ROUNDS OF NEGOTIATIONS IN THE UNDERWORLD:
TRANSFORMATIONS OF RITUAL CAVE PRACTICES AND ANCIENT MAYA SOCIETY

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ABSTRACT

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ROBERT GESCHEIDER

To date, most research on Maya ritual cave use has been synchronic and lacking articulations with the wider Maya social processes. In this thesis, my goal is to examine the archaeological record of Maya ritual cave practice diachronically, to look for evidence of structures associated with ritual practice, and to understand how ritual practices are influenced by sociopolitical changes. Because ritual practice is linked to the material circumstances of practitioners, specific practices are strategic, flexible, and may serve as a resource to understand change at larger societal scales. The materiality of ceramics and the spatial parameters of the caves in which they are placed allow for a variety of differential treatments and emplacements. Ritual change may be evidenced by a change in these patterns and this can indicate a shift that is external to such microscale developments. To study these changes in practice, methods must first answer how and when changes occurred by reconstructing the use-life histories of Maya caves. Ceramic typologies, data collection from published archaeological records, and statistical analyses are the primary methods employed for this thesis. Ritual and Practice theories provide the foundations for interpreting ritual practice changes in the context of macroscale societal structures. Key findings include peak frequency temporal alignments across three of four regions and Late Classic spatial expansions in ritual cave use, with at least one expansion evident in each of the same three regions. This research is important in establishing a baseline of temporal shifts and regional variation in ritual cave practice, which may afford a richer, more contextualized understanding of both ancient Maya ritual cave use and Maya cultural development.

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1.0 INTRODUCTION

The purpose of this thesis is to examine Maya ritual cave practices diachronically, and to demonstrate how ritual cave practices and their changes articulate with developments in Maya society. The seemingly opposed ritual characteristics of repetitiveness (Marcus and Flannery 1994:56; Moyes 2006:20; Pauketat 2001:80; Rappaport 1979:176) and fungibility (Morehart and Butler 2010:590; Whitehouse 2002:295) mark Maya cave use as a candidate for examining past social processes (Prufer 2002:603). Previous studies have linked changes in ritual practices to regional and interregional culture histories (Moyes 2006; Woodfill 2007). In this study, I synthesize data from 116 caves across four ancient Maya regions to allow for a more pan-regional reconstruction of ritual cave depositional patterns, and the articulation of ritual cave practice changes with macro-level cultural and historical developments. My primary research question asks whether changes in ritual cave practices articulate with changes in the Maya sociopolitical sphere.

The significance in answering this question is its potential contribution toward answering how ideology structures social, economic, political, and ritual systems (Kintigh et al. 2014:880), how these structures attempt to address novel situations and crises, and how such interrelations may create path-dependency in decision-making (Kintigh et al. 2014; Hodder 2014:31). Answering such questions may allow researchers to fit the ancient Maya with a theory of societal development that illustrates the role of ideology amid societal complexity and social stress. This may have value for contemporary decision-making, in predicting the likelihood of success for large, transformational changes meant to address contemporary crises, the outcome of which may be measured in terms of societal persistence or collapse (Kintigh et al. 2014).

The main data for this thesis include temporal attributes that delineate the ritual use-lives of ancient Maya caves, and various attributes of the ritual cave ceramic deposits spread across the central and southern lowlands of the Maya area. These data were collected and compiled from published archaeological research, with some information derived from field research undertaken in Belize. Supplementary data include findings from published ethnographic, ethnohistoric, epigraphic, and iconographic studies. These latter data may be used either to suggest competing hypotheses, or as multiple lines of reasoning to support an interpretation.

This research relies on extensive data collection and statistical analyses. The initial step was to compile data on the use-life spans and temporal intensification periods for a large number of caves in Belize, Northern Honduras, and regions of Guatemala. These temporal attributes of individual caves may indicate patterns of relative increase and decrease in cave use through their regional and temporal aggregation. The next step was to compile additional data on the cave ceramic deposits: their spatial associations and conditions of treatment. This step was key in delineating ritual practices from one another, and in determining ritual change across space and time. The final step was to combine these datasets and compare periods of ritual intensification and change to the archaeologically and epigraphically-known history for these periods.

These methods are appropriate for several reasons. One is that ceramics are among the most common and copious type of artifact throughout the Maya area (Moyes et al. 2017:329), and can be relatively dated. Another reason is that these data are necessary to examine multiple scales of ritual cave use, and to reconstruct temporal genealogies of ritual practices for different areas. Lastly, these methods afford a greater possibility of identifying proximate causes for changes in ritual practice, whereas such causes may be centered outside of a given region. The greatest limitation of these methods stems from the reliance on secondary sources. Although the

variability of archaeological details in reporting can be mitigated in many instances, all peer-reviewed publications are summative to some degree. As a result, the findings of this study may afford only lesser reflections of ritual practices than those that could be gleaned from field reports and direct examination of the sites and artifacts.

2.0 BACKGROUND OF ANCIENT MAYA CAVE INVESTIGATIONS

Throughout Maya cave investigations history and in every period, there have been indications of the ritual nature of these spaces and deposits. Due to lags and obscurities in publication, the deaths of prominent researchers, and the absence of interdisciplinary syntheses during the early periods, recognition of this ritual aspect was repeatedly delayed. The slow accumulation of multiple lines of evidence and the development of sources eventually led to this revelation, which has since been utilized to develop models of inquiry that intertwine with aspects of ancient Maya society that had once been considered as separate and unapproachable.

2.1 Early Exploratory Period (1840 – 1914)

The 1841-1843 Stephens and Catherwood expedition to Central America is touted as both the beginning of Maya archaeology (Spenard 2006:20; Brady 1989:10), and the first historical investigation of Maya caves (Scott 2009: 9). There were, however, no research questions or systematic archaeological descriptions provided by these early explorers (Kieffer 2018:41; Prufer 2002:119; Spenard 2006:20). Caves encountered were mostly noted as sources of domestic water (Stephens [1843]1996: 27, 54, 111, 146, 184), with only passing mentions of ceramics and "rubbish" (Stephens [1843]1996: 52). In one instance, the authors note the discovery of an idol within a cave near Mayapan, but the presence of hearths and animal bones was considered evidence of use as a "refuge or residence" (Stephens [1843]1996:28). Moreover, the "imaginary

dangers" and great trepidation of the local peoples regarding the explorers entering certain caves met with a lack of further inquiry (Stephens [1843]1996:53, 160-161).

