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– RESEARCH REPORT –

Refining the Chronology of Rapa Nui (Easter Island) Rectangular Houses: the re-dating of two residential sites on the eastern rim of Rano Kau

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ABSTRACT

P. C. McCoy and colleagues carried out a comprehensive survey and excavations at selected sites in the southwestern portion of Rapa Nui (Easter Island) in 1968. This included the excavation of a rectangular house (*hare*; 1-187) and a nearby stone-lined earth oven (*umu pae*; 1-186), both on the eastern rim of Rano Kau. A single radiocarbon date of AD 770 ± 230 from 1-187 was reported and subsequently accepted by some researchers as supporting early island settlement but was contested by others. This paper reports the re-dating of these sites as part of a collaborative research program including the digitization, auditing, and archiving of McCoy's (1968) previously un-cataloged site survey records and analysis of charcoal collected during the 1968 survey. The archiving of these and other records reveals the paucity of available radiocarbon determinations for rectangular houses while stressing their importance to population expansion trajectories on Rapa Nui. These newly acquired radiocarbon dates support the development of a more refined model of island settlement, while speaking to the utility of conducting new analyses on archived samples in archaeological research.

Keywords: Collections and archives; radiocarbon dating; chronology; settlement; population expansion; Rapa Nui (Easter Island)

INTRODUCTION

Systematic archaeological research and radiocarbon dating on Rapa Nui began in earnest with the 1955–56 Norwegian Expedition to Easter Island and the Eastern Pacific (Heyerdahl and Ferdon, Jr. 1961, 1965). William Mulloy and Gonzalo Figueroa (1966) prepared a report for UNESCO that recommended an island-wide survey and restoration of selected sites. To facilitate the survey, the island was divided into 35 overlapping quadrangles drawn at a scale of 1 to 5,000 for inclusion in a planned atlas of survey sheets (Mulloy 1968:16–18, Fig. 6). These were overlaid on a topographic map collected in 1965 during a systematic photographic survey by the Chilean Air Force. Within this map grid, in 1968 Patrick C. McCoy and his team conducted a comprehensive survey of the island's southwestern portion, including the volcanic caldera of Rano Kau (also known as Rano Kao; McCoy 1973, 1976, 1979).

Resulting archival and archaeological collections were placed into the care of the central repository for archaeological collections on Rapa Nui, the Museo Antropológico Padre Sebastián Englert (MAPSE), Hanga Roa. McCoy personally archived a copy of his field notes, maps, and photographs. Within the framework of the Hoʻomaka Hou Research Initiative (HHRI, Mulrooney *et al.* 2016) and the Easter Island Statue Project (EISP, Van Tilburg *et al.* 2008), a collaborative research program was undertaken that included the digitization, auditing, and archiving of McCoy's previously un-catalogued site survey records and the identification of selected charcoal samples collected during excavation of Sites 1-186 and 1-187.

Here, we present the results of the re-dating analysis of these two key sites excavated by McCoy and his team during the 1968 survey. The re-dating component of this research builds on recent efforts across the East Polynesian region that utilize rigorous protocols including the selection of short-lived samples (see Allen and Huebert 2014; Rieth *et al.* 2011) and samples from secure stratigraphic provenances in the application of AMS radiocarbon dating techniques (e.g., Kahn *et al.* 2014, 2016; Kirch and McCoy 2007; Mulrooney *et al.* 2014; Rieth and Athens 2013; Tuggle and Spriggs 2001). The newly acquired radiocarbon dates reported here provide additional data for dating the use of residential structures and help to refine settlement trajectories for Rapa Nui.

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BACKGROUND

The 1968 survey of the southwestern portion of Rapa Nui was carried out with the goal of documenting sites and features to develop a basic taxonomy having possible utility when expanded island-wide. Five quadrangles covering nearly 2,000 acres were systematically surveyed (Figure 1). The team, which included surveyor Mario Arévalo Poblete, documented a total of 1,738 sites within the designated study area. The Quadrangle 1 (Rano Kau) map locating 530 sites was prepared by McCoy and Arévalo Poblete. The team identified a range of structures that they interpreted as houses. One type, the rectangular house with its subclassifications, is the subject of this article.

Although excavation was not part of the original survey design, during the 1968 survey, stratigraphic excavations were undertaken at 1-187, an example of what was at the time a newly-reported variant of rectangular house (*hare*, Figures 2 and 3) and 1-186, a stone-lined earth oven (*umu pae*, Figure 4) located relatively close to the house foundation and thought to be related. Wood charcoal samples from the excavations at 1-186 and 1-187 were submitted to the Washington State University Radiocarbon Dating Laboratory in 1970. The remaining samples were archived by McCoy.

A sample of wood charcoal from Feature 1, a hearth in the interior floor of the house (1-187) was tentatively identified by members of McCoy's Rapanui field crew as *Thespesia populnea* (Pacific rosewood) and returned a determination of 1180 ± 230 BP (Sample no. WSU-1146; determination converted to a calendar age range of AD 770 ± 230) (McCoy 1973: 62). Three obsidian hydration dates from this context gave an estimated age of 792 ± 81 BP (AD 1176 ± 81), 765 ± 81 BP (AD 1203 ± 81), and 818 ± 72 BP (AD 1150 ± 72) (McCoy 1973: 62). In the 1973 article where he reported these results, McCoy noted the following about the house: '… its antiquity remains in question because of the large standard deviation on a single radiocarbon date and uncertainty of the [obsidian] hydration rate for the island' (McCoy 1973: 61). He subsequently concluded that 'while none of the dates are firm, they do suggest a relatively early position of the house in the Easter Island cultural sequence' (McCoy 1973: 62).

