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Settlement and Expansion in an Hawai'ian Valley: The Archaeological Record from North Hālawā, O'āhu

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ABSTRACT

Construction of the Interstate H-3 Highway in leeward O'āhu has provided an 8-km-long transect of the inland portion of Hālawā *ahupua'a*. Extensive archaeological fieldwork in the valley has shown that this region was intensively used in pre-Contact (A.D. 1778) times. Seventy-four radiocarbon dates are used to evaluate population settlement and expansion from the period of first known use (around A.D. 1150) until the contact period. Rapid expansion began about A.D. 1400 and resulted in the establishment of numerous permanent habitations and extensive dryland agricultural areas.

Keywords: HAWAI'I, ARCHAEOLOGY, MODEL, SETTLEMENT, RADIOCARBON DATING.

INTRODUCTION

Archaeological work in North Hālawā Valley, O'āhu, Hawai'i has shown that there was extensive use of this valley in pre-European times. The focus of this paper is on 74 radiocarbon dates which are used to evaluate population settlement and expansion from the twelfth century until European contact in the late eighteenth century.

North Hālawā Valley is one of the major leeward valleys of the Ko'olau Mountain Range on the island of O'āhu. The valley is narrow and sharply cut, especially in its more inland regions. The valley floor is about 8 km long and from 500 to 1000 m wide. Elevations range from 45 to 365 m above sea level. Three small streams and various intermittent tributaries merge to form North Hālawā stream which in turn joins South Hālawā stream on the coastal plain. Narrow alluvial flats occur along the upper and middle portions of the stream and become wider towards the mouth of the valley.

ARCHAEOLOGICAL DATA

Over 65 archaeological sites, varying from isolated *imu* (earth ovens) to large multi-component complexes, have been recorded in the valley (Fig.1). Although fieldwork is still in progress and analysis is incomplete, enough information is available to discuss the emerging settlement pattern.

The ten earliest dated features, from nine sites (including two from Site 119) throughout the valley, include two *imu*, five agricultural terraces, an earthen depression, a habitation

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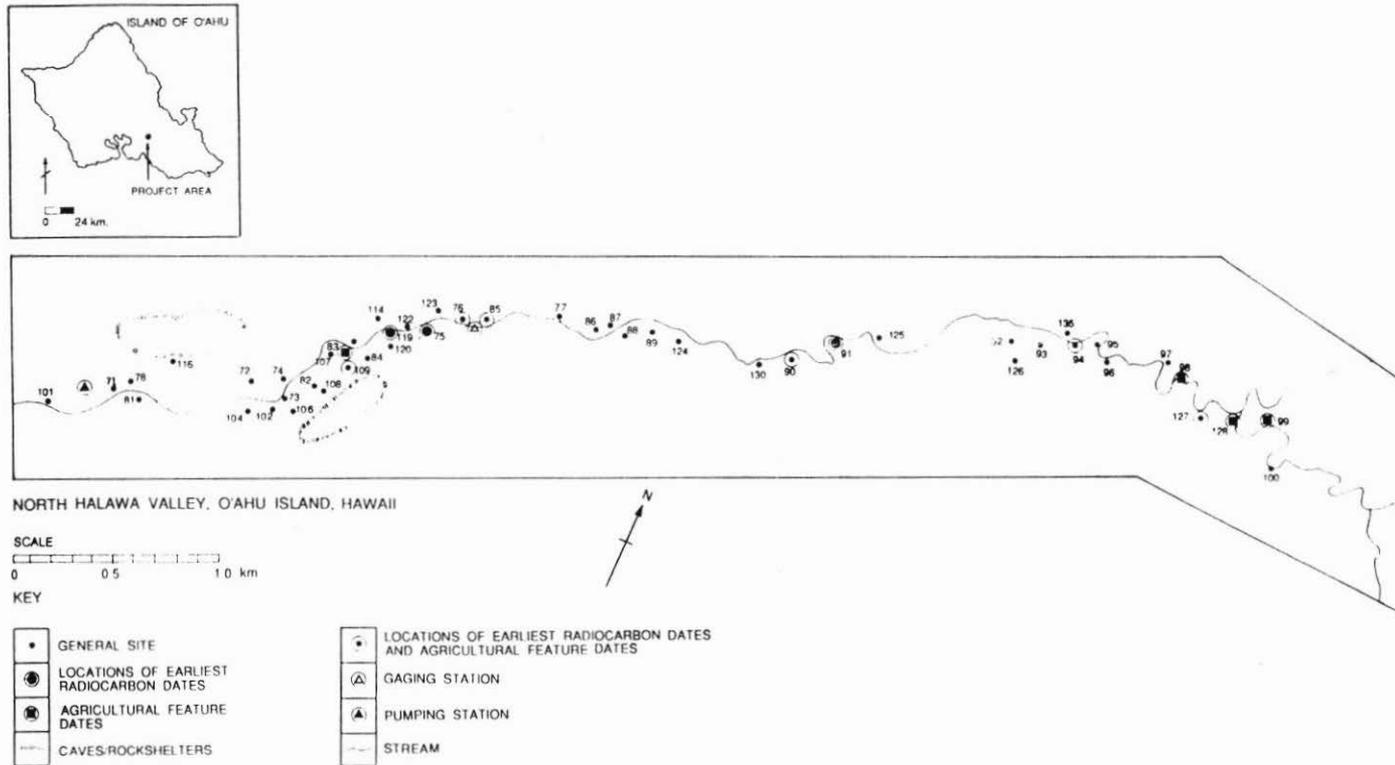


Figure 1: Site Locations Within North Halawa Valley

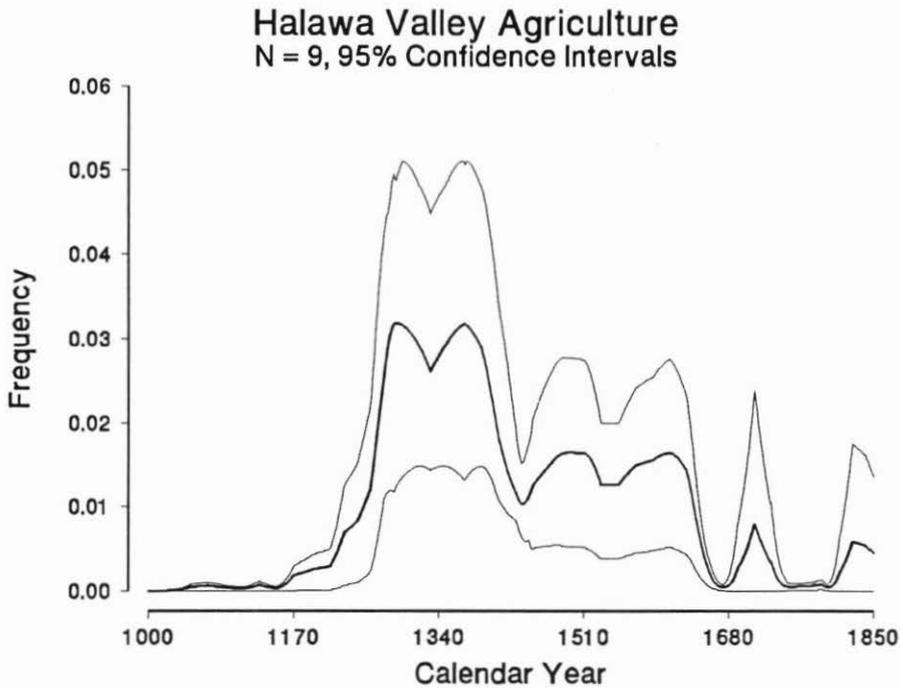


Figure 2: Halawa Valley Agriculture

terrace, and a small pit (Fig. 1). The dates for these features indicate that the valley was being utilised by the middle of the thirteenth century and perhaps earlier.

Using the method developed by Dye and Komori (this volume), Figures 2 to 7 present the radiocarbon data in the form of annual frequency distributions. The dates are listed in Appendix 1.

Nine agricultural features have so far been dated. Eight are dryland features and one is a wetland feature. After calibration the dates range from early thirteenth century to post-European times (Fig. 2).

The production of charcoal related to agricultural features increased rapidly in the mid- to late thirteenth century and lasted at this peak level until the early fifteenth century when there was a steep decline. From the mid-fifteenth until at least the mid-seventeenth century, the level of charcoal production remained at this lower level.

Sixty-four dates are from habitation features, which were the focus of much of the initial dating in North Hālawā Valley. Fifty-six of these dates are from four feature types: habitation terraces (18), *imu* (20), caves/rockshelters (9), and small pits (9). When calibrated, these dates range from the mid-thirteenth century to post-contact times (Fig. 3).

Creation of charcoal related to habitation features began between the late thirteenth century and about A.D. 1400. A rapid increase in sample density occurred during the fifteenth century, after which a constant density rate was maintained until post-European times.

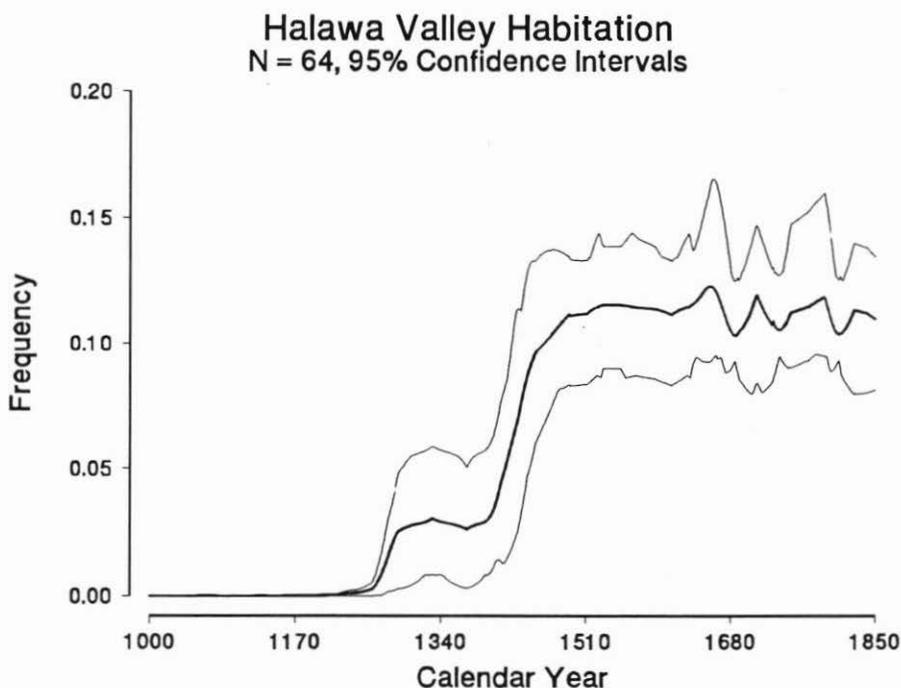


Figure 3: Halawa Valley Habitation

If the four habitation feature types are separated it is clear that what they have in common is a steep rise in the distribution curve around the beginning of the fifteenth century and a levelling off by the end of that century (Figs 4–7).

The main difference is between habitation terraces and the other three types. The graphs for *imu*, caves/rockshelters, and small pits all show well formed distribution curve segments during the period between A.D. 1200 and 1400. In contrast, the curve for habitation terraces does not begin until after A.D. 1400.

THE MODEL

On the basis of the radiocarbon data, the following model of occupation and use of leeward North Hālawā Valley is proposed.

During the mid-thirteenth century, points along the entire length of the valley were already in use. This suggests that initial use was some time earlier, perhaps the late twelfth century.

As previously noted, the ten earliest dated features included *imu*, agricultural features, an earthen depression, a habitation terrace, and a small pit. These features are functionally diverse and represent agricultural production, food preparation, and residence. Agricultural production took place in both wetland and dryland systems and in many parts of the valley.

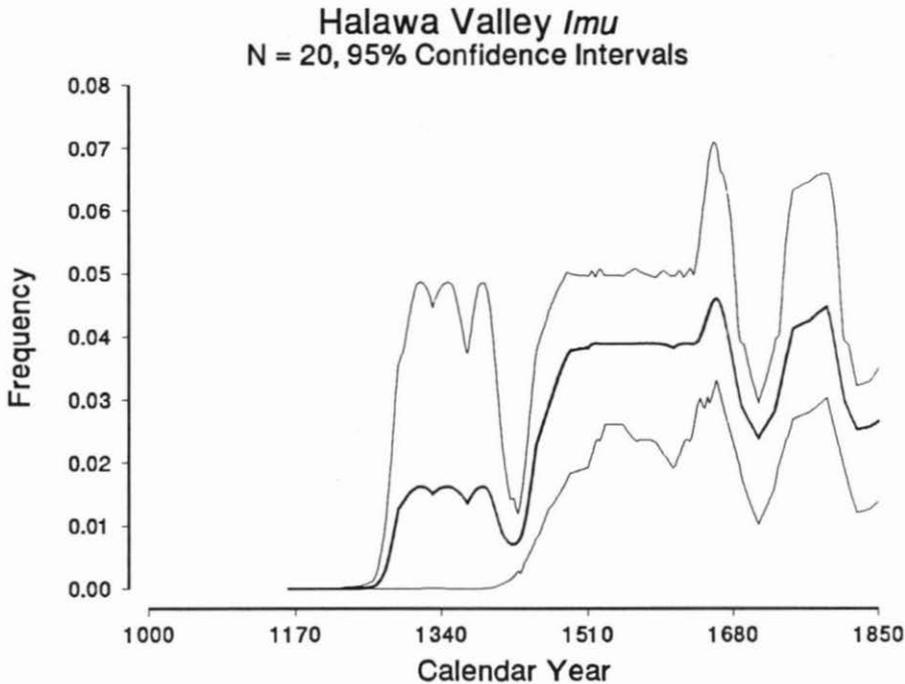


Figure 4: Halawa Valley Imu

Sites were probably small and habitation short term.

A rapid increase in the development of agricultural features began in the mid-thirteenth century and continued for almost two hundred years. Extensive complexes of dryland and, to a lesser extent, wetland systems were developed in the lower reaches of the valley. The middle and upper portions of the valley were also more extensively used, but the sites generally remained small. An increase in the number of habitation features may also reflect this expansion of agricultural activity. Most of the habitation features were still short term.

After A.D. 1400, another change in the valley settlement pattern occurred. This was the establishment of long term or permanent habitations, which were often stone-faced, earth-filled, rectangular terraces. These habitations are clustered at the lower end of the valley and in some cases were constructed on top of previous agricultural features. The existing extensive agricultural complexes continued in use. At this time, also, sites which may reflect differential social status appeared.

With the establishment of permanent habitations and the appearance of social stratification, the final pre-European settlement pattern was formed. In the lower part of the valley, large agricultural complexes were in use, and permanent habitations, which may have been socially stratified, were located among them.

Site size and function varied in the mid-section of the valley. There are two large complexes, although other known sites are small. The upper portion of the valley continued to be used but sites there remained small.

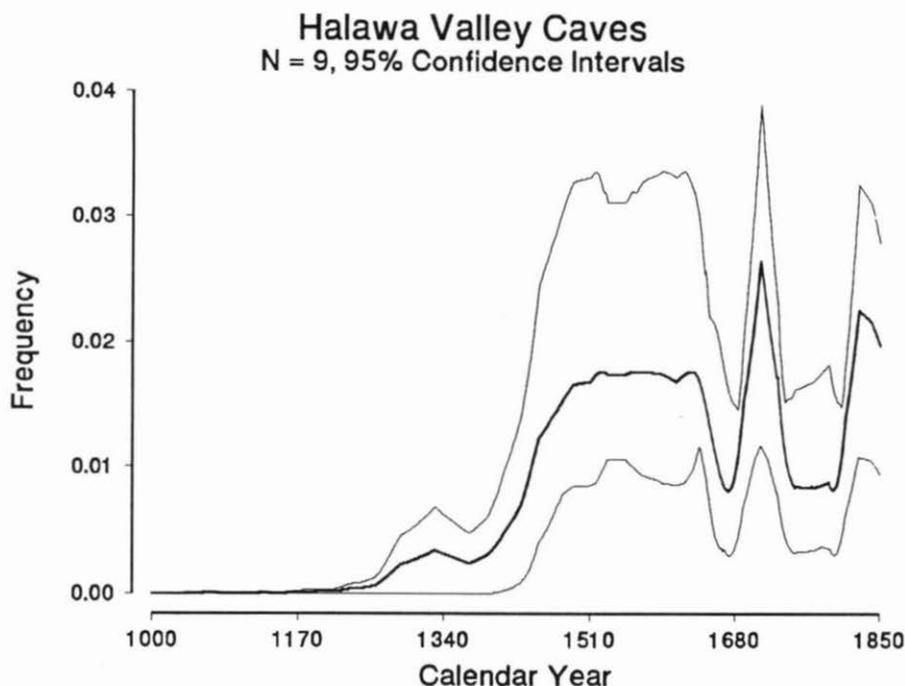


Figure 5: Halawa Valley Caves and Rockshelters

DISCUSSION

How does this proposed model of North Hālawā Valley settlement and expansion compare with a generalised Hawaiian model? Kirch (1985) has proposed a culture-historical sequence consisting of a Colonization Period (A.D. 300–600), Developmental Period (A.D. 600–1100), Expansion Period (A.D. 1100–1650), Proto-Historic Period (A.D. 1650–1795), and Historic Period (A.D. 1795 to present).

According to Kirch, the Expansion Period was the most significant period of cultural change in Hawaiian prehistory. During this period the Hawaiian population burgeoned to several hundred thousand and expanded into even the most marginal and arid regions of the islands. Some of the primary features of the Expansion Period were the development of new sites and settlements, shifts in settlement patterns and architecture, economic production intensification partly through the replacement of dryland forests and scrub by various kinds of field systems, and radical changes in social and political organisation.

The model suggested here for North Hālawā Valley fits Kirch's sequence, especially the Expansion Period. The model suggests that the initial settlement of the valley was in the late twelfth century and for 200 years after the mid-thirteenth century there was a rapid increase in agricultural activity. During this 200 year period, extensive agricultural complexes were established. These were somewhat earlier, but on a smaller scale, than the field systems of

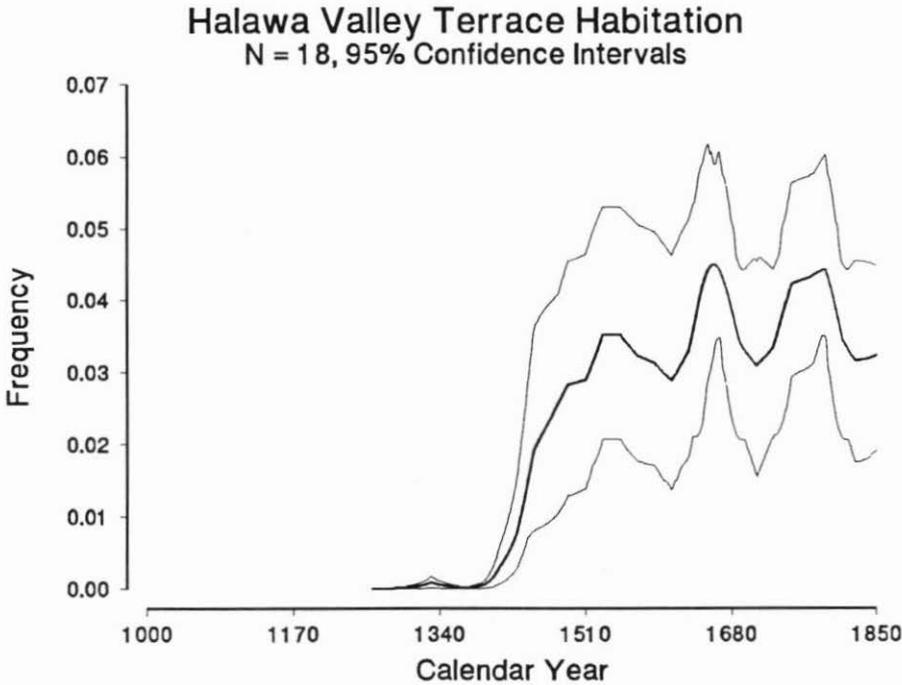


Figure 6: Halawa Valley Habitation Terraces

Kona and North Kohala on Hawai'i Island. As the agricultural activity increased, so did the number of habitation sites, which remained small and temporary.

The model indicates that after A.D. 1400 there was a change in the types of habitations. Where before habitations were small and temporary they now became clusters of features, many of which were stone-faced, earth-filled rectangular terraces.

Finally, the radical social and political changes Kirch sees as happening during the Expansion Period are echoed in the Hālawā model. These changes become evident after A.D. 1400.

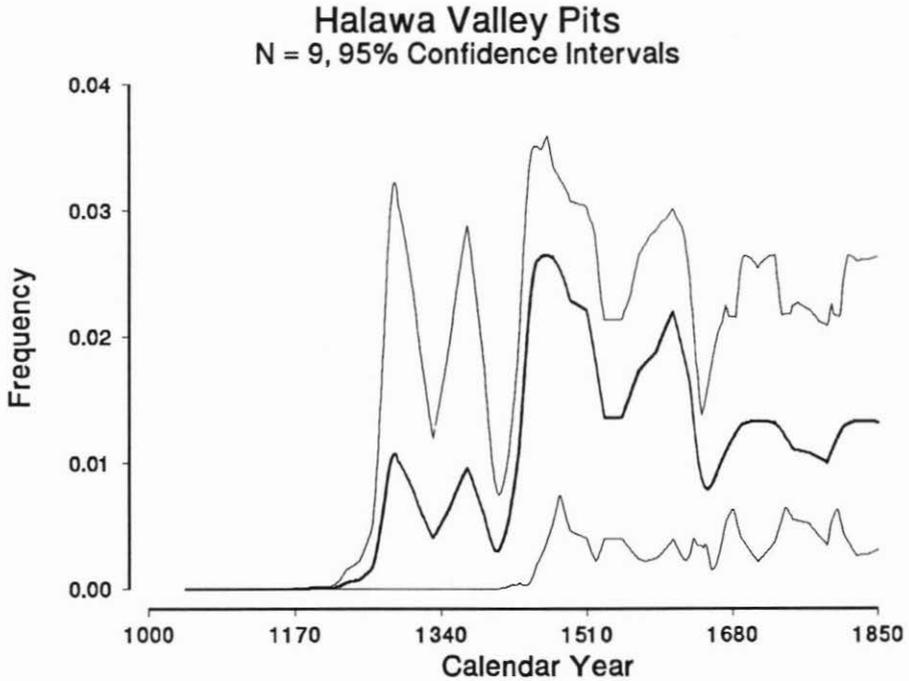


Figure 7: Halawa Valley Pits

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Kirch, P.V. 1985. *Feathered Gods and Fishhooks*. University of Hawaii Press, Honolulu.

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APPENDIX 1

Hālawā VALLEY RADIOCARBON DATES

Sample Number	Laboratory Number	CRA	Function	Feature	Site Number	$\delta^{13}\text{C}$
HRC-1035	BETA-29274	580±100	Agricultural	Terrace	50-OA-B01-0085	-27.4
HRC-1041	BETA-29280	20±50	Agricultural	Terrace	50-OA-B01-0099	-26.5
HRC-1043	BETA-29282	360±70	Agricultural	Terrace	50-OA-B01-0098	-26.4
HRC-1044	BETA-29283	690±90	Agricultural	Terrace	50-OA-B01-0090	-25.3

HRC-1200	BETA-34091	360±60	Agricultural	Terrace	50-OA-B01-0083	-23.4
HRC-1284	BETA-37631	600±70	Agricultural	Terrace	50-OA-B01-0094	-27.1
HRC-1289	BETA-37636	690±80	Agricultural	Layer	50-OA-B01-0127	-27.6
HRC-1290	BETA-37637	330±50	Agricultural	Layer	50-OA-B01-0128	-28.0
HRC-1296	BETA-37643	610±70	Agricultural	Terrace	50-OA-B01-0109	-26.6
HRC-0985	BETA-25191	210±60	Habitation	Pit <small>(small imu)</small>	50-OA-B01-0085	-20.8
HRC-0986	BETA-25192	570±60	Habitation	Platform	50-OA-B01-0119	-13.8
HRC-0987	BETA-25193	350±50	Habitation	Terrace	50-OA-B01-0084	-12.7
HRC-0988	BETA-25194	170±40	Habitation	Terrace	50-OA-B01-0084	-12.0
HRC-0989	BETA-25195	270±50	Habitation	Terrace	50-OA-B01-0086	-29.6
HRC-1003	BETA-26162	350±40	Habitation	<i>imu</i>	50-OA-B01-0092	-25.0
HRC-1004	BETA-26163	330±50	Habitation	Layer ?	50-OA-B01-0092	-27.1
HRC-1005	BETA-26164	430±50	Habitation	Small pit	50-OA-B01-0089	-29.5
HRC-1006	BETA-26165	130±60	Habitation	Layer	50-OA-B01-0092	-26.2
HRC-1007	BETA-26166	330±40	Habitation	Pit <small>(hearth?)</small>	50-OA-B01-0088	-27.6
HRC-1014	BETA-27819	220±50	Habitation	Layer	50-OA-B01-0091	-28.4
HRC-1015	BETA-27820	110±50	Habitation	<i>imu</i>	50-OA-B01-0091	-29.4
HRC-1017	BETA-27822	210±50	Habitation	<i>imu</i>	50-OA-B01-0093	-28.0
HRC-1018	BETA-27823	80±50	Habitation	<i>imu</i>	50-OA-B01-0093	-28.8
HRC-1019	BETA-27824	380±50	Habitation	Pit,hearth	50-OA-B01-0094	-28.7
HRC-1020	BETA-27825	210±70	Habitation	<i>imu</i>	50-OA-B01-0095	-28.6
HRC-1021	BETA-27826	390±60	Habitation	<i>imu</i>	50-OA-B01-0096	-29.2
HRC-1022	BETA-27827	500±50	Habitation	Layer	50-OA-B01-0096	-28.1
HRC-1023	BETA-27828	10±50	Habitation	Platform	50-OA-B01-0083	-29.7
HRC-1036	BETA-29275	300±60	Habitation	<i>imu</i>	50-OA-B01-0091	-26.7
HRC-1037	BETA-29276	150±50	Habitation	<i>imu</i>	50-OA-B01-0091	-26.8
HRC-1038	BETA-29277	360±70	Habitation	Terrace	50-OA-B01-0084	-13.9
HRC-1039	BETA-29278	100±70	Habitation	Terrace	50-OA-B01-0084	-23.0
HRC-1040	BETA-29279	140±60	Habitation	Terrace	50-OA-B01-0084	-10.0
HRC-1042	BETA-29281	210±50	Habitation	<i>imu</i>	50-OA-B01-0098	-25.9
HRC-1053	BETA-29554	410±80	Habitation	Terrace	50-OA-B01-0086	-26.5
HRC-1054	BETA-29555	100±70	Habitation	Terrace	50-OA-B01-0086	-26.8
HRC-1055	BETA-29556	50±70	Habitation	Terrace	50-OA-B01-0086	-27.2
HRC-1056	BETA-29557	140±90	Habitation	Terrace	50-OA-B01-0086	-25.9
HRC-1057	BETA-29558	320±60	Habitation	<i>imu</i>	50-OA-B01-0088	-25.8
HRC-1058	BETA-29559	120±50	Habitation	Pit <small>(small)</small>	50-OA-B01-0088	-25.8
HRC-1059	BETA-29560	80±60	Habitation	Pit <small>(small)</small>	50-OA-B01-0088	-26.2
HRC-1060	BETA-29561	380±70	Habitation	<i>imu</i>	50-OA-B01-0091	-25.0
HRC-1061	BETA-29562	620±60	Habitation	<i>imu</i>	50-OA-B01-0091	-27.1
HRC-1062	BETA-29563	170±50	Habitation	<i>imu</i>	50-OA-B01-0091	-28.1
HRC-1120	BETA-32141	10±70	Habitation	Cave/shelter	50-OA-B01-0103	-19.0
HRC-1121	BETA-32142	50±60	Habitation	Rockshelter	50-OA-B01-0103	-10.9
HRC-1122	BETA-32143	310±50	Habitation	Cave/shelter	50-OA-B01-0105	-10.6
HRC-1123	BETA-32144	40±60	Habitation	Cave/shelter	50-OA-B01-0105	-24.9
HRC-1124	BETA-32145	230±60	Habitation	Cave/shelter	50-OA-B01-0110	-11.7
HRC-1125	BETA-32146	20±60	Habitation	Cave/shelter	50-OA-B01-0112	-11.8
HRC-1126	BETA-32147	330±80	Habitation	Cave/shelter	50-OA-B01-0112	-9.8
HRC-1127	BETA-32148	60±70	Habitation	Cave/shelter	50-OA-B01-0115	-27.6
HRC-1128	BETA-32149	500±140	Habitation	Cave/shelter	50-OA-B01-0078	-10.9
HRC-1193	BETA-34084	360±50	Habitation	Pit <small>(small imu)</small>	50-OA-B01-0072	-11.8
HRC-1194	BETA-34085	300±60	Habitation	Terrace	50-OA-B01-0074	-20.5
HRC-1195	BETA-34086	200±50	Habitation	Terrace	50-OA-B01-0074	-24.2
HRC-1196	BETA-34087	250±60	Habitation	<i>imu</i>	50-OA-B01-0075	-27.2

HRC-1198	BETA-34089	660±60	Habitation	Pit(small)	50-OA-B01-0075	-28.6
HRC-1201	BETA-34092	280±60	Habitation	<i>imu</i>	50-OA-B01-0083	-23.0
HRC-1202	BETA-34093	170±70	Habitation	Pit(small)	50-OA-B01-0083	-21.5
HRC-1205	BETA-34096	140±60	Habitation	Terrace	50-OA-B01-0104	-21.9
HRC-1207	BETA-34098	590±50	Habitation	<i>imu</i>	50-OA-B01-0119	-26.8
HRC-1208	BETA-34099	160±60	Habitation	Terrace	50-OA-B01-0119	-26.6
HRC-1283	BETA-37630	370±70	Habitation	Cave/shelter	50-OA-B01-0132	-21.1
HRC-1285	BETA-37632	460±50	Habitation	Layer	50-OA-B01-0099	-27.9
HRC-1286	BETA-37633	270±70	Habitation	Layer	50-OA-B01-0100	-27.6
HRC-1287	BETA-37634	40±60	Habitation	Layer	50-OA-B01-0116	-19.6
HRC-1291	BETA-37638	260±50	Habitation	Terrace	50-OA-B01-0106	-22.8
HRC-1292	BETA-37639	230±50	Habitation	Terrace	50-OA-B01-0106	-15.4
HRC-1293	BETA-37640	350±80	Habitation	Terrace?	50-OA-B01-0106	-20.3
HRC-1294	BETA-37641	200±50	Habitation	Terrace	50-OA-B01-0108	-20.6
HRC-1295	BETA-37642	160±70	Habitation	<i>imu</i>	50-OA-B01-0108	-19.2
HRC-1297	BETA-37644	260±70	Habitation	Layer	50-OA-B01-0109	-16.3
HRC-1288	BETA-37635	200±60	Habitation	<i>imu</i>	50-OA-B01-0126	-27.6