Henry Mercer's *The Hill Caves of Yucatan* (1896) represents a number of first achievements with regard to Maya cave research. It was the first archaeological report on Maya caves and the first to focus solely on caves (Spenard 2006:20; Woodfill 2007:537, 2011:213). Additionally, Mercer was the first to use the stratigraphic method in this context (Brady 1989:11). He investigated 29 caves and excavated 10, but in merely seeking the earliest human cave use through chronological reconstructions he missed their ritual significance (Prufer 2002:119; Spenard 2006:21; Kieffer 2018:41). His treatment of the cave context was essentially one of habitation (Mercer 1975 [1896]:9; Scott 2009:9; Woodfill 2011:213; Kieffer 2018:41). While the quality of his analyses afforded comparison of the cave ceramics to those of the outlying area (Mercer 1975: 162-167; Prufer 2002:119; Woodfill 2007: 537), the publication was not available until 1975 (Prufer 2002:120; Spenard 2006:20).

Following Mercer, Edward H. Thompson published *Cave of Loltun* (1897) which included stratigraphic excavation maps, artifact drawings, and cave art renderings (Prufer 2002:120; Spenard 2006:21). Thompson continued to work in the Yucatan, dredging the cenote at Chichen Itza and excavating burials within a cave underlying monumental architecture (Kieffer 2018:41). *The High Priest's Grave* was among the first publications to consider ritual ceremony in connection with Maya cave deposits (Thompson 1938:34; Prufer 2002:120). Thompson wavered on the question of habitation over ritual cave use, wherein his focus was centered on what could be learned about early Yucatan inhabitants (Thompson 1932:91; Spenard 2006:21), even while considering the possibility of "votive offerings" (Thompson 1938:34; Prufer 2002:120). Thompson's findings for both the grave and the cenote ultimately supported

arguments for the ritual nature of ancient Maya cave deposits, but these two publications were delayed for decades (Prufer 2002:121; Spenard 2006: 21; Mirro 2007:4).

George Byron Gordon published *Caverns of Copan* in 1898, reporting on 5 caves on the banks of the Sesemil stream (1898:3). Gordon excavated in cave #3 and provided stratigraphic records and artifact descriptions. Despite Gordon's belief that "people either dwelt in caves or resorted to them occasionally, from motives of practice, custom, or protection." (1898:10), he interpreted the third cave in ritual terms (Spenard 2006:22). Citing both colonial Spanish priests' ethnohistories of an "extensive cave cult" among the Maya and Daniel Brinton's (1894) writings on nagualist cult practices (Gordon 1898:10; Brinton 1894:45-49), Gordon formed his ritual interpretation based upon a low level of soil compaction, cremated skeletal material, and ceramics that were incomparable to those found at Copan (Gordon 1898:9; Kieffer 2018:44-45). At the same time, Gordon was dismissive of local peoples' fear of entering the caves as superstition (1898: 10-11). With all evidence to the contrary, Gordon maintained a belief in the cave habitation paradigm (Woodfill 2007:536).

Eduard Seler (1901) reported on three caves of Quen Santo in highland Guatemala. Seler produced a partial map for one cave and a regional map that included the cave system (Brady 1989:14). His report included drawings and photographs, and is considered on par with the quality of both Mercer's and Thompson's reports (Brady 2000:2). Seler was unconcerned with the function of caves, and as a result, treated these spaces in the same manner as a habitation context (Woodfill 2007:538, 2011:213; Scott 2009:9). Clues to the caves' ritual nature were thereby overlooked or ignored (Spenard 2006:22). Brady cites the name of the caves itself, "Holy Cave," as a clue; one that Seler had mistranslated and ascribed to the whole of the plateau (Seler 1901:146-147; Brady 1989:15, 2000:2).

Among numerous, brief descriptions of caves and their contents recorded in this period (see Kieffer 2018:42), the work of A. Hooten Blackiston (1910) is notable for its unequivocal attribution of deposits to ritual activity (Prufer 2002:122). Blackiston provided thorough descriptions of artifacts found in a cave near Naco, Honduras (Robbins 2005:1). These include a number of copper bells and wooden masks (Blackiston 1910:540; Prufer 2002:122). He reports that "this cave was used solely for religious purposes" (1910:540). Blackiston's failure to provide an accurate location for the cave, however, has resulted in the inability to conduct any follow-on studies (Robbins 2005:1).

Gordon indicated that the ritual nature of caves among the Maya during the contact period was common knowledge. He states:

> "But we know, from the writings of the early Spanish priests, that there was an extensive cave cult, devoted to the worship of a cave god, and the rites and ceremonies were performed in caverns" (1898:10).

Several early copies and translations of the Popul Vuh, a Quiche script of the Maya creation myth illustrating Maya ritual beliefs and the significance of caves, were written during this time (Von Scherzer 1857; De Bourbourg 1861; Spence 1908). Kieffer states that ethnohistoric accounts of "ritual and human sacrifice" were transcribed by the Spanish, but that some were not available until the 20th century (2018:36-37). One such account, that described human sacrifices in the cenote at Chichen Itza, was Bishop Diego de Landa's "Relacion de las Cosas de Yucatan." Copies of Landa's accounts were already in circulation in 1864,1881,1900, and many of his observations were also included in some early reports by López De Cogolludo (1688) and Beuchat (1818) (Kieffer 2018:37). Near the end of this period, copies, photographs, and translations of portions of the Books of Chilam Balam were being made, and George B. Gordon acquired one of these in 1910 (Roys 1933:14). Among the early ethnographers, B.M. Norman

(1842) relayed that cenotes were given reverence as the origins of "religious legends" (2009[1842]:99), and Francisco Belmar (1901:5) noted the existence of a sacred cave on an island in Oaxaca (Kieffer 2018:43). It is unclear, however, to what extent the early cave explorers knew of, or had access to such early documentation suggesting the ritual nature of caves (Kieffer 2018:43). Additionally, the Maya emic equivalence of caves and cenotes was not known until much later (Kieffer 2018:60).

2.2 Interwar Period (1914-1950)

During the interwar period, archaeological research of Maya caves is characterized as declining in both the quality standards of reports and in the number of cave studies (Prufer 2002:122; Spenard 2006:22; Mirro 2007:5). This came with the involvement of large institutions focused on collecting, while subsequently omitting, ignoring, or marginalizing cave studies (Brady 1989:20; Spenard 2006:23; Mirro 2007:5; Scott 2009:10; Kieffer 2018:46). Consequently, the habitation paradigm persisted amidst a growing body of evidence supporting ritual interpretation.

