22 WHO WERE THE EARLY PRECLASSIC MAYA?: REVISITING KEY QUESTIONS ABOUT ORIGINS OF VILLAGE LIFE IN THE BELIZE RIVER VALLEY

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The beginning of the Preclassic period (~1200/1000-900 cal BC) represents one of the most critical transitions in Maya prehistory, when the development of sedentary village life, increased reliance on maize agriculture, and the adoption of ceramic technology first appear at a large scale across the lowlands. While this transition set the stage for subsequent social ranking and urban living, it was non-linear, dynamic, and varied between regions. In this paper, we provide an updated overview of recent investigations into the beginning of the Preclassic period in the Belize River Valley. We address current debates about the timing of this transition, discuss new datasets adding to our knowledge, and suggest avenues for future study into this important time period in Maya prehistory.

Introduction

Almost 15 years ago, Paul Healy (2006) provided one of the most comprehensive treatments of the Preclassic Maya of the Belize River Valley in *Research Reports in Belizean Archaeology*, discussing issues of origins, chronology, architecture, trade and exchange, and subsistence systems. While he described the development of social inequality and political complexity throughout the entirety of the Preclassic period, one of the most important questions Healy (2006:24) identified for future research was, "How did ancient Maya 'civilization' begin?" While the evolutionary connections between foragers, the first farming communities in the Maya lowlands were diverse (e.g., Clark and Cheetham 2002; Prufer et al. 2019), they remain poorly understood in the Belize River Valley, and elsewhere in the Maya lowlands. What we do know about this period is that beginning sometime around 1200-1000 cal BC, small communities in the Belize Valley began to aggregate permanently in settlements located along the Belize River and its tributaries. Accompanying the transition to sedentism was an increasing commitment to maize agriculture, the adoption of pre-Mamon ceramic technology, early public architecture programs, and intensification of long-distance exchange with other groups in Mesoamerica, setting the stage for the development of social complexity in western Belize and across the Maya lowlands (Chase and Chase 2012:256).

This paper builds upon the synthesis initially presented by Healy as an update to what we do and do not know about the beginnings of Maya village life in the Early Preclassic Belize River Valley (Figure 1). We define the Early Preclassic (1200/1000-900 cal BC) of as the period when permanent agrarian villages first appear in the archaeological record of the eastern Maya lowlands, including western Belize (Figure 2; Awe 1992; Ebert et al. 2017; Healy 2006). It is differentiated from the subsequent Middle Preclassic by distinctive pottery types associated with the Cunil ceramic complex (described below; see also Callaghan and Neivens de Estrada 2016; Ebert et al. 2019; Rice 2019; Sullivan et al. 2018). Excavations conducted by several projects in the region at the sites of Cahal Pech, Blackman Eddy, Xunantunich, and Actuncan, among others, have explicitly focused on understanding the timing and the social contexts associated with the appearance of Early Preclassic farming communities. While this research has been ongoing for more than 30 years in some cases, a renewed interest in earliest Maya villages over the past decades has amplified chronological and artifactual datasets and our knowledge of the first sedentary Maya communities. In this paper, we synthesize recent research related to three primary topics: 1) debates about the chronology for the Early Preclassic, 2) new artifact datasets adding to our knowledge of early village life, and 3) paleoclimate studies, which we use as a springboard to suggest avenues for future study.

The Early Preclassic Chronology

Debates have surrounded the chronology for the Early Preclassic in the eastern Maya

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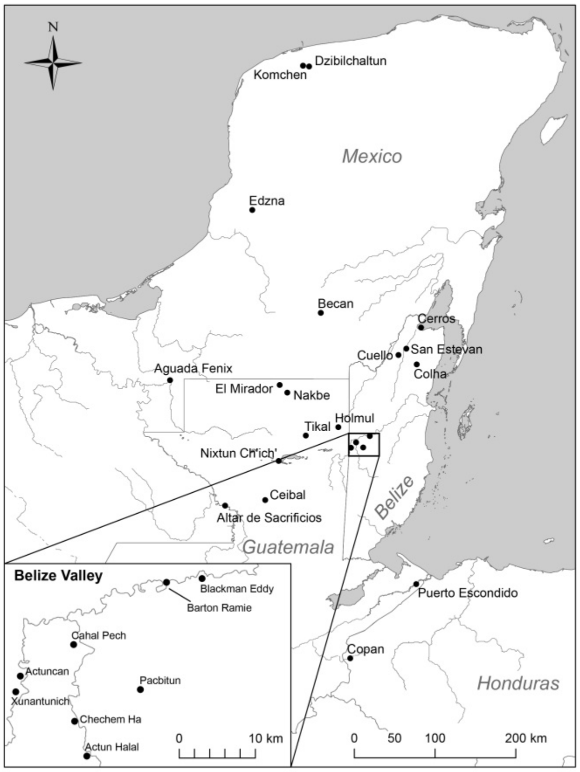

Figure 1. Map of the Maya lowlands with major Preclassic sites. Inset shows Belize Valley sites mentioned in text.

Time Period	cal date BC/AD	Belize Valley Ceramic Complex	Regional Lowland Ceramic Tradition
Postclassic	900	New Town	Tepeu
Term Classic	800	Spanish Lookout	
Late Classic	700		
	600	Tiger Run	
Early Classic	500 400	Hermitage	Tzakol
Late Preclassic	300 200 100 1 cal BC/AD 100 200 300	Barton Creek: Late Facet / Early Facet	Chicanel
Middle Preclassic	400 500 600 700 800	Jenny Creek: Late Facet / Early Facet	Mamon
Early Preclassic	900 1000 1100 1200	Cunil	Pre-Mamon

Figure 2. Timeline for the Belize Valley with calibrated date rages for ceramic phases.

lowlands for several decades. A major issue fueling these debates is that the first sedentary farmers of the Belize Valley, in addition to their (semi-)mobile predecessors, left few traces in the archaeological record. The presence of stemmed or barbed chert points (Lowe and Sawmill points) and bifaces (constricted adzes) used by foraging groups document the region's initial inhabitants. Recent use-ware analyses by Stemp and colleagues (2016) indicate that both Lowe and Sawmill points served as projectile points, while constricted adzes were likely associated with agricultural activities. Most of these artifacts are surface finds that have typically been dated to the Late Archaic (2500–1900 cal BC) based on stylistic attributes (Figure 3; Lohse 2010; Stemp and Awe 2013; Stemp et al. 2016). Prufer and colleagues (2019; see also Prufer 2018) recently provided a revised chronology for Lowe points based on radiocarbon dating from stratified rockshelter contexts in the Maya Mountains of southern Belize, pushing this point type much further back to the Early Archaic between ~8300-7300 cal BC. The Belize Valley possesses one of the highest frequencies of Lowe points in the Maya lowlands, suggesting that Early Archaic peoples were also present in the Belize Valley during this time.

The most secure evidence for Late Archaic occupation in western Belize comes from the site of Actun Halal Rockshelter, located just south of the Belize Valley (Lohse 2010, n.d.). Radiocarbon dates from pre-ceramic deposits containing small amounts of lithic debitage, a constricted adze, and fire-cracked cobbles document periodic use of the site by Archaic foragers (and possible low-level farmers) between ~2400-1200 cal BC (Table 1 and Figure 4; Lohse 2010, n.d.). We recently submitted two additional samples for dating from early contexts at Actun Halal, which date to the Middle Preclassic (PSUAMS-5868) and Early Classic (PSUAMS-5869). The radiocarbon dates from the site suggest overlap between mobile foraging populations and the first sedentary Maya communities and provide the only continuous directly dated primary sequence linking Archaic and Preclassic contexts.

A second factor confounding our knowledge about the Early Preclassic relates to an uneven coverage of dates across the Belize Valley. A total of 51 radiocarbon dates from surface sites, rockshelters, and caves spanning from the Late Archaic and through the Early

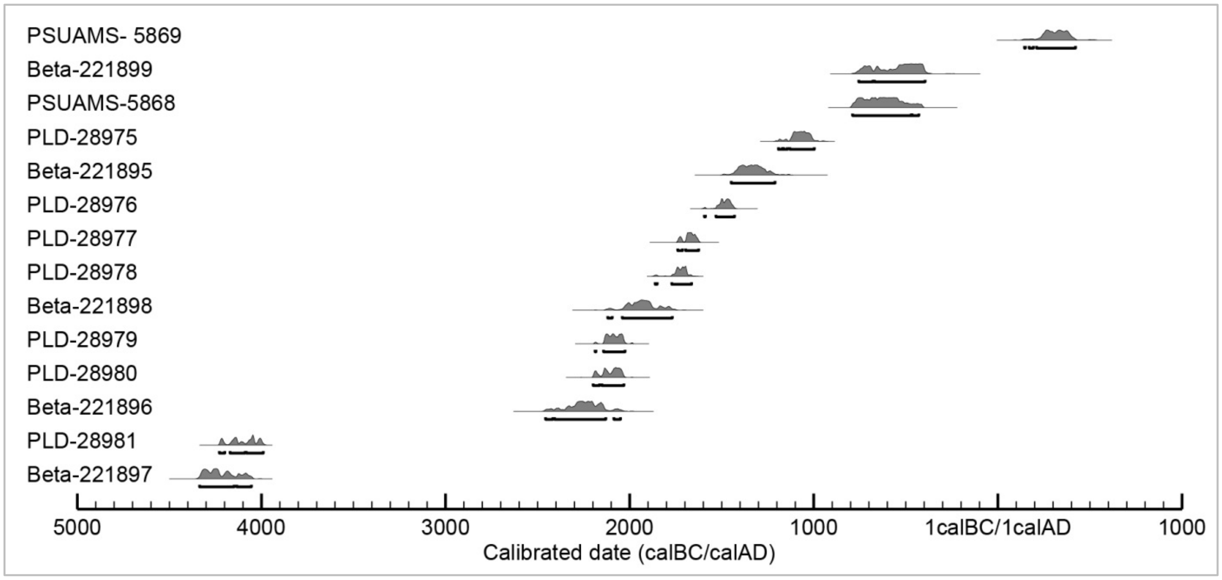

Figure 3. Calibrated 14C dates (2σ ranges) for Actun Halal Rockshelter. Data from Table 1.

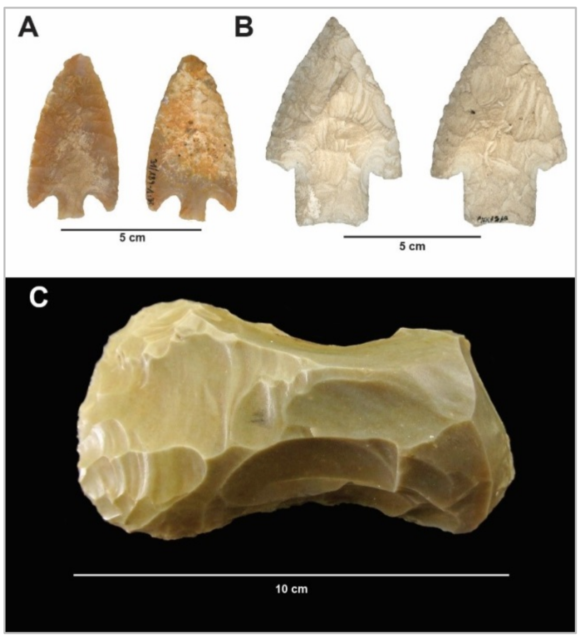

Figure 4. Examples of diagnostic Archaic period lithic artifacts including a (A) Sawmill point and (B) Lowe point, and (C) unifacial constricted adze (photos by Jaime Awe).

Preclassic have been published up to the present time (Table 2 and Figure 5). If we narrow our scope to only Early Preclassic dates (i.e., those associated with Cunil pottery), we have 37 dates from eight sites. Not all sites, however, have experienced similar intensities of dating activity. For example, at Xunantunich one radiocarbon date (3325-2910 cal BC) associated with highly patinated lithic artifacts may indicate possible Late Archaic period components at the site (Brown et al. 2011:21). Other early contexts at the site include paleosols that contain only a very small number of sherds with higher concentrations of chert flakes, tools, and freshwater shells, with one other date (1220-295 cal BC) possibly representing transitional Archaic-to-Preclassic contexts. Excavations at Blackman Eddy documented Early Preclassic pottery from the earliest phases on construction within the site's epicenter (Garber et al. 2004:27-28). Based on a program of radiocarbon dating conducted in the early 2000s, four dates place Early Preclassic settlement slightly later at the site of Blackman Eddy (990-800 cal BC; Garber et al. 2004). Small numbers of dates have also been recently reported for the nearby site of Actuncan in the Belize Valley (*n*=2; LeCount et al. 2017) and Nixtun-Ch'ich, located in the neighboring Petén region of Guatemala (*n*=2; Rice 2019). Stratigraphic excavations at Cahal Pech have produced the largest number of published radiocarbon dates for the Early Preclassic in the Belize Valley (*n*=11; Awe 1992; Ebert et al. 2017, 2019; Sullivan and Awe 2013), so the site presents an excellent case study for chronology building so far in the Belize Valley (discussed in more detail below).

Finally, different methods of chronological evaluation have led to debates about the exact

Table 1. Radiocarbon dates from Actun Halal listed from youngest to oldest.

Lab Number	Context	Material	Conventional ^{14}C yr (BP)	2σ cal range	Reference
PSUAMS-5869	EU 4XTN Lvl 7	Charocal (*Pinus* sp.)	1720±50	AD 145-425	This study
Beta-221899	N98E98, 99.55 cmbd	Charcoal	2410±60	760-395 BC	Lohse 2010
PSUAMS-5868	EU 4 Lvl 5	*Zea mays* kernel	2490±50	790-430 BC	This study
PLD-28975	N97.32E119.82, 97.41 cmbd	Charcoal	2890±25	1195-995 BC	Lohse n.d.
Beta-221895	N97E119, 97.4 cmbd	Charcoal	3080±50	1450-1210 BC	Lohse 2010
PLD-28976	N97.64E119.42, 97.33 cmbd	Charcoal	3220±25	1595-1430 BC	Lohse n.d.
PLD-28977	N97.25E119.2, 97.16 cmbd	Charcoal	3380±20	1740-1625 BC	Lohse n.d.
PLD-28978	N97E119, 97.2-97.15 cmbd	Charcoal	3425±20	1865-1660 BC	Lohse n.d.
Beta-221898	N97E119, 97.2 cmbd	Charcoal	3580±50	2120-1765 BC	Lohse 2010
PLD-28979	N97.1E118.2, 97.17 cmbd	Charcoal	3695±20	2190-2025 BC	Lohse n.d.
PLD-28980	N97.41E118.27, 97.13 cmbd	Charcoal	3715±25	2200-2030 BC	Lohse n.d.
Beta-221896	N97E119, 97.16 cmbd	Charcoal	3800±50	2460-2050 BC	Lohse 2010
PLD-28981	N97E119, 97.05-97.00 cmbd	Charcoal	5265±25	4230-3990 BC	Lohse n.d.
Beta-221897	N97E119, 96.99 cmbd	Sediment	5380±50	4340-4055 BC	Lohse 2010

Table 2. Early Preclassic radiocarbon dates (associated with Cunil phase pottery) reported for the Belize Valley and surrounding regions.

Site	Context	Material	Lab No.	Conventional ^{14}C age (BP)	2σ cal range	Reference
Actuncan	Str. 26, Feature 20: Jar rim with burned offering	Charcoal	PSUAMS- 6700/ UCIAMS-166071	2985±15	1125-1015 BC	LeCount et al. 2017:26
Actuncan	Str. 41, Feature 6: dedication deposit	Charcoal	UCIAMS-116846	2835±20	1050-925 BC	LeCount 2015
Barton Ramie	Mound BR-123, Section 2, 0.22 m below datum, within fire basin	Charcoal	TBN-310-3*	4155±153	3320-2285 BC	Willey et al. 1965:29
Barton Ramie	Mound BR-155, 1.30-1.50 m level of test cut	Charcoal	TBN-310-1*	4016±118	2885-2205 BC	Willey et al. 1965:29
Barton Ramie	Mound BR-123, between Floors D and E, clay fill	Charcoal	TBN-310-2*	3434±131	2120-1425 BC	Willey et al. 1965:29
Barton Ramie	Mounds 123-24	Charcoal	Q-1575*	3200±110	1750-1135 BC	Hammond 1977:62
Blackman Eddy	BR-F3	Charcoal	Beta-122281	2990±60	1405-1045 BC	Garber et al. 2004:Table 3.2
Blackman Eddy	BR-F5b	Charcoal	Beta-162573	2800±60	1050-840 BC	Garber et al. 2004:Table 3.2
Blackman Eddy	BR-F5a	Charcoal	Beta-159142	2750±40	1000-815 BC	Garber et al. 2004:Table 3.2
Blackman Eddy	Bedrock	Charcoal	Beta-122282	2730±40	995-800 BC	Garber et al. 2004:Table 3.2
Cahal Pech	Str. B4 EU 9, Lvl 14, Below Fl. 13	Charcoal	Beta-253771	2970±20	1375-1050 BC	Sullivan and Awe 2013; Ebert at al. 2019b
Cahal Pech	Plaza B, Op. 1-v, Lvl 15	Charcoal	Beta-253773	2940±40	1265-1015 BC	Sullivan and Awe 2013; Ebert at al. 2019b
Cahal Pech	Str. B4, EU 5, Below Fl. 13, on bedrock	Charcoal	Beta-77207	2930±50	1280-980 BC	Healy and Awe 1995:Table 1
Cahal Pech	Str. B4, EU 10, Lvl 21. Fl. 13	Charcoal	UCIAMS-111162	2845±20	1075-920 BC	Ebert et al. 2017

Site	Context	Material	Lab No.	Conventional ^{14}C age (BP)	2σ cal range	Reference
Cahal Pech	Str. B4, EU 8, Lvl 13, Fl. 13	Charcoal	Beta-253772	2840±40	1125-900 BC	Sullivan and Awe 2013; Ebert at al. 2019b
Cahal Pech	Plaza B/4th, Lot PL-B-168, Below Fl. 17	Faunal Bone	UCIAMS-172403	2835±20	1050-925 BC	Ebert et al. 2017
Cahal Pech	Str. B4, EU 8, Lvl 12/13. Fl. 13	Charcoal	UCIAMS-111158	2830±15	1030-920 BC	Ebert et al. 2017
Cahal Pech	Plaza B/4th, Lot PL-B-169, Below Fl. 17	Charcoal	UCIAMS-169816	2820±15	1015-920 BC	Ebert et al. 2017
Cahal Pech	Str. B4, EU 5, Fl. 10A	Charcoal	Beta-77205	2800±50	1110-830 BC	Healy and Awe 1995:Table 1
Cahal Pech	Plaza B/3rd, Lot PL-B-184, Fill/Sascab	Charcoal	UCIAMS-169817	2800±20	1010-900 BC	Ebert et al. 2017
Cahal Pech	Str. B4, EU 5, Fl. 10C	Charcoal	Beta-40865	2740±70	1055-795 BC	Awe 1992:205
Cahal Pech	Str. B4, Fl. 11	Charcoal	Beta-56765*	2730±140	1285-510 BC	Awe 1992:134
Cahal Pech	Str. B4, EU 4, below Fl. 9	Charcoal	Beta-40864	2720±60	1000-795 BC	Awe 1992:136
Cahal Pech	Str. B4, Level 8	Charcoal	Beta-77206*	1950±200	405 BC-AD 540	Healy and Awe 1995:Table 1
Cahal Pech	Str. B4, EU 5, Fl. 11	Charcoal	Beta-77204*	2710±120	1215-540 BC	Healy and Awe 1995:Table 1
Chechem Ha Cave	Chamber 2, Level 10	Charcoal	AA57279	3760±34	2290-2035 BC	Moyes et al. 2009
Chechem Ha Cave	Chamber 2, Level 9	Charcoal	AA57278	3755±35	2290-2035 BC	Moyes et al. 2009
Chechem Ha Cave	Chamber 2, Level 12	Charcoal	AA57281	2931±62	1375-935 BC	Moyes et al. 2009
Chechem Ha Cave	Chamber 2, Level 11	Charcoal	AA57280	2865±33	1130-925 BC	Moyes et al. 2009
Chechem Ha Cave	Chamber 2, Level 13	Charcoal	AA57282	2847±34	1115-915 BC	Moyes et al. 2009
Chechem Ha Cave	Chamber 2, Level 8	Charcoal	AA57277	2826±34	1110-900 BC	Moyes et al. 2009
Nixtun-Ch'ich'	Level AA, bedrock	Charcoal	Beta-232952	2900±40	1220-975 BC	Rice 2019:Table 2
Nixtun-Ch'ich'	Level AA, bedrock	Charcoal	Beta-232953	2880±40	1210-930 BC	Rice 2019:Table 2
Pacbitun	No contextual information	Charcoal	Beta-25377*	2750±100	1215-770 BC	Healy 1990: Table 1
Pacbitun	No contextual information	Charcoal	Beta-25372*	2720±170	1370-410 BC	Healy 1990: Table 1
Xunantunich	Group E bedrock	Charcoal	Beta-275307	4410±40	3325-2910 BC	Brown et al. 2011:212
Xunantunich	Group E paleosol layer	Charcoal	Beta-275306	2890±49	1220-925 BC	Brown et al. 2011:212

*Denotes radiometric measurement.

timing for the appearance of farming villages in the archaeology of the Belize Valley. Lohse (2009, 2010), for example, has evaluated radiocarbon dates from Cahal Pech and Blackman Eddy published prior to 2010, by ordering them chronologically to look at where they fell on a time scale. Focusing on Cahal Pech, he initially suggested that earliest dates from the site are more accurately associated with preceramic or pre-cultural paleosols above bedrock, rather than from Cunil-phase deposits, and therefore the foundation of the sedentary pottery-using settlement probably also begins after 1000 cal BC (Lohse 2010). Inomata (2017) has also used similar datasets to evaluate the beginning of the Cunil phase in the Belize Valley. He applied Bayesian statistical modeling to four dates from Blackman Eddy and six dates from Cahal Pech based on their association with Cunil ceramics. Based on this modeling for Cahal Pech, Inomata argues that the Cunil ceramic phase should be around 1000 cal BC, with the transition to the Jenny Creek phase (Middle Preclassic) starting at around 900 BC. Inomata also suggests that the Cunil complex is lacking key features found in the earliest ceramic traditions of Mesoamerica

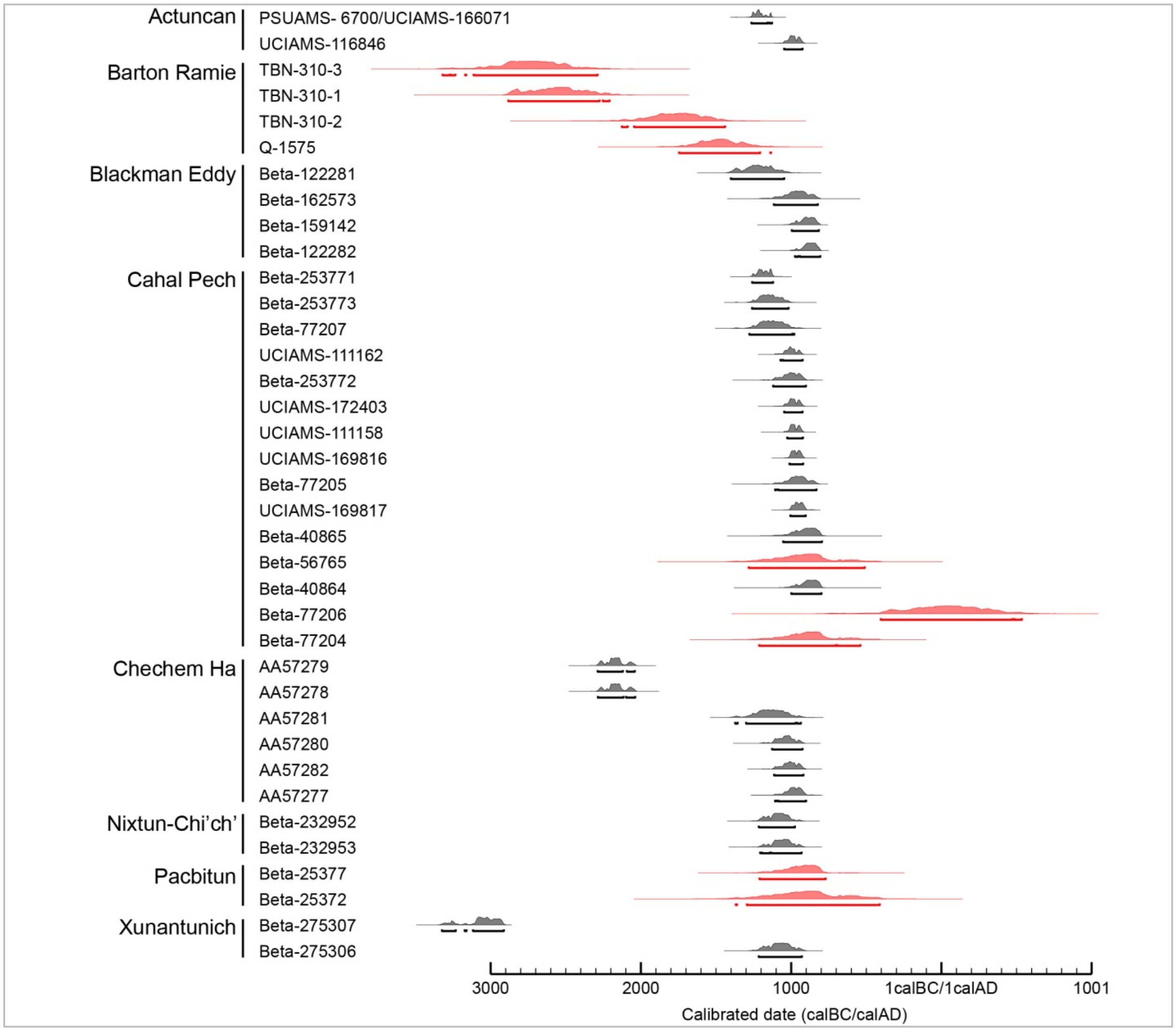

Figure 5. Calibrated 14C dates (2σ ranges) for Early Preclassic sites in the Belize Valley. Data from Table 2.

(e.g., *tecomates*), and artifacts such as figurines more closely resemble those of Middle Preclassic lowlands styles. Based on a revised evaluation of more recently published dates, 1100 cal BC has been suggested by Lohse as a more likely starting point for the first villages in the Belize Valley, with older dates possibly attributed to problematic contextual associations, and/or the mixing of old carbon in Middle Preclassic deposits (Lohse n.d.).

Ordering dates based on ceramic associations provide general timeframes of when specific artifact styles appear in the archaeological record, essentially helping to construct culture histories that can be tested with additional datasets. Chronology building, however, must also address questions about when specific events associated along with the earliest permanent villages in the Belize Valley occurred beyond the appearance of ceramics. Architecture, deposits, and discrete features that appear at different times across a given site represent these events. Therefore, context specific chronological evaluations need to be developed based on additional radiocarbon dates, incorporating *a priori* stratigraphic data. This approach to chronology building has been recently applied at Cahal Pech (Ebert 2017; Ebert et al. 2017), where excavations at Structure B4 and Plaza B have produced one of the longest continuous stratigraphic sequences for the Belize Valley

(Ebert et al. 2017). Bayesian modeling of dates has produced ranges for the earliest Cunil strata between 1195-985 cal BC, with subsequent construction events between 1100-950 cal BC (construction of Floors 12-11; Ebert et al. 2017). Three direct dates from similar contexts also place domestic construction in the earliest strata in the site's Plaza B during the Early Preclassic. Early Preclassic strata included evidence of domestic architecture, which typically consisted of the remodeling of a series of superimposed living surfaces supporting wattle-and-daub domestic structures and postholes dug directly into bedrock (Awe 1992:208; Peniche May 2016). These low buildings are usually located directly on top of black paleosols, which contain only a very small number of ceramic sherds with higher concentrations chert flakes and tools and freshwater shells. Possible Archaic deposits have been documented at Cahal Pech by several investigators, though they have not been directly dated (see Ebert 2018; Horn 2015:316).

Because radiocarbon dates represent confidence intervals, the date ranges discussed above represent estimates for the timing of different events that document the processes underlying early community formation. Additional dating work is needed from multiple sites across the Belize Valley to produce a regional chronology for the Early Preclassic. Our research at Cahal Pech over the past year includes dating of nine additional charcoal samples, both from newly excavated and precisely dated contexts at Cahal Pech, with the publication of results forthcoming. The results will be useful for eliminating potential outlier dates that might bias modeling results, as has been suggested by other researchers. It is also important to keep in mind that these dates represent the first *archaeologically* visible expression of early sedentary Maya communities, and additional chronological analyses of Archaic contexts will help us understand *why* we begin to see villages in the archaeological record of the Early Preclassic.

Cunil Pottery

At the heart of chronological debates about the Early Preclassic is the appearance of the first ceramics in the archaeological record of the Belize Valley. Since Healy wrote his initial overview in 2006, one of the most important advances in the archaeology of this period has been to comprehensively document and define the Cunil ceramic complex, representing the first pottery in the eastern Maya lowlands (Sullivan and Awe 2013; Sullivan et al. 2018). Cunil pottery was initially recognized at Cahal Pech in the early 1990's by Jaime Awe (1992:226-231) as typologically distinct and stratigraphically preceding early facet Jenney Creek (Middle Preclassic) ceramics defined by Gifford (1976; see also Gifford 1970) at Barton Ramie. While the assemblage from these excavations was relatively small, consisting of only about 250 sherds, excavations in subsequence years continued to recover materials from Cunil ceramics. To date over 2000 diagnostic sherds have been recorded at Cahal Pech (Sullivan et al. 2018), with similar contexts also reported from the Belize Valley sites including Blackman Eddy (Garber et al. 2004), Actuncan (Letcount et al. 2019:249), and Xunantunich (Brown et al. 2011; LeCount and Yaeger 2008) over the past 15 years. Cunil deposits have also recently been found at Holmul (Callaghan and Neivens de Estrada 2016) and the site of Nixtun-Ch'ich' (Rice 2019), located in the eastern Petén region of Guatemala, expanding the extent of this Early Preclassic ceramic interaction sphere.

Cunil pottery includes two wares: Belize Valley Dull Wares and Belize Valley Coarse Wares. The coarse wares compose most of the assemblage (65%) and include unslipped utilitarian vessels such as large jars, bowls, as well as some gourd-shaped *tecomates* (Sullivan et al. 2018). Ceramic colanders have also been identified as Coarse Wares and were used by the Early Preclassic Maya to produce *nixtamal* (lime-treated maize; Sullivan and Awe 2013). Along with impressions of corncobs on pottery and maize cupule fragments from household contexts, these data indicate that maize production formed an important component of the diet during the Early Preclassic and likely was the impetus for initial ceramic production. The Cunil complex also includes slipped bichrome serving vessels attributed to the Dull Ware category. Dull Wares form approximately 35% of the assemblage and are characterized by a fine paste tempered with volcanic ash, calcite, quartzite, and mica and/or hematite inclusions (Sullivan et al. 2018). Many

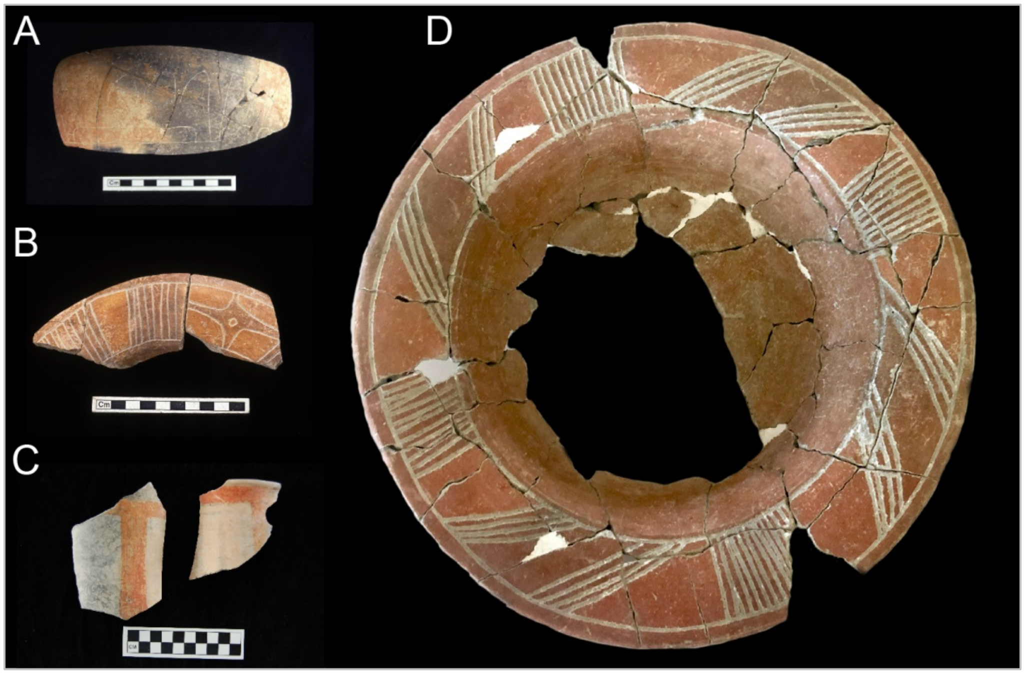

Figure 6. Examples of Cunil ceramics from Cahal Pech including a) Kitam Incised, b) Zotz Zone Incised, c) Uck Red, and d) Zotz Zoned Incised (photos by Jaime Awe and Claire Ebert).

Dull Ware vessels also have matte slips incised with symbols that connect them to widespread Mesoamerican iconography (Figure 6; Garber and Awe 2009; Sullivan and Awe 2013).