The *umu pae* identified as 1-186, and located 12 meters south-southeast of the rectangular house, was also excavated to determine its age and possible functional relation-

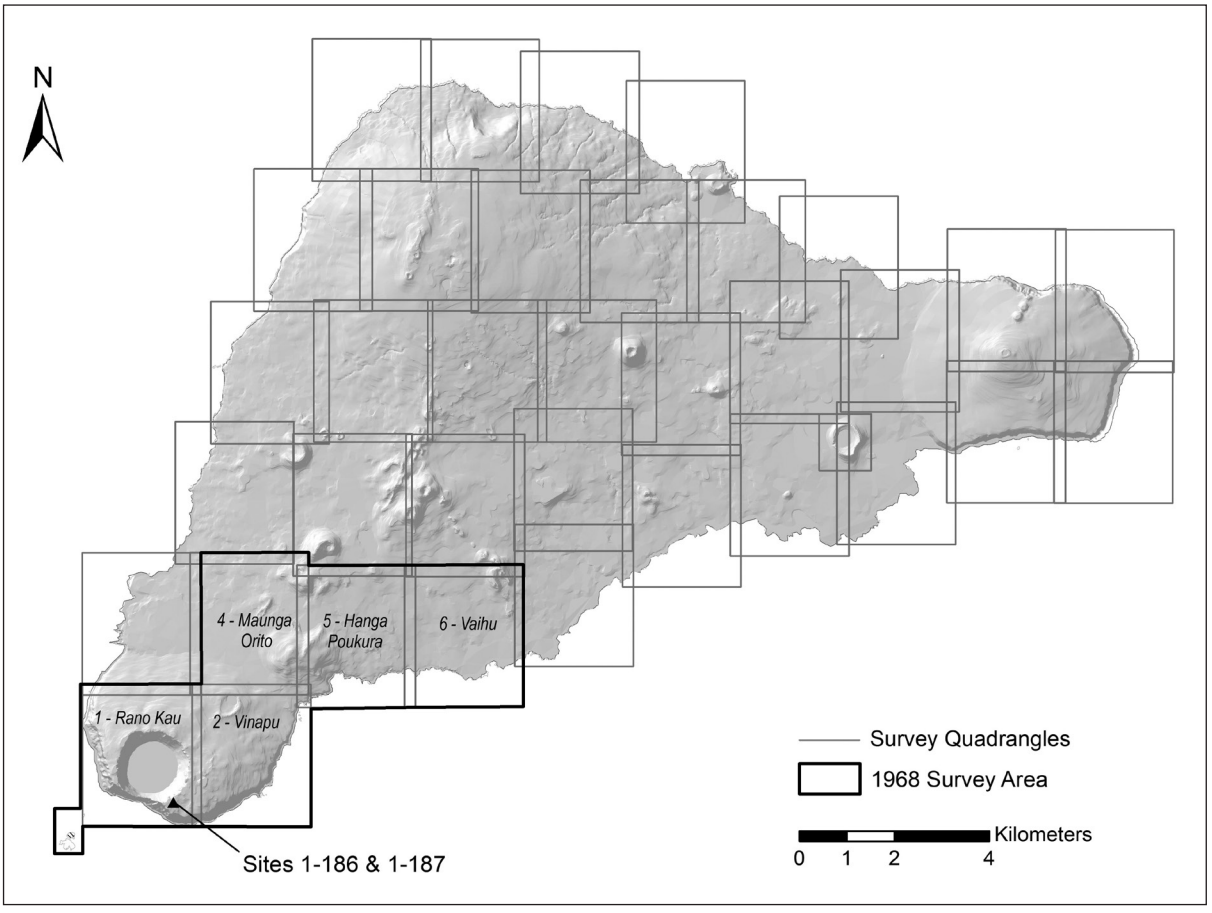

Figure 1. The 1968 survey quadrangles area and locations of Sites 1-186 and 1-187 (digital elevation model of Rapa Nui courtesy of Thegn N. Ladefoged).

Figure 2. Field photograph of 1-187 *hare* (rectangular house) prior to excavation (photograph by Herb Pownall, 1968).

Figure 3. Field photograph of 1-187 *hare* (rectangular house) during excavation (photograph by Rafael Rapu, 1968).

Figure 4. Field photograph of 1-186 *umu pa'e*, thought at the time of excavation to possibly be a feature of Site 1-187, December 1968 (photograph by Rafael Rapu, 1968).

ship to the house. Wood charcoal was collected from a dense charcoal deposit below a lens of fire-cracked rock at a depth of 25–35 cm below surface. Charcoal was collected from the bottom of the earth oven and tentatively identified, again by members of the field crew, as bulrush/totora reed (*Scirpus riparus*), ti (*Cordyline fruticosa*), and sugarcane (*Saccarum officinarum*). This sample (Sample No. WSU-1147) returned a date of 350 ± 220 BP, which was converted to a calendar age range of AD 1600 ± 220 (McCoy 1973: 63). Three obsidian hydration dates from this context gave an estimated age of 418 ± 111 BP (AD 1550 ± 111), 329 ± 72 BP (AD 1639 ± 72), and 321 ± 81 BP (AD 1647 ± 81) and were in general agreement with the radiocarbon determination, which McCoy noted was 'hardly conclusive in view of the large margin of error' (McCoy 1973: 63).

Together with radiocarbon determinations from elsewhere, including early dates from 'Anakena and the so-called 'Poike Ditch' (Heyerdahl and Ferdon Jr. 1961), the determination of 1180 ± 230 BP from the rectangular house (1-187; Sample no. WSU-1146) has been cited frequently as evidence for early settlement of Rapa Nui (e.g., Martinsson-Wallin and Crockford 2001; Spriggs and Anderson 1993; also see McCoy 1976; Ayres 1994; Steadman *et al.* 1994; Stevenson and Haoa C. 1998, 2008; Vargas *et al.* 2006). The radiocarbon date from the hearth in the rectangular house (1-187) was recalibrated to AD 660–1040 by Martinsson-Wallin and Crockford (2001), who also noted that an 'obsidian date indicates early 12th century' for the occupation of the site (2001: 249, Table 1), thus reiterating McCoy's observation about the lack of agreement between these two datasets.

The original dates from the 1968 excavation were incorporated into various regional analyses that explored island settlement throughout the wider East Polynesian region. Advocating for the application of 'chronometric hygiene', Spriggs and Anderson (1993: 210) rejected the date from the *umu pae* (1-186) because the sample included mixed isotopic fractionation. They accepted the early date from the hearth in the rectangular house (1-187), however, citing it as 'the earliest acceptable radiocarbon date for settlement' (Spriggs and Anderson 1993: 210). Applying an even more restrictive chronometric hygiene protocol to radiocarbon determinations of >750 BP from archaeological contexts on Rapa Nui, Hunt and Lipo (2006, Table S1) subsequently rejected this date simply because it was non-paired. In their statistical analysis of dates from throughout East Polynesia, Wilmshurst *et al.* (2011) placed this date into a 'Class 2' reliability class based on its large range of probability (± 230 years), thereby omitting it from their corpus of reliable 'colonization' dates from across East Polynesia. Mulrooney (2013) also classified the same date as a 'Class 2' determination in an island-wide analysis of published radiocarbon data for the island because the date was on unidentified charcoal from a secure cultural deposit.

CURRENT STUDY

The uncertainty of chronometric determinations originally noted by McCoy and reiterated through recent analyses of the corpus of radiocarbon dates from the island that rejected the originally reported dates based on various criteria indicated that re-dating of 1-186 and 1-187 was warranted. This meant, in addition to the fact that the charcoal samples were archived, and their stratigraphic context was sufficiently documented, that re-dating might provide new insights into the use trajectory of the rectangular house, one of 614 rectangular houses with survey location points. The compilation of multiple survey datasets into a composite research subset by EISP staff provides the currently available island-wide archaeological survey context for rectangular houses (*hare*) on Rapa Nui and the specific data framework within which this research is supported.

COLLABORATIVE DATA AUDIT AND HABITATIONAL CONTEXT

The McCoy survey field notes are a foundational archive and part of a landmark collaborative research effort underlying a forthcoming publication (Van Tilburg and Arévalo Pakarati in prep.). The database into which McCoy's data are now entered originated in the statue (*moai*) database (Van Tilburg 1986). It was expanded to a broader collaborative inventory of sites, features and artifact types (Sherwood *et al.* 2019; Van Tilburg and Arévalo Pakarati in prep.) and McCoy's field data were integrated as part of a first-stage effort to provide context for *moai* sites in the EISP database.

There were several qualities of McCoy's 1968 survey that supported reuse of legacy data: robust field notes were recorded in a complete and consistent manner as direct observations separate from interpretative summaries, handwritten notes were transcribed to typescript and cross-checked to the map after field collection to correct most errors, and they were archived in a simple and accessible format ordered by unique binominals. The EISP analytical process and procedures regarding McCoy's field data and of specific application to the research reported here began when Bishop Museum Archaeology Collections interns scanned McCoy's typescript field notes, sketches, print photographs, and maps, then transferred the over 3,500 digital files to EISP for processing. Each of his 1,738 site descriptions were transcribed, reviewed, and entered into the database as 2,684 text field note entries. The descriptions of each site feature were parsed into 6,400 discrete object records classified within an expanded taxonomy, including that of rectangular houses. Each object record page (i.e. *umu pae*; 1-186, or *hare* 1-187) is a continuously-updated chronological index to publication citations and unpublished notes describing attributes and the situation of each object. Scans of McCoy's survey maps were georeferenced in ArcGIS to align with the correlating Universidad de Chile archaeological atlas locations (Cristino *et al.* 1981) and adjusted to fit the Instituto Geográfico Militar de Chile 2004 base map (Figure 5). Linking each object record to its map location activated the Universidad de Chile atlas site locations, which were drafted based on the 1968 field survey, but published without site descriptions. When the 1968 survey was integrated with subsequent survey data collected by the Universidad de Chile and Earthwatch teams (Cristino and Vargas 1980; Cristino *et al.* 1981; Stevenson 1986, 1997; Stevenson and Haoa C. 1998, 2008; Stevenson *et al.* 1999, 2005; Vargas C. 1998; Vargas C. *et al.* 2006), the combined field observations represent a total body of field work that extends over decades.