Publications by Thomas Gann dominated the earlier half of this period, but the quality of reports fell short of those produced previously (McNatt 1996:81; Prufer 2002:122; Spenard 2006:22-23; Scott 2009:10). Gann reported on a number of caves in Belize (Gann 1918, 1924, 1925, 1926, 1928, 1929, 1930; Gann and Thompson 1931,1937; see McNatt, 1996:81-82), but his reporting was inconsistent in mapping, artifact analyses, descriptions, and illustrations (Prufer 2002:124; Spenard 2006:22-23). Moreover, Gann retained adherence to the habitational model despite potential evidence of ritual sacrifice (Gann 1918:54; Kieffer 2018:44) and of a large copal incense cache that he discovered in a cave (Gann 1918:138-139, 1929:48; Spenard

2006:23). He referred to ceramic deposits in caves as “rubbish” (Gann 1928:188-194; Gann and Thompson 1931:43).

The most substantial institutional research of caves of this period was conducted by the British Museum near Pusilha / Luubantun (Kieffer 2018:45). For the three caves investigated, a sitemap including cave locations, descriptions of excavated areas, and stratigraphic illustrations were included, but artifact descriptions were limited (Joyce et al. 1928; Joyce 1929; Gruning 1930; Prufer 2002:123; Spenard 2006:23). Collection of museum pieces took precedence over analysis, diminishing the greater understanding of cave deposits (Brady 1989:17; Spenard 2006:23). For one small cave near Pusilha and despite Thomas Gann’s interpretation of it as a dump of “kitchen rubbish” (Gann 1928:188-198; Prufer 2002:124), Thomas Joyce posited the possibility of a sacred space on account of the burials contained within (Joyce 1929:443; Brady 2000:2; Prufer 2002:123; Peterson 2006:4; Spenard 2006:23). The British Museum project also documented caves in western Belize near Benque Viejo and Xunantunich at this time (Joyce et al. 1928:347-350: Peterson 2006:4), while continuing to assume the habitation model (Peterson 2006:5-6).

At the same time, The Museum of the North American Indian and the New York Times funded investigations of caves by Gregory Mason in Guatemala and Belize (Mason 1928, 1940; McNatt 1996:82; Prufer 2002:123; Kieffer 2018:46). Like other projects of the time, Mason’s work tended to favor collection over systematic analysis (Prufer 2002:123). Prufer states of Mason’s work in Guatemala that “No detailed accounts were published”, and of the Rio Frio caves in Belize, that Mason produced “detailed accounts of artifacts and an array of plates”, but that “no attempt is made to analyze the ceramics” (Mason 1928:7-44; Prufer 2002:123).

One additional investigation of this period, the study of Cueva Encantada, Morelos in central Mexico by A.R.V. Arellano and Florencia Muller, is noteworthy for adherence to professional quality standards. Brady characterizes this study as "technically superior to those of Pusilha" (Brady 2000:2). Producing maps, stratigraphic profiles, illustrations, and ceramic analyses (Arellano and Müller 1948; Müller 1948), the researchers, however, made "little attempt at interpreting the caves within a larger framework" (Brady 2000:2).

For most institution-based research, caves were either omitted or given only the brief descriptions that characterize most of the cave studies in this period (see Brady 1989:18-19). Despite this, other developments in Maya studies began at this time that would impact the cave studies of later periods. Ralph Roys (1933) translated *The Book of Chilam Balam of Chumayel*, an ethnohistoric record of Maya perspectives that include origins, ritual, and cenote sacrifice. The 17th century accounts of Don Diego Quijada, detailing cenote sacrifices to end drought (Scholes and Adams 1938; Scholes and Roy 1948; see Kieffer 2018:39) and Alfred Tozzer's (1941) English translation of Bishop de Landa's 16th century accounts of Maya ritual practices were also published at this time. Other publications include Francisco de Burgoa's (1934) ethnohistoric accounts of cave shrines and ancestor veneration, and Pedro Sanchez de Aguilar's (1937) reports linking murals depicting sacrifices with deposits of remains in caves (Kieffer 2018:47). Thompson's *The High Priest's Grave*, published in 1938, added to this growing corpus of cave documentation, as did new ethnographic studies by Redfield's and Villa Rojas (1934) documenting of the sacred nature of cenotes (Kieffer 2018:47-48). Lastly, the first attempts at systematizing the chronological and typological order of Maya ceramics occur within this period (Merwin and Vaillant 1931; Ricketson and Ricketson 1937).

2.3 Developmental Period (1950-1986)

Within this period, researchers begin to turn the corner from a habitational view of ancient Maya cave use to one of ritual, although the habitational concept still had purchase among some. Gradually, interest and standards of archaeological reporting increase with respect to Maya cave contexts. Additionally, the first attempts of synthesis and interdisciplinary research were undertaken. This period represents the solidification of various elements of archaeological research that, together, would form the basis for our research understandings to-date.

The first major study of this period is a return to one of Stephens and Catherwood's (1841,1843) exploration sites. The Carnegie Institute of Washington's project at Mayapan was significant for a number of reasons. Firstly, this project began to bridge the gap in treatment between cave studies and surface sites, as it fully incorporated the caves into the research plan and documented relationships between architecture and caves (Peterson 2006:4). Secondly, it produced a large number of publications that included caves and higher quality standards in documentation (Scott 2009:10-11; Kieffer 2018:46; R.E. Smith 1952, 1954, 1956; Shook 1952, 1955; A.L. Smith 1955; Stromsvik 1953, 1956). Reports included site maps, detailed descriptions, drawings, plates of both artifacts and features, ceramic, and faunal analyses (Brady 1989:22; Spenard 2006:24). Thirdly, consideration was given to modern Maya rituals held near one of the cenotes (Shook 1952:250). Additionally, some of the ceramicists working at Mayapan were also in the process of developing a system of ceramic typological chronology that continued to take shape into the following decade (Willey et al. 1967:290). Despite recognition of modern Maya rituals surrounding cave locations, this project still assumed a habitation model (Peterson 2006:5-6).

The first synthesis and interpretation of Maya caves from a ritual perspective was made by J.E.S. Thompson (1959; Prufer 2002:125; Kieffer 2018:55-56). Thompson combined ethnography, ethnohistory, and archaeology into a new methodology whereby he reexamined early cave studies and matched their artifactual findings with ritual contexts supported by the ethnographic and ethnohistoric data (Thompson 1959:128-129; Prufer 2002:125-126; Woodfill 2007:538, 2011:213; Scott 2009:11; Kieffer 2018:55-56). Thompson revisited reports from a number of prominent early researchers, including those of Stephens (1843), George Gordon (1898), Eduard Seler (1901), Thomas Gann (1918, 1925, 1928, 1934), Henry Mercer (1896), Edward H. Thompson (1897, 1904, 1938), A. Hooten Blackiston (1910), George Mason (1928), and Thomas Joyce (1929), and built an argument for the ritual use of caves by cross-referencing the archaeology with ethnohistoric and ethnographic data (1959:122-129). Thompson concluded that there were eight specific uses of caves, the majority of which were ritual-related (Prufer 2002:125; Kieffer 2018:55). Despite the revolutionary nature of this synthesis, circulation of the report was diminished by the unusual choice of publication by Hamburg's Museum fur Volkerkunde, and not reprinted until 1975 (Prufer 2002:125 Woodfill 2007:538), although it was cited by contemporary cave researchers (Brady 1989:28).