A recent instrumental neutron activation analysis (INAA) study of Cunil ceramics from Cahal Pech identified three distinct compositional groups (A, B, and D) containing Cunil ceramics, indicating a preference for specific paste recipes during the Early Preclassic (Ebert 2017; Ebert et al. 2019b). Analyses identified two compositional groups to which most Cunil sherds were attributed. One compositional group (*n*=71) consists of utilitarian vessels, including unslipped jars and bowls used for daily tasks including water storage and cooking. The Cunil phase samples in this group can be attributed primarily to the Belize Valley Coarse Ware category. This paste recipe for the Cunil samples in this group overlaps with Middle Preclassic ceramics, suggesting continuity in local utilitarian ceramic production. A second compositional group (*n*=34) contains ash tempered sherds and some with fine texture calcite pastes, characteristic of Cunil Dull Wares. Many samples in this group are types that are typically decorated with dull slips and post-slip incising (e.g., Baki Red Incised, Mo Mottled, and Kitam Incised types; see Sullivan and Awe 2013). Specimens in this first group were also found to be compositionally unique compared to a large database of ceramics previously analyzed by the Missouri University Research Reactor (MURR), indicating that decorated Cunil pottery was produced at and distributed locally between communities within the Belize Valley (Ebert et al. 2019b). Because many of these vessels possess incised motifs with significant ideological meaning, they may have been produced and used as a publicly visible medium to communicate differences in wealth and status within the Early Preclassic Cahal Pech community (Ebert et al. 2019).

Trade and Exchange

In addition to being integrated into broader Mesoamerican social systems, new data also indicates that Early Preclassic Belize Valley communities were active participants in interregional economic networks. Healy (2006:20) noted the presence of exotic imports in Preclassic contexts including obsidian, greenstone, and marine shell, but noted that the actual "mechanisms for trade" had yet to be explored. Since then, researchers have focused

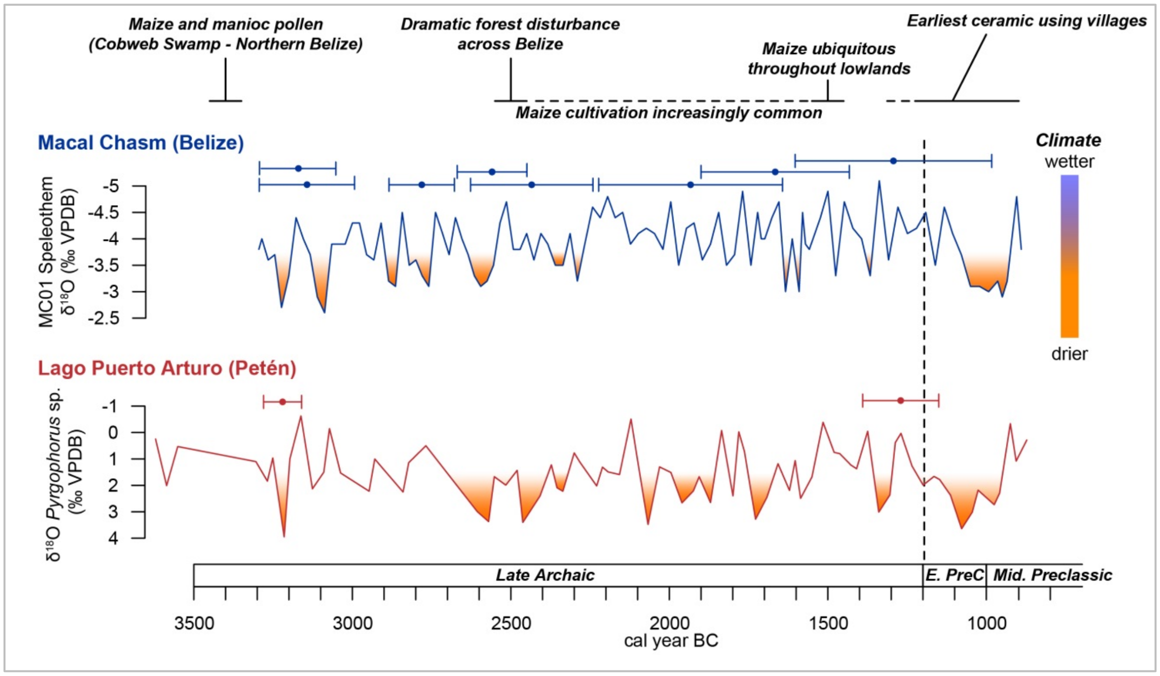

Figure 7. Preclassic paleoclimate records with Macal Chasm (MC01) δ18O speleothem record (Akers et al. 2016) at top and and Lago Puerto Arturo gastropod (Pyrgophorus sp.) δ18O record (Wahl et al. 2016) on the bottom. Directly dated historical events (2σ calibrated ranges) are indicated at top. Vertical dashed line shows approximate onset of drier conditions at the beginning of the Preclassic.

Figure 8. Map of Maya lowlands with paleoecological datasets and chorological data highlighted. Dates listed in calibrated 14C years.

on documenting the types of trade and exchange underlying household economies of the Early Preclassic, especially obsidian tools production that would have provided the "cutting edge" for early agriculturalists. The best evidence for this comes from published obsidian datasets from Cahal Pech, where the Early Preclassic obsidian assemblage was derived exclusively from excavated contexts at Structure B4 in the site core (Ebert 2017; Ebert and Awe 2018). While this is relatively small compared to later Classic period assemblages (*n*=22), both technological and geochemical source data provide clues about how Early Preclassic Maya of the Belize Valley engaged in long-distance exchange. Obsidian nodules and percussion flakes compose more than half of the assemblage (~68%, *n*=15), with only one pressure blade present in early contexts. The presence of some cores and decortication debris suggests that nodules were imported and flakes produced on site. This stands in contrast to later Preclassic and Classic period assemblages, where most artifacts are blades that were probably imported as finished tools (Ebert 2017).

Only two other studies, one at Blackman Eddy in the lower Belize Valley (Kersey 2006) and the other in the Copan Valley of Honduras (Aoyama 1999), have reported obsidian source data for the Early Preclassic period. Comparisons indicate that Early Preclassic sites developed distinct long-distance networks to provision their households with large quantities of non-local obsidian. Whereas Cahal Pech relied solely on El Chayal obsidian (*n*=22), data for contemporaneous contexts at Blackman Eddy (*n*=5) shows a reliance upon obsidian from the San Martin Jilotepeque source during the Early Preclassic (Kersey 2006). In contrast, a larger sample (*n*=76) from sites in the Copan Valley show that early communities consumed only obsidian from the Ixtepeque source, which was relatively close to the region (Aoyama 1999:53).

Paleoecological and Paleoclimate Datasets

Over the past 15 years, new paleocological and paleoclimate datasets from across have provided clues about the processes affecting the earliest inhabitants of the Maya region, including the Belize Valley. These were not available at the time of Healy's initial assessment but have provided a wealth of knowledge about the ecological and climate context of first Maya communities in the Belize Valley, and beyond. Perhaps one of the most interesting questions these new data bring up is *why* people would settle on the landscape in permanent farming communities in the first place. The first evidence for agriculture in Belize appears in environmental records around 3500 cal BC, when paleoecological studies in northern Belize document maize and manioc pollen, along with evidence for forest clearing and burning for slash-and-burn farming (Figure 8; Pohl et al. 1996). Paleoenvironmental records and archaeological data from across the Maya lowlands suggests that maize production dramatically increased after 2400 cal BC and was ubiquitous by 1500 BC indicating committed farming (northern Belize, Jacob 1995, Jones 1994; Petén, Wahl et al. 2016; Honduras, Kennett et al. 2017).

With these early developmental trends in mind, we can examine how they correspond with paleoclimate archives. Consideration of two paleoclimate records located relatively close to the Belize Valley helps to put these developments in perspective (Figure 7). The first record is from Macal Chasm, located ~25 km south of the Belize Valley (Akers et al. 2016). The second is a lake sediment core from Lago Puerto Arturo in the neighboring Petén region of Guatemala (Wahl et al. 2016). Both records indicate relatively humid and stable conditions in the eastern Maya lowlands (encompassing the Belize Valley) during the Late Archaic, especially when we see maize cultivation increase dramatically in paleoecological records (Ebert et al. 2019). It is not until a relatively dry period in paleoclimate records that we see the first ceramic-using villages in the regions. A third record from Lake Tuspan (Petén) also documents earlier periods of drought during the transition from the Archaic and Early Preclassic (~1800-1000 BC), with wetter conditions prevailing during the beginning of the Middle Preclassic (Nooren et al. 2018).

Severe and protracted droughts throughout the Preclassic would have affected the entire Maya region, and posed serious risks to agricultural production (Ebert et al. 2017, 2019; Medina-Elizalde et al. 2016). Current settlement data suggest that population levels in the Belize Valley were likely very low during the Early Preclassic, however, offering little competition in the resource-rich alluvial valley so that climate change may not have been an important factor in settlement. If food production was not impacted by climate change, evidence for agricultural intensification should vary with periods of climatic drying from the Late Archaic through Early Formative, with increases in paleobotanical evidence (e.g., pollen, macrobotanicals) temporally corresponding with more stable and humid climatic conditions. Alternatively, if food production was negatively impacted by climate change, the appearance of different types of risk management strategies (e.g., storage facilities for pooling and redistribution of resources) may develop with the onset of drying climate conditions at the beginning of the Early Preclassic period. Additional research at the regional scale is necessary to address this hypothesis.

Future Research

Archaeologically detectable evidence for settled farming communities occurs almost 1000 years later in the Maya lowlands compared to other parts of Mesoamerica (Rosenswig 2015) and followed several millennia of intensive exploitation of wild plant foods and low-level food production during the Archaic period (Kennett 2012). New datasets produced by archaeologists over the past 15 years are helping us to answer the question of not only when but also how ancient Maya civilization began, yet treatments of this subject are still uncommon. Few sites in the Maya lowlands have produced contextual evidence of Early Preclassic occupation, and Preclassic period contexts are often deeply buried beneath later Classic period (~AD 250-900/1000) monumental architecture, making them relatively inaccessible (Rosenswig 2015). We suggest four avenues for future research that can help to fill in gaps in our knowledge. First, additional chronological data is necessary to compare multiple early occupational sequences in the Belize Valley, as well as to reconstruct broader spatial, demographic, and economic developments at the regional level. As noted above, only one or two radiocarbon assays have been produced for many sites. Multiple dates from early contexts are necessary to create robust chronologies with strong anchors. Site-specific chronologies can also be directly compared to other archaeological, paleoclimate, and paleoenvironmental records to document the timing for food production intensification and to understand the dynamic nature of settlement patterns in the Early Preclassic Belize Valley.

Second, additional archaeometric analyses of Early Preclassic materials are needed. While we have conducted both INAA of pottery and pXRF for obsidian artifacts from Cahal Pech, few comparative studies are available to examine boarder regional trends. These data are incredibly important because they can document variable mechanisms of trade and exchange between sites in the Maya lowlands that formed the foundation for socio-economic inequality in subsequent periods.

Third, integration of environmental datasets will be vital for future research on the Early Preclassic. The first Maya communities in the archaeological record were farming communities. Climate change, including protracted droughts, affected the entire Maya region over the past several millennia and likely posed serious risks to agricultural production, including during the beginning of the Preclassic. While many paleoclimate proxy records from the lowlands span the duration of Archaic-to-Preclassic transition, less research has been devoted to comparing climate fluctuations to cultural changes during this time compared to the Terminal Classic. These data will be essential for understanding the variability in responses to environmental changes, such as drought, which likely served as important drivers in the dynamics influencing aggregation within Early Preclassic communities.

Finally, researchers need to focus on developing new datasets beyond those addressed in this paper to answer questions about how and why the first Maya farming communities emerged. These include paleobotanical and zooarchaeological data that can tell us about changing subsistence practices, which incorporated a broad array of resources that required a broad range of inputs and tactics of exploitation. These will not be easy tasks to undertake but are necessary to provide a holistic picture of the earliest Maya villages that provided the foundation for this important Mesoamerican civilization.

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