With specific regard to the radiocarbon evidence that underpins this discussion, we found that dates and recalibrations are often repeated in publications as summarized tables of previously published data. Contextual descriptions are often abstracted into brief statements often lacking clear lines of citation (e.g., Martinsson-Wallin & Crockford 2001). The archival task applied to this research required more detailed information about each radiocarbon record so that reported data could be traced directly to a specific document source. Thus, each radiocarbon sample entry is linked to the appropriate cited report and supported by directly quoted text about the sample and the hierarchy of objects containing the sample. For example, in the EISP database, the complete nested record for 1-187 (*hare*) contains separate pages for the rectangular structure, the hearth, and the bulk sample, which has sub-records listing each radiocarbon date and any recalibrations. Supplemental reports are filed under each level of this object relationship. In this hierarchical and chronological array of data, visible discrepancies can be quickly understood as possible typos or misinterpretations replicated in publications.

Charcoal sample locations reported here were checked by georeferencing locator maps to contemporary satellite imagery to better understand the full topographical landscape context of the location where the charcoal sample was collected. The identification of wood charcoal suitable for re-dating from the hearth inside the rectangular house (1-187) and the nearby *umu pae* (1-186) was meant to extend the re-examination of archival materials in the context of compiled and cross-referenced data. The re-dating analysis reported below was undertaken only after all data were audited to ascertain whether archived wood charcoal samples were from stratigraphic contexts within cultural layers and would thus be suitable for analysis. Below, we present the results of re-dating analysis for these excavated contexts and discuss implications for Rapa Nui settlement trajectories.

RE-DATING ANALYSIS OF 1-186 AND 1-187

Archived wood charcoal samples from 1-186 and 1-187 (which are temporarily curated in Pacific Legacy's labora-

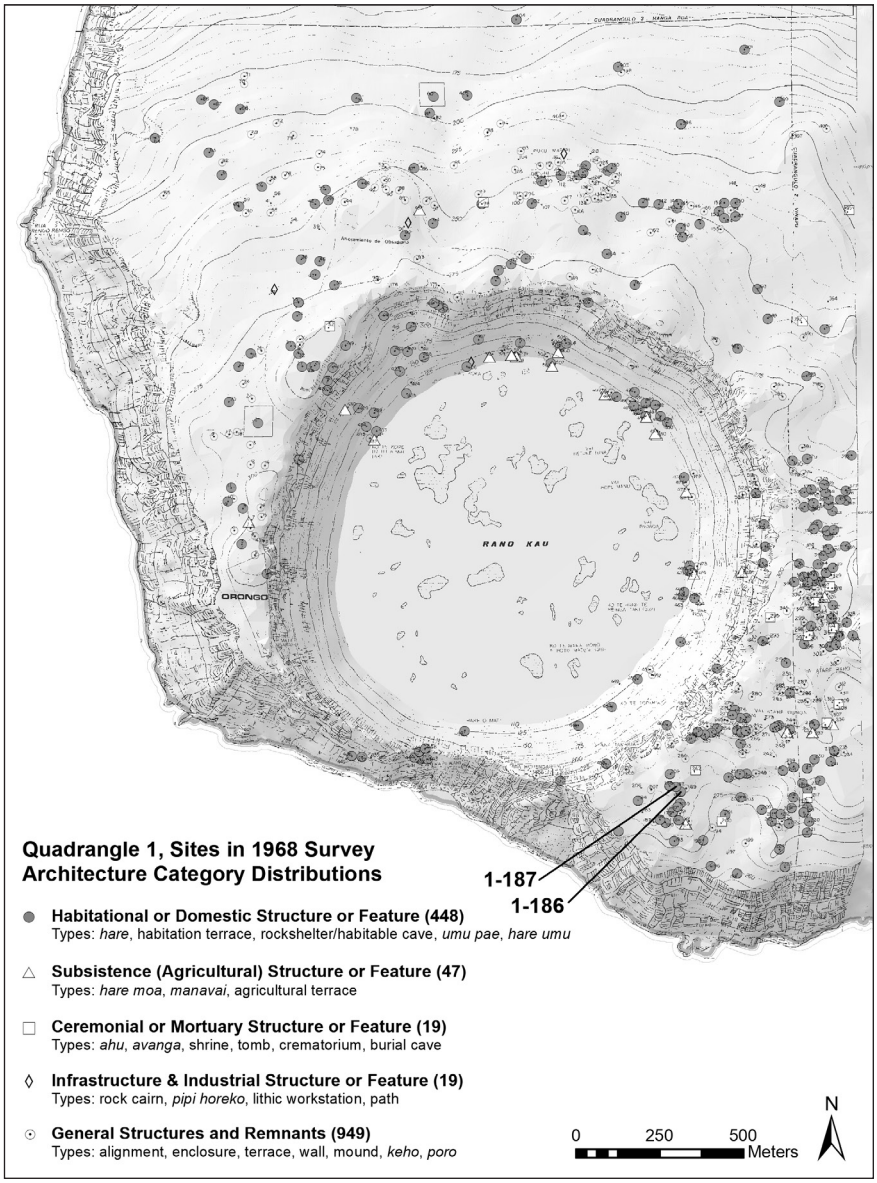

Figure 5. Distribution of selected object categories in Quadrangle 1, Rano Kau (Kao). Data: McCoy n.d. (1968) unpublished survey field notes, reclassified into EISP taxonomies. Site locations and contour map: Cristino *et al.* 1981. Underlying terrain generated based on contours from Instituto Geográfico Militar de Chile 2004 base map.

tory in Kailua, Hawai'i and will be transferred to MAPSE at a future date) were submitted to the Wood Identification Laboratory at the International Archaeological Research Institute, Inc. and were analyzed by Jennifer Huebert, Ph.D. Bulk samples from the *umu pae* (1-186) and the hearth feature in the *hare* (1-187) were submitted for identification. Short-lived species were identified in each of the two samples, making them suitable for dating (Huebert 2017). Two sub-samples from each context were submitted to Beta Analytic, Inc. for AMS radiocarbon dating analysis.

The sub-samples submitted to Beta Analytic, Inc. for AMS radiocarbon dating from the hearth inside the *hare* (1-187) include a small twig from an indeterminate species likely from ferns and/or herbs (WIDL No. 1615-1) and an indeterminate nutshell fragment likely from a palm (WIDL No. 1615-2). From the *umu pae* (1-186), a twig from an indeterminate hardwood (WIDL No. 1615-7) and a sample of *Sophora toromiro* (WIDL No. 1615-13) were submitted. Although this species is not a short-lived species according to the criteria set forth by Allen and Huebert (2014), i.e. having a lifespan of less than 10 years, it is considered a medium-lived species (lifespan of 10–75 years) and was one of the few charcoal fragments that was identifiable to species.

The sub-samples from the hearth inside the *hare* (1-187) returned conventional radiocarbon ages of 780 ± 30 BP

and 580 ± 30 BP. These were calibrated using the Southern Hemisphere Atmospheric Calibration (SHCal13) in OxCal v. 4.3.2 (Bronk Ramsey 2020; Hogg *et al.* 2013; Reimer *et al.* 2013) and returned calibrated ages of AD 1221–1375 and AD 1324–1440 at two standard deviations (Table 1; Figure 6). The samples from the *umu pae* (1-186) returned conventional radiocarbon ages of 400 ± 30 BP and 430 ± 30 BP. These were calibrated to AD 1454–1626 and AD 1442–1623 at two standard deviations using OxCal v. 4.3.2. These results suggest that the terminal use of the *umu pae* occurred more recently than that of the hearth inside the 1-187 rectangular house. The re-dating of 1-186 and 1-187 thus suggests the earliest possible use of the *hare* at AD 1221, with likely use during the 14th century and final use of the *umu pae* sometime between the mid-15th and mid-17th century.

ISLAND-WIDE IMPLICATIONS

The data collected in the 1968 survey suggested that rectangular houses were an uncommon type of habitation, highly localized to a small area on the southwest corner of the island and probably constructed only in the early to middle part of the Rapa Nui cultural sequence, prior to widespread deforestation of the island (McCoy 1973: 65–66). Data collected in subsequent surveys in other parts of the island (e.g., Vargas C. *et al.* 2006; Stevenson *et al.* 2005; Stevenson and Haoa 2008) indicate that rectangular houses were much more common than previously thought and were probably constructed over a longer period of time. A total of 614 stone foundations are categorized as rectangular houses, or *hare* var. 3, the EISP definition of which follows:

> Rectangular or sub-rectangular, single- or double-walled stone foundation; the long axis is formed of stones end to end; a parallel interior foundation outline or double alignment is sometimes present; size range is ~4–5 m long and 2–3 m wide; a hearth may be present. This variant includes structures formerly classified as Type 6 Sub-rectangular (*hare kaukau*) (Vargas C. *et al.* 2006); inferred non-elite permanent residence.

Survey points for each of these 614 rectangular foundations have been derived from combining the following available published, reported, or archived datasets: Ayres (1975); Ayres *et al.* (2000); Cristino F. and Vargas C. (1980); Cristino F. *et al.* (1981); Haoa Cardinali and Gonzalez Nualart (Survey Archive GIS Dataset, 2005–2019); MAPSE (n.d., Easter Island Archaeological Survey, Akahanga Site Dataset); McCoy (1968, 1973, 1976); Mulrooney (2012, 2013); Mulrooney *et al.* (2006–2008); Stevenson (1981, 1997); Stevenson and Haoa Cardinali (2008); Stevenson *et*

Table 1. *New radiocarbon determinations from Sites 1-187 (*hare*) and 1-186 (*umu pae*), Rano Kau (dates calibrated using OxCal v. 4.3.2).*

Sample No.	Site No.	Wood Charcoal ID	Lab No.	Conventional Radiocarbon Age (CRA)	Calibrated Date Range (2 SD; SHCal 13)
WIDL 1615-1	1-187	Indeterminate small twig	Beta-469438	780 ± 30 BP	cal AD 1221–1375
WIDL 1615-2	1-187	Indeterminate (cf. palm)	Beta-469439	580 ± 30 BP	cal AD 1324–1440
WIDL 1615-7	1-186	Indeterminate hardwood twig	Beta-469440	400 ± 30 BP	cal AD 1454–1626
WIDL 1615-13	1-186	*Sophora toromiro*	Beta-469441	430 ± 30 BP	cal AD 1442–1623

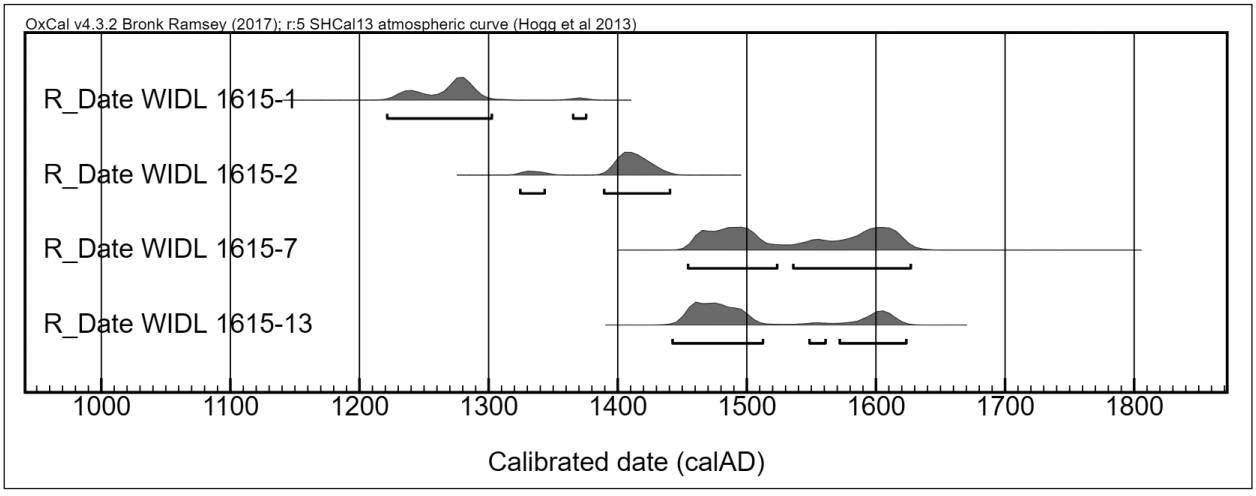

Figure 6. Calibrated radiocarbon dates from 1-187 (*hare*) and 1-186 (*umu pae*), Rano Kau.

al. (2001–2011); Stevenson *et al.* (2004); Stevenson *et al.* (2005); Stevenson Fieldbooks (n.d.); U. Chile (n.d., 1984, 1991); Vargas C. *et al.* (2006).

The vast majority of the documented rectangular houses are located in the interior regions of the island. The level of detail contained in the documentation of these structures varies. Within a total count of 614 rectangular houses, only 171 (27.9%) report structural features such as interior or exterior pavements. Of those, 59 (34.5%) pavements are external. Only 16 rectangular houses are reported to have an internal feature such as a hearth (excavated or not). Moreover, 201 of the 614 (32.7%) rectangular houses lack additional descriptive information aside from habitation structure type, meaning that additional structural or other features not otherwise reported may exist.

The Rapa Nui social system is ethnographically described as descent groups (*mata*; tribe) and individual lineage groups (*ure*; lit. penis) arrayed as ranked households (*paeŋa; paenga*; lit. foundation stone or building block). Lineage heads served as advisors (*hōnui*) to chiefs (*ʻariki).* Two sociopolitical divisions (*hānau*) eventually emerged, consolidated, and became ʻassociated with different parts of the island' (Routledge 1919: 221). The divisions are *ko tuʻu ʻaro ko te mata nui* (northwest) and *ko hotu ʻiti ko te mata ʻiti* (southeast) (Routledge 1919; Métraux 1940; Englert 1970, Hotus y el Consejo de Jefes de Rapa Nui 1988). The documented rectangular houses are distributed nearly evenly between northwest (302 *hare*) and southeast (312 *hare*) sociopolitical regions. Although there is some spatial bias visible in the distribution due to uneven survey coverage, as records are only available for surveys undertaken in particular areas of the island, the total rectangular house inventory constitutes a substantial settlement data corpus contextually underlying the current study.

Of the overall sample of 614 documented rectangular houses, just 13 structures have been stratigraphically excavated, and three contextually acceptable or reliable radiocarbon determinations exist in addition to the results presented herein for *hare* 1-187 (Table 2 and Figure 7). Three are in the southeast region (two hearths and one circular *umu pae*) and one is in the northwest region (a hexagonal *umu pae*). The dates are from Site 1-193, located on the rim of Rano Kau near Site 1-187, as well as Sites 18-228 and 18-419, both located in the interior of the island. Site 1-193 returned a modern (contaminated) date, and the dates from Sites 18-228 and 18-419 had probability distributions that suggest use sometime from the mid-15th century to the mid-17th century, or possibly slightly later in the case of Site 18-419. All are later than the newly acquired determinations for *hare* 1-187 reported here.

DISCUSSION

The new dates for the *hare* (1-187) suggest use of the interior hearth feature possibly as early as AD 1221–1375 or sometime between the early 13th century and the early-15th century. The dates from the nearby *umu pae* (1-186) show that it was likely used between the mid-15th century to the

Table 2. *New radiocarbon determinations from 1-187 (*hare*) on Rano Kau compared with other dates from rectangular house contexts on Rapa Nui (all re-calibrated using OxCal v. 4.3.2).*

Site No.	Material Type	Location	Lab No.	CRA	Date Range (2 SD; SHCal 13, calibrated using OxCal v. 4.3.2)	Reference
1-187	Wood charcoal, Indeterminate small twig	Feature 1, hearth at the base of house floor, 30–36 cm below surface	Beta-469438	780 ± 30 BP	cal AD 1221–1302 (93.1%), cal AD 1365–1375 (2.3%)	Current study
1-187	Wood charcoal, Indeterminate (cf. palm)	Feature 1, hearth at the base of house floor, 30–36 cm below surface	Beta-469439	580 ± 30 BP	cal AD 1324–1343 (8.0%), cal AD 1389–1440 (87.4%)	Current study
1-193	Wood chacoal	Hearth inside rectangular house, Square A2 and A3, 15–25 cm below surface	I-7516	Modern		Ayres 1975: 97
18-228	Wood charcoal, possibly *Thespesia populnea*	Circular *umu pae* inside rectangular house	Beta-47282	400 ± 60 BP	cal AD 1445–1643 (95.4%)	Vargas Casanova *et al.* 2006: 296–8, Gráfico 7.5
18-419	Wood charcoal, possibly *Thespesia populnea*	Hexagonal *umu pae* inside rectangular house	Beta-47283	330 ± 60 BP	cal AD 1457–1673 (89.3%), cal AD 1743–1771 (3.2%), cal AD 1779–1797 (2.6%)	Vargas Casanova *et al.* 2006: 297–8, Gráfico 7.5