Within the same time frame as J.E.S. Thompson's initial publication, several researchers were active in documenting Maya cave deposits. A.H. Anderson, the first Archaeological Commissioner of Belize, worked with the British Museum in excavating Awe Cave / Las Cuevas (Digby 1958) which had evidence of cremation burials (McNatt 1996:82; Prufer 2002:132). He was also instrumental in collections and excavations at Rio Frio E, Cubetas, and Eduardo Quiroz caves (McNatt 1996:82; Prufer 2002:132). Richard MacNeish and Frederick Peterson published documentation of Santa Marta rockshelter in Chiapas, sponsored by the New World

Archaeological Foundation (MacNeish and Peterson 1962). The presence of burials and figurines did not, however, preclude a habitation presumption (Prufer 2002:129). In contrast, E. Wyllys Andrews IV of Tulane University's Middle American Research Institute focused "on the ceremonial aspect of caves and their relation" to surface sites (Spenard 2006:24). He produced monographs for Balankanche and La Gruta de Chac caves near Dzibilchaltun Yucatan (1961, 1965, 1970), finding of the former a "doubtless sacred recourse...the importance of its water is reflected in the complex of symbols painted on the water jars..." (1965:20), and noting no evidence of habitation for the latter (Prufer 2002:130; Andrews 1965:19). Significantly, the religious nature of Balankanche was recognized by the larger Maya archaeological community (Kieffer 2018:47). Andrews is also credited with having improved quality standards of reporting (Spenard 2006:24; Mirro 2007:6).

David Pendergast actively pursued Maya cave archaeology at this time, at first, working with A.H. Anderson and later, completing Anderson's work in Belize (McNatt 1996:82). Pendergast produced a number of monographs and is known for treating caves with the same detail afforded to surface sites (Brady 1989:25; Mirro 2007:6). He published reports on Eduardo Quiroz Cave (1964, 1971), Actun Balam (1966, 1969), Rio Frio E (1971), and Actun Polbilche (1974). His work raised the standards for cave archaeology in creating detailed and accurate site and cave maps, describing and illustrating artifacts, making comparisons to similar assemblages, and utilizing specialists for data analyses (Spenard 2006:24-25). Pendergast was conservative regarding the ritual interpretation of caves, adhering to the habitation paradigm (Prufer 2002:133; Peterson 2006: 5-6; Woodfill 2007:538). Additionally, Pendergast refrained from analyzing ceramics in accordance with the latest type-variety classifications and applied a modal approach instead (Pendergast 1969:12; 1970:10; 1971:23; 1974:15). Nevertheless, Pendergast's

monographs are considered superior works for this time (Prufer 2002:133; Spenard 2006:24; Mirro 2007:6; Kieffer 2018:46).

Although working outside the Maya area, Doris Heyden (1973, 1975, 1981) influenced Maya cave studies through her interpretive model of the cave beneath the Sun Temple at Teotihuacan (Brady 1989:29-30; Kieffer 2018:57). Heyden continued in the footsteps of J.E.S. Thompson (1959) in utilizing ethnographic and ethnohistoric sources in combination with archaeology to evaluate this site in terms of ritual (Prufer 2002:151; Woodfill 2011:214). She also incorporated linguistics and linked architecture and landscape with the cave's significance (Heyden 1975: 134-143; Prufer 2002:151). Heyden diverged from Thompson's functionalist categories by invoking social meaning and ideological belief (Brady and Prufer 2005:4; Prufer 2002:150). However, she failed to immediately recognize or to extrapolate the primary importance of this cave to its site beyond the immediate context (Brady 2005:5; Peterson 2006:6-7: Scott 2009:11)). As Ann Scott states: "Throughout the 1970s, caves were treated as self-contained sites and little attempt was made to relate cave data to the larger social system of surface settlement" (2009:18). The potential of Heyden's model for wider application and connections, however, was recognized (Brady and Prufer 2005:4).

The end of this period saw a surge of interpretive models utilizing multi-disciplinary literature in support of the ritual significance in cave deposits (Scott 2009:11). Heyden continued to publish articles that further implicated caves in the social, political, and ideological rituals of ancient Maya activity (Prufer 2002:150). She was only one among a number of researchers exploring this interpretive approach. Patricia Carot viewed deposits in the Candelaria and adjacent caves as ritual activity (1976, 1982a, 1982b; Woodfill 2007:538). Barbara MacLeod and Dennis Puleston compiled ethnohistoric, epigraphic, and archaeological literature to explore cave

ritual, and posited caves as cognitively analogous to the Maya underworld, Xibalba (1979; Kieffer 2018:55-56). Mary and John Pohl related faunal cave assemblages specifically to the *cuch* ceremony of animal sacrifice (1981, 1983), and designated caves as "the most sacred precinct of the Maya" (Pohl and Pohl 1983:28). Dorie Reents-Budet and Barbara MacLeod (1997) excavated Petroglyph Cave in 1978, approaching the deposits from a ritual perspective and utilizing Gifford's (1976) type-variety system from Barton-Ramie in the Belize River Valley.

The great archaeological strides achieved in Maya cave archaeology throughout this period were accompanied by ethnographic, ethnohistoric, and technical advancements. Ralph L. Roys translated ritual incantations from a Codex ostensibly dated to the 18th century (Roys 1965: vii). There was ethnographic work linking caves with rain petition offerings (Vogt 1961,1964,1969, 1977,1981; Navarette 1966, 1971, 1974; Thompson 1970; see Kieffer 2018:51), and ancestor worship (Gurnee et al. 1968; Miles 1965; Carlson 1981; Nash 1970:19, 45; Villa Rojas 1969:223; Vogt 1969:298-301; see Kieffer 2018:51). As well, the very notion of what defined a cave according to the Maya was clarified through ethnography as any hole penetrating the ground (Laughlin 1975:132; Vogt 1969:375) with implications for cave archaeologists (Kieffer 2018:60). Vogt's ethnographic work in particular would influence Maya cave archaeologists in subsequent periods (Kieffer 2018:62). Epigraphers and art historians complemented the growing body of knowledge (Scott 2009:11). Additionally, the effort to systematize ceramic chronologies expanded and transformed from a broad and loosely structured group of wares, into a sophisticated type-variety system that offered not only comparability of assemblages across regions of the Maya world, but also characterizations of Maya development across time (Willey et al. 1967). Willey et al. state:

> The initial Mamom sphere was restricted in space and less uniform from one site to another than later spheres. It was followed by the Chicanel sphere, monolithic in its uniformity and covering the largest territory ever reached by Petén-like ceramics. After a disruption associated with the appearance of the Floral Park sphere at the eastern edge of the Maya Lowlands, the ceramics of the area were reintegrated in the very stable Tzakol sphere. With the Tepeu sphere, more rapid change and greater local divergence began, which culminated with the three contemporaneous spheres of terminal Classic date. For Postclassic times, only the New Town sphere was found in the southern Maya Lowlands. (1968: 312-314).

James C. Gifford published *Prehistoric Pottery Analysis and the Ceramics of Barton Ramie* in the Belize Valley (1976), and in the late 1970s, the technique of using accelerator mass spectrometry in radiocarbon dating decreased the sample size required and increased the time efficiency of this absolute dating technique (Taylor 2000:64-65).

This period as a whole, then, may be viewed as the maturation and coming together of various disciplines into a "critical mass" that would ultimately give rise to the sub-field of Maya cave archaeology. By the end of this period, however, one ingredient was notably missing. Ann Scott has noted, that the deaths of E Wyllys Andrews in 1971, J.E.S. Thompson in 1975, and Dennis Puleston in 1978, as well as the shifts of focus by Barbara MacLeod and David Pendergast left Maya archaeology without senior leaders who were well-versed in cave contexts (Scott 2009:12-14). This deficiency required a significant amount of time and effort to rectfy.

2.4 Foundation Period (1986-1997)

At the beginning of this period, work at Naj Tunich in Guatemala was already well-underway with some of the epigraphy and rock art having already been published (Stone 1982, 1983). There were some additions made to the interpretive models of the previous period (Heyden 1987, 1991). However, the advancements in Maya cave archaeology of this period are largely due to one individual whose impact would be difficult to overstate. Ann Scott indicates that "the underlying assumptions of the field were defined, a methodology was established, and a

theoretical position took shape during these years." (2009:15). James Brady's work during this phase served to propel Maya cave archaeology forward at a time when the field lacked cave specialists.

When discovered, Naj Tunich was entirely unique among Maya caves, containing 500 hieroglyphs, 44 figures, and close to 100 paintings, in addition to ceramic deposits and other material offerings that included human sacrifices (Brady and Stone 1986:19-23). It is not surprising then that its investigation was the "first long-term, systematic study of a single cave in Mesoamerica" (Woodfill 2011:214) and that it was multidisciplinary and "problem-oriented" (Scott 2009:16). Brady made a strong argument against the habitation model, noting it was the interior of ceramics that were burned amidst evidence of copal incense, and that the unslipped, utilitarian wares oft cited as evidence of domestic function, were associated with hieroglyphs and rock art that explicitly illustrated ritual (Brady 1989:213, 323-324; Kieffer 2018:61-62; Woodfill 2007:539). Brady's research demonstrated that caves were "a central part of Maya cosmovision", and that they were symbolically significant in Maya ideology (Woodfill 2007:539: Mirro 2007:7). Underlying this notion, the findings at Naj Tunich indicated elite use of caves during the Late Classic period (Brady and Stone 1986:19; Spenard 2006:25; Kieffer 2018:61), expanding the sphere of interpretation beyond ritual meaning and into other categories of research on the ancient Maya. Significantly, Brady demonstrates differential activity in cave areas, resulting in his dichotomy of public and private rituals (Brady 1989:402,404; Spenard 2006:25; Woodfill 2007:539). Lastly, Brady affords an exhaustive synthesis of previous cave literature at this time, and later compiles a list of sources for Maya cave studies (Brady 1996).

At much the same time, Juan Luis Bonor conducted a survey of caves surrounding the Yucatan site of Oxkintok (Bonor 1987; Bonor and Sanchez y Pinto 1991). Some caves were

interpreted as sacred landmarks, while those of difficult access were considered sources of ritual water or ceramic dumps (Bonor Villarejo 1989:303-308; Peterson 2006:8). While decrying the lack of publications on Yucatec caves as prohibitive for comparisons (Bonor 1989:304), limited resources for this study compounded the issue, resulting in diminished archaeological standards for cave mapping, excavations, and systematic collections (Brady 1997:354; Peterson 2006:8).

In 1987, Juan Pedro Laporte began Proyecto Atlas, a multi-year effort at documenting sites threatened by looting and destruction in various regions of Guatemala (Corzo et al. 2011:1247). The southeastern Petén received the project's early attention, and caves were investigated in a number of areas. Caves near the Late Classic Maya center of Ixkun were particularly notable, with Cueva de Cerro Este showing direct association to the site (Prufer 2002:145) and yielding Late Preclassic Ixobel Orange ceramics that were also found in Naj Tunich, and discovered again during the subsequent period in Torre Hun near Cancuén (Spenard 2006:101, 149-150).

Following his dissertation (1989), James Brady took on another project which would have further lasting impact on Maya cave archaeology. In 1990, Arthur Demarest began the Petexbatun Regional Archaeological Project, a large-scale project investigating multiple sites. The discovery of caves beneath architecture at Dos Pilas spurred establishment of the Petexbatun Archaeological Cave Survey subproject to be led by James Brady (Woodfill 2011:214). This was the first large settlement survey to include the systematic study of caves, and the first to utilize cave specialists (Woodfill 2011:214; Kiefer 2018:67). However, even before all of Brady's findings were published, interest in both Demarest's model and Maya cave archaeology increased substantially due in part to Demarest's promotions (Scott 2009:17-18; Spenard 2006:26; Woodfill 2011:214). Researchers have noted that the Petexbatun Regional

Archaeological Project and Petexbatun Regional Cave Survey led directly to the establishment of a number of large, regional surveys in the subsequent period, that would include caves (Spenard 2006:26; Woodfill 2011:214), but other factors were also in play.

As Kieffer has noted, with this period comes the more-timely publication of cave archaeology field research (2018:62). In 1993, the internet first became available to the public. Arthur Demarest seems to have capitalized on the accompanying desire for information, with E Wyllys Andrews V having indicated that the Petexbatun Regional Cave Survey had "the best press of recent times" (Scott 2009:17). Leading up to the 1997 SAA Nashville meeting, Ann Scott notes the importance of communications and e-mail in building a coalition of researchers interested in Maya caves (Scott 2009:15, 21). James Brady's 45 publications on Maya cave research during this time certainly fueled this heightened interest, as did a "boom" in Maya ethnography (Kieffer 2018:61-62). Multiple ethnographers focused on the sacredness and role of caves in Maya ritual and ideology at this time (see Kieffer 2018:62-63). Additionally, Lisa Lecount (1996) published her dissertation chronologically seriating, and thereby constraining the dates of certain Late Classic and Terminal Classic ceramics of Xunantunich. In the same year, Jaime J. Awe, director of the Belize Valley Archaeological Reconnaissance project (BVAR), launched the Western Belize Regional Cave Project (Hoggarth et al. 2020:705; Kieffer 2018:62).

2.5 Emergence Period (1997-2009)

In this period, the ritual aspect of Maya caves was well-accepted and researchers reached beyond interpretation of ritual meaning alone. Peterson states:

> "The 1990s witnessed an unprecedented number of archaeological projects that integrated the study of cave use with investigation of surface sites. Surveys were more systematic than their predecessors and artifact analyses became increasingly interpretive with cave-

> specific research questions, more scientific analytical methods, and technological advancements" (2006:8-9).

Woodfill notes that these studies provided more nuance, examining the larger contexts of caves, geographically and politically (2007:524), and Holley Moyes explicitly sought to link cave ritual behavior to other social systems, including the political and environmental (2006:16). In essence, acceptance of the ritual cave model and the combination of cave studies with regional settlement surveys allowed researchers to expand interpretations into larger societal contexts.

In 1997, Brady reported his findings and interpretations from the Petexbatun Regional Cave Survey, on 22 caves in the vicinity of Dos Pilas. These reports further demonstrated how elites had appropriated ritual caves (Brady 1997:614; Brady et al. 1997:357; Woodfill 2007:540), expanding upon the notion that Brady first-suggested with Naj Tunich. Using Heyden's model (Peterson 2006:9), Brady argues that the caves were determinant factors in Maya settlement planning and architectural layout (Brady 1997:614; Brady et al. 1997:357; Spenard 2007:26; Woodfill 2007:540). As part of this argument, he notes how the ceramic cave deposits predate monumental architecture and the Late Classic expansion of the site, suggesting that the caves had been ritually important for a long period as "sacred landmarks" (Brady et al. 1997:357). In terms of ritual practice, he posited that utilitarian ceramics were used for incense burning, with painted ceramics used for the presentation of offerings (Brady et al. 1997:361; Spenard 2006:26). In addition to ritual, and political characterizations drawn from these caves, Brady added the economic, comparing the proportions of consumed products deposited in the caves with those of surface sites (Brady et al. 358-359).

Led by Jaime J. Awe, the Western Belize Regional Cave Project (WBRCP) conducted reconnaissance in 1996, and formally began operations in 1997. This project documented a large

number of caves and the ritual deposits therein, producing annual field reports, and importantly, providing opportunities for students to conduct interdisciplinary research in caves (Mirro 2007:8; Kieffer 2018:62). This resulted in numerous, varied, cave-related masters theses, dissertations, and publications (Griffith 1998, 1999; Mirro and Awe 1999; Ferguson 2000, 2001; Gibbs 2001; Halperin 2002; Halperin et al. 2001; Mirro and Mirro 2001; Dema et al. 2002; Griffith et al. 2002, 2003; Helmke and Ishihara 2002; Griffith and Torres 2002; Morehart 2002; Moyes 2001, 2003, 2006; Owen, V. 2002; Mirro, M. 2007; Galvan 2016; Moyes et al. 2009; see Hoggarth et al. 2020). As with the caves at Dos Pilas, the WBRCP investigated some caves with settlement connections, specifically those of Actun Uayazba Kab, Actun Tunichal Muknal, and Actun Nak Beh (Prufer 2002:143-144; Peterson 2006:12). Complementing the notion of ritual caves as legitimating authority, Halperin notes the predominance of Late Classic ceramics at the Actun Nak Beh entrance, in contrast with the Early Classic deposits of the cave interior (2005:118), suggesting an increase in public performance of rituals. Overall, the WBRCP findings demonstrated that during Late / Terminal Classic period, "ritual intensified alongside political and environmental instability" (Hoggarth et al. 2020:706). Few cave studies better demonstrate this societal articulation with ritual cave use than Holley Moyes' (2006) dissertation on Chechem Ha cave. Moyes used ceramic deposit typologies and carbon dating of charcoal to chronologically and spatially, map the cave's use, discovering alignments with known regional history and environmental reconstructions (2006:552-560). Such articulations represent a monumental and lasting achievement for the WBRCP, far exceeding the notion of Maya caves as simply ritual venues, and tying caves with surface sites and Maya history. Lastly, the WBRCP played a significant role in re-populating Maya archaeology with cave researchers, whom it had been lacking in the previous decades.

Like the WBRCP, the Yalahau Archaeological Cave Survey began in 1996. The project documented 20 caves from an understudied portion of the northern Yucatan (Rissolo 2001:2, 6). Rissolo recognized a physiographic contrast of water availability in this area opposite previously studied portions of the Yucatan, and questioned whether caves here were used differently (Rissolo 2001:2, 6-7). He demonstrated that water basins were treated as sacred, documenting the rock art and ceramic offerings centered around these features (Rissolo 2001:340-342, 362-365). He also noted restrictive entrance constructions and architecture, which he suggests may be evidence of elite appropriation (Rissolo 2001:343,347-349). Despite the absence of directly associated settlements (Woodfill 2007:540), the deposits provided a more complete historical reconstruction of the region (Rissolo 2001:345; Peterson 2006:10).

As one component of the multi-year Maya Mountains Project, Keith Prufer investigated 53 caves in southern Belize, within the vicinity of two Classic Maya centers starting in 1997 (Prufer 2002:2). Evidence of elite appropriation and ritual performance areas in front of caves were noted (Prufer 2002:629-630; Peterson 2006:11), as well as the pattern of cave use predating site construction (Prufer 2002:638). However, Prufer invokes the role played by shamans, especially for the less variant, private rituals held within caves, but also in contrast to the assumed power of elites (Prufer 2002:638-640). Perhaps most importantly, this study illustrates both similarities and differences of ritual practiced over time and space in the two communities, indicating ritual change and differentiation (Prufer 2002:638).

The Xibun Archaeological Research Project (XARP) was also founded in 1997, and studied both settlements and caves to document and better understand the relations between them (Peterson 2006:18, 292). Only one cave, Actun Chanona, was directly linked to a settlement (Woodfill 2007:541), and elite appropriation was supported by the findings (Peterson 2006:293).

Peterson found extensive removal and transport of speleothems from caves to settlements in the valley, interpreting this as indicative of the symbolic and sacred importance afforded to caves at all levels of Maya society (Peterson 2006:292-293). The study therefore reflects a more cross-societal view of cave rituals (Peterson 2006:294, 298). It is significant for both enhancing the history of this region, and for calling into question assumptions about ritual practice that were developing from the study of caves directly associated with large surface sites (Peterson 2006:294-297). Similar types of relationships between caves and surface sites were made evident by Christopher Helmke's (2009) Ph.D. research conducted in the Roaring Creek Valley under the auspices of the Western Belize Regional Cave Project.

Led by Arthur Demarest, the Cancuén Archaeology Project began in 1998 leading to creation of the Upper Pasión Archaeological Cave Survey subproject in 2001 (Woodfill 2007:10: Woodfill and Rivas 2020:564-565). The primary goal was to determine the role that caves played in the region (Spenard 2006: 25), but beyond this, the researchers set out to further demonstrate a link between temple pyramids and mountain-caves in the use of the landscape surrounding the Late Classic site of Cancuén (Spenard 2006:26). The cave investigations expanded throughout the Pasión region, resulting in numerous publications and dissertations (Woodfill et al. 2001, 2002; O'Mansky 2002; O'Mansky et al. 2003; Spenard 2006; Woodfill 2007, 2010; Woodfill et al. 2006; Woodfill and Spenard 2001). Although the findings support ritual interpretations, reiterate a pattern of cave use predating settlement (Spenard 2006:161; Woodfill 2007:574), and include Late Classic cave-exterior ritual performance areas (Spenard 2006:66; Woodfill 2007:555-556), the interpretations extend further into the economic and sociopolitical spheres (Spenard 2006:140, 162; Woodfill 2007:573, 582-583). Spenard demonstrated an Early Classic link between the San Francisco area caves and southeastern Petén, suggesting pilgrimage or

other social relations (Spenard 2006:161). Woodfill shows local economics, trade, migration, and Petén political structures as having influence on the ceramic deposits of the Candelaria caves (2007:580-584).

The importance of context in cave studies, both in terms of the larger societal systems within which cave rituals are conducted, and the spatial and associative cave context of individual deposits is characteristic of this period (Woodfill 2007:542). Interdisciplinary collaboration reaches a peak. Kieffer notes an increase in ethnographies "relating to ritual, material sacrifice, and caves" at this time, and cites the work of Linda Brown (2004) as significant for delineating the context of material sacrifices (Kieffer 2018:70). During this period, David Stuart identifies the glyph meaning 'cave' (Stuart 1999; Vogt and Stuart 2001), which appears on stelae at Uaxactun, Tikal, Copan, Quirigua, Altar de Sacrificios, and Caracol (Prufer 2002:153, 156). This suggests the importance accorded to caves by the ancient Maya, and provides an additional contextual link between cave ritual practices and larger societal developments.

2.6 The Reflectance Period (2009-Present)

The study of ancient Maya ritual caves continues to this day, but the relative fervor and proliferation of cave studies during the previous period has levelled off. One project that has continued to produce regular publications, M.A theses, and dissertations that are cave-related is the Central Belize Archaeological Survey Project (CBAS). This project began in 2009, branching off from the Belize Valley Archaeological Reconnaissance Project, and focusing on the Caves Branch, Roaring Creek, and Sibun River Valley areas (Andres et al. 2011:1). Following the previous era's model, The CBAS project investigates ritual caves and surface sites in tandem, in attempting to reconstruct historical relationships and developments (Andres et al. 2011:1).

Some of the studies of this period include data collected previously. One example is that of the Belize Cave Research Project, the stated goal of which was to "better understand how beliefs and practices affect political processes and decision-making" (Moyes et al. 2017:327). This project studied 75 caves of northern, western, and central Belize, and included previously collected data from Actun Chechem Ha and Actun Tunichal Muknal. The familiar pattern of cave use predating site development is noted (Moyes et al. 2017:332-333). Moyes et al. establish chronologies for all the caves using both ceramic typologies and AMS radiocarbon dating, and find mostly continual cave use from the Preclassic period or Early Classic periods, while suggesting a religious schism at the end of the Classic period (Moyes et al. 2017:335).

In his own follow-on report to his dissertation (2007), Brent Woodfill notes that the "interpretive thrust" of the previous era had diminished efforts to link cave deposits with larger societal structures, and challenges the field to utilize the data from ritual caves to examine a broader range of issues, especially culture history (2011:216). His challenge suggests higher levels of synthesis, and yet it seems not to have been accepted by the field. One possible explanation for the decreased frequency of cave studies may simply be the extensive work conducted in the previous era, but another possibility seems plausible. Airborne canopy-penetrating LiDAR introduced in 2009 survey of Caracol had a revolutionary effect upon Maya archaeology (Chase et al. 2012; Inomata 2017). The imagery demonstrated a far more expansive polity, which settlement studies and years of research had failed to uncover (Chase et al. 2012:12918-12919). This survey was soon followed by similar LiDAR surveys in Western Belize (2013), Uxbenka (2015), Izapa (2013), Ceibal (2015), Gran Cacao (2016), and multiple studies have followed. Some of these studies have specifically targeted caves (Weishampel et al. 2011; Moyes and Montgomery 2019). This technological advancement has somewhat reset

priorities for Maya archaeology, but ritual cave use will certainly continue to be taken into account.

3.0 THEORETICAL PERSPECTIVES – Ritual and Practice Theories

The main research question for this thesis - whether changes to ancient May ritual cave practices articulate with societal developments - requires a diachronic view of practice, while operating upon the assumption that all ancient Maya cave deposits are the result of ritual activity. The concepts of 'ritual' and 'practice' are well-aligned, with theorists of one persuasion often referencing the other (Bell 1997:76; Pauketat 2001:80; Ortner 1984:154; Morehart and Butler 2010:594), and as Sherry Ortner states, "Ritual in fact is a form of practice." (1984:157). This thesis employs both ritual and practice theories to investigate how ancient Maya cave deposits may relate to larger societal events and developments. The overarching theoretical frameworks utilized are those of Catherine Bell's "ritualization" (1992) and Timothy Pauketat's practice theory, known as "historical processualism" (2001). Bell (1992:90-93) treats ritualization as practice and the object of her investigation, as she considers this differentiating action to be performed in alignment with strategies that are specific to each culture. The strategies of Bell's framework afford ritual practice connections to either religious and/or social purposes, while allowing Maya-specific theories and models to be subsumed under this banner. Pauketat (2001:83) illustrates how changes in practice at one level may result from historical changes that have occurred at a different level, and this theory is equally applicable to both ritual and social categories. I employ both Bell's and Pauketat's models, supplementing them with elements from other ritual and practice theories that have gained purchase among ancient Maya researchers. In this section, I examine a number of these theories, before elaborating on those of Bell (1992) and Pauketat (2001).

3.1 RITUAL THEORY - Emile Durkheim

Emile Durkheim's *The Elementary Forms of Religious Life* (1912) illustrates several concepts which have demonstrated poignancy in Maya research. Durkheim (1912:421-422, 424, 430-431, 436, 439) suggests that the origin of religious beliefs can be found in experiences of the natural world. Validation of this concept in relation to the Maya has been derived from ethnographic sources. Evon Vogt (1969:387), for example, recorded that the Tzotzil Maya believed that caves produced rain clouds, based upon their observations of water vapor rising from cave entrances. Likewise, the Maya belief that winds and lightning originate from caves has been attributed to real-world observations (Bassie 2002:6; Woodfill 2021:2). Durkheim (1912:431) further notes how religions "attempt to connect things to one another." For the ancient Maya, this is demonstrated through cave analogues that include human reproduction, agriculture, as well as some "complementary oppositions" that were perceived by the ancient Maya as functioning cyclically in the natural world (Coggins 1988:66-67, 69; Woodfill and Henderson 2016:189). Additional ancient Maya examples of such cognitive associations include likening the quadripartite universe to a turtle shell, maize to the tail of an armadillo, and young maize shoots to the tongue of a serpent (Prufer 2002:228-229; Marcus and Flannery 1994:70).

Beyond the experiential origins of religious belief, Durkheim finds that such "collective representations" similarly effect the development of society (1912:421). This cross-categorical integration is evident in ancient Maya practices. Concepts of cosmology and directionality have proven applicable at multiple scales and for various space-organizing activities, such as site planning (Brady 1997:604), monumental architecture (Ashmore 1989:272), milpas farming (Brady 1997:603), and ritual cave practices (Moyes 2012:107; Woodfill and Henderson 2016:186). For both religious ritual and society, Durkheim states the necessity of maintaining,

reaffirming, and regenerating collective beliefs (1912:420, 429), however, his focus centers upon social cohesion as ritual function, rather than the emic understanding any culture would have of its ceremonies. Nevertheless, renewal was a primary concern for the ancient Maya, and Durkheim's linking of ritual practice with society aids this thesis.

Although Durkheim's view is largely synchronic, he does indicate that change occurs within society and religion, and provides several reasons. He suggests that circumscription plays a part in changing religion, noting how expanded spheres of interaction may lead to the consolidation of ideas (1912:428, 446). He also suggests that changes are made when concepts are found not to correlate with reality (1912: 435, 445). Expanding on this, Durkheim states that "Only quite weighty events can succeed in changing the mental equilibrium of society." (1912:436). Each of these points may be valuable in examining ritual and societal change over the long history of the ancient Maya.

3.2 RITUAL THEORY - Mircea Eliade

Through extensive cross-cultural study, Mircea Eliade developed archetypal models of religious and ritual behaviors that have proven relevant in relation to Mesoamerican beliefs, including those of the ancient Maya (Brown 2021:394-395). One distinct parallel of Eliade's work relates to a Maya cognitive model of the universe, or cosmogram. Eliade's study demonstrates that ancient religions sought to recreate the original act of creation by establishing a sacred 'center' within the landscape with four directional areas extending from it (1959:42-45). This cognitive model corresponds to the quincuncial form, a quadri-partitioned square containing a central point, utilized by both the ancient and modern Maya. Its long-standing use among the Maya is attested by ethnohistoric studies (Brown 2021:394; Garcia-Zambrano 1989:218-220, 223-226), ethnographic studies (Gossen 1974:34; Holland 1963; Redfield and Villa Rojas 1934;

Sosa 1985:417–423; Vogt 1976:13; see Moyes 2001:128), ancient iconographic representations (Garber and Awe 2009:155-157; Guernsey 2010:82), settlement layouts (Mathews and Garber 2004:56; Ashmore 1991:201), and artifact distributions in caves (Moyes 2001:132).

An important aspect of Eliade's model is that central places are where separate levels of the world meet (1965:15). Eliade argues that one such place cross-culturally, is a sacred mountain, and that residences, temples, palaces, even cities are symbolic replications of this natural feature (1965:12). For the ancient Maya, residential structures (Mathews and Garber 2004:51; Brady and Ashmore 1999:127, 139, Vogt 1998:26), temple-pyramids (Vogt 1964:194; Stuart 1997:15), and various levels of settlement (Brady 1997:604; Garcia-Zambrano 1989:218-221) are tied to the mountain-cave construct as a central location of vertical level convergences. Relevant to this ritual theory and this thesis are the manners in which the ancient Maya employed this model to communicate with the supernatural across levels. Analyses of various ancient Maya practices and representations that include the quincuncial model (Coggins 1988:67), have illustrated the ancient Maya invocation of various "complementary oppositions" within their belief system (Woodfill and Henderson 2016:189), and these may further inform the present study.

Eliade also provides a perspective on ritual intent and meaning. He indicates that periodic rituals reenact the original creation in order to purify the community and rebirth time itself (1965:52-54). Bell states that Eliade "found ritual inseparable from the delineation of a sacred place and the "regeneration" of time" (Bell 1992:99). The Dresden Codex, Bishop De Landa's account (Tozzer 1966:151-152), Books of Chilam Balam, and other ethnohistoric and ethnographic sources indicate that the Maya conducted such renewal rituals, and often in caves (Vail and Looper 2015:123-127; Stone 1989, 2005:135). The 16th century Maya origin story, the

Popul Vuh, is important in this regard as it designates a cave location wherein hero twins are killed, return to life, and death is defeated (Tedlock 1985:78, 82). As an agricultural society, the ancient Maya performed rituals in caves to ensure water, fertility, and renewal of life (Brady 1989:38,42-48; Moyes 2001:107). Eliade's theory for a cognitive spatial model and a regenerative ritual focus coupled with evidence from the Maya themselves constitutes an important perspective for the study of ancient Maya ritual cave practices.

3.3 RITUAL THEORY - Ruth Whitehouse

From a cross-cultural perspective, Ruth Whitehouse (1992; 2015) offers an interpretation of ritual cave practices that is unique and somewhat absent in Maya cave research (but see Woodfill and Henderson 2016; Stone 1995; Lucero 2010). Whitehouse offers alternate interpretations of ritual cave deposits based on different theoretical models, providing contrasts, but also a consideration of other researchers' perspectives, including that of a ritual fertility focus (2015:49). One of Whitehouse's interpretive models is based on the use of "material metaphor", considering both "colