

THE RISE AND FALL OF A SECONDARY POLITY: LA JOYANCA (GUATEMALA)

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Introduction

Paleoenvironmental studies have recently made impressive contributions to our understanding of the Maya Lowland Terminal Classic crisis (e.g. Dunning et al. 2012; Hodell et al. 2005; Kennett et al. 2012; Leyden 2002). They put much emphasis on the detection of drought episodes during the ninth century and later. There is no doubt that such events had an impact on Maya sociopolitical dynamics, although ninth-century droughts may have entailed relatively moderate rainfall reduction (Medina-Elizalde et al. 2010, 2012). Not only Maya agriculture but also urban populations were vulnerable to variation in precipitation (Scarborough et al. 2012). However, it is problematic to spatially extrapolate the results of those paleoenvironmental analyses to distant sites across the Lowlands (Aimers and Hodell 2011). Moreover, the impact of reconstructed climatic events does not appear to have been as direct and synchronous as we would expect, and the concatenation of environmental and sociopolitical factors remains poorly investigated (Butzer 2012; see Demarest, this publication). We are now in pressing need of local transdisciplinary studies combining archaeology with paleoenvironmental proxies, allowing interpretations focused on circumscribed, relatively small-scale research “windows.”

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Figure 1. Map of northwestern Petén, Guatemala, locating la Joyanca, Zapote Bobal, and El Pajara (Proyecto PNO-La Joyanca).

The La Joyanca uplands south of the San Pedro Mártir river have been the locus of such research from 1999 to 2003 (Figure 1; Arnauld et al. 2004; Carozza et al. 2007; Métaillé et al. 2003), with additional fieldwork conducted in 2006, 2010 (Barrios 2010), and 2012 (Arnauld et al. 2012a, 2012b, 2013b). The archaeological methodology applied to the site is global as it takes into account the settlement as a whole in order to reconstruct the local society. Paleoenvironmental analyses currently in progress are based on a series of three sediment cores taken from Laguna Tuspan, 5 km from the site — a spatial proximity that is rare in the Lowlands. Surrounding uplands were also surveyed and their Classic occupation has been briefly evaluated.

La Joyanca is a secondary center that rapidly reached its apogee by the Late-Terminal Classic, then gradually lost its population from AD 850 to 1050. In general terms, the balkanization process that successfully supported the late development of this secondary center did not deter the collapse of the local community (for similar cases in Belize, see Iannone 2005: 27). Indeed, it may have rather exacerbated its political, agricultural, and demographic failure. At least initially under the dominance of some regional power (probably Hix Witz, see below), by AD 600 the local dynasty began building the public plaza of the settlement that was rapidly urbanizing during the Late Classic period. While it politically collapsed a few generations later, ca. 800-850, neither the higher-rank residential groups nor their associated lower-rank neighborhoods were abandoned. Instead it appears that the local population gradually drifted away from the settlement, leaving the site almost deserted

by approximately AD 1050. A sharp contrast thus exists between the rapid destruction of the political entity and the slow disintegration of the local urban society, which apparently managed to withstand climatic and political, perhaps also military, events for as long as two centuries, from 850 to 1050. We focus on this political collapse and its apparent consequence, the gradual “dis-urbanizing” process, against the background of drought episodes and regional turmoil.

We first present the occupational sequence of La Joyanca, along with the main lines of its demographic and environmental dynamics through the Classic period, then briefly discuss the evidence on its public plaza of political events that apparently occurred by AD 800–850. Preliminary results of multi-proxy analyses from both Tuspan A and B lacustrine cores will be mentioned, but not outlined in detail (Fleury et al., in preparation). We argue that the politically dominant group in the city, impacted by external pressure and drought episodes, lost its primacy through a series of events that appear to have definitively destroyed the political community. Although relatively more resilient, local social groups would have then diminished in size, as the recently urbanized population (at the turn of the Early to Late Classic periods) may have never fully stabilized in the settlement, threatening all social constituent parts with disintegration. Peasants gradually abandoned the city, returning to their earlier, more “rural” way of life.

La Joyanca

This medium-sized, clearly nucleated settlement is set on uplands 80 m high above perennial swamps and small lakes, endowed with deep fertile soils, but vulnerable to drought (cf. Figure 1). The density of structures is high (635 over 1.6 km², or 457/km²; Figure 2), and at its apogee, by AD 750–850, the small city or large village may have reached 1,200 to 1,500 inhabitants (Lemonnier 2009). The Main

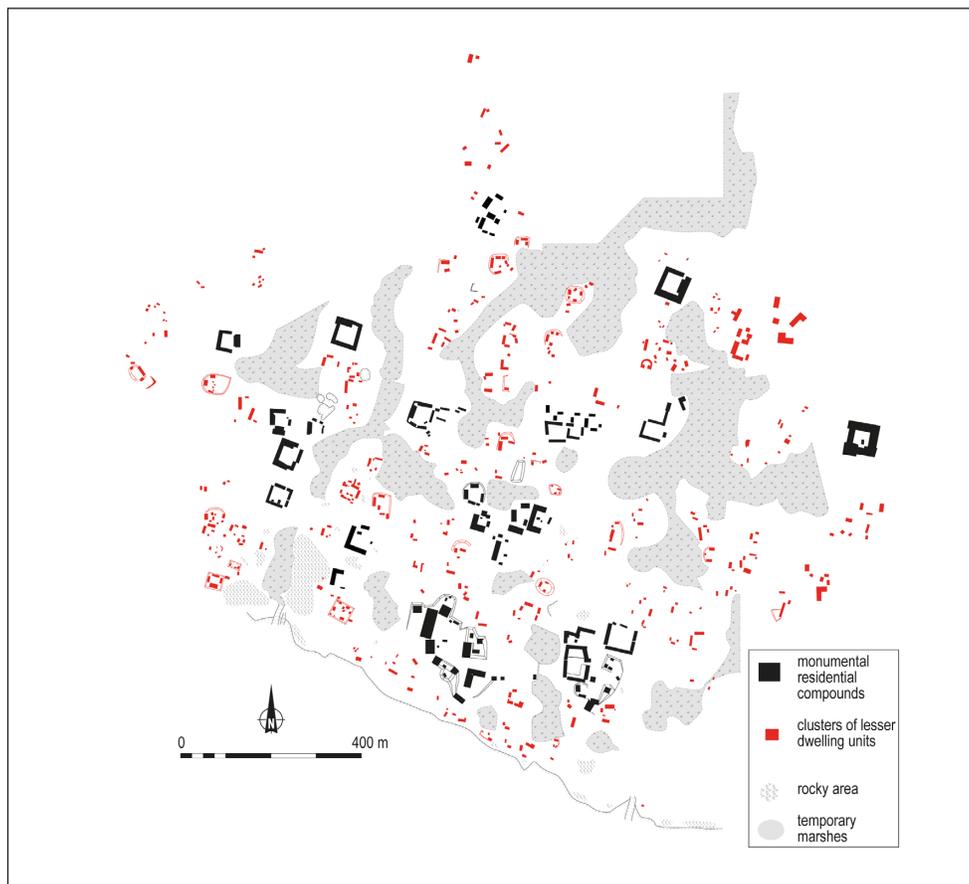


Figure 2. Site map of La Joyanca (Proyecto PNO-La Joyanca, G. García, E. Lemonnier, E. Barrios).

Plaza is surrounded by a number of large buildings, among which two facing temples formerly stood on pyramidal substructures (13 m high), and one building 52 m long extends on a high platform with a wide stairway on the west side. Only one stela has been found, located not in the Main Plaza but in one of the elite residential compounds — labelled Guacamaya — with an inscription dating to the Early Classic period, when the local social group probably began exerting some degree of dominance over the community. In view of associated features in this residential compound (with the stela: monolithic altars, one masonry altar, an elaborate tomb with a bone artefact incised with glyphs including an emblem glyph; Arnauld et al. 2004: 48-52), such “dominance” can be attributed to divine rulership, a political regime well-illustrated in most Late Classic primary centers (Grube 2011; Sharer and Golden 2004).

At a larger scale, the La Joyanca region is part of the northwestern Petén circumscribed by three rivers, the Usumacinta on the west, the San Pedro Mártir to the north, and the Pasión to the south (cf. Figure 1). The Hix Witz (Hixwitz, or Hiix Witz) kingdom would have been the main political entity in the sector, with El Pajal and Zapote Bobal as dual (or successive) head centers (Fitzsimmons et al. 2009; Gámez et al. 2007; Martin and Reents-Budet 2010; Stuart 2012). Uncomfortably inserted midway amidst the Yaxchilán, Petexbatún, El Perú-Waka’, and Tikal kingdoms, Hix Witz was involved in the alliance systems between the hegemonic powers represented by Tikal and Calakmul, but “directly engaged in Calakmul’s sphere of interaction in the late seventh century” (Martin and Reents-Budet 2010: 5). El Pajal and La Joyanca are located in easily defensible high places, whereas Zapote Bobal has some partially defensible locales.

At the local scale, it is important to note that the city shows a clear internal structure of eleven “neighborhoods” (Figure 3), each including a Class II residential compound (Class I being the previously mentioned Guacamaya compound) surrounded by Class III-IV clusters of lesser houses (up to 83 structures each; Lemonnier 2012). It can be argued that rivalry among those social groups may have weakened, or even destroyed, the local rulership by AD 800-850, although, as will be discussed below, external pressures may have been a more proximate causal factor. These same social groups, including the one that had ruled the city, were resilient enough to survive the political crisis, retaining at least part of their subordinate population and building additional vaulted residences over the course of at least four generations. Almost total abandonment terminated the settlement by AD 1050 or even 1100.

Paleoenvironmental and Archaeological Sequences of La Joyanca

The following narratives briefly summarize the Classic part of the paleoenvironmental sequence from Lake Tuspan on one hand, and on the other, the archaeological occupation-construction sequence of La Joyanca elite compounds and Main Plaza. We also give preliminary results of the 2012 fieldwork research that was focused on the occupational sequence of the low-rank units in the residential zone.

Tuspan Lacustrine Cores

After a first attempt in 2000 in the north part of the lake, two cores were extracted in 2001 then 2006 from the southern tip of the lake (cf. Figure 1). They are distant 5 km from La Joyanca as the crow flies and directly beneath two archaeological sites located on the high southeastern bank, Tuspan and Las Aguadas. Together these sites have a total of 21 domestic units (57 structures), along with 21 *aguadas* and 7 *chultun*, two distinct types of water reservoir (Arnauld et al. 2013b). This high number indicates that water provisioning was a serious concern for the ancient population despite the proximity of the lake below. The Tuspan A core sequence has been published (Galop et al. 2004) while analyses on Tuspan B and C are still in progress (Fleury et al., in preparation).

From 100 BC to AD 200, there is a marked decrease in agricultural activities, with no signal at all by AD 100, at the end of the Preclassic (Galop et al. 2004: 58 *passim*). Later, activities resumed and by AD 400-500 they reached a climax when all signals consistently indicate extensive land use in the lake surroundings. Then, after AD 540 (or AD 400 according to the most recent evidence; Fleury et

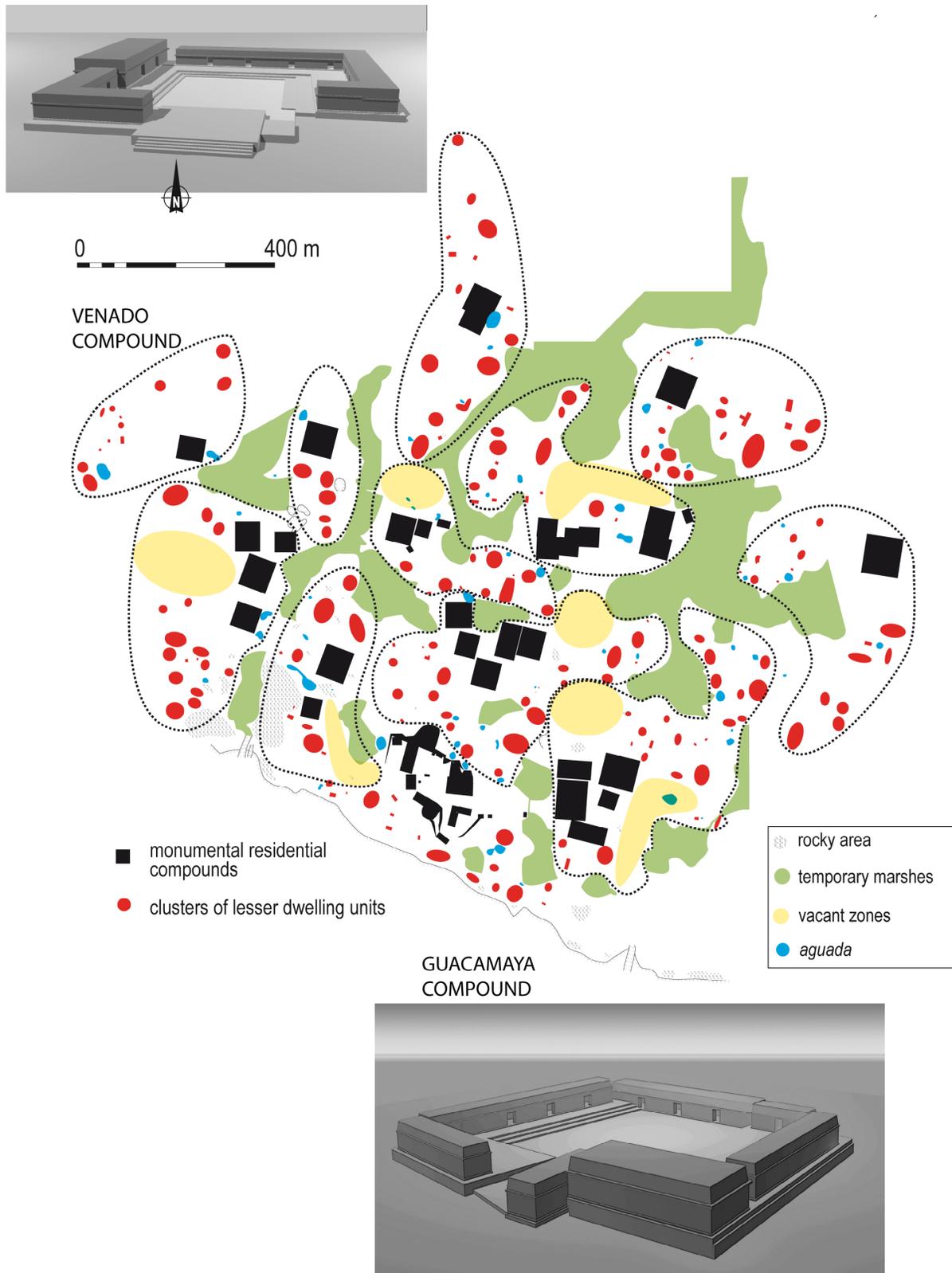


Figure 3. La Joyanca neighborhoods and their components: monumental residential compounds (Classes I-II), clusters of smaller dwelling units (Classes III-IV), temporary marshes or *bajos*, and vacant zones (possible cultivated zones; modified from E. Lemonnier 2009), with rendering of monumental compounds (Proyecto PNO-La Joyanca, T. Saint-Dizier).

al. in prep.), a marked decrease in activities is again noted in the same surroundings, while evidence of deforestation and soil erosion indicates continuous land use farther away from the banks. Lastly, by AD 800 reforestation begins and the erosion signal stops, an interruption in activities that seems to be generalized spatially, suggesting that the regional population left or drastically decreased. Later on, hints of agricultural activities (some degree of deforestation and maize pollen) are dated to AD 1150-1200.

This narrative is consistent with most recent results bearing on climatic shifts with drought episodes dated to the end of the Preclassic (AD 150-200), the Terminal Classic (AD 800-1050), and the eleventh century (e.g. Kennett et al. 2012). The unexpected component is the early decrease in local agriculture around the Tuspan lake from AD 400 or 540 on. As this does not appear to be an artefact resulting from dating methods, population mobility — or alternatively, a demographic catastrophe — is the most likely explanation for this early interruption during the Early Classic.

The Archaeological Sequence of La Joyanca

The chronoceramic sequence has been published (Forné 2006). It is partially based on a series of twenty-one ¹⁴C calibrated dates (Arnauld and Forné 2004). The Early Classic phase, La Flor, extends from AD 250 to 600, the early Late Classic Abril 1 phase is dated 600 to 750, and the late Late Classic subphase Abril 2, 750 to 850. A re-analysis of Terminal Classic ceramics has also been completed (Forné 2005) allowing the Tuspan phase to be divided into two facets, Tuspan 1 (850-950) and Tuspan 2 (950-1050) (Figure 4).

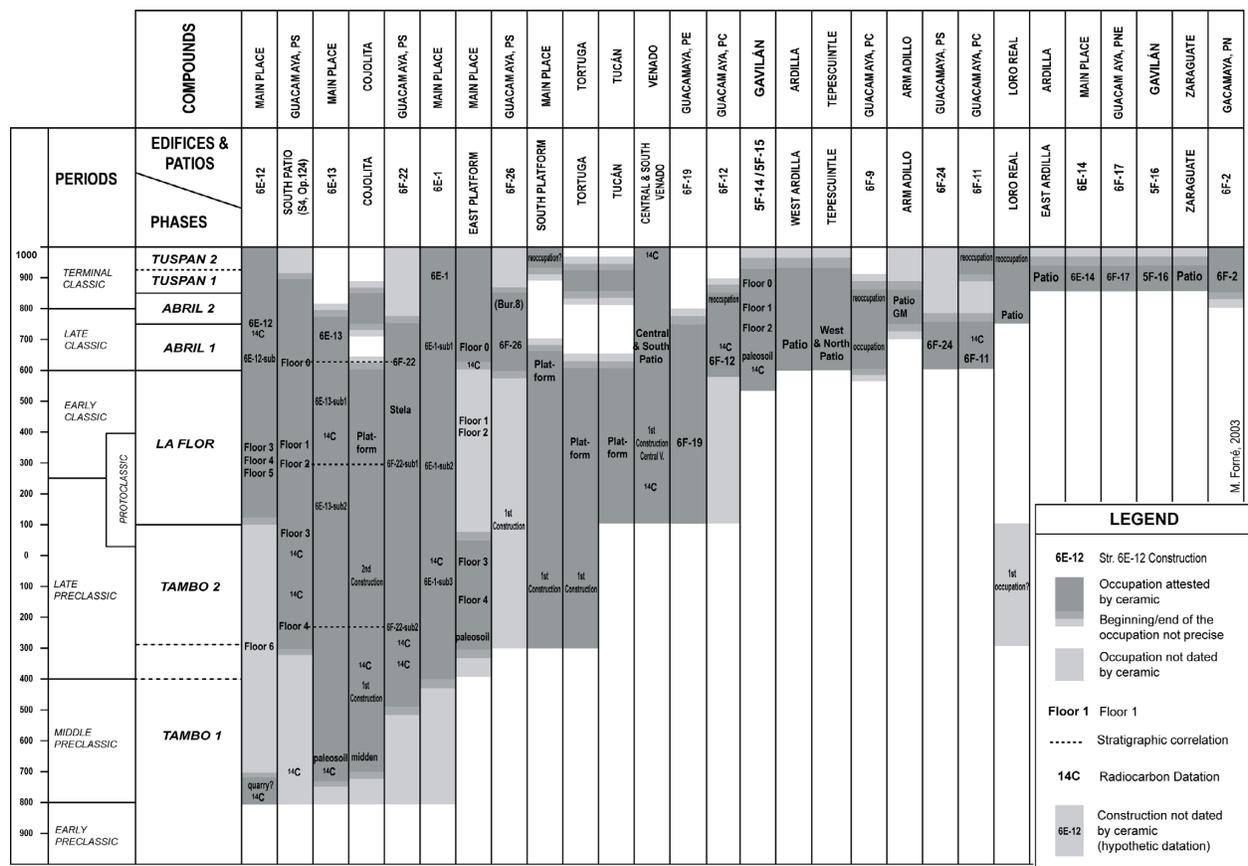


Figure 4. General La Joyanca construction sequence (excavated structures of the public plaza and residential zone), including monumental and non-monumental architecture (modified from M. Forné 2006); note that many structures were built or rebuilt by AD 600.

Among the eleven elite compounds which spatially determine (along with other features) the corresponding neighborhoods, seven have been dated. Guacamaya's five large patio groups were subject to extensive excavations allowing us to establish a precise sequence of their construction and occupation (Breuil-Martínez et al. 2004). The sequence of the Main Plaza is also relatively well known (Arnauld and Forné 2004). What was unknown until the 2012 fieldwork was the timing of the foundation and abandonment of the lesser-ranked patio groups.

The site was occupied during the Middle and Late Preclassic periods, but monumental construction in the patio groups and the Main Plaza dates to the Early-Late Classic transition, AD 600-650. By this time, out of the five earliest elite compounds (Tucán, Cojolita, Venado, Tepescuintle, and Guacamaya), all clustered in the southwest fringe of the *meseta* close to the Main Plaza (Figure 5), two were abandoned, or lightly occupied. Guacamaya was the place where the site's stela

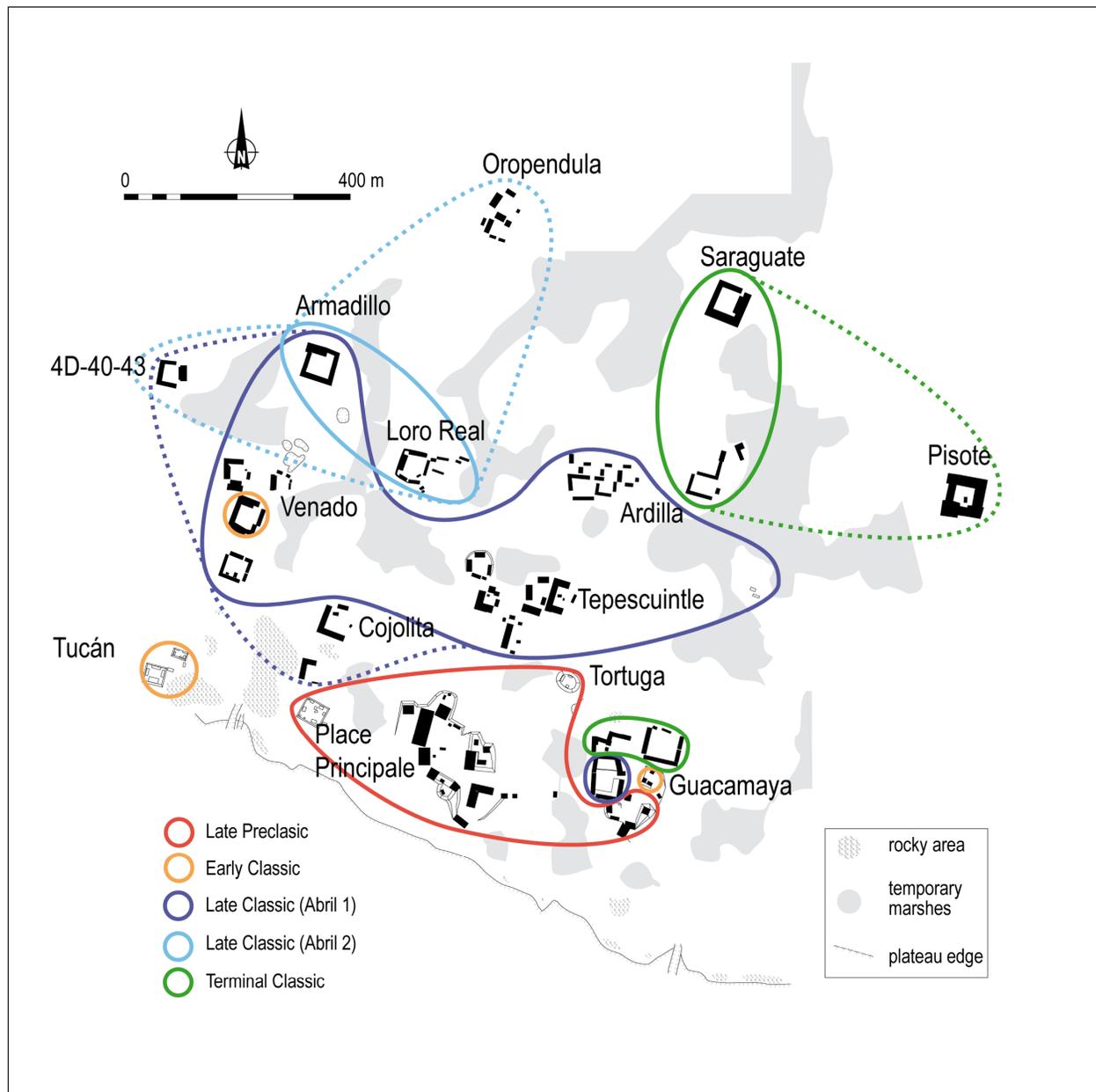


Figure 5. Space-time model for the settlement expansion (E. Lemonnier 2009).



Figure 6. Stela 1 discovered in the Guacamaya Compound (Proyecto PNO-La Joyanca).

was erected (Figure 6). Its inscription includes a date, AD 485, and a mention of one name, Chan Ahk, associated with Hix Witz, according to David Stuart (2003, 2008; see also Arnauld et al. 2004: 51; Fitzsimmons et al. 2009; see Guenter 2005 for several identical names at El Perú-Waka'). The associated tomb, with the inscribed bone showing an emblem glyph, is stratigraphically and stylistically synchronous with the stela date. A few generations later, the first vaulted residences of the Guacamaya compound were built by 600-650, as well as a vaulted, three-room ritual house on the Main Plaza located 400 m to the west. Arguments supporting the spatial and symbolic relation between this building and the Guacamaya stela-altar-tomb complex have been presented (Arnauld 2004; Bazy et al. 2010).

The Main Plaza acquired its final shape by AD 750, with the construction of the east and west temple pyramids (the west one built over the earlier ritual house just mentioned) and the long hall with a large stairway, 6E13, a type of building present in many epicenters but little studied (Figure 7; see Arnauld 2001; Bey et al. 1997). The latter was completely excavated from 2000 to 2002.

Structure 6E13 (52 m in length), initially a long hall open on the plaza with just one central masonry bench, was later subdivided into six rooms, the largest ones at the extremes and the smallest on both sides of the central bench room (Figure 8). This internal evolution has been interpreted as reflecting specific political dynamics between the ruler — who supposedly occupied the central bench — and the chiefs of the most powerful “houses” corresponding to the elite compounds in the settlement: partition of 6E13 would reflect a loss of effective power for the ruler, whose central reception room became narrowly framed by the rooms of those lesser chiefs (Arnauld et al. 2004: 111-113). In this central room, archaeological evidence dated ca. AD 800-850 points to the occurrence of some violent episode that will be briefly described below. Afterwards the plaza seems to have been abandoned, although there was still some ritual activity in the temples. One C-shaped residence (Rice 1986) was built on the Plaza close to 6E13 during the Terminal Classic.

At that time, only one Late Classic elite compound had been abandoned (Armadillo). Vaulted residences were added on the sides of large patios at Guacamaya and Saraguata as late as Tuspan 2, (i.e., after AD 950). But by 1050, the settlement was largely abandoned. A trench excavated in colluvial

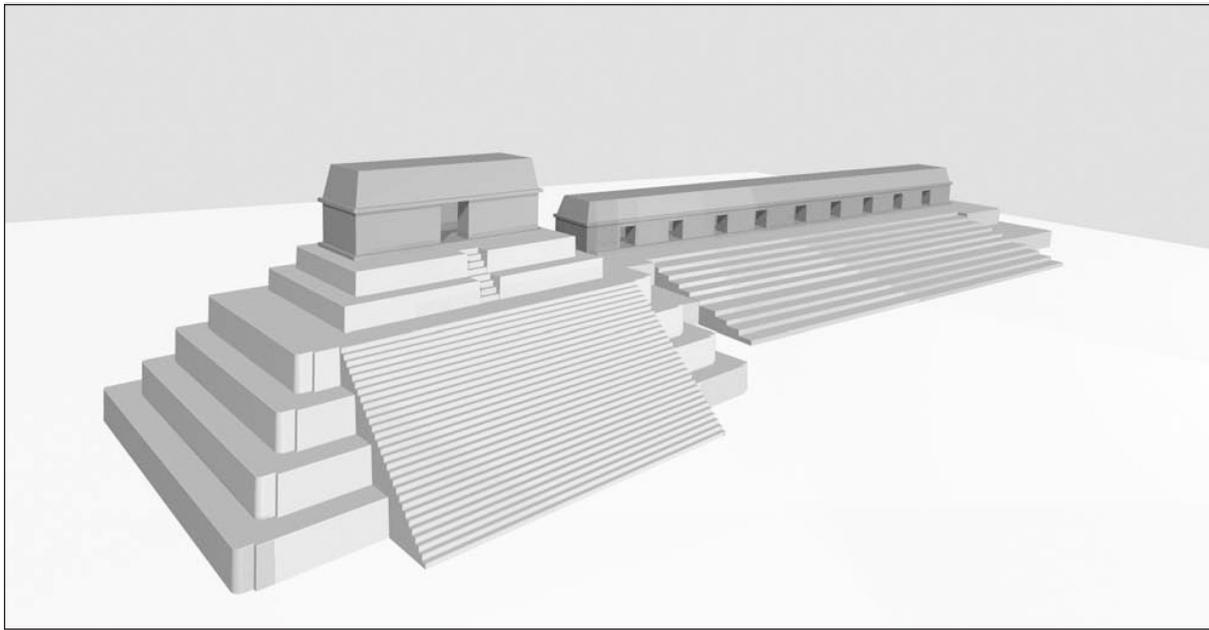


Figure 7. Public buildings on La Joyanca Main Plaza west side (background: Structure 6E13; Proyecto PNO-La Joyanca, rendering T. Saint-Dizier).

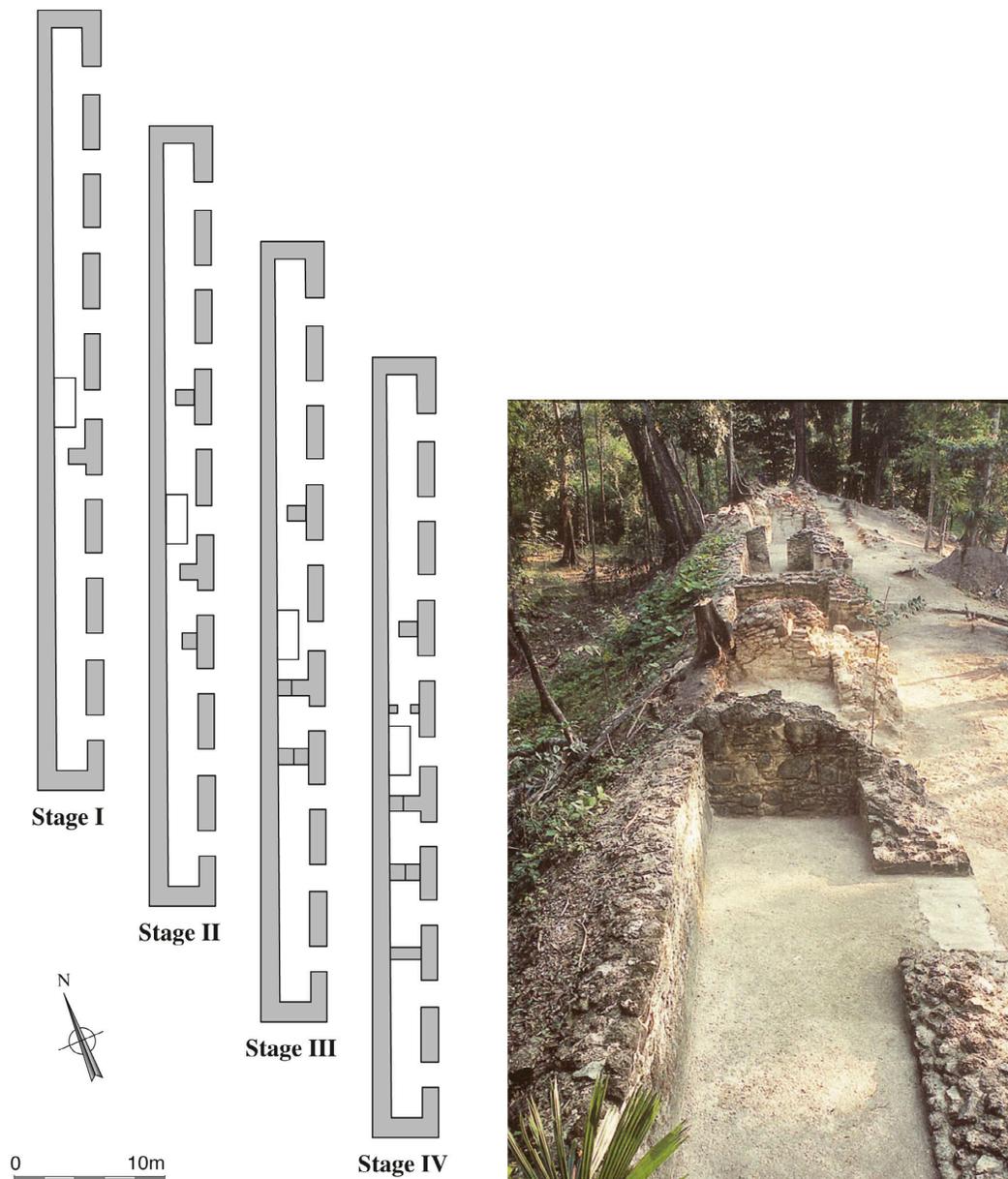


Figure 8. Modifications of Structure 6E13 (M.-C. Arnauld).

sediment at the base of the site escarpment south of the Guacamaya compound provided one ^{14}C dating: 1020(1160)1230 (2 sigma; Beta 155684). The Tuspan ceramics do not include Postclassic diagnostics.

The 2012 fieldwork aimed at testing the hypothesis that the majority of the lesser houses (lower-ranking dwelling units clustered in neighborhoods) had been founded as a result of a population movement into the settlement that would have occurred by the Early-Late Classic transition, explaining the abrupt decrease in land use close to the Tuspan lake (starting from AD 400-540, see above). Forced resettlement has sometimes been hypothesized for the formation of Mesoamerican Classic (or Postclassic) cities (Jones 1982: 291; McAnany 1995: 96).

Briefly, the preliminary results are the following (Arnauld et al. 2013a, 2013b). The test pit program designed to date at least 30% of all low-ranking units ($n=171$) sampled the three neighborhoods closest to the Plaza and next three to the north. In each of them test pits were excavated in 54% to

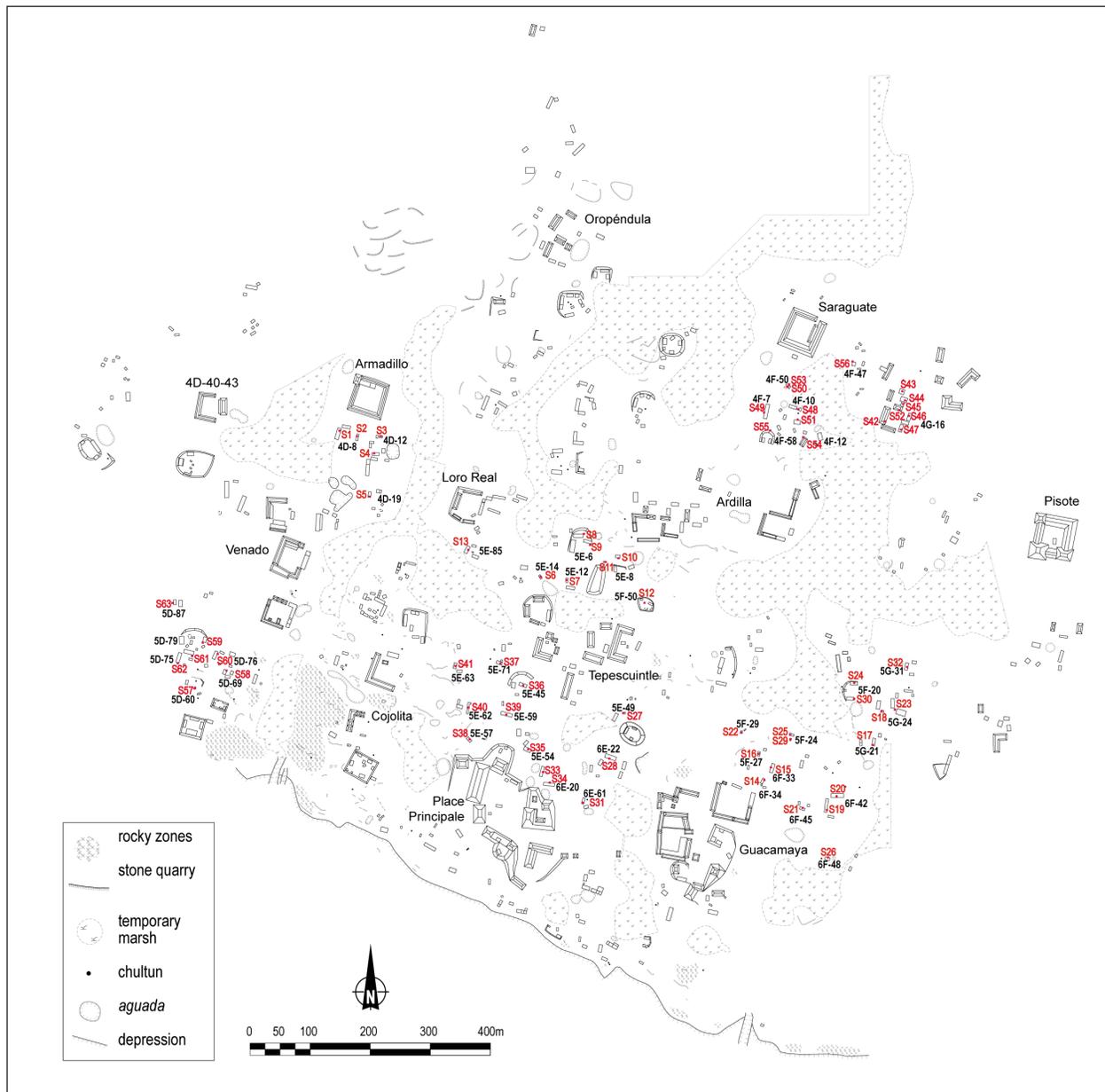


Figure 9. Site map of La Joyanca with test pits (in red) dug in Classes III-IV dwelling units, 2012 (Proyecto La Joyanca-Tuspan B).

60% of all units (Figure 9). Pending further analysis of the 63 test pits carried out from June 13 to July 15 (Arnauld et al 2012a, 2013a, 2013b), what can be provisionally deduced is that, as predicted, a majority of units were founded in the Late La Flor or Early Abril 1 phases. However, occupation is denser during Early Classic times than expected, and it will be difficult to discriminate potential immigration from in situ growth in this early occupation. In any case, there is no doubt that the strongest and most rapid demographic dynamics (immigration and in situ growth) of the city is to be dated Abril 1, Early Late Classic, just before the construction of the six sampled elite compounds and of the Main Plaza public buildings. The correlation proposed between rapid, large building programs and urban population growth (either through immigration or in situ growth) is potentially promising.

As for the timing of the lesser dwellings' abandonment, it did occur during the Terminal Classic. But pending further analytical evaluation, we must admit that archaeological test pits and

chronoceramic dating methods probably fail to detect a synchronous process in all, or a majority, of the sampled units. Unfortunately, under conventional methodology, in small mounds upper stratigraphic layers give too little information on context and material. Chronoceramic datings tend to confirm that abandonment episodes occurred during Tuspan 1, starting from AD 850. However, this does not mean that people were leaving the city at that time, as a number of lesser ranking families may have moved into the latest-built residences in large elite compounds (i.e., Guacamaya and Saraguat). In any case, the evidence is that the population most probably kept on drifting away from the settlement during the Tuspan 2 subphase (AD 950–1050). The paleoenvironmental sequence suggests a gradual process of abandonment starting by AD 800 at the earliest, perhaps still underway by 1000 or 1050, if not later on.

A Violent Episode in Structure 6E13 (Main Plaza)

Even though it still seems speculative to correlate archaeological traces of violence with political collapses (i.e., dynastic ruptures ending the system of divine kingship), when detected they must be carefully observed and compared so as to evaluate the causes, effects, and timing of potentially specific processes. In the case of La Joyanca, Structure 6E13, the long edifice bordering the west side of the Main Plaza (cf. Figures 7 and 8), provides this type of evidence. The central masonry bench was dismantled with all veneer stones removed, the vault was abruptly collapsed — probably by extracting or burning the lintels (see Fash et al. 2004: 272) — and one corpse (or living individual) was thrown amidst the fallen flagstones and rubble on the bench side (Figure 10; Breuil-Martínez et al. 2001: 70–71). Also close to this pseudo burial, we found traces of ritual activities, with charcoal

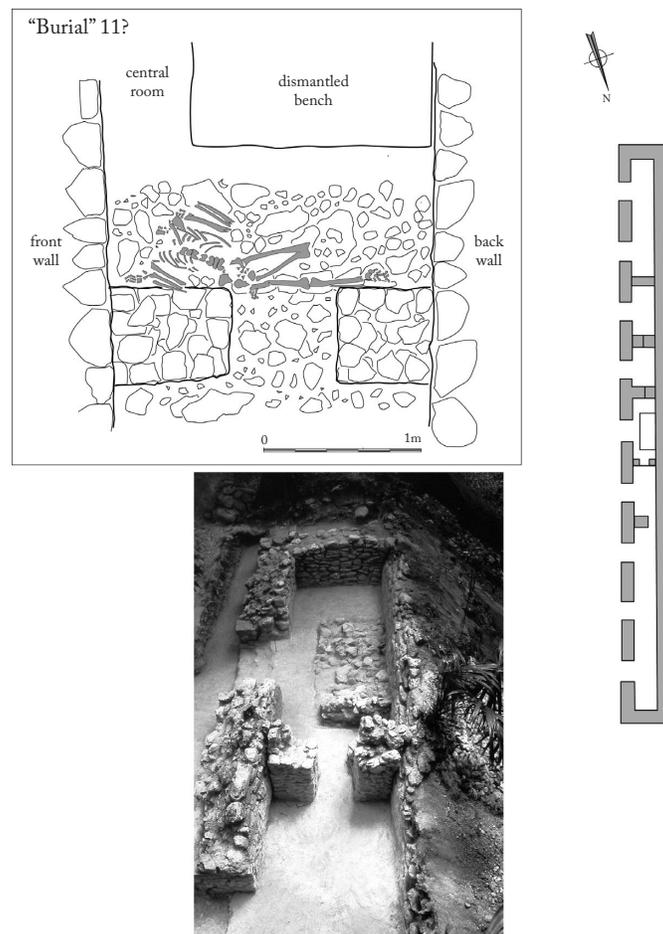


Figure 10. Edifice 6E13 with dismantled bench and “Burial 11” (Proyecto PNO-La Joyanca).

and ashes along with jar and comal sherds set on rubble but below the vault flagstones (Element 775, alternatively interpreted as a very brief domestic occupation).

Although ambiguous, the evidence suggests that the edifice was rapidly desecrated, its roof destroyed, and an individual buried within the ruins with little respect on the central bench side. Associated ceramics preclude a Tuspan dating: instead these events occurred at the end of the Abril 2 phase, ca. 800-850. As the Main Plaza was abandoned during the Terminal Classic (except for domestic reoccupation and light ritual activities in both temples), we suggest that the 6E13 episode that happened in the central room of what was the largest building with political functions at La Joyanca — sheltering meetings and receptions of the ruler with the chiefs of the social houses — may have resulted from a political crisis terminating the local Classic rulership.

It is important to observe that after this episode the large elite compounds of the site were not abandoned. Still occupied, some of them even underwent continuous construction of residences. Lower ranking dwellings were being abandoned but, as mentioned, we cannot assess whether all or most of the abandonments occurred synchronically or during a certain time lapse. No new public building was built on the Main Plaza.

The evidence suggests that the political entity that had existed in the settlement during the Classic period was destroyed by AD 800-850, and that the authorities of every dominant house withdrew into their residential compounds with their subordinate neighbors, maintaining the local organization at a smaller scale than that of the Late Classic community. There was political disintegration, but the urban settlement itself did not disappear simultaneously.

Discussion

Similar to the 6E13 case just described, Terminal Classic dismantling of benches or “thrones” in public, or semi-public, buildings has been noted in several lowland sites (see Arnauld et al. 2004: 115; Iannone 2005; Stanton et al. 2008: 241; Webster and Inomata 2004: 161; see also Ponciano et al., this publication). One instance, in Structure 9N82 at Copán, even includes the specific feature of a pseudo burial (Webster 1989: 26-30). Focusing on buildings at large, other comparative cases include the complete infilling of royal palaces located in public plazas in the epicenters of Lamanai, La Milpa, Xunantunich, and Minanha (Graham 2001; Hammond and Tourtellot 2004; Iannone 2005): the structures were carefully covered up, that is, “canceled,” with no monumental building apparently replacing them. Iannone (2005), who discusses several of these cases, interprets them as the result of a local political collapse provoked by some external, superior force intervening locally, rather than by internal rivalry (see also Fash et al. 2004).

In the La Joyanca case, we have argued that competition among the most powerful houses in the settlement may have been strong during the Late Classic period. Whereas this factor could have played a determinant role in the destruction of the internal political organization (Arnauld et al. 2004: 122-124), Iannone’s interpretative scheme better explains why none of the elite house compounds were destroyed or abandoned simultaneously. Had internal rivalry among the local houses caused the political crisis, one of them, or several allied houses, would have taken the lead, destroyed the ruler’s palace — that is the Guacamaya compound — and would have built a new political building over 6E13 on the Main Plaza (see Iannone 2005: 39, for a similar argument). Also, generalized internal strife would have entailed destruction throughout the settlement. However, the Guacamaya compound was left untouched and even prospered in Tuspan times, as did all other houses (except Armadillo). Our extensive test pit program carried out all over the residential zone in 2012 did not reveal evidence of destruction. On the Plaza, Structure 6E13 was left in ruins after AD 850, and no additional edifice was ever built as a candidate for primary political function (6E1 was an old building, still occupied during the Tuspan subphases, but as a rather small residence, whereas 6E14, a C-shaped building located in front of 6E13, was built late on the Plaza floor, probably also with residential functions).

An additional line of evidence can be adduced in support of the “exterior meddling” hypothesis.

Given that the Hix Witz kingdom is indirectly mentioned (through the name Chan Ahk) in the inscription of the single stela at the site, it can be surmised that the external forces responsible for ending the local constituency had their origin in Hix Witz. At the time indicated by the inscribed date (AD 485), Hix Witz probably supervised (“authorized”) the stela’s erection within the Guacamaya residential compound instead of in a more public place. Later on (AD 600-750), the monumental building program developed on the public plaza with the support of a dozen local social houses may have been a matter of concern for Hix Witz, as it created a new constituency, that is, a local dynastic rulership supported by the political gathering of those houses into Structure 6E13, built around AD 750, simultaneously with one of the temple pyramids. This evolution was either unauthorized by Hix Witz or entailed tensions building up among the tripartite powers represented by Hix Witz, the Guacamaya rulers, and the local house chiefs. It is certainly meaningful that no stela was ever erected on the plaza (under prohibition of either Hix Witz or the local house heads).

In sum, our interpretation would recontextualize the La Joyanca sequence of political events (reflected by the construction sequence of the public plaza and elite compounds) within the context of the so-called “balkanization process” that is given much interpretive importance in the Maya Lowlands by Late-Terminal Classic times (e.g. Elson and Covey 2006; Fash et al. 2004; Yaeger and Hodell 2008; see also Demarest, this publication). As the La Joyanca rulership locally consolidated, with its new institutional architecture installed on the public plaza, balkanization was under way over the Lowlands and also at a local scale through the dynamics reflected in the changes noted within Structure 6E13 (see above). The local house chiefs themselves helped modify this community edifice to their own benefit and had little interest in destroying it. It seems more logical to speculate that superior authorities, possibly the Hix Witz kingdom, violently interfered with the local course of affairs, in a retaliation process that resulted in counter-balkanization. The external origin of the interference may have been other than Hix Witz; however, this would not alter the logic at work in both processes. Generally speaking, if balkanization is considered in the interpretation of lowland Terminal Classic evidence, then for a number of cities the opposite process must be expected, that is, retaliation by superior forces destroying local institutions that they consider threatening to their authority. This is why the archaeology of Terminal Classic public and semi-public architecture and occupation in secondary or minor centers is so important, and we particularly advocate paying attention to political buildings of the La Joyanca 6E13 type.

In turn, environmental factors, rather than the political crisis itself, would account for the timing. Drought episodes of the early ninth century, along with a general warlike context throughout the Western Lowlands, probably weakened the local rulers due to their incapacity to ensure sufficient rainfall through ritual. Their subordinates might have shifted alliances, and some formerly supporting leaders may have acted treacherously. This would have accelerated both balkanization and retaliation processes by AD 850. In the same way but at a wider scale in the local society, later drought years either provoked, or furthered, the dispersion of the La Joyanca neighborhood population. Particularly during the eleventh century, when dry conditions lasted for many years (see Kennett et al. 2012), it seems that a real demographic demise could not be avoided. And finally, the possibility that some social groups in neighborhoods had been captured in warring circumstances cannot be discarded, although no archaeological evidence of unequivocally rapid abandonment has been recovered at La Joyanca.

It remains plausible that, by as early as AD 850, the initial drifting out of the local population (as reflected by occupational sequences of lesser houses at La Joyanca, and also by the paleoenvironmental Tuspan B signals of reduced land use activities) began just after the political rupture, rather than as a direct consequence of a drought episode. Admittedly this allegation is speculative, as no proxies enable us to weigh the relative effects of one set of (environmental) factors against another set of (political) factors.

Once the local dynasty had fallen, local populations withdrew within their neighborhoods under the authority and protection of their noble chiefs, until the latter also proved unable to ritually

conjure rainfall, or to create new resources (reservoirs) large enough to ensure staple crops. Thus, “they could no longer induce or entice people to stay” (Ashmore et al. 2004: 321, referring to Xunantunich rulers). The *aguadas* dispersed over the La Joyanca neighborhoods are too small to allow field irrigation (Lemonnier 2009). During dry years, the La Joyanca inhabitants would have had to leave their houses and associated infields, either because local staple production had become too risky, or because food redistributed within the noble houses that they were affiliated with did not complement failing crops. As many of them had settled relatively recently in the La Joyanca neighborhoods, and probably continued growing crops on distant outfields, they had a place to go. Due to land use practices (and also to social dynamics, like father-and-son relationships), traditionally a degree of population instability certainly favored mobility in times of crisis (Ashmore et al. 2004; Farriss 1978, 1984; Inomata 2004; Jones 1982; note that La Milpa was populated as rapidly as it was deserted, per Hammond and Tourtellot 2004). Once people began drifting out, the noble houses gradually lost their authority with the loss of the manpower and resources that had enabled them to command construction programs, long-distance trade trips, and food redistribution through feasting and social rituals. In sum, at a local scale, drought episodes gradually destroyed the neighborhoods of the city, and at a regional scale, competition among elites violently destroyed the divine rulership regime. The result of both processes is that the nucleated settlement dissolved and dispersed. Having a propensity to spatial mobility, Maya peasants moved out of their urban neighborhoods back to the hinterland. There, they were pushed “below the level of datable archaeological visibility” (Hammond and Tourtellot 2004: 289; see Kelly 1992: 50).

Conclusion

Archaeological and paleoenvironmental evidence from the La Joyanca site and hinterland suggests that locally the general crisis of the Terminal Classic period developed through two sequent, although certainly overlapping, phases. First, the “political phase” took place by the early ninth century, that is, during (or just after) the early series of drought years (AD 780, 820). At that time and in this particular region, they would have had less impact on the La Joyanca urban society than the competition and balkanization processes building up over the northwestern Lowlands among regional elites. Second, the “social phase” developed much more gradually through the Terminal Classic (AD 850–1050), with the urban community breaking down into its constituent neighborhoods, then those neighborhoods, or social houses, dissolving and dispersing in the hinterland. In this late process, it seems that the series of drought years deeply impacted social groups inasmuch as, in dry years, every family individually had to rely more and more on their outfield crops, as their urban infields were losing productivity. The ninth century droughts must have chased out the last remnants of the city population, although our latest ¹⁴C dating — 1020(1160)1230 cal AD — comes from colluvia associated with cultural material at the base of the site, still indicating some degree of local human activity, if not continuous occupation. The second “social phase” means that urban nucleation was ill-adapted to the then-current climatic conditions, with local elites too weakened to organize new adaptive modes.

Under the general scenario we have proposed, the drought parameter would have less to do with the crisis itself than with the non-recovery of most Maya cities at the turning point of the Terminal Classic to Postclassic. Whereas Maya societies were resilient enough in their social groupings, their Classic urbanism was not.

The whole series of events and process is quite long, possibly extending over three centuries. We need to assess the corresponding chronological sequence in Maya lowland sites, using as many cultural and environmental proxies as possible. Particularly relevant, evidence of violent and rapid events reflected in some public buildings by the Late-Terminal Classic must be detected and interpreted, especially in secondary or minor centers. Among other contributions, environmental evidence helps pinpoint the timing and rhythm of human activities at several spatial scales, including their latest occurrence, that are in large part invisible to archaeologists. As commented by Takeshi Inomata

during the meeting, what we should work on is the micro-chronology of each place that we study.

One structural cause of the abandonment of Terminal Classic Maya cities — probably the most often cited aspect of the “collapse” — is the traditional mobility of urban populations in tropical forests, especially in the case of the Maya Late Classic neighborhoods that rapidly formed by AD 600 when massive growth has been detected in many site sequences (Culbert and Rice 1990). These populations perhaps never really stabilized. The study of mobility and stability is just one aspect of a larger investigation in Maya paleodemography that we have to tackle. Archaeologically tracing population dynamics, as well as rapid movements in, and out, of Classic cities is certainly a difficult task. This is only possible with the help of environmental proxies applied to sectors where both approaches can be implemented simultaneously. Comparison with other societies in tropical lowlands would also be useful.

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References

- Aimers, James J. and David A. Hodell
2011 Societal Collapse: Drought and the Maya. *Nature* 479 (7371): 44–45.
- Arnauld, M.-Charlotte
2001 La “casa grande”: evolución de la arquitectura del poder del Clásico al Postclásico. In *Reconstruyendo la ciudad maya: el urbanismo en las sociedades antiguas*, edited by Andrés Ciudad Ruiz, M^a Josefa Iglesias Ponce de León and M^a del Carmen Martínez Martínez, pp. 363–401. Sociedad Española de Estudios Mayas, Madrid.
2004 *La “Tradition du Petén”: géographie du sacré à La Joyanca (Petén nord-occidental, Guatemala) et à Balamku (sud du Campeche, Mexique)* (online: <http://www.mae.u-paris10.fr/siteaci/aci/NiveauII/MMI/Peten>).
- Arnauld, M.-Charlotte, Véronique Breuil-Martínez and Erick M. Ponciano (editors)
2004 *La Joyanca (La Libertad, Guatemala), antigua ciudad maya del noroeste del Petén*. CEMCA, CIRMA, Asociación Tikal, Mexico and Guatemala.
- Arnauld, M.-Charlotte and Mélanie Forné
2004 Cronología de La Joyanca. In *La Joyanca (La Libertad, Guatemala), antigua ciudad maya del noroeste del Petén*, edited by M.-Charlotte Arnauld, Véronique Breuil-Martínez and Erick M. Ponciano, pp. 17–36. CEMCA, CIRMA, Asociación Tikal, Mexico and Guatemala.
- Arnauld, M.-Charlotte, Mélanie Forné, Erick M. Ponciano, Eva Lemonnier, Mauricio Diaz, Gabriella Luna, Adriana Segura and Julien Sion
2012a Ritos de transición, ritos de crisis: perspectivas para la movilidad poblacional en las sociedades mayas clásicas. In *XXVI Simposio de Investigaciones Arqueológicas en Guatemala*, edited by Bárbara Arroyo et al. Museo Nacional de Arqueología y Etnología, Asociación Tikal, Guatemala (in press).

- Arnauld, M.-Charlotte, Eva Lemonnier, Mélanie Forné, Laura Gámez, Edy Barrios Villar and James Fitzsimmons
 2012b *Perspectivas sobre el Centro-Oeste de Petén desde La Joyanca, Zapote Bobal y otros centros mayas clásicos, Guatemala*. In *XXV Simposio de Investigaciones Arqueológicas en Guatemala*, edited by Bárbara Arroyo, Lorena Paiz Aragón and Héctor E. Mejía, pp. 111-125. Museo Nacional de Arqueología y Etnología, Asociación Tikal, Guatemala.
- Arnauld, M.-Charlotte, Eva Lemonnier, Mélanie Forné, Erick M. Ponciano, Julien Sion and Didier Galop
 2013a *Early to Late Classic Population Mobility in La Joyanca, Northwestern Petén, Guatemala* (Symposium "Population mobility in the hinterland of Mesoamerican cities"), 78th Society for American Archaeology Annual Meeting, 3-7 April, 2013, Honolulu.
- Arnauld, M.-Charlotte, Erick M. Ponciano, Eva Lemonnier, Mélanie Forné, Adriana Segura Rodas, Gabriela Vásquez Luna, Mauricio Díaz García and Julien Sion
 2013b *Proyecto La Joyanca-Tuspan B. Informe final de la Temporada 2012 (13 de junio al 15 de julio)*. IDAEH, CEMCA, Guatemala.
- Ashmore Wendy, Jason Yaeger and Cynthia Robin
 2004 *Commoner Sense: Late and Terminal Classic Social Strategies in the Xunantunich Area*. In *The Terminal Classic in the Maya Lowlands: Collapse, Transition, and Transformation*, edited by Arthur A. Demarest, Prudence M. Rice and Don S. Rice, pp. 302-323. University of Colorado Press, Boulder.
- Barrios Villar, Edy
 2010 *Conservación emergente del Edificio 6E-12 del sitio arqueológico La Joyanca, La Libertad, Departamento de Petén, Guatemala*. Informe Técnico Final presentado al IDAEH. PROSIAPETEN, CEMCA, Guatemala.
- Bazy, Damien, Juan Antonio Valdés and M.-Charlotte Arnauld
 2010 *El templo doméstico y la casa política: de rituales privados a rituales públicos en centros mayas clásicos*. In *El ritual en el mundo maya: de lo privado a lo público*, edited by Andrés Ciudad Ruiz, M^a Josefa Iglesias Ponce de León and Miguel Sorroche Cuerva, pp. 181-201. Publicaciones de la SEEM, 9, Sociedad Española de Estudios Mayas, Grupo de Investigación Andalucía-América, CEPHCIS-UNAM, Madrid.
- Bey, George J. III, Craig A. Hanson and William M. Ringle
 1997 *Classic to Postclassic at Ek Balam, Yucatan: Architectural and Ceramic Evidence for Defining the Transition*. *Latin American Antiquity* 8(3): 237-254.
- Breuil-Martínez, Véronique, Eva Lemonnier and Erick M. Ponciano
 2004 *Vivir en La Joyanca*. In *La Joyanca (La Libertad, Guatemala), antigua ciudad maya del noroeste del Petén*, edited by M.-Charlotte Arnauld, Véronique Breuil-Martínez and Erick M. Ponciano, pp. 73-94. CEMCA, CIRMA, Asociación Tikal, Mexico and Guatemala.
- Breuil-Martínez, Véronique, Erick M. Ponciano and M.-Charlotte Arnauld (editors)
 2001 *Proyecto Petén Noroccidente-La Joyanca, Informe No. 3, Tercera Temporada de Campo, 2001*. CEMCA, Guatemala.
- Butzer, Karl W.
 2012 *Collapse, environment and society*. *Proceedings of the National Academy of Sciences USA* 109(10): 3632-3639.

Carozza, Jean-Michel, Didier Galop, Jean-Paul Métaillé, Boris Vannière, G. Bossuet, F. Monna, J. A. López-Sáez, M.-Charlotte Arnauld, Véronique Breuil-Martínez, Mélanie Forné and Eva Lemonnier

2007 Land use and soil degradation in the southern Maya Lowlands from Preclassic to Postclassic times: the case of La Joyanca (Petén, Guatemala). *Geodynamica Acta* 20(4): 195-207.

Culbert, T. Patrick and Don S. Rice (editors)

1990 *Precolumbian Population History in the Maya Lowlands*. University of New Mexico Press, Albuquerque.

Dunning, Nicholas P., Timothy P. Beach and Sheryl Luzzadder-Beach

2012 Kax and kol: collapse and resilience in lowland Maya civilization. *Proceedings of the National Academy of Sciences USA* 109(10): 3652-3657.

Elson, Christina M. and R. Alan Covey (editors)

2006 *Intermediate Elites in Precolumbian States and Empires*. University of Arizona Press, Tucson.

Farriss, Nancy M.

1978 Nucleation versus Dispersal: The Dynamics of Population Movement in Colonial Yucatan." *Hispanic American Historical Review*, 58: 187-216.

1984 *Maya Society under Colonial Rule. The Collective Enterprise of Survival*. Princeton University Press, Princeton.

Fash, William L., E. Wyllys Andrews and T. Kam Manahan

2004 Political Decentralization, Dynastic Collapse and the Early Postclassic in the Urban Center of Copán, Honduras. In *The Terminal Classic in the Maya Lowlands: Collapse, Transition, and Transformation*, edited by Arthur A. Demarest, Prudence M. Rice and Don S. Rice, pp. 260-287. University of Colorado Press, Boulder.

Fitzsimmons, James L., Laura Gámez and Mélanie Forné

2009 Monuments, Caches, and the Lords of Jaguar Hill: Creating the Sacred from the Mundane. *Mexicon* XXXI(2): 43-49.

Fleury, Sophie, Bruno Malaizé, Philippe Martinez, Viviane Bout-Roumazeilles, Didier Galop, Kees Nooren, Jacques Giraudeau, Karine Charlier, Pierre Carbonel, M.-Charlotte Arnauld and Alexandre Torneberg

In prep. Climate variability and Maya settlement on Laguna Tuspán (Petén, Guatemala) during the last 4000 years (submitted to *Journal of Paleolimnology*).

Forné, Mélanie

2005 Étude céramique de Tuspan 2, La Joyanca, Peten, Guatemala. Ms (64 p.).

2006 *La cronología cerámica de La Joyanca, Noroeste del Peten, Guatemala*. BAR International Series, no. 17, Paris.

Galop Didier, Eva Lemonnier, Jean-Michel Carozza and Jean-Paul Métaillé

2004 Bosques, milpas, casas y aguadas de antaño. In *La Joyanca, antigua ciudad maya del noroeste del Peten (Guatemala)*, edited by M.-Charlotte Arnauld, Véronique Breuil-Martínez and Erick M. Ponciano, pp. 55-71. CEMCA, CIRMA, Asociación Tikal, Guatemala.

Gámez, Laura, James Fitzsimmons and Mélanie Forné

2007 Epigrafía y arqueología de Hixwitz: investigaciones en Zapote Bobal, La Libertad, Petén. In *XX Simposio de Investigaciones Arqueológicas en Guatemala, 2006*, edited by Juan Pedro Laporte, Bárbara Arroyo and Héctor E. Mejía, pp. 345-367. Museo Nacional de Arqueología y Etnología, Guatemala.

Graham, Elizabeth

2001 Collapse, Conquest and Maya Survival at Lamanai, Belize. *Archaeology International* 4: 52-56.

Grube, Nikolai

2011 La figura del gobernante entre los mayas. *Arqueología Mexicana* XIX(110): 24-29.

Guenter, Stanley P.

2005 Informe preliminar de la epigrafía de El Perú. In *Proyecto Arqueológico El Perú-Waka'. Informe No. 2, Temporada 2004*, edited by Héctor L. Escobedo and David Freidel, pp. 359-397. Guatemala (online: www.mesoweb.com/resources/informes/Waka2004-Cap13.pdf).

Hammond, Norman and Gair Tourtellot

2004 Out with a Whimper: La Milpa in the Terminal Classic. In *The Terminal Classic in the Maya Lowlands: Collapse, Transition, and Transformation*, edited by Arthur A. Demarest, Prudence M. Rice and Don S. Rice, pp. 288-301. University of Colorado Press, Boulder.

Hoddel, David A., Mark Brenner and Jason H. Curtis

2005 Terminal Classic Drought in the Northern Maya Lowlands Inferred from Multiple Sediment Cores in Lake Chichancanab (Mexico). *Quaternary Science Reviews* 24: 1413-1427.

Iannone, Gyles

2005 The Rise and Fall of an Ancient Maya Petty Royal Court. *Latin American Antiquity* 16(1): 26-44.

Jones, Grant D.

1982 Agriculture and Trade in the Colonial Period Southern Maya Lowlands. In *Maya Subsistence. Studies in Memory of Dennis E. Puleston*, edited by Kent V. Flannery, pp. 275-294. Academic Press, New York and London.

Kelly, Robert L.

1992 Mobility/Sedentism: Concepts, Archaeological Measures, and Effects. *Annual Review of Anthropology*, 21: 43-66.

Kennett, Douglas J., Sebastian F. M. Breitenbach, Valorie V. Aquino, Yemane Asmerom, Jaime Awe, James U. L. Baldini, Patrick Bartlein, Brendan J. Culleton, Claire Ebert, Christopher Jazwa, Martha J. Macri, Norbert Marwan, Victor Polyak, Keith M. Prufer, Harriet E. Ridley, Harald Sodemann, Bruce Winterhalder and Gerald H. Haug

2012 Development and Disintegration of Maya Political Systems in Response to Climate Change. *Science* 338: 788-791.

Lemonnier, Eva

2009 *La structure de l'habitat du site maya classique de La Joyanca (Petén Nord-Ouest, Guatemala) dans son environnement local*. Paris Monographs in American Archaeology 23. BAR International Series. Oxford.

Leyden, Barbara W.

2002 Pollen evidence for climatic variability and cultural disturbance in the maya lowlands. *Ancient Mesoamerica* 13: 85-101.

Martin, Simon and Dorie Reents-Budet

2010 A Hieroglyphic Block from the Region of Hiix Witz, Guatemala. *The PARI Journal* XI(1): 1-6.

McAnany, Patricia A.

1995 *Living With the Ancestors: Kinship and Kingship in Ancient Maya Society*. University of Texas Press, Austin.

Medina-Elizalde, Martín, Stephen J. Burns, David W. Lea, Yemane Asmerom, Lucien von Gunten, Victor Polyak, Mathias Vuille and Ambarish Karmalkar

2010 High-resolution stalagmite climate record from the Yucatán Peninsula spanning the Maya Terminal Classic period. *Earth and Planetary Science Letters* 298: 255-262.

Medina-Elizalde, Martín and Eelco J. Rohling

2012 Collapse of Classic Maya Civilization Related to Modest Reduction in Precipitation. *Science* 335: 956-959.

Métaillié, Jean-Paul, Didier Galop, Jean-Michel Carozza, Gilles Salleron, Rachel Effantin, Boris Vannièrre, Gilles Bossuet and Mario Veliz Pérez

2003 Dynamiques et ruptures dans l'histoire des basses terres mayas. Questions et méthodes à partir du programme "La Joyanca" (Nord-Ouest du Petén, Guatemala). In *Des milieux et des hommes: fragments d'histoires croisées*, edited by Tatiana Muxart, Franck-Dominique Vivien, Bruno Villalba and Joëlle Burnouf, pp. 139-150. Éditions scientifiques et médicales, Elsevier-Masson, Paris.

Rice, Don S.

1986 The Peten Postclassic: A Settlement Perspective. In *Late Lowland Maya Civilization: Classic to Postclassic*, edited by Jeremy A. Sabloff and E. Wyllys Andrews V, pp. 301-346. University of New Mexico Press, Albuquerque.

Scarborough, Vernon L., Nicholas P. Dunning, Kenneth B. Tankersley, Christopher Carr, Eric Weaver, Liwy Grazioso Sierra, Brian Lane, John G. Jones, Palma Buttles, Fred Valdez and David L. Lentz

2012 Water and sustainable land use at the ancient tropical city of Tikal, Guatemala. *Proceedings of the National Academy of Sciences USA* 109(31): 12408-12413.

Sharer, Robert J. and Charles W. Golden

2004 Kingship and Polity: Conceptualizing the Maya Body Politic. In *Continuities and Changes in Maya Archaeology, Perspectives at the Millenium*, edited by Charles W. Golden and Greg Borgstede, pp. 23-50. Routledge, New York and London.

Stanton, Travis W., M. Kathryn Brown and Jonathan B. Pagliaro

2008 Garbage of the Gods? Squatters, Refuse Disposal, and Termination Rituals Among the Ancient Maya. *Latin American Antiquity* 19(3): 227-247.

Stuart, David

- 2003 La identificación de Hixwitz, un centro político maya del periodo Clásico. Paper presented at *XV Simposio de Investigaciones Arqueológicas en Guatemala*. Museo Nacional de Arqueología y Etnología, Guatemala.
- 2008 A Stela from Pajamal, Guatemala. *Maya Decipherment* (online: decipherment.wordpress.com/2008/05/31/a-stela-from-pajamal-guatemala/).
- 2012 The Hieroglyphic Stairway at El Reinado, Guatemala. *David Stuart's Notes, Mesoweb* (online: www.mesoweb.com/stuart/notes/Reinado.html).

Webster, David L. (editor)

- 1989 *The House of the Bacabs, Copan, Honduras*. Studies in Precolumbian Art and Archaeology n° 29, Dumbarton Oaks, Washington, D.C.

Webster, David L. and Takeshi Inomata

- 2004 Identifying Subroyal Elite Palaces at Copan and Aguateca. In *Palaces of the Ancient New World*, edited by Susan Toby Evans and Joanne Pillsbury, pp. 149-175. Dumbarton Oaks Research Library and Collection, Washington, D.C.

Yaeger, Jason and David A. Hodell

- 2008 The Collapse of Maya Civilization: Assessing the Interaction of Culture, Climate and Environment. In *El Niño, Catastrophism, and Culture Change in Ancient America*, edited by Daniel H. Sandweiss and Jeffrey Quilter, pp. 187-235. Dumbarton Oaks Research Library and Collection, Washington, D.C.