit fill (Clark 1987:105). A date is also reported for “a buried A horizon in layer II although no Hawaiian cultural materials or features were found in association with this buried surface....” (Clark 1987:107). Two different systems of date processing are used for this buried A horizon with Stuiver and Pearson (1986) analyses yielding a date range of AD 600–790 and Klein et al. (1982) yielding a date range of AD 430–905. In the absence of any associated Hawaiian cultural materials, it remains uncertain that this date range should be understood as a cultural date.

8.3.2 River-Nimitz Redevelopment Project Inadvertent Discovery (Landrum and Dixon 1992)

The B. P. Bishop Museum Public Archaeology Section became involved in a River-Nimitz redevelopment project (Landrum and Dixon 1992) in response to the inadvertent discovery of a human burial. This burial find was unusually deep “approximately 2.5 m beneath the surface in a water-saturated matrix” (Landrum and Dixon 1992:8). A radiocarbon date on the burial was evaluated at AD 1430–1650.

8.3.3 Nuuanu Court Project Archaeological Inventory Survey (Dunn and Rosendahl 1993)

Paul H. Rosendahl, Inc. (Dunn and Rosendahl 1993) carried out an archaeological inventory survey for the Nuuanu Court Project on a parcel bounded by Bethel Street on the south, Nimitz Highway on the west, Nu‘uanu Avenue on the north and buildings on the east. Three radiocarbon dates are reported, for which two of the date ranges extend into the modern period. The study concludes that occupation in the project area began “perhaps...as early as AD 1250 at Site 2456” (Dunn and Rosendahl 1993:9).

8.3.4 Kekaulike ‘Ewa Block Paleoenvironmental Investigations (Athens and Ward 1994)

The International Archaeological Research Institute (IARII; Athens and Ward 1994) prepared a report on paleoenvironmental investigations for the Archaeological Consultants of Hawai‘i in coordination with their Kekaulike ‘Ewa Block archaeological data recovery (Riley et al. 1995). Three samples from a core were submitted for dating. All three dates are in pre-Polynesian times.

By a core depth of 3-42 cmbs (Stratum IIa) a time-depth of 2201–2608 Before Present (B.P.) was suggested (Athens and Ward 1994:16).

8.3.5 Kekaulike Ewa Block Archaeological Inventory Survey (Kennedy et al. 1994)

Archaeological Consultants of Hawai'i (Kennedy et al. 1994) conducted an archaeological inventory survey for the Kekaulike Revitalization Project 'Ewa Block in an area bounded by Hotel, River, King, and Kekaulike Streets (one block inland from the present study corridor), reporting seven radiocarbon dates. Two of the dates were basically modern and three of the dates pre-date posited Polynesian arrival. These carbon samples are posited to actually have been blackened wood (Kennedy et al. 1994:132). The authors conclude that occupation in an age range of AD 1386–1710 is indicated (Kennedy et al. 1994:132).

8.3.6 Kekaulike 'Ewa Block Archaeological Data Recovery (Riley et al. 1995)

Archaeological Consultants of Hawai'i (Riley et al. 1995) conducted archaeological data recovery work for the Kekaulike Revitalization Project 'Ewa Block (one block inland from the present study corridor) as a follow-up to the archaeological inventory survey effort (Kennedy et al. 1994, discussed previously). Eight radiocarbon dates are reported. Four of the dates are Before the Common Era (BCE) and relate to pre-Polynesian geological processes, and four of the dates are believed to relate to Hawaiian activity. The date range of AD 1664–1955 (Beta #67534) “was taken at the interface between prehistoric Hawaiian occupation and Western materials. The date was not unexpected” (Riley et al. 1995:95). The date range of AD 796–1000 (Beta #67535) was associated with “a well-defined coral block platform with the remains of a human burial beneath it...” (Riley et al. 1995:95). The date range of AD 874–1061 (Beta #67536) “consisted of coconut and other wood that was lodged in the wall of the Fishpond (Site #4587) [and] the date may be an accurate record of the fishpond construction, in which case it is the earliest date obtained for a fishpond in the Hawaiian Islands” (Riley et al. 1995:95). The date range of AD 1445–1693 (ISGS 2731) was from a pit feature (Riley et al. 1995:95).

8.3.7 Kekaulike Diamond Head Block Archaeological Inventory Survey (Goodwin 1997)

The International Archaeological Research Institute (Goodwin 1997) reported on an archaeological inventory survey at SIHP # 50-80-14-4875 in an area bounded by Kekaulike Street, Hotel Street, Maunakea Street, and King Street (one block inland from the present study corridor, this project area was further reported on by Goodwin and Allen 2005 addressed below). A firepit (Feature 25) in their Test Trench 2 “yielded a radiocarbon date between AD 1200–1390” (Goodwin 1997:44). Three samples were submitted for carbon dating (Goodwin 1997:19), but two yielded modern dates.

8.3.8 Kūwili Fishpond/Liliha Paleoenvironmental Study (Athens and Ward 1997)

The International Archaeological Research Institute (Athens and Ward 1997) carried out a Liliha paleoenvironmental coring project at the former Kūwili Fishpond with carbon dates reported for two cores (Core 4 and Core 5). The two dates from Core 4 are in pre-Contact Polynesian times, but the five dates from Core 5 are Before the Common Era and prior to human arrival in the Hawaiian Islands. These two radiocarbon dates “suggest that construction and use of the fishpond probably occurred during the AD 1500s and that infilling occurred very

rapidly.... Presumably the fishpond was largely filled with sediment by the early AD 1600s; apparently it was not well-maintained following initial construction” (Athens and Ward 1997:18). The dating of Kūwili Fishpond would be revisited by McGerty et al. 1997 and Hammatt et al. 2008 (both discussed below) with different conclusions reached.

8.3.9 Kūwili Fishpond/Liliha Civic Center Archaeological Excavations (McGerty et al. 1997)

Scientific Consultant Services (SCS, McGerty et al. 1997) carried out archaeological excavations at the former Kūwili Fishpond (SIHP # 50-80-14-5368) for a proposed Liliha Civic Center project. Twelve radiocarbon samples were analyzed from a stratigraphic sequence. Nine show an overall steady decrease in conventional age from the stratigraphically lowest sample (McGerty et al. 1997:63). The chronological anomalies or inversions in the chronological record are explained as resulting from re-deposited pond material used as fill. The SCS study concluded that fishpond initial construction and utilization dated from approximately AD 1100. This comparatively early date was noted to be a “major discrepancy” and to “vary greatly” from the dates for initial construction in the IARII study (McGerty et al. 1997:73).

8.3.10 Kawa Fishpond Archaeological Inventory Survey (McDermott and Mann 2001)

In the course of an archaeological inventory survey for a proposed Nimitz Highway water system improvements project, McDermott and Mann (2001) report a total of four radio-carbon dates from Kawa Fishpond (SIHP # 50-80-14-5966). A radiocarbon date from a coconut shell fragment and a date from wood charcoal appear straightforward. The other two dates on organic sediments were complicated inasmuch as “it is a virtual certainty that a significant portion of the carbon in both sediment samples was marine in origin” and corrections are presented to address the “marine reservoir effect” (McDermott and Mann 2001:56). The authors conclude that “pond sediments were accumulating at least as early as AD 1150–1350.” (McDermott and Mann 2001:65). This date is “associated with the transformation of the previously higher-energy lagoonal environment into the lower-energy ponded environment that is often characteristic of traditional Hawaiian fishponds” (McDermott and Mann 2001:65, 66).

The authors note the following:

Age determinations on presumed culturally derived wood and charcoal from the fishpond layer and the lagoonal layer immediately below yielded significantly younger ages. A coconut shell fragment from the fishpond layer, Stratum XIII, dated to A.D. 1450–1650. Wood charcoal from the lagoonal layer immediately beneath the presumed fishpond deposit yielded an age of A.D. 1670–1960. As well as their inconsistency with the results of the sediment samples, these dates are clearly inverted. They are more consistent with the hypothesized later prehistoric and known historic use of the pond. (McDermott and Mann 2001:65)

8.3.11 Harbor Court Archaeological Data Recovery (Lebo 2002)

A Paul H. Rosendahl, Inc. data recovery project (Lebo 2002) at the Harbor Court project, bounded by Nimitz Highway, Bethel, and Queen Streets in downtown Honolulu, reports thirteen charcoal dates and seven sediment dates. The study concludes that the radiocarbon dates suggest “a fairly dense or consistent occupation of this area beginning between A.D. 1000–1200.” (Lebo

2002:5–10). Six of the carbon dates (Beta #56365, #56367, #56372, #56374, #56375, and #56381) appear to provide solid support for this conclusion (Lebo 2002:5–11).

8.3.12 Kekaulike Diamond Head Block Archaeological Data Recovery (Goodwin and Allen 2005)

IARII (Goodwin and Allen 2005) report on archaeological data recovery work as a follow-up to the archaeological inventory survey effort (Goodwin 1997, discussed above) at SIHP # 50-80-14-4875 in an area bounded by Kekaulike Street, Hotel Street, Maunakea Street, and King Street (one block inland from the present study corridor) two radiocarbon dates were obtained. The authors concluded that a *kī* (ti) charcoal sample “suggest[s] a date around AD 1450 or 1500.” and that a second sample from “a rake-out deposit that may also have been used as a more general refuse pit” most likely dated to the one-sigma ranges of AD 1630–1685 and 1740–1810 (Goodwin and Allen 2005:231). Taking into consideration a carbon date from the survey phase of research it was concluded that the site “may have been in use as early as the 13th century, and was very likely occupied by the 16th century” (Goodwin and Allen 2005:231).

8.3.13 Victoria Ward Village Shops Archaeological Inventory Survey (Bell, McDermott, and O’Leary 2006)

In the course of an archaeological inventory survey for a Victoria Ward Village Shops Project, bounded by Auahi, Kamake‘e, and Queen Streets, it was noted that, while portions of SIHP # 50-80-14-6855 showed evidence of historic disturbance and land use, large portions of the historic property, based on extensive sampling of features, contained no historic artifacts, only traditional Hawaiian cultural material. In order to better establish the age of deposition for this apparently pre-Contact or early historic traditional Native Hawaiian cultural deposit, CSH carried out radiocarbon dating for two wood charcoal samples from two different pit features, located in the exclusively traditional Native Hawaiian portion of the cultural layer.

Despite the fact that both carbon dates have date ranges into modern times the authors concluded the following:

...based on this lack of evidence for non-traditional Native Hawaiian goods or activities, and the results of radiocarbon dating, it is more likely that the preserved traditional Hawaiian components of SIHP 50-80-14-6855 accumulated in the late prehistoric or early historic period, likely between AD 1690 and 1810. (Bell, McDermott, and O’Leary 2006:243)

8.3.14 Kūwili Fishpond Data Recovery (Hammatt, Hazlett, and Shideler 2008)

Cultural Surveys Hawai'i (Hammatt, Hazlett, and Shideler 2008) reported seven radiocarbon dates from data recovery work at Kūwili Fishpond. The study concluded that the earliest pond sediments were deposited circa AD 1020 to 1120, which was consistent with the estimates of AD 1100 from McGerty et al. (1997), and significantly earlier than the estimate for fishpond construction of Athens and Ward (1997) of the AD 1500s.

8.3.15 Block 2 Parking Lot Archaeological Inventory Survey (Pammer, Fong, and Hammatt 2011)

Cultural Surveys Hawai'i (Pammer et al. 2011) carried out an archaeological inventory survey for Kamehameha Schools Block 2 Parking Lot re-development on a parcel bounded by South Street to the northwest, Halekauwila Street to the northeast, Keawe Street to the southeast, and Pohukaina Street to the southwest. Two carbon dates were obtained; one was modern and the other on a pit feature had a range of AD 1640 to 1950 with a 44.5% probability of AD 1735 to 1805.

8.3.16 Ko'olani Phase II Project Archaeological Inventory Survey (Runyon et al. 2011)

Cultural Surveys Hawai'i (Runyon et al. 2011) carried out an archaeological inventory survey for a Ko'olani Phase II (now called Waihonua) within the city block bound by Kamake'e Street to the west, Ala Moana Boulevard to the south, Waimanu Street to the north, and Pi'ikoi Street to the east. They report three radiocarbon dates, and all have relatively wide ranges extending into modern times. Based on three radiocarbon dates, it was concluded that the cultural layer (SIHP # 50-80-14-7115) was utilized between AD 1615 to 1891.

Table 265. Radiocarbon Dates Previously Reported from the Vicinity of the Project Area (organized chronologically by date of study)

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	13C/12C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration
Clark 1987	Makai Parking Garage, Trench SB-2, Layer I, Feat. 28, 20–30 cmbs	Charcoal	19460	580 +/- 60	-		AD 1270–1410
Clark 1987	Makai Parking Garage, Trench C10, Layer II, Feat. 25, 126–130 cmbs	Charcoal	19461	1330 +/- 120	-		AD 430–905
Landrum and Dixon 1992	River-Nimitz Redevelopment Project (SIHP #50-80-14-4193)	Bone	33957	260 +/- 60	-18.6 _{0/00}	360 +/- 60	AD 1430–1650
Dunn and Rosendahl 1993	Nuuanu Court project, BT-1, Layer V, 51/53–41/68 cmbs	Charcoal	60189	300 +/- 110	-22.2 _{0/00}	350 +/- 110	AD 1390–1955 (82% probability AD 1390–1700)
Dunn and Rosendahl 1993	Nuuanu Court project, BT-3, Layer VB, 98–112 cmbs	Charcoal	60190	500 +/- 100	-21.5 _{0/00}	560 +/- 100	AD 1250–1622 (94% probability AD 1250–1520)
Dunn and Rosendahl 1993	Nuuanu Court project, BT-6, Layer V, 64–70 cmbs	Charcoal	60191	210 +/- 90	-28.0 _{0/00}	160 +/- 90	AD 1522–1955 (92% probability 1627–1955)
Athens and Ward 1994	Kekaulike 'Ewa Block, Core 1, IIa, 9–12 cmbs	Wood	64218	2400 +/- 60	-29.5 _{0/00}	2330 +/- 60	BP 2152–2706
Athens and Ward 1994	Kekaulike 'Ewa Block, Core 1, IVa, 278–292 cmbs	Sediment	63533	4510 +/- 80	-28.0 _{0/00}	4460 +/- 80	BP 5303–4866

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	¹³ C/ ¹² C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration
Athens and Ward 1994	Kekaulike 'Ewa Block, Core 1, IVb, 468–480 cmbs	Sediment	63534	5370 +/- 60	-27.6 _{0/00}	5370 +/- 60	BP 6290–5949
Kennedy et al. 1994	Kekaulike 'Ewa Block Trench 2, FE 7, 111 cmbd	Charcoal	57066	120 +/- 100	-26.9 _{0/00}	90 +/- 100	AD 1650–1955
Kennedy et al. 1994	Kekaulike 'Ewa Block Trench 2, Layer III, 139 cmbd	Charcoal	57067	100.7 +/- 0.9%	-25.2 _{0/00}	100.8 +/- 0.9%	Modern
Kennedy et al. 1994	Kekaulike 'Ewa Block Trench 2, Layer III, 145 cmbd	Charcoal	57069	280 +/- 120	-25.9 _{0/00}	270 +/- 120	AD 1440–1710 (63% probability for this date range)
Kennedy et al. 1994	Kekaulike 'Ewa Block Trench 2, Layer III, 145 cmbd	Charcoal	57273	450 +/- 90	-25.7 _{0/00}	440 +/- 90	AD 1386–1648
Kennedy et al. 1994	Kekaulike 'Ewa Block Trench 2, Layer VI, 226 cmbd	Charcoal ?	57070	2870 +/- 90	-28.4 _{0/00}	2820 +/- 90	BC 1196–812
Kennedy et al. 1994	Kekaulike 'Ewa Block Trench 2, Layer VII, 286 cmbd	Charcoal ?	57068	3130 +/- 60	-30.7 _{0/00}	3040 +/- 60	BC 1443–1208
Kennedy et al. 1994	Kekaulike 'Ewa Block Trench 2, Layer VI, 294 cmbd	Charcoal ?	57071	2650 +/- 80	-29.5 _{0/00}	2580 +/- 80	BC 852–484
Riley et al. 1995	Kekaulike 'Ewa Block, C:A5 V/1, 90 cmbd	Wood	66504	2170 +/- 70	-29.1 _{0/00}	2100 +/- 70	BC 215–AD 33

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	¹³ C/ ¹² C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration
Riley et al. 1995	Kekaulike 'Ewa Block, C:A5 V/1, 95 cmbd	Wood	66505	4280 +/- 60	-27.1 _{0/00}	4240 +/- 60	BC 2927–2623
Riley et al. 1995	Kekaulike 'Ewa Block, C:A5 V/3, 111 cmbd	Wood	66508	2800 +/- 90	-26.7 _{0/00}	2770 +/- 90	BC 1113–787
Riley et al. 1995	Kekaulike 'Ewa Block, C:J5 VI/4, 180 cmbd	Wood	66509	3040 +/- 80	-29.4 _{0/00}	2970 +/- 80	BC 1393–971
Riley et al. 1995	Kekaulike 'Ewa Block, C:F5 III/7–8, 75–90 cmbd	Charred material	67534	140 +/- 100	-27.9 _{0/00}	90 +/- 100	AD 1664–1955
Riley et al. 1995	Kekaulike 'Ewa Block, C:14 IV/2, 108 cmbd	Charred material	67535	1160 +/- 60	-25.1 _{0/00}	1160 +/- 60	AD 796–1000
Riley et al. 1995	Kekaulike 'Ewa Block, B:A1/A2 FE102, 140 cmbd	Charred material	67536	1100 +/- 50	-27.3 _{0/00}	1060 +/- 50	AD 874–1061
Riley et al. 1995	Kekaulike 'Ewa Block, A:J3 III/3 FE 123, 50–60 cmbd	Charcoal	ISGS-2731	280 +/- 70	-26.5 _{0/00}	NA	AD 1445–1693
Athens and Ward 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Core 4, Layer III 167–176 cmbs	Sediment	69559	450 +/- 80	-18.9 _{0/00}	540 +/- 80	BP 480–289
Athens and Ward 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Core 4, Layer III, 228–235 cmbs	Sediment	69560	460 +/- 100	-18.1 _{0/00}	570 +/- 100	BP 507–293

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	¹³ C/ ¹² C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration
Athens and Ward 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Core 5, Layer III, 3.27 m	Wood	69561	2400 +/- 90	-32.2 _{0/00}	2280 +/- 90	BP 2351–2148
Athens and Ward 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Core 5, Layer IV, 6.45 m)	Wood	69562	3070 +/- 70	-28.0 _{0/00}	3020 +/- 70	BP 3337–3079
Athens and Ward 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Core 5, Layer IV, 12.4 m	Wood	69563	5360 +/- 60	-27.4 _{0/00}	5320 +/- 60	BP 6188–5960
Athens and Ward 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Core 5, Layer V, 19.94–20.09 m	Sediment	69564	7900 +/- 90	-25.5 _{0/00}	7890 +/- 90	BP 8948–8515
Athens and Ward 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Core 5, Layer V, 23.17–23.32 m	Sediment	69565	8060 +/- 70	-27.5 _{0/00}	8020 +/- 70	BP 8988–8675
Goodwin 1997	Kekaulike Diamond Head Block (SIHP #50-80-14-4875), TT 2 Feat. 25	Ash/ Sediment	-	-	-	740 +/- 60	AD 1184–1394

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	¹³ C/ ¹² C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration
Goodwin 1997	Kekaulike Diamond Head Block (SIHP #50-80-14-4875), TT 11 Feat. 50	Charcoal or ash/sediment	-	-	-	-	Modern
Goodwin 1997	Kekaulike Diamond Head Block (SIHP #50-80-14-4875), TT 12 Feat. 54	Charcoal or ash/sediment	-	-	-	-	Modern
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IIIi, 128 cmbs	Sediment	72644		-19.0 _{0/00}	1190 +/- 80	AD 670–1010
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IIIe, 143 cmbs	Sediment	72645		-20.9 _{0/00}	1060 +/- 60	AD 880–1050 AD 1100–1115
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IIIe, 155 cmbs	Sediment	72647		-19.9 _{0/00}	1110 +/- 60	AD 790–1030
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IIIf, 165 cmbs	Sediment	72648		-20.0 _{0/00}	530 +/- 50	AD 1310–1350 AD 1380–1450

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	$^{13}\text{C}/^{12}\text{C}$ Ratio	Conventional Radiocarbon Age (BP)	2σ Calibration
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IIIf, 175 cmbs	Sediment	72650		-18.9 _{0/00}	760 +/- 40	AD 1220–1300
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IIIg, 192 cmbs	Sediment	72652		-18.9 _{0/00}	940 +/- 60	AD 1000–1240
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IIIg, 198 cmbs	Sediment	72653		-17.8 _{0/00}	1120 +/- 40	AD 870–1010
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IIIg, 216 cmbs	Sediment	72654		-19.5 _{0/00}	1060 +/- 60	AD 880–1050 AD 1100–1110
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IIIg, 222 cmbs	Sediment	72655		-17.0 _{0/00}	1230 +/- 60	AD 670–970
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IIIg, 241 cmbs	Sediment	72657		-20.0 _{0/00}	1160 +/- 60	AD 720–740 AD 760–1010

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	$^{13}\text{C}/^{12}\text{C}$ Ratio	Conventional Radiocarbon Age (BP)	2σ Calibration
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IV, 252 cmbs	Sediment	72658		-22.8 _{0/00}	1630 +/- 60	AD 260–290 AD 320–570
McGerty, et al. 1997	Kūwili Fishpond (SIHP #50-80-14-5368) Trench 1, Layer IV, 260 cmbs	Sediment	72660		-24.5 _{0/00}	1530 +/- 60	AD 410–650
McDermott and Mann 2001	Kawa Fishpond (SIHP #50-80-14-5966), Tr. 3, Str. XIII, 205-230 cmbs	Organic sediment	157191	810 +/- 40	-25.5 _{0/00}	800 +/- 40	AD 1150–1357*
McDermott and Mann 2001	Kawa Fishpond (SIHP #50-80-14-5966), Tr. 3, Str. XIV, 230-240 cmbs	Organic sediment	157192	1230 +/- 50	-21.3 _{0/00}	1290 +/- 50	AD 711–1029*
McDermott and Mann 2001	Kawa Fishpond (SIHP 50-80-14-5966), Tr. 3, Str. XIII 205-230 cmbs	Coconut shell	157193	350 +/- 40	-25.8 _{0/00}	340 +/- 40	AD 1450–1650
McDermott and Mann 2001	Kawa Fishpond (SIHP #50-80-14-5966), Tr. 3, Str. XIV, 230-240 cmbs	Wood charcoal	157194	120 +/- 40	-26.0 _{0/00}	100 +/- 40	AD 1670–1770 (30.3% probability for this date range) AD 1800–1960 (65.1% probability for this date range)

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	¹³ C/ ¹² C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III/V, Feat. 4	Charcoal	56363	5650 +/- 70	-30.0 _{0/00}	5570 +/- 70	BC 4686–4344
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. V Feat. 1	Charcoal	56364	270 +/- 110	-26.0 _{0/00}	250 +/- 110	AD 1429–1953
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. V/III, Feat. 9	Charcoal	56365	830 +/- 60	-27.0 _{0/00}	800 +/- 60	AD 1036–1144 AD 1147–1288
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. V, Feat. 2	Charcoal	56366	2290 +/- 100	-25.2 _{0/00}	2280 +/- 100	BC 760–94
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456) Str. III Feat. 8	Charcoal	56367	980 +/- 80	-27.1 _{0/00}	940 +/- 80	AD 894–1221
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. V, Feat. 2	Charcoal	56368	200 +/- 50	-26.1 _{0/00}	180 +/- 50	AD 1637–1710 AD 1718–1886 AD 1912–1950
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. V, Feat. 7	Charcoal	56369	270 +/- 100	-27.5 _{0/00}	230 +/- 100	AD 1436–1952
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. V/ III, Feat. 6	Charcoal	56370	130 +/- 60	-26.4 _{0/00}	110 +/- 60	AD 1652–1955
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456) Str. III/V, Feat. 8	Charcoal	56371	110 +/- 140	-31.3 _{0/00}	10 +/- 140	AD 1476–1955

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	¹³ C/ ¹² C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III, Feat. 8	Charcoal	56372	910 +/- 50	-25.9 _{0/00}	890 +/- 50	AD 1019–1224 AD 1228–1245
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. IV	Charcoal	56373	190 +/- 60	-26.3 _{0/00}	170 +/- 60	AD 1530–1546 AD 1635–1952
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III, Feat. 10	Charcoal	56374	1020 +/- 50	-26.3 _{0/00}	1000 +/- 50	AD 898–920
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III, Feat. 13	Charcoal	56375	770 +/- 50	-26.7 _{0/00}	750 +/- 50	AD 1164–1168 AD 1186–1298
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III, Feat. 9	Soil	56376	790 +/- 160	-21.5 _{0/00}	850 +/- 160	AD 902–917 AD 961–1437
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III, Feat. 6	Soil	56377	410 +/- 60	-22.9 _{0/00}	440 +/- 60	AD 1411–1640
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III/V, Feat. 7	Soil	56378	1800 +/- 70	-22.8 _{0/00}	1840 +/- 70	AD 68–409
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III, Feat. 9	Soil	56379	2360 +/- 90	-23.9 _{0/00}	2380 +/- 90	BC 782–333 BC 325–202
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III, Feat. 9	Soil	56380	5110 +/- 230	-23.6 _{0/00}	5150 +/- 230	BC 4440–3374

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	$^{13}\text{C}/^{12}\text{C}$ Ratio	Conventional Radiocarbon Age (BP)	2σ Calibration
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III	Soil	56381	1030 +/- 80	-24.0 _{0/00}	1050 +/- 80	AD 783–788 AD 831–838 AD 875–1189 AD 1204–1206
Lebo 2002 ⁺	Harbor Court (SIHP #50-80-14-2456), Str. III/V, Feat. 8	Soil	56382	1060 +/- 80	-24.1 _{0/00}	1070 +/- 80	AD 779–1160
Goodwin and Allen 2005	Kekaulike Diamond Head Block (SIHP #50-80-14-4875), Feat. 484 “rake-out deposit in EU 13”	Wood charcoal	76258	280 +/- 90	-27.8 _{0/00}	240 +/- 90	AD 1455–1950
Goodwin and Allen 2005	Kekaulike Diamond Head Block (SIHP #50-80-14-4875), Feat. 591, refuse deposit in EU 13	<i>Cordyline fruticosa</i> charcoal	182116	380 +/- 40	-23.8 _{0/00}	400 +/- 40	AD 1430–1525 AD 1560–1630

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	¹³ C/ ¹² C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration
Bell et al. 2006	Ward Village Shops (SIHP #50-80-14-6855), Trench F2, Feat. A, Str. IV, 50–65 cmbs	Wood charcoal	215873	-	-18.4 _{0/00}	20 +/- 40	AD 1690–1730 (15.7% probability for this date range) AD 1810–1920 (55.4% probability for this date range) AD post-1940 (24.3% probability for this date range)
Bell et al. 2006	Ward Village Shops (SIHP #50-80-14-6855), Trench F9, Feat. H, Str. II, 80–100 cmbs	Wood charcoal	215874	-	-22.2 _{0/00}	0 +/- 40	AD 1690–1730 (12.1% probability for this date range) AD 1810–1920 (47.0% probability for this date range) AD post-1940 (36.3% probability for this date range)
Hammatt, et al. 2008	Kūwili Fishpond, Trench 1, Str. IIIa, 180–190 cmbs	Sediment	-	870 +/- 40	-19.2 _{0/00}	970 +/- 40	AD 990–160

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	13C/12C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration
Hammatt, et al. 2008	Kūwili Fishpond, Trench 1, Str/ IIIc, 217–224 cmbs	Sediment	-	1030 +/- 40	-20.0 _{0/00}	1110 +/- 40	AD 810–1020
Hammatt, et al. 2008	Kūwili Fishpond, Trench 1, Str. IVa, 228–238 cmbs	Sediment	-	840 +/- 40	-17.1 _{0/00}	970 +/- 40	AD 990–1160
Hammatt, et al. 2008	Kūwili Fishpond, Trench 1, Str. IVb, 248–257 cmbs	Sediment	-	820 +/- 40	-18.7 _{0/00}	920 +/- 40	AD 1020–1210
Hammatt, et al. 2008	Kūwili Fishpond, Trench 2, Str. III, 230–240 cmbs	Sediment	-	1820 +/- 40	-21.9 _{0/00}	1870 +/- 40	AD 50–240
Hammatt, et al. 2008	Kūwili Fishpond, Trench 2, Str. III, 255–262 cmbs	Sediment	-	970 +/- 40	-20.8 _{0/00}	1040 +/- 40	AD 890–1050 AD 1100–1120
Hammatt, et al. 2008	Kūwili Fishpond, Trench 1. Str. IV, 275–285 cmbs	Sediment	-	1040 +/- 40	-17.5 _{0/00}	1160 +/- 40	AD 770–980
Pammer, et al. 2011	KS Block 2, Test Trench 65, Pit Feat.	Charcoal	301374	-	-24.6 _{0/00}	10 +/- 30	AD 1960 to beyond 1960
Pammer, et al. 2011	KS Block 2, Test Trench 26, Feat. 1	Charcoal	303200	-	-24.1 _{0/00}	230 +/- 30	AD 1640–1950 AD 1735–1805 (44.5% probability for this date range)

Source	Provenience	Material	Beta #	Measured Radiocarbon Age (BP)	¹³ C/ ¹² C Ratio	Conventional Radiocarbon Age (BP)	2 σ Calibration
Runyon et al. 2011	Waihonua Project, Test Unit 2, Feat. 17, Str. II	Charcoal	275010	-	-25.2 _{0/00}	160 +/- 40	AD 1660–1960 AD 1717–1891 (61.3% probability for this date range)
Runyon et al. 2011	Waihonua Project, Test Unit 2, Feat. 21 Str. II	Charcoal	283708	190 +/- 40	-24.3 _{0/00}	200 +/- 40	AD 1640–1950 AD 1724–1815 (48% probability for this date range)
Runyon et al. 2011	Waihonua Project, Test Unit 12, (SIHP #50-80-14-7115) Str. IIb	Charcoal	286105	-	-11.8 _{0/00}	260 +/- 40	AD 1520–1950 AD 1615–1681 (40.6 % probability for this date range)

* Range reported follows corrections for the marine reservoir effect (McDermott and Mann 2001:58)

+ The 21 radiocarbon dates in the Lebo 2002 study are each presented in terms of calibration date(s) and four sets of “Range Method” date ranges. (See Lebo 2002, Chapter 5). “Range Method A: Intercept 2” date(s) are presented here.

8.4 Summary of Carbon Dating Results in the Context of our Knowledge of the Chronology of the City Center Lands

What is most striking from the 28 charcoal samples dated for the HHCTCP City Center is how late the dates are. Only six of the dates are solidly in pre-Contact times and 21 of the date ranges extend into modern times. Given the limitations of the radiocarbon calibration curve for the period between AD 1650 and 1950, uncertainty remains regarding what this clustering of dates truly represents. Samples for carbon dating were deliberately selected from proveniences in which no historic artifacts or western wood (conifer and temperate hard wood) was present. The supposition that the majority of these dates are from the late pre-Contact and/or early post-Contact period is supported by the indicated most probable date ranges.

These relatively late dates are in contrast to the previously reported dates from downtown Honolulu. While any specific date or set of dates may be questioned, several studies suggest significantly earlier settlement in what is now downtown Honolulu (See Section 8.3 and Table 265.). Riley et al. (1995) and Lebo (2002) report dates solidly before AD 1100. Several additional studies (Clark 1987, Goodwin 1997, and Goodwin and Allen 2005) suggest dates prior to AD 1400. Portions of downtown Honolulu may have been ideal for relatively early settlement. It may be the case that the present HHCTCP City Center study missed areas of earlier settlement by virtue of being too seaward (much of the present alignment was actually off-shore of this area of particular interest for relatively early settlement).

It seems certain this large number of relatively late carbon dates is at least partly a reflection of the discovery of Honolulu Harbor by foreigners as an ideal location for anchorage and the related movement of Kamehameha I's center of rule to Kou/Honolulu in 1809 (Lebo and McGuirt 2000b:8). The lure of foreign trade and the primary domain of the ruler of the united Hawaiian Islands would have been major demographic attractions.

This timeframe, however, was one of great demographic movement on the central south shore of O'ahu. The ruling chief of O'ahu, Kahahana, would have been concerned to mobilize and mass forces to repel the long anticipated invasion of the Maui chief Kahekili that occurred circa 1783. Kamakau (1992:135) relates that Kahahana was living at Kawananakoa in lower Nu'uuanu at the time of Kahekili's invasion. Kahekili's invasion may have placed substantial forces for a prolonged period within the City Center lands. This would be repeated with Kamehameha's large amphibious landing circa 1795. Kamehameha appears to have maintained substantial Big Island and Maui forces on O'ahu with an eye toward the conquest of Kaua'i from circa 1795 to 1810. Kamakau gives us a feeling for the times and the movement of people because of the preparation for war.

At Oahu the fleet remained for a year, the whole company, including Kamehameha's sons and daughters with their households and those of his brothers and sisters, his counselors and chiefs, over a hundred in each household, running into a thousand. (Kamakau 1992:189)

This historically documented influx of people could be responsible for the numerous radiocarbon dates spanning the period of initial Western contact. The presence and

activities of Kamehameha's warriors and family and even those forces who accompanied the ruling chief Kahahana and the invading forces of Kahikili may account for many of these relatively late carbon dates.

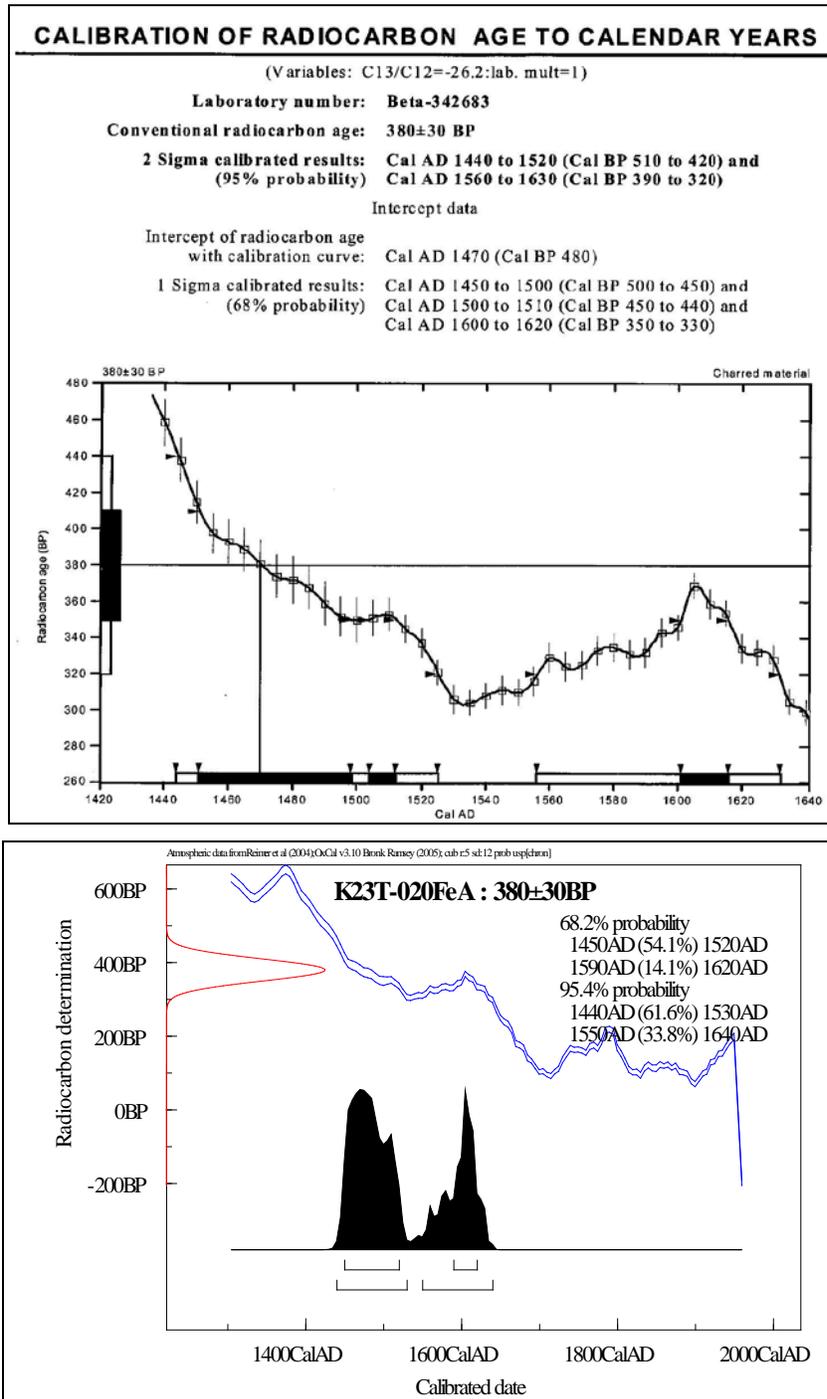
8.5 Summary of Carbon Dating Results in Hawaiian Cultural Chronologies

Various attempts have been made to develop chronologies of Hawaiian culture (Table 266). The earliest date range recovered (from T-020) of AD 1440–1640 would not fall within any of the two earliest posited time periods. The six dated samples with date ranges that lie entirely before 1680 would appear to fall best within conceptions of a time marked by “Expansion” or “Late Expansion” Expansion into a new area is indeed what we appear to be seeing as a late phase of expansion into areas little utilized previously. The vast majority (17) of the date ranges entirely post-date 1630, and the upper end of almost all of these date ranges runs into modern times. These date ranges would all relate to the last phase of posited cultural development.

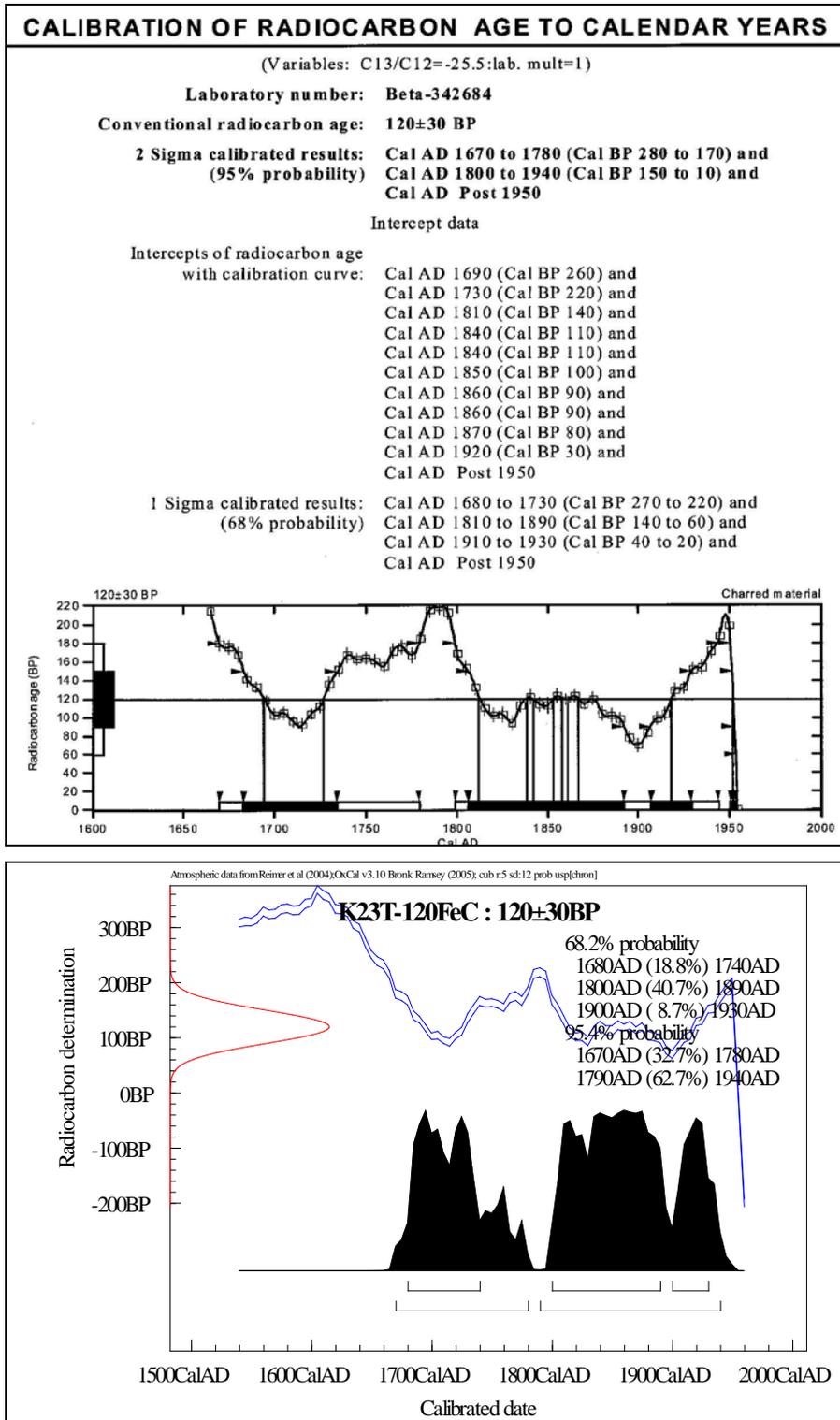
Table 266. Chronologies of Hawaiian Culture

Cordy (1974)	Hommon (1976)	Spriggs (1988)	Allen (1999)	Kirch (1985, 2000)
Initial Settlement Period	Phase I (AD 500–1400)	Phase I (AD 1–600) Colonization Period	Colonization (AD 500–600)	Colonization Period (AD 300–600)
New Adaptation Period	Phase II (AD 1400–1550)	Phase II (AD 600–1100) Developmental Period	Accelerating Inland Expansion (AD 1100)	Developmental Period (AD 600–1100)
Complex Chiefdom Period	Phase III (AD 1550–1650)	Phase III (AD 1100–1400) Early Expansion Period	Coordination of Economic Resources (AD 1300)	Expansion Period (AD 1100–1650)
	Phase IV (AD 1650–1778)	Phase IV (AD 1400–1600) Late Expansion Period	<i>Ahupua'a</i> fully developed (AD 1600)	Proto-Historic Period (AD 1650–1795)
		Phase V (AD 1600–1795) Classical Period	Initial Contact (AD 1778)	

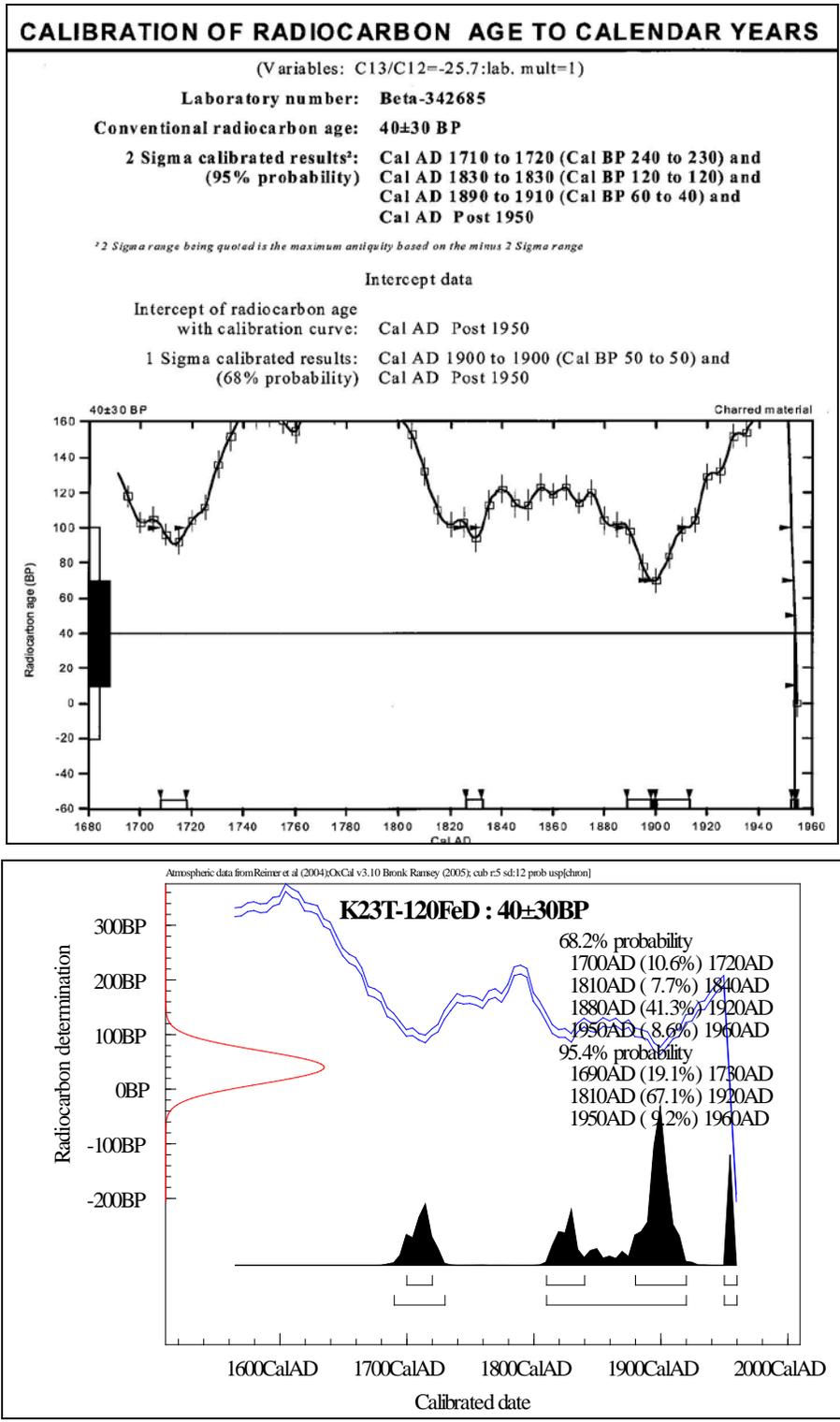
8.6 Calibration of Radiocarbon Age to Calendar Years presented in Order of Beta Analytic Sample Number



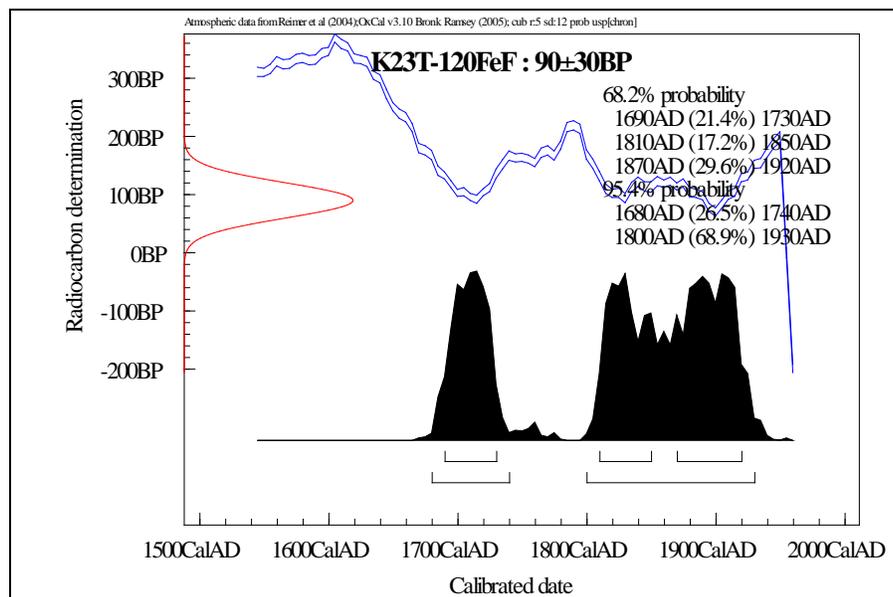
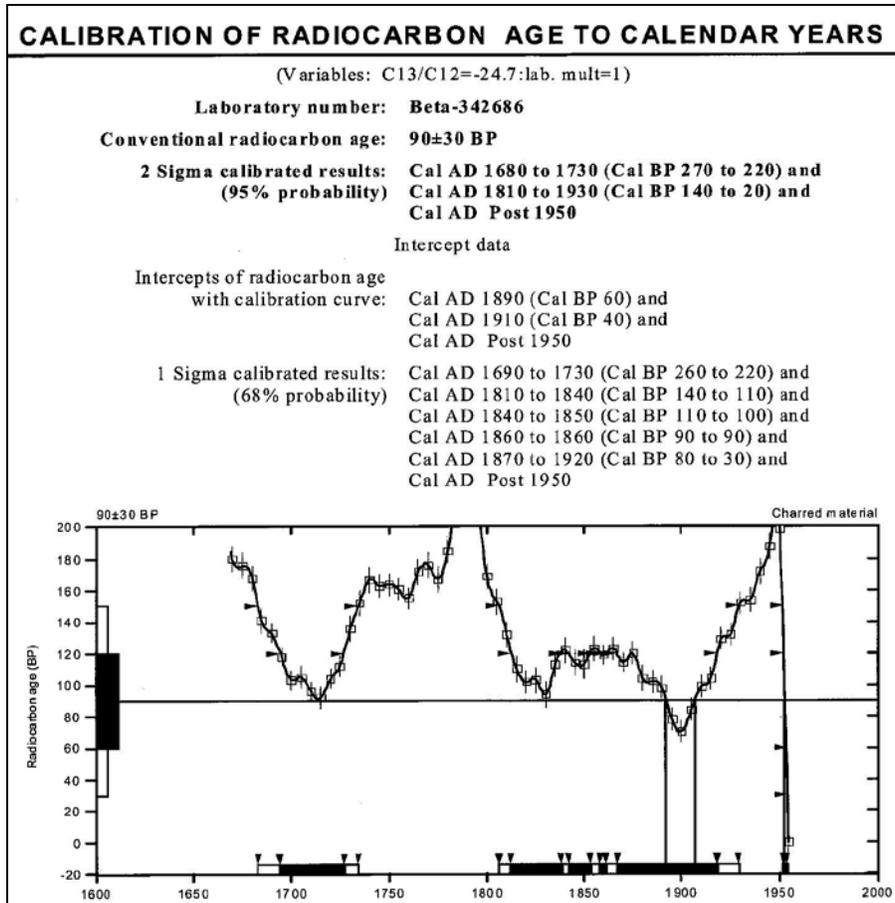
Beta #342683 (T-020, Str. II, Feat. A, 235–250 cmbs)



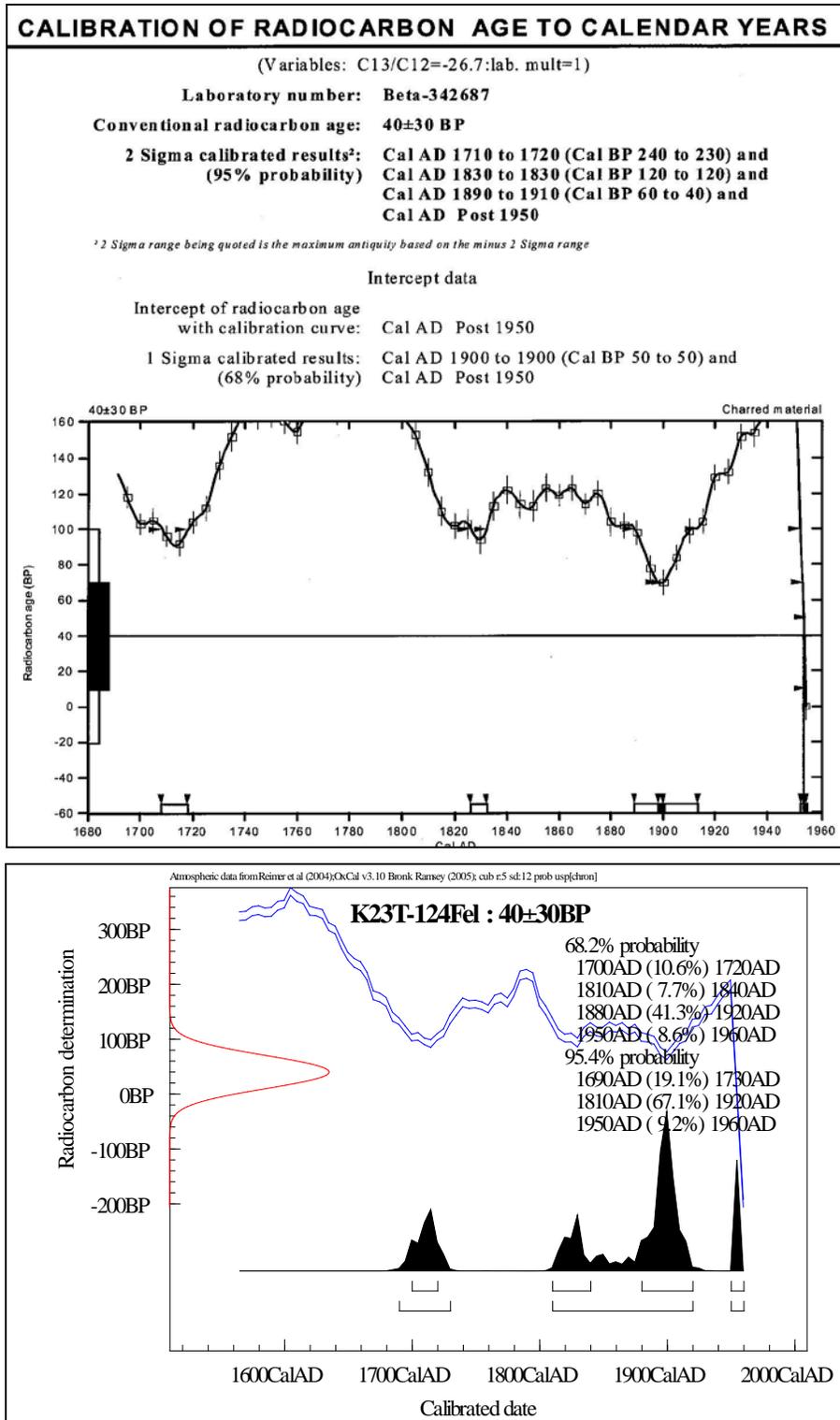
Beta #342684 (T-120, Str. II, Feat. C, 112–126 cmbs)



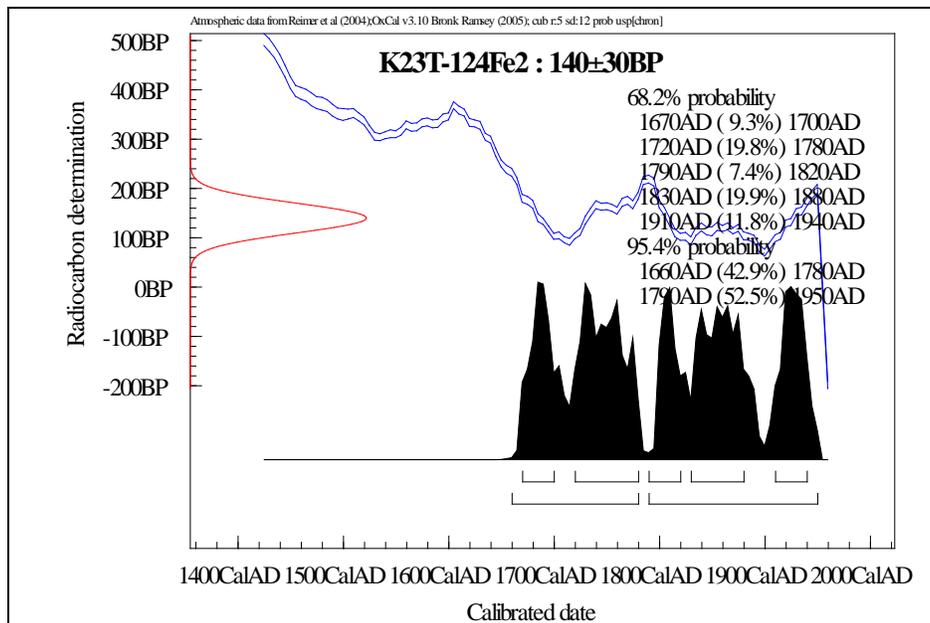
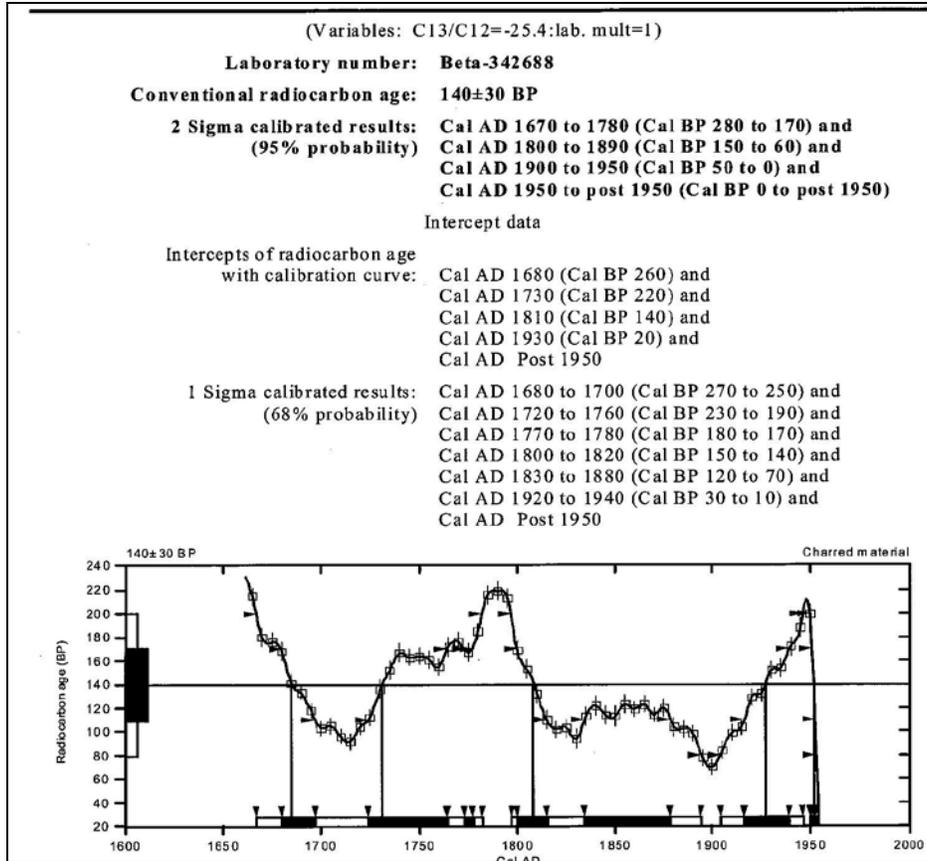
Beta #342685 (T-120, Str. II, Feat. D, 110–118 cmbs)



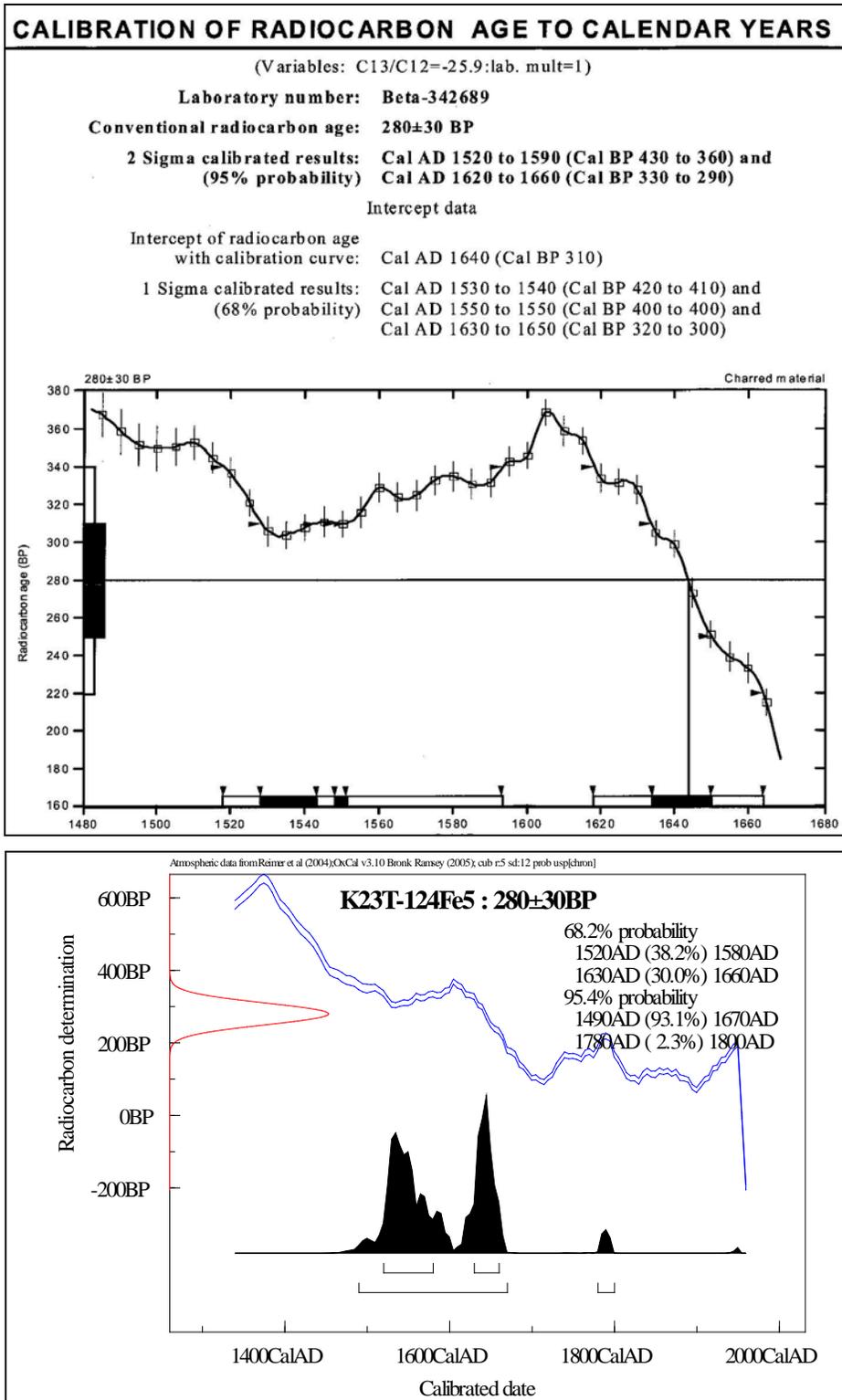
Beta #342686 (T-120, Str. II, Feat. F, 104–107 cmbs)



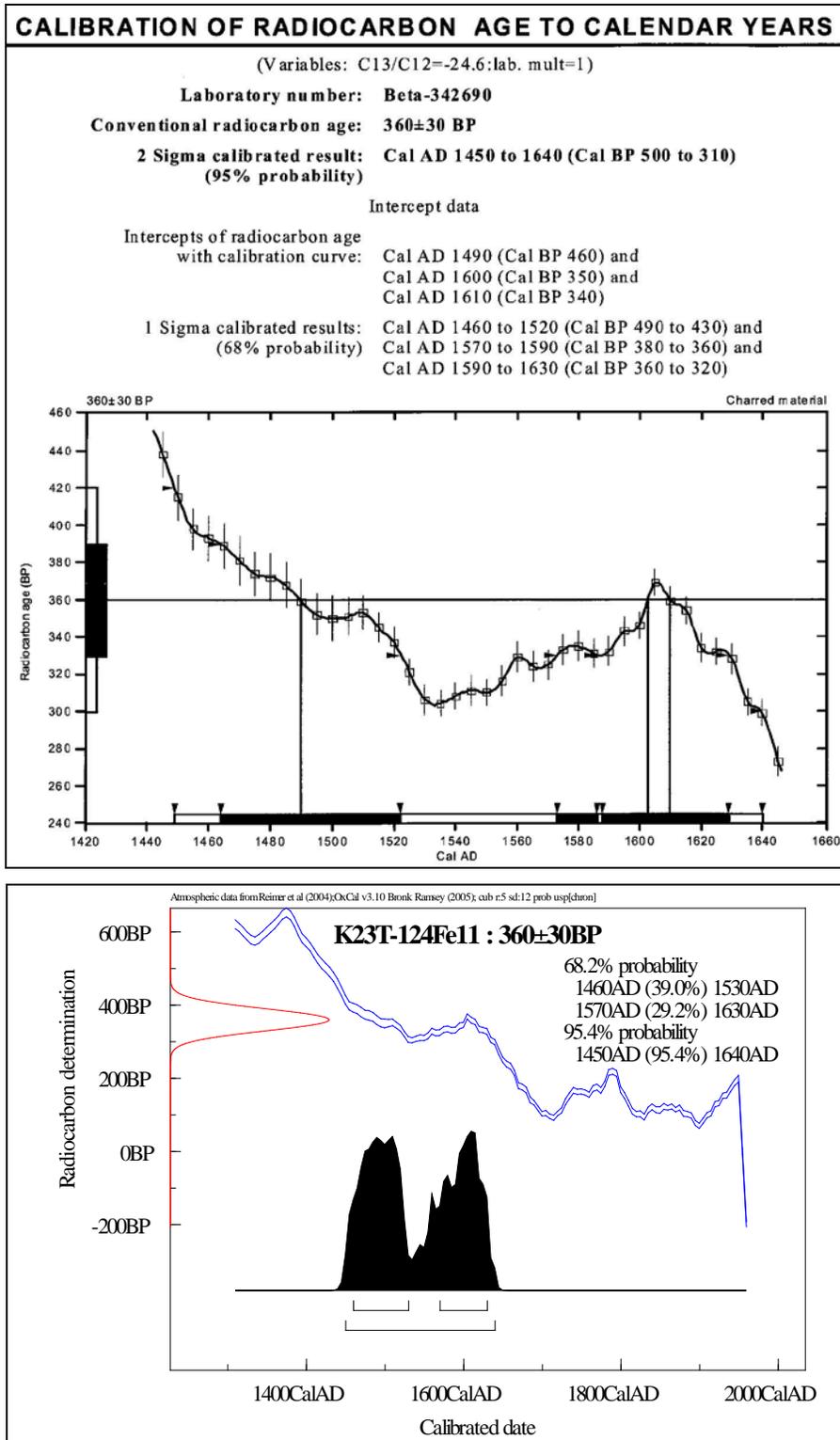
Beta #342687 (T-124, Str. IIa, Feat. 1, 138–144 cmbs)



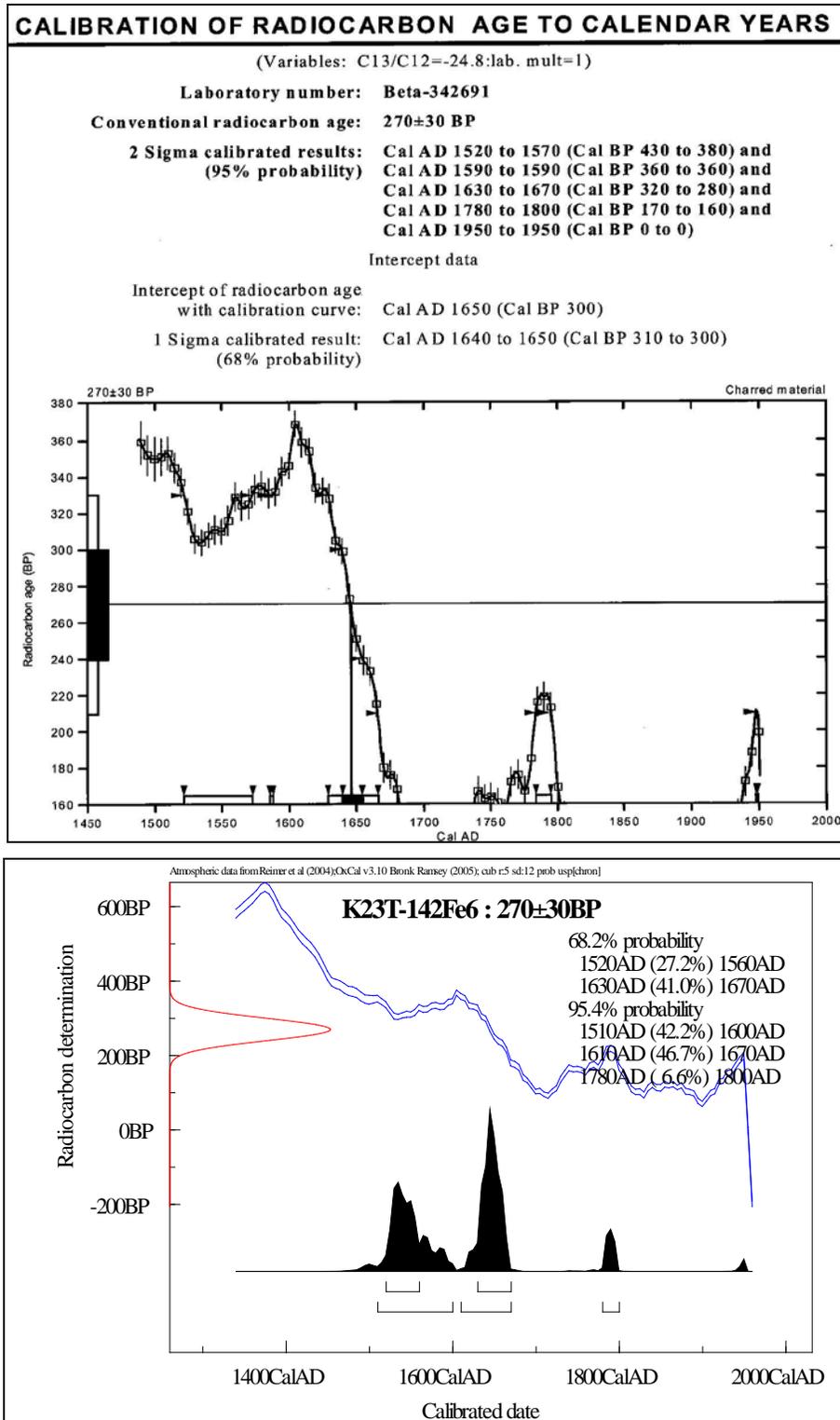
Beta #342688 (T-124, Str. IIa, Feat. 2, 118–125 cmbs)



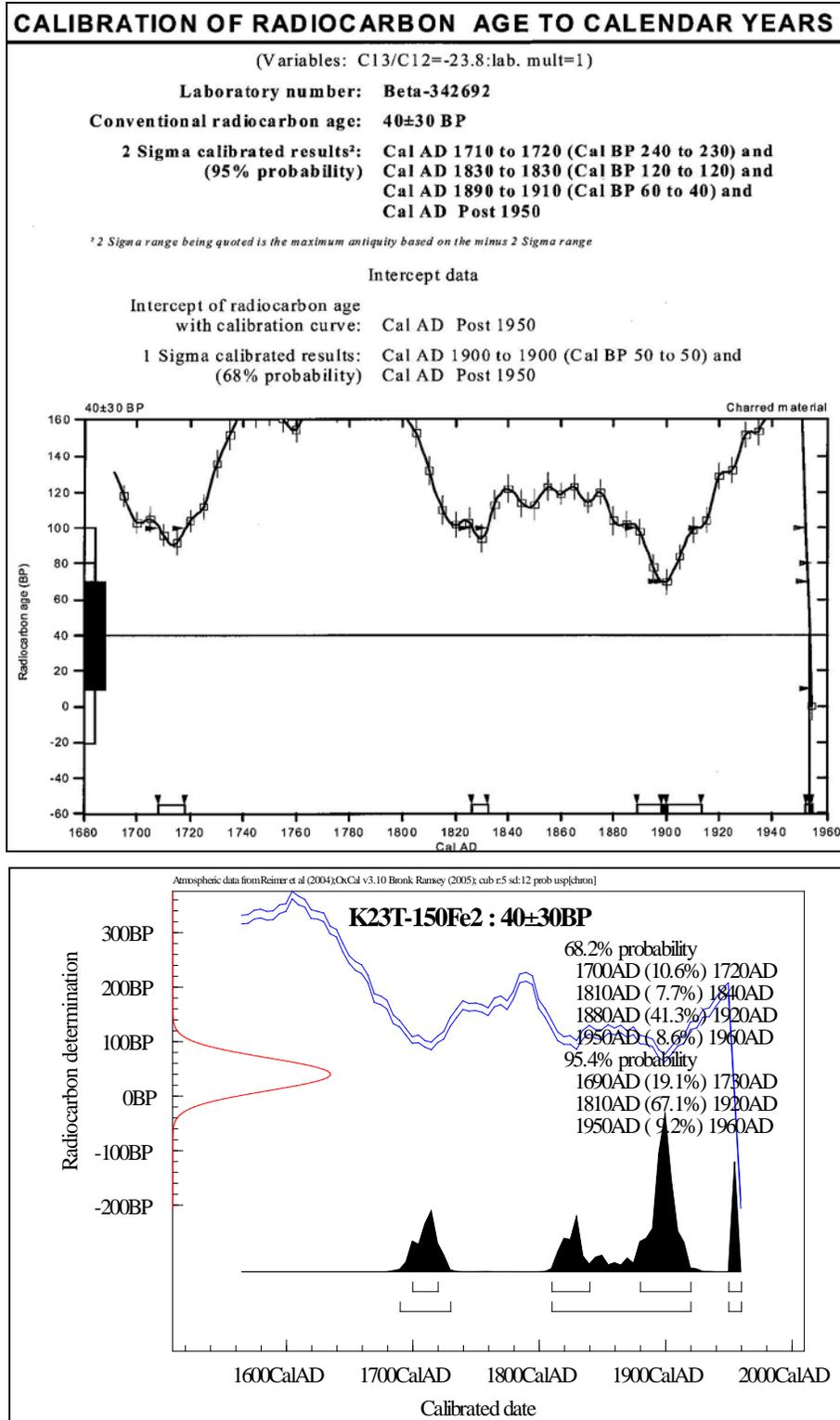
Beta #342689 (T-124, Str. Iib, Feat. 5, 140–163 cmbs)



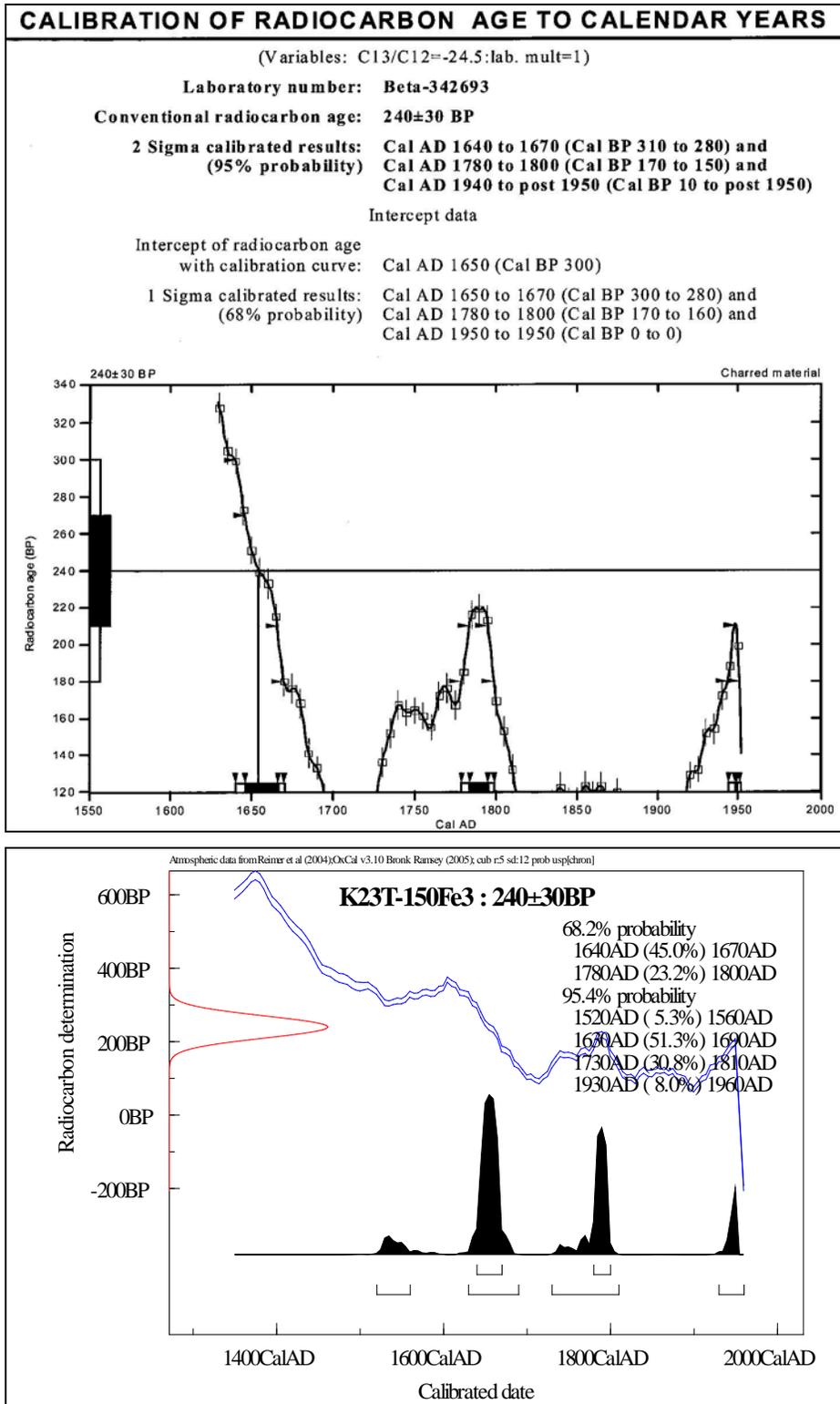
Beta #342690 (T-124, Str. IIb, Feat. 11, 120–132 cmbs)



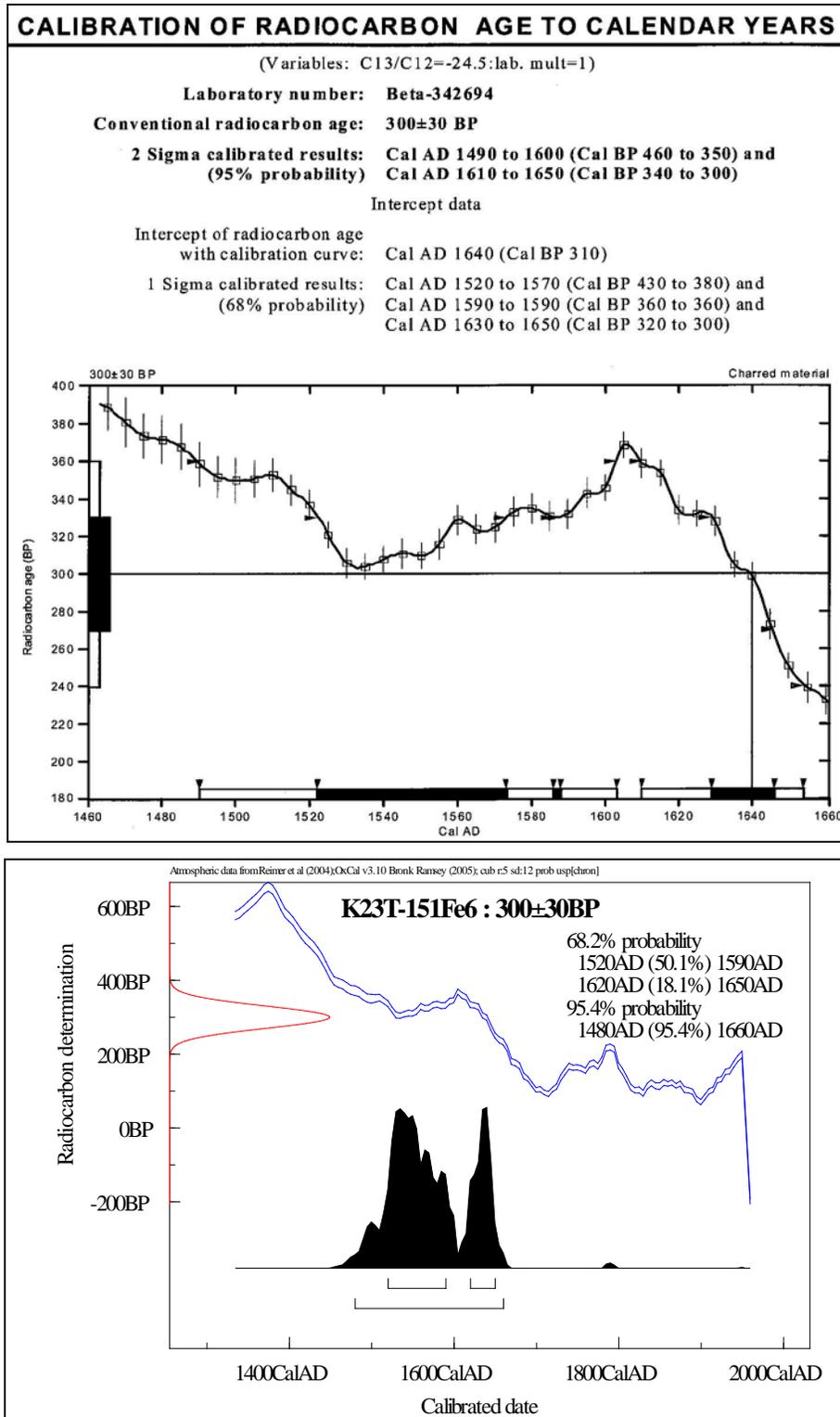
Beta #342691 (T-142, Str. IIa, Feat. 6, 55–70 cmbs)



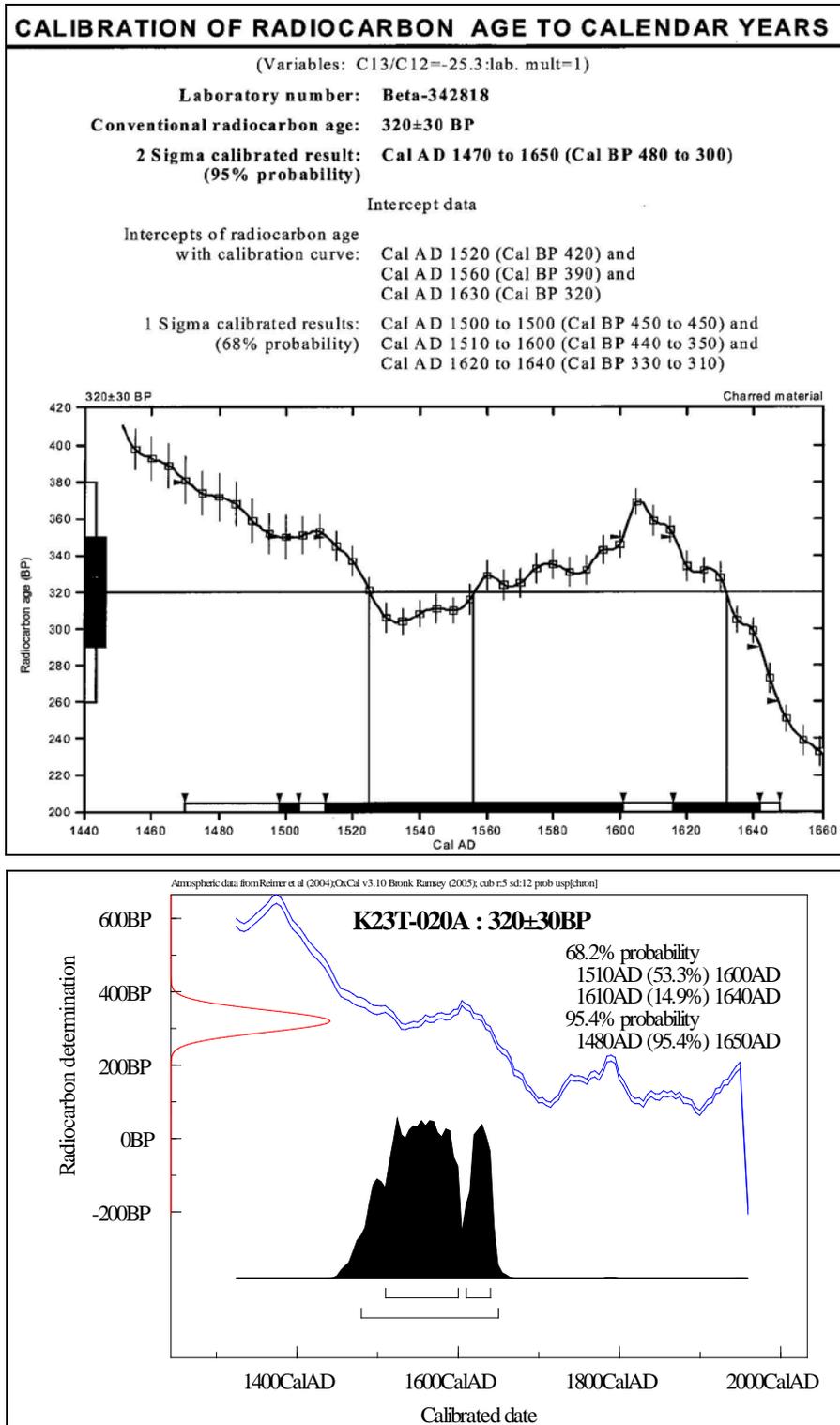
Beta #342692 (T-150, Str. II, Feat. 2, 70–75 cmbs)



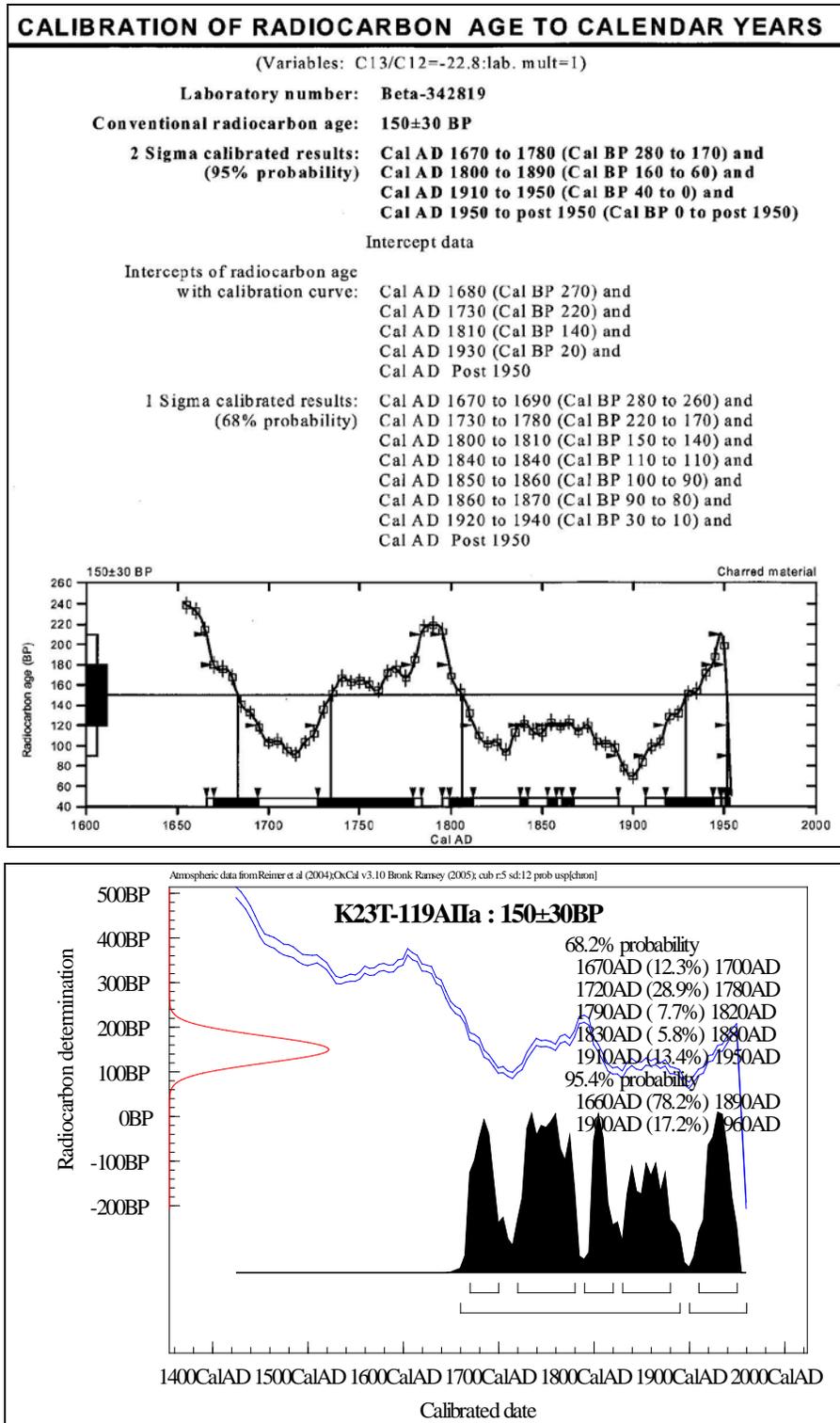
Beta #342693 (T-150, Str. II, Feat. 3, 90–130 cmbs)



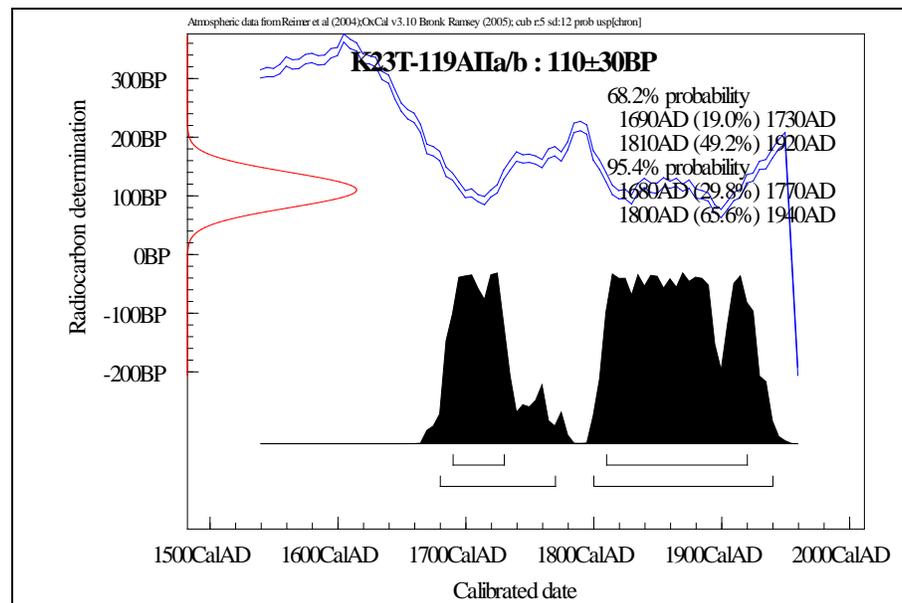
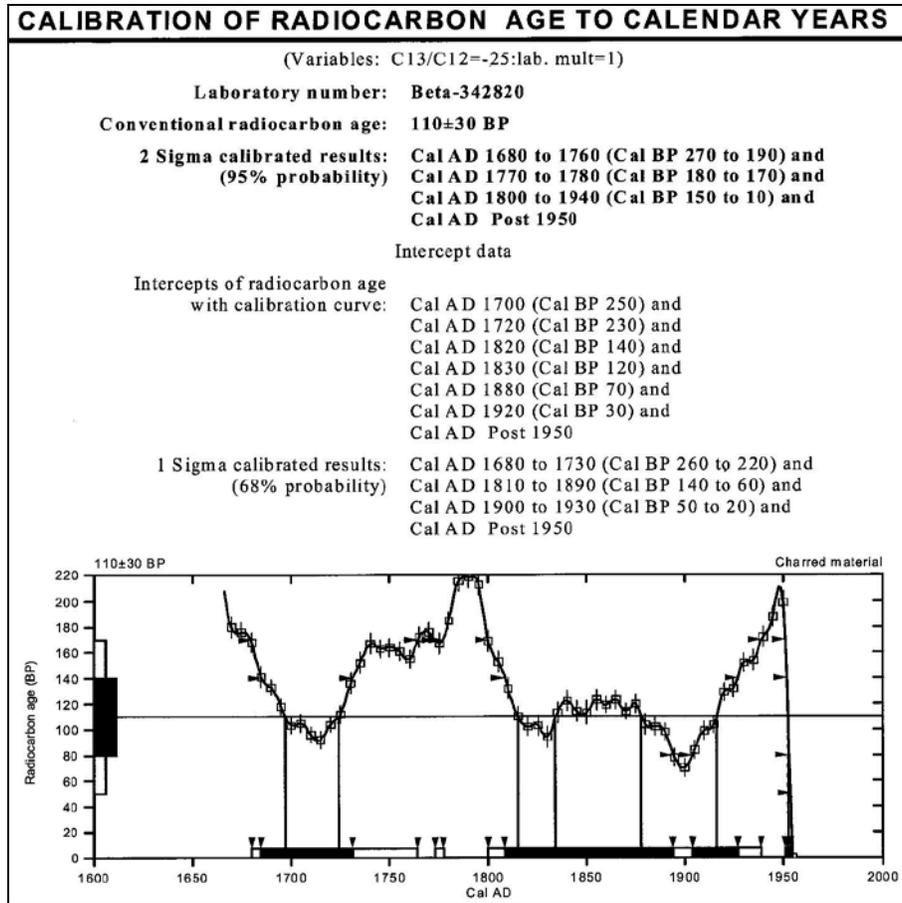
Beta #342694 (T-151, Str. IIa, Feat. 6, 86–108 cmbs)



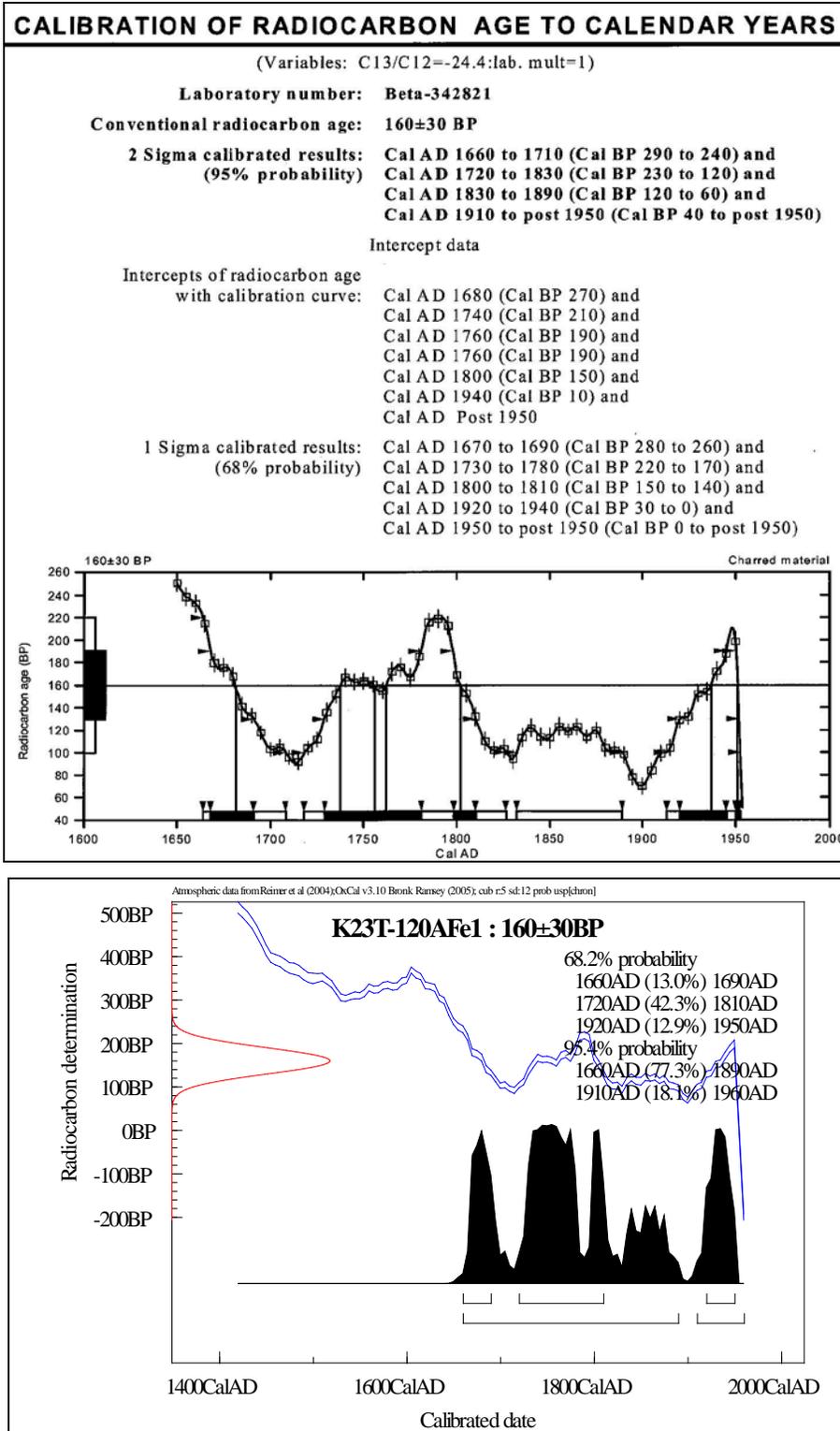
Beta #342818 (T-020A, Str, II, 230–234 cmbs)



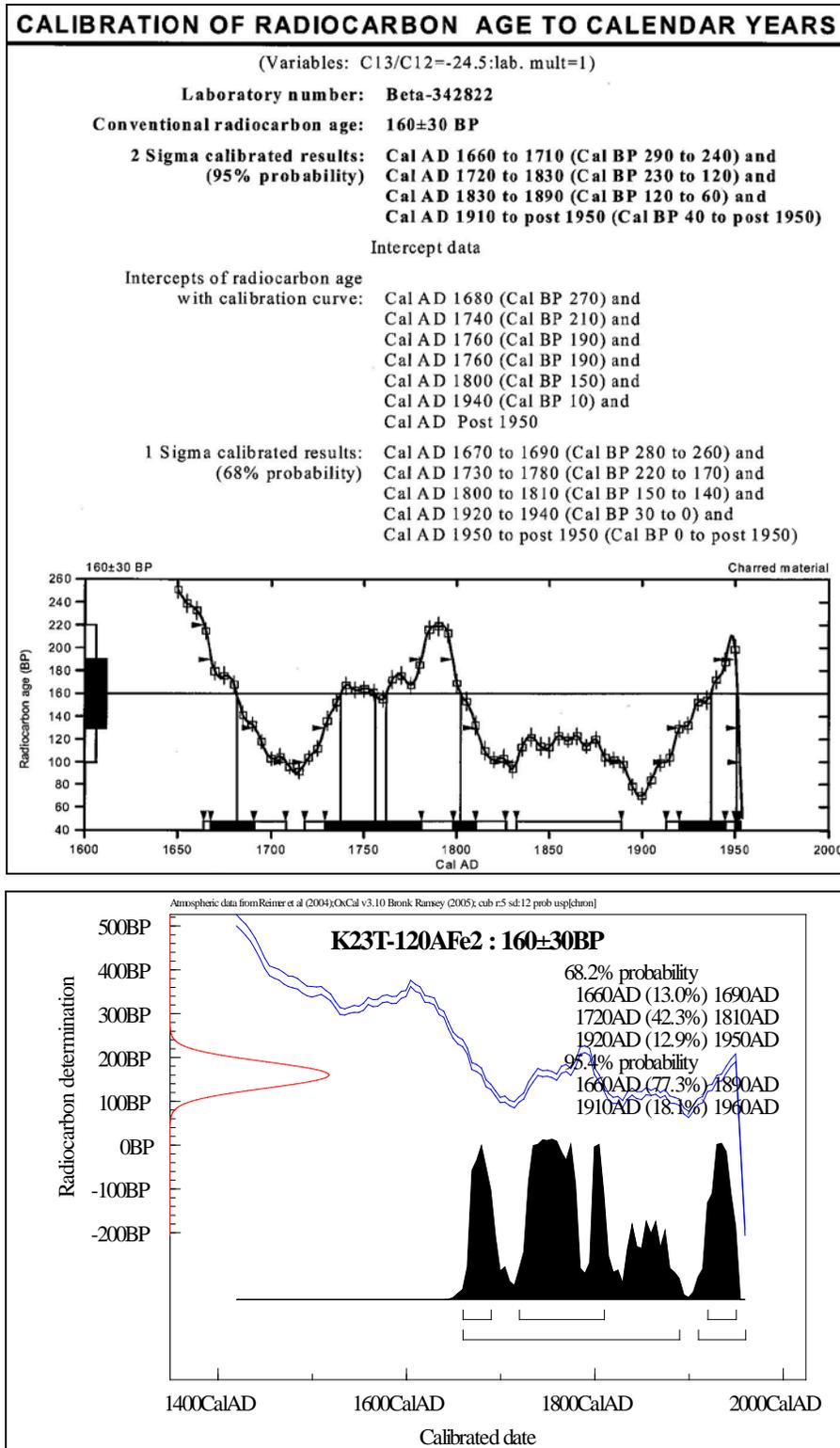
Beta #342819 (T-119A, Str. IIa, 80–93 cmbs)



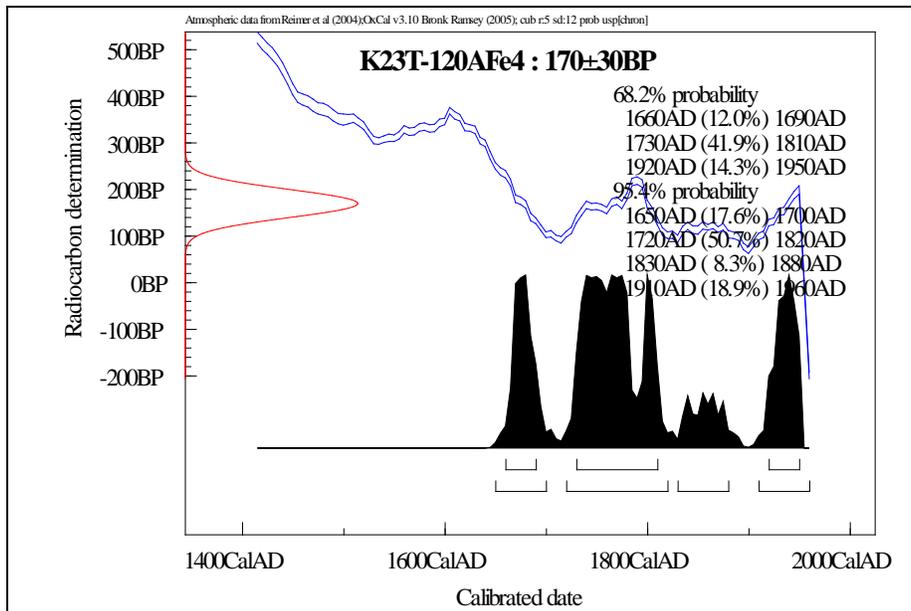
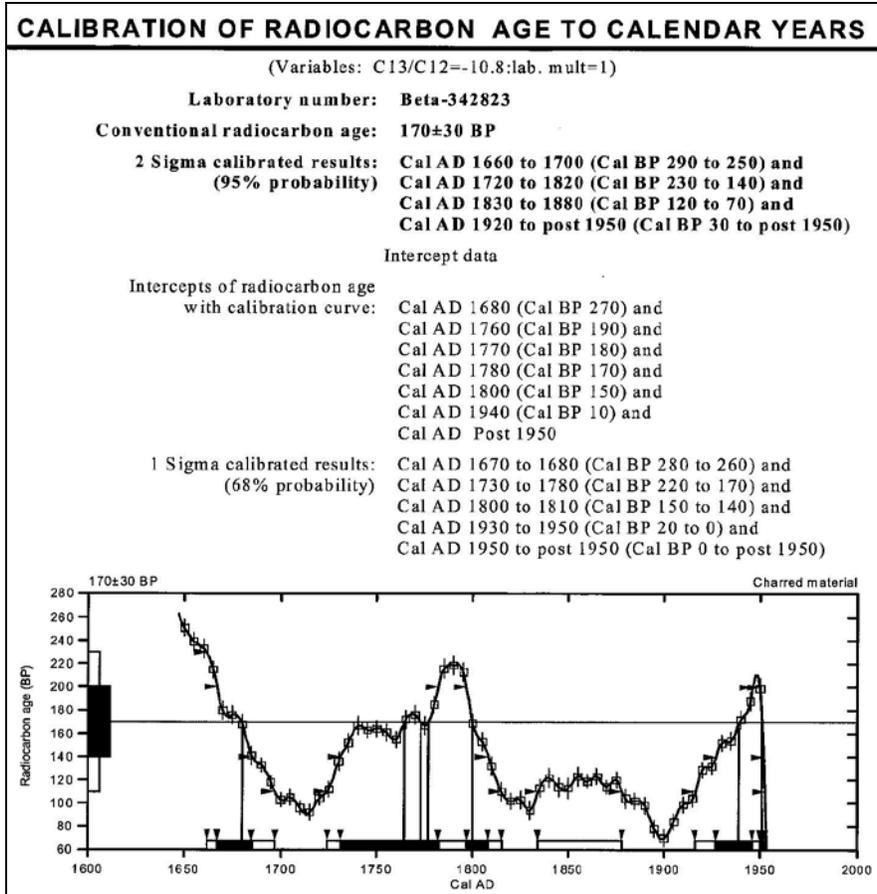
Beta #342820 (T-119A, Str. IIa/b, 125–150 cmbs)



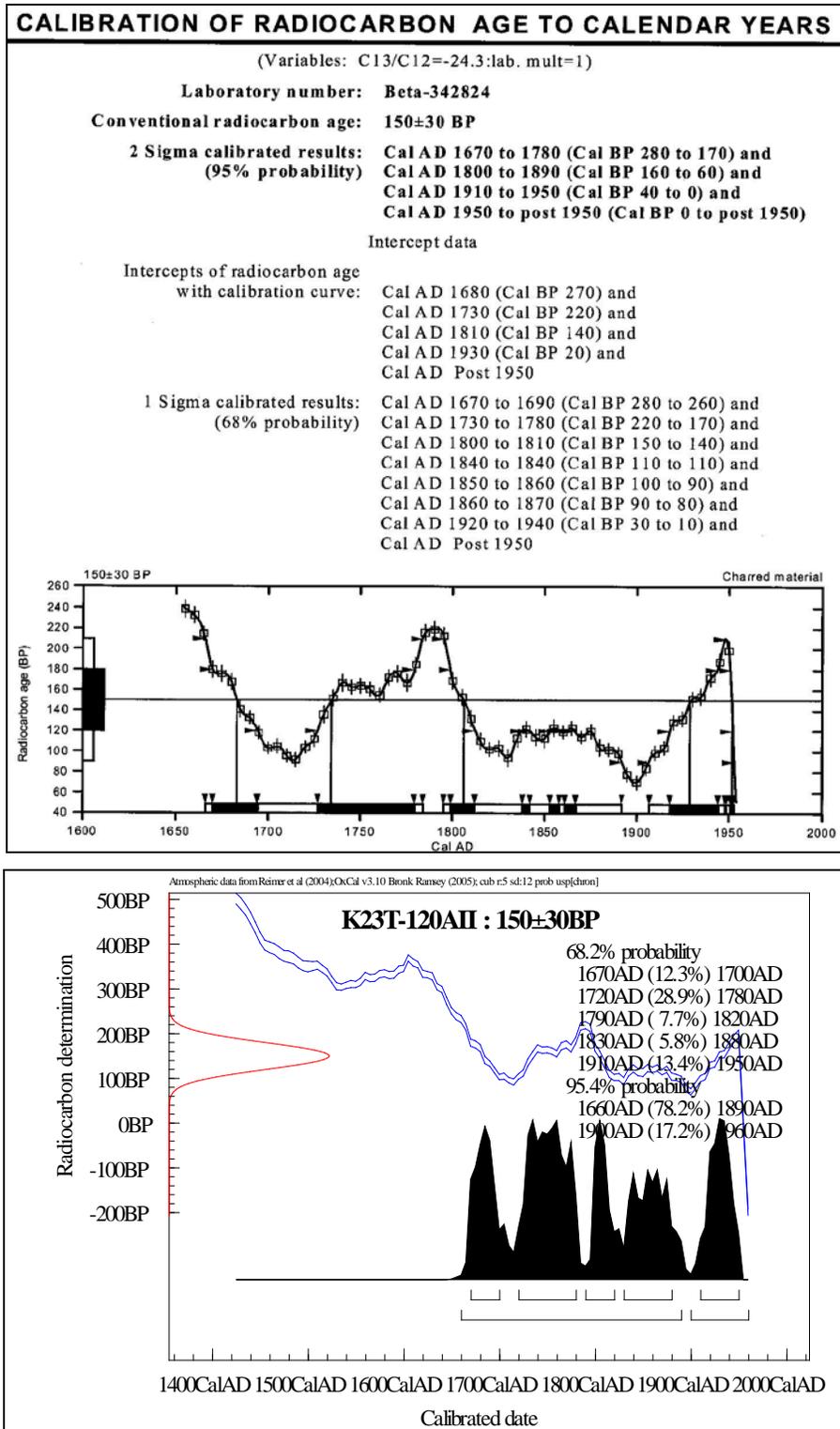
Beta #342821 (T-120A, Str. II, Feat. 1, 128–136 cmbs)



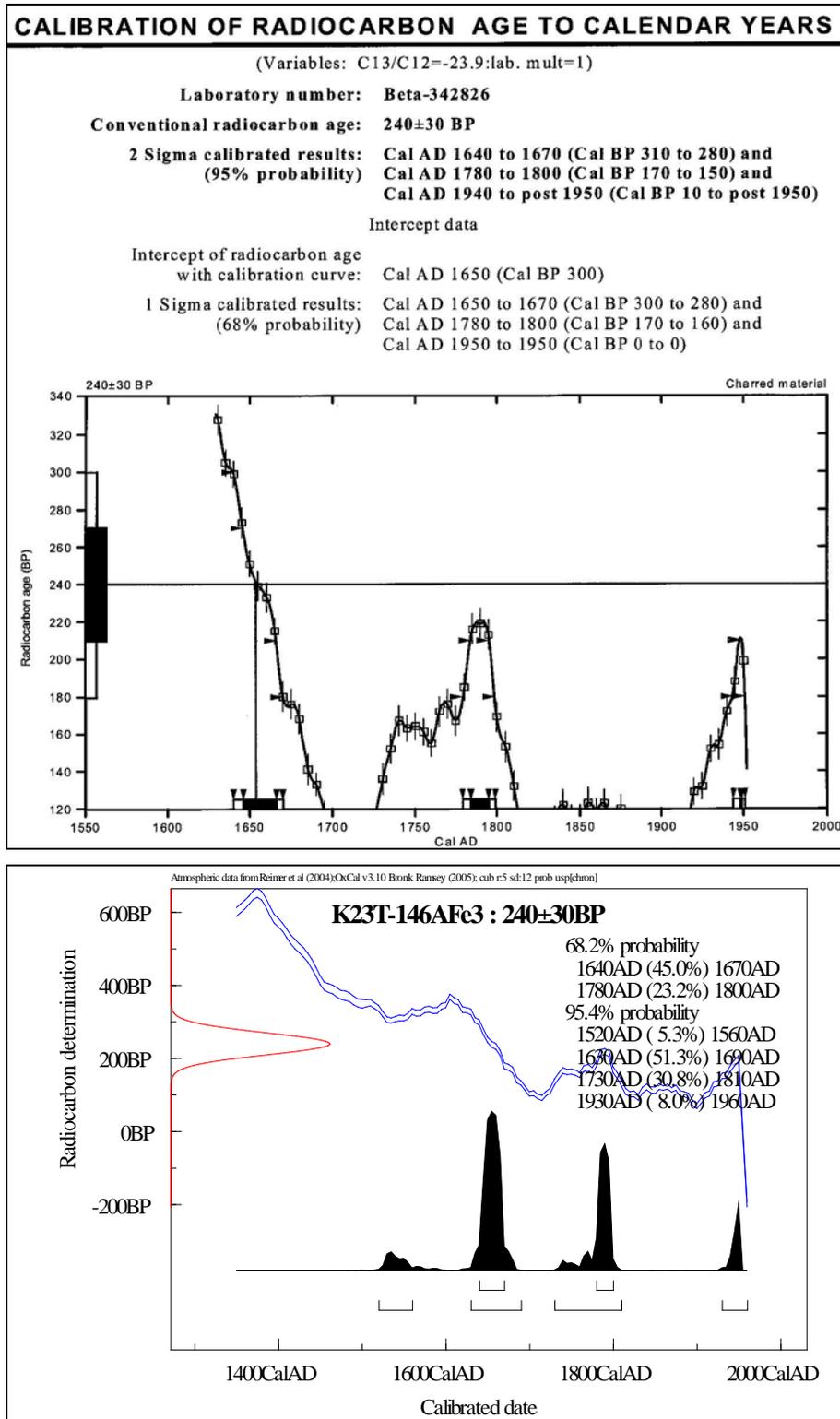
Beta #342822 (T-120A, Str. II, Feat. 2, 125–137 cmbs)



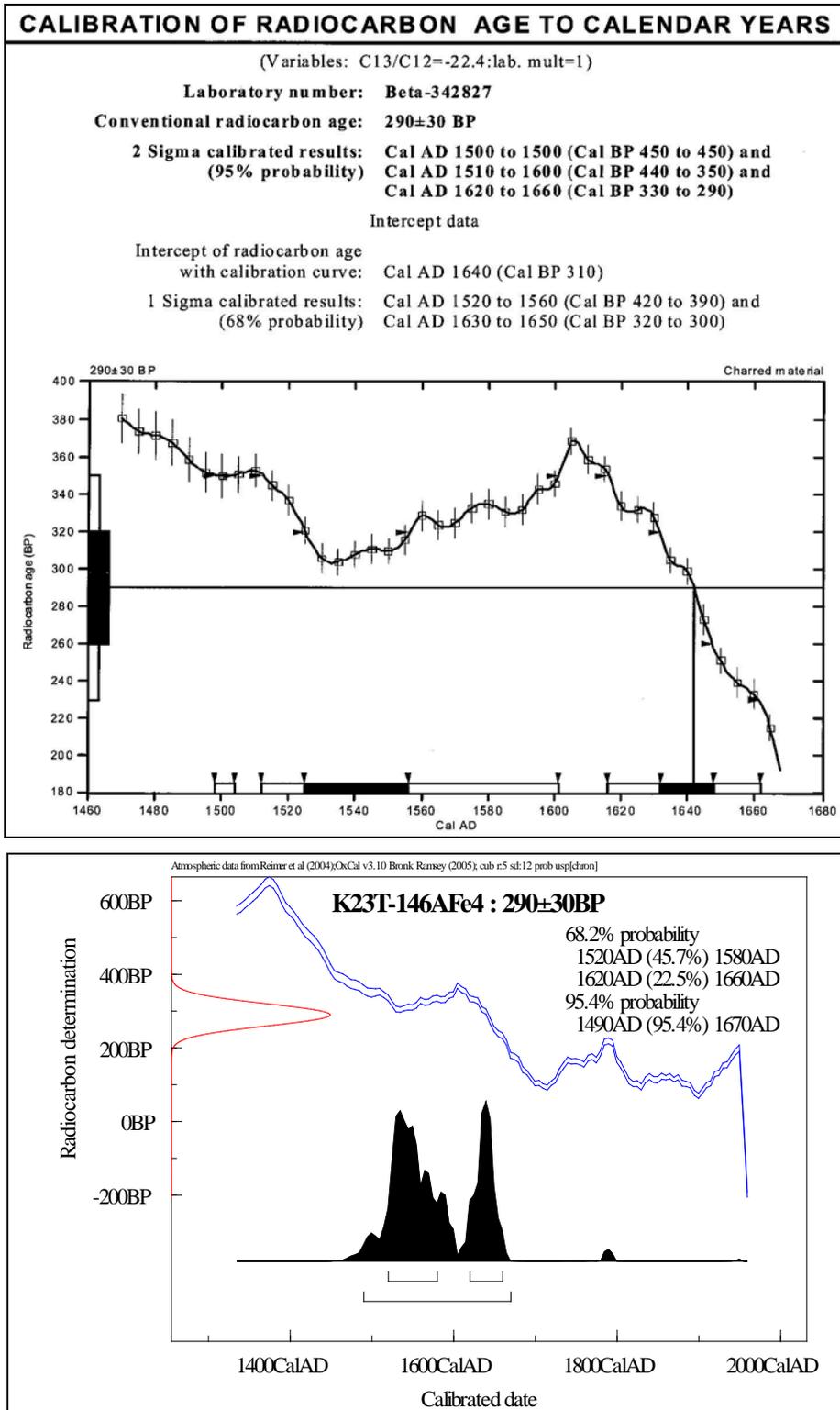
Beta #342823 (T-120A, Str. II, Feat. 4, 128–132 cmbs)



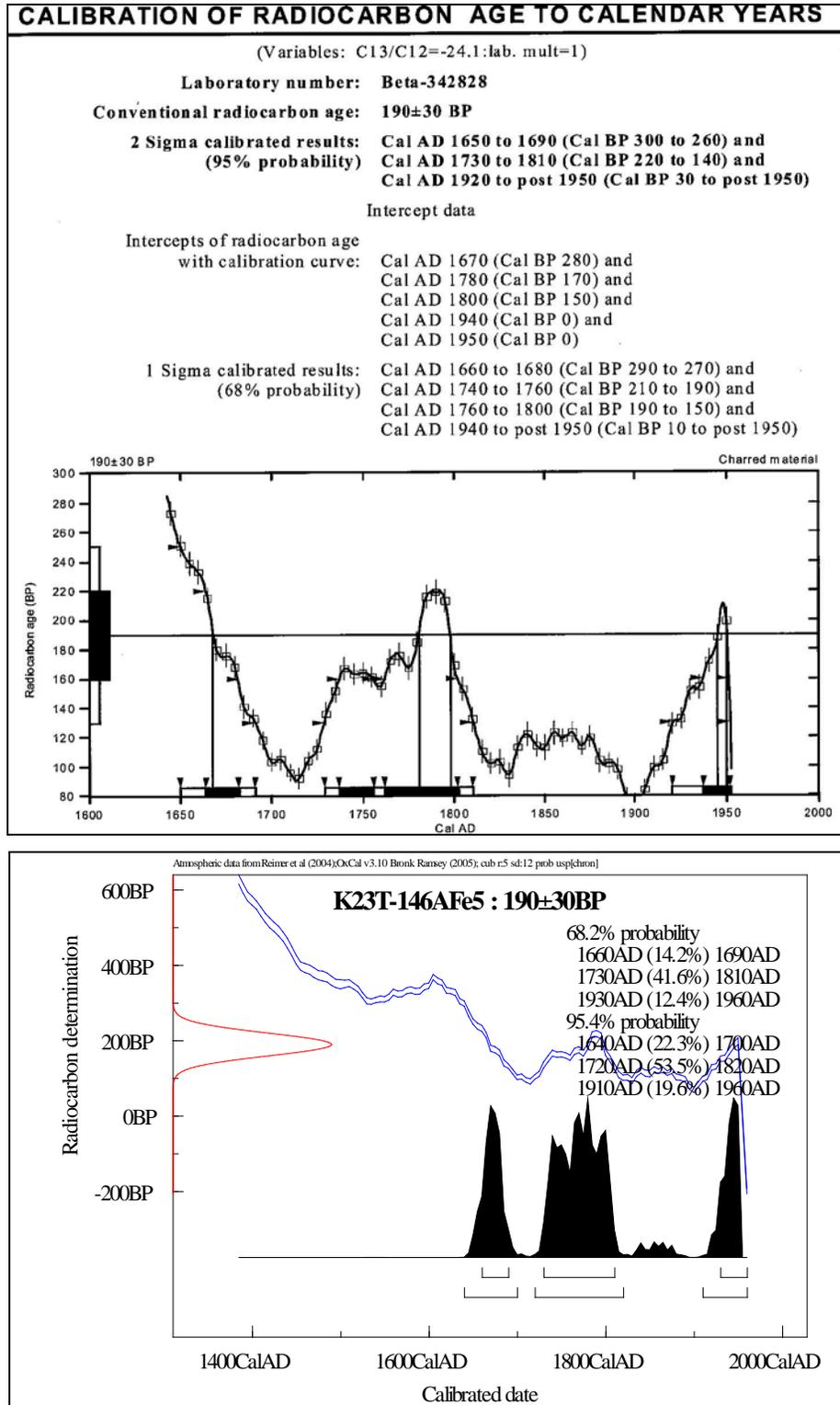
Beta #342824 (T-120A, Str. II)



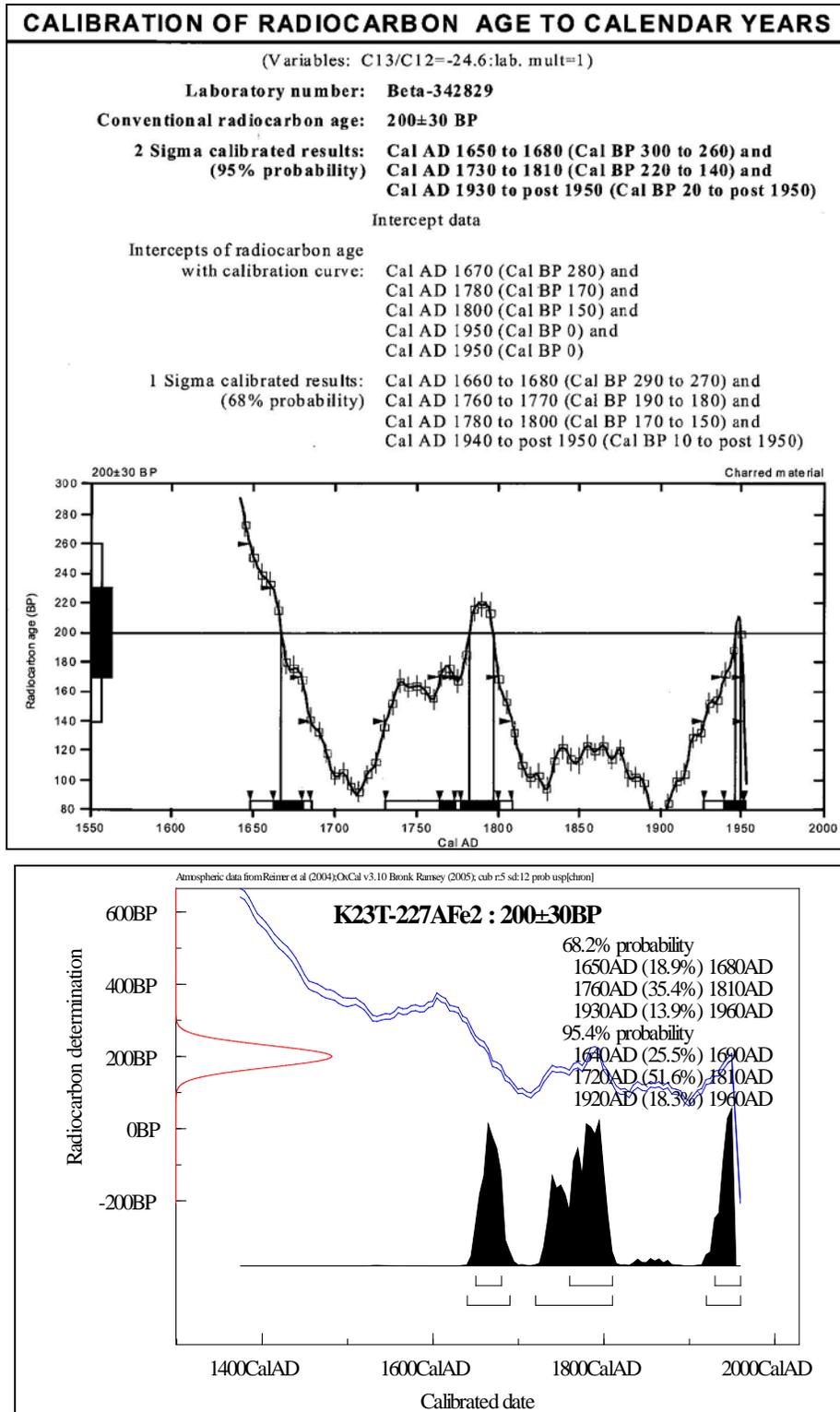
Beta # 42826 (T-146A, Str. IIA, Feat. 3, 83-94 cmbs)



Beta #342827 (T-146A, Str. Ila, Feat. 4, 85–95 cmbs)



Beta #342828 (T-146A, Str. IIA, Feat. 5, 81–92 cmbs)



Beta #342829 (T-227A, Str. IIA Feat. 2, 108–131 cmbs)

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.8:lab. mult=1)

Laboratory number: **Beta-342984**

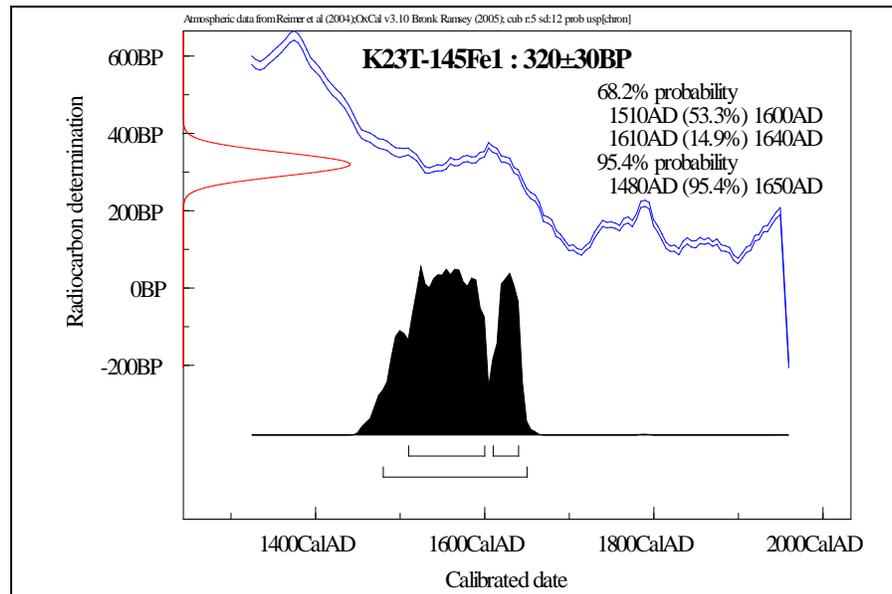
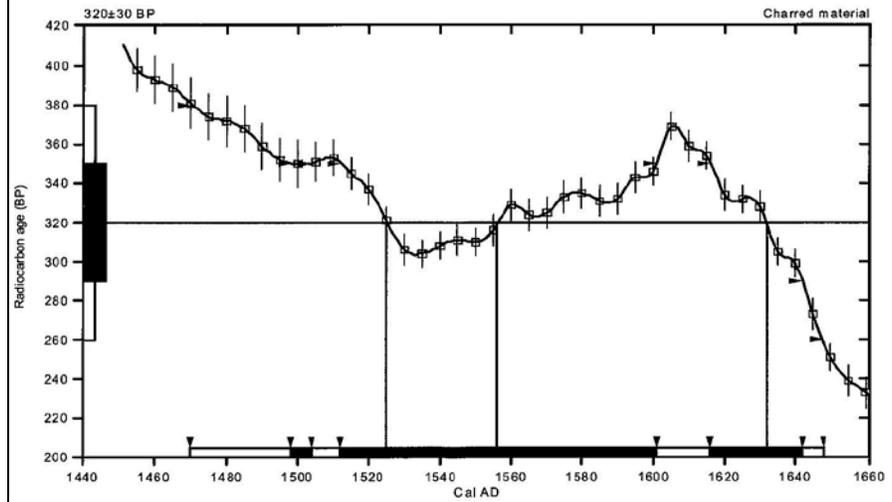
Conventional radiocarbon age: **320±30 BP**

2 Sigma calibrated result: **Cal AD 1470 to 1650 (Cal BP 480 to 300)**
(95% probability)

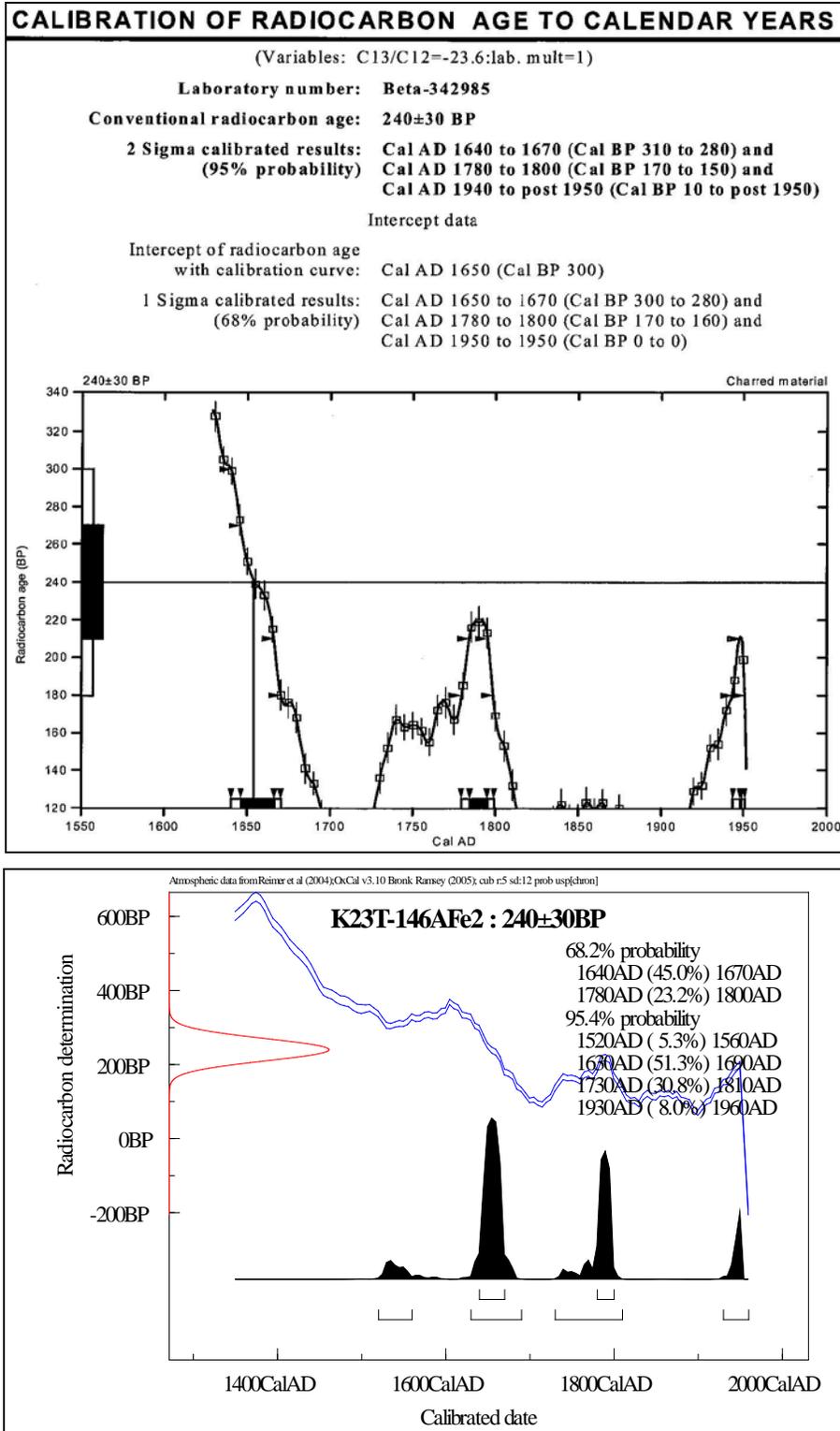
Intercept data

Intercepts of radiocarbon age with calibration curve:
Cal AD 1520 (Cal BP 420) and
Cal AD 1560 (Cal BP 390) and
Cal AD 1630 (Cal BP 320)

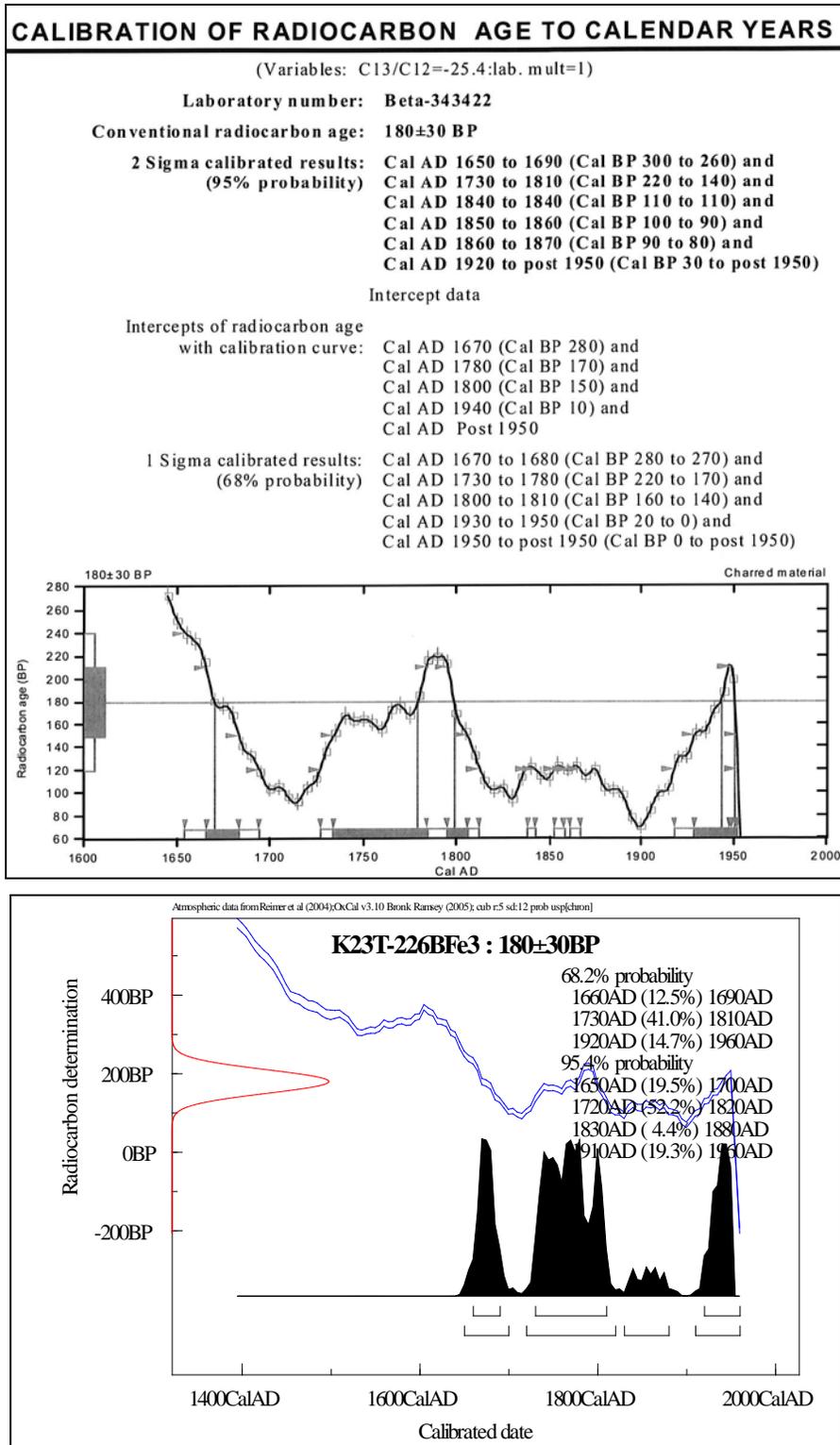
1 Sigma calibrated results:
Cal AD 1500 to 1500 (Cal BP 450 to 450) and
(68% probability) Cal AD 1510 to 1600 (Cal BP 440 to 350) and
Cal AD 1620 to 1640 (Cal BP 330 to 310)



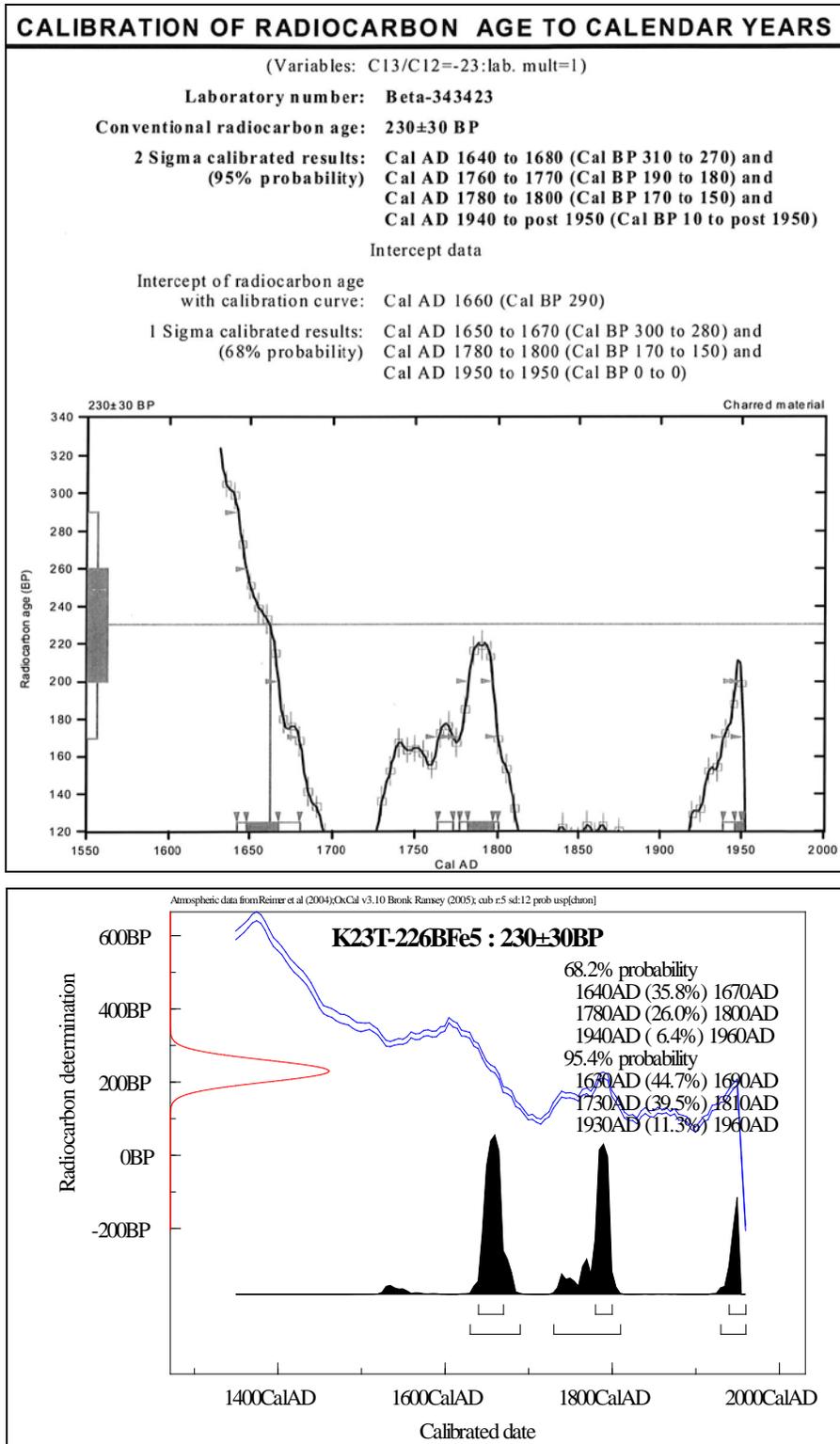
Beta #342984 (T-145, Str. IIa Feat. 1, 81–95 cmbs)



Beta #342985 (T-146A, Str. IIa, Feat. 2, 75–90 cmbs)



Beta #343422 (T-226B, Str. II, Feat. 3, 82–93 cmbs)



Beta #343423 (T-226B, Str. II, Feat. 5, 76–90 cmbs)

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24;lab. mult=1)

Laboratory number: **Beta-343424**

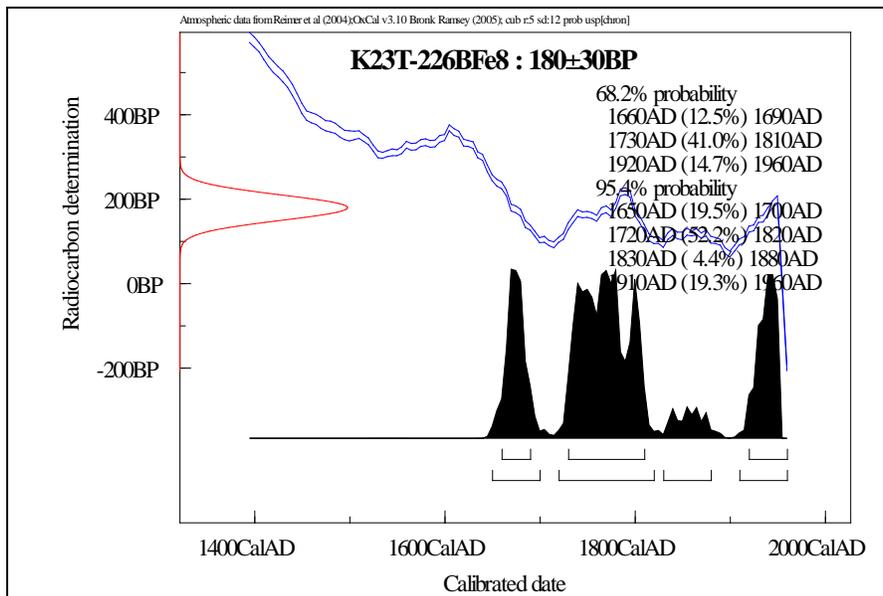
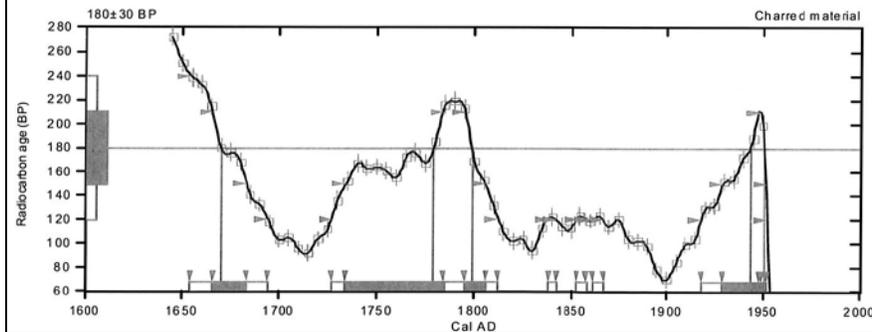
Conventional radiocarbon age: **180±30 BP**

2 Sigma calibrated results: Cal AD 1650 to 1690 (Cal BP 300 to 260) and
 Cal AD 1730 to 1810 (Cal BP 220 to 140) and
 Cal AD 1840 to 1840 (Cal BP 110 to 110) and
 Cal AD 1850 to 1860 (Cal BP 100 to 90) and
 Cal AD 1860 to 1870 (Cal BP 90 to 80) and
 Cal AD 1920 to post 1950 (Cal BP 30 to post 1950)

Intercept data

Intercepts of radiocarbon age with calibration curve:
 Cal AD 1670 (Cal BP 280) and
 Cal AD 1780 (Cal BP 170) and
 Cal AD 1800 (Cal BP 150) and
 Cal AD 1940 (Cal BP 10) and
 Cal AD Post 1950

1 Sigma calibrated results: Cal AD 1670 to 1680 (Cal BP 280 to 270) and
 Cal AD 1730 to 1780 (Cal BP 220 to 170) and
 Cal AD 1800 to 1810 (Cal BP 160 to 140) and
 Cal AD 1930 to 1950 (Cal BP 20 to 0) and
 Cal AD 1950 to post 1950 (Cal BP 0 to post 1950)



Beta #343424 (T-226B, Str. II, Feat. 8, 78–94 cmbs)