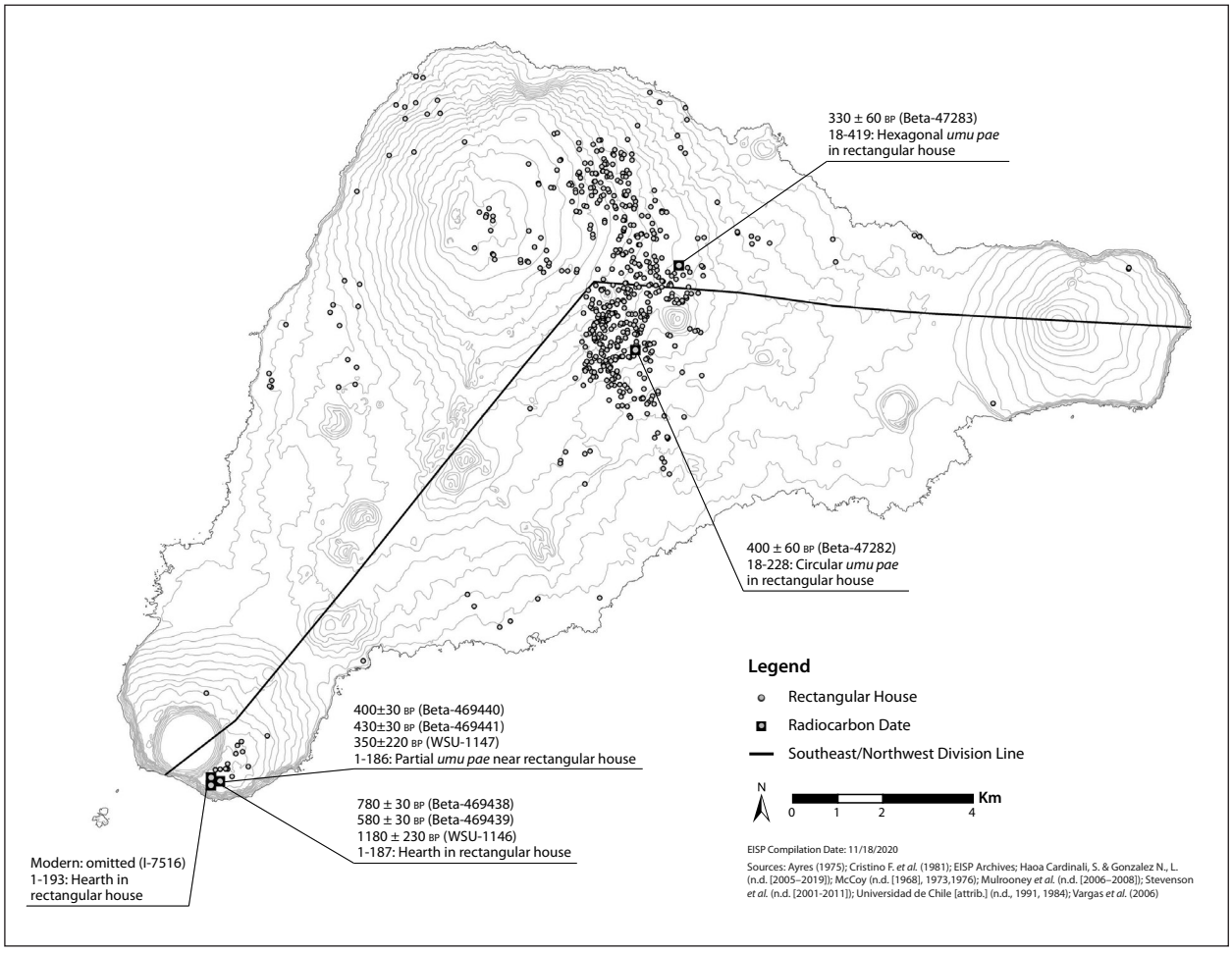

Figure 7. Locations of documented rectangular houses with radiocarbon dated contexts indicated (copyright EISP 2020).

early 17th century. The revised dates for the rectangular house are significant to Rapa Nui archaeology as they have been examined in relation to the largest compiled distribution of similar stone foundations defined in the field as rectangular houses by experienced archaeologists and informed sources (cited above). Thus, the redated structures originally documented by McCoy (1976, 1978) are now visible within a large and well-defined taxonomic group and expanded chronological context.

Furthermore, re-dating of the *hare* (1-187) contradicts earlier suggestions that it represents one of the earliest reliably dated residential contexts on Rapa Nui (e.g. Spriggs and Anderson 1993; Martinsson-Wallin and Crockford 2001). Instead, our analysis demonstrates that it is more likely to reflect the expansion of an established and growing population into non-coastal locations and following earlier initial settlement of the island. We assert that the re-dating analysis, within the context of the island-wide rectangular house data, strongly suggests that the timing and tempo of internal population expansion and dispersal, and even of initial settlement, are unresolved (compare with DiNapoli *et al.* 2020; Hunt and Lipo 2006; Rieth and Cochrane 2018; Stevenson *et al.* 2015; also see Shepardson *et al.* 2008; Wallin *et al.* 2010).

The results of the re-dating of the *hare* (1-187) and the *umu pae* (1-186) situated on the rim of the Rano Kau caldera contribute new insight into the overall interpretive trajectory of internal population expansion following earlier settlement on Rapa Nui. It is notable that the newly acquired dates align well with similar results from re-dating of other 'early' sites across the East Polynesian region, which have refined island chronologies significantly in recent years (e.g., Conte and Molle 2014; Dye and Pantaleo 2010; Kahn *et al.* 2014; Mulrooney *et al.* 2014; Molle 2011). The targeted re-dating of sites having sufficiently detailed field records using current techniques and protocols (Allen and Huebert 2014; Rieth and Athens 2013; Rieth and Cochrane 2018), and the archival-based data compilations described herein will undoubtedly continue to enhance our understanding of the settlement, internal population expansion, and transformation of remote Pacific Island landscapes by Polynesian societies.

CONCLUSION

The few existing acceptable radiocarbon dates from rectangular houses, when viewed within the large sample of 614 rectangular houses within the Rapa Nui habitation corpus, reveal a need for additional appropriate radiocarbon data. Yet, the newly acquired dates from the re-dating of two residential features on Rano Kau, together with a thorough review of previously reported radiocarbon determinations for rectangular house types, enhance our understanding of settlement trajectories on Rapa Nui.

The residential features described here are provided within their localized regional sociopolitical contexts on the Rapa Nui landscape. Our analysis of the limited extant corpus of existing radiocarbon dates for some of these houses, along with the newly updated radiocarbon results we acquired and reported here, suggest that a more detailed and nuanced understanding of internal population expansion events is necessary to explore population dynamics and Rapa Nui settlement. Houses in all typological categories and dispersed on the landscape in patterned ways require extended study and additional radiocarbon determinations before being considered within cultural trajectories, settlement, and population dynamics.

The collaborative archiving of records from McCoy's 1968 survey demonstrated that those data were ideal for collections-based research, and the new AMS ^{14}C dates reported here amplify that established record and update earlier interpretations. The new dates we provide here fit within the limited corpus of reliable radiocarbon dates from securely provenanced short-lived samples from other residential sites on Rapa Nui. Moreover, the re-dating of Sites 1-186 and 1-187 highlights the utility of properly collecting and archiving robust field data and associated samples for future analysis, and the ability of such archived material to then interact with reported survey data to offer new insight. We conclude, therefore, that archaeologists who design surveys with an eye towards future reuse through established archives create a valuable baseline for collaborative inquiry.

Memory and oral traditions in science are as fragile as those that characterize society in general. While most archaeologists would acknowledge that protection of cultural property prevents loss and prolongs the life of objects and the information they contain, we have found that few consider their own field notes to be cultural property, and few decide early in their careers how to conserve the records they inevitably generate. Here, we have demonstrated the value to new re-dating efforts that join paper and photographic records, collated data, and overlooked archival and museum records or objects, thus generating new insights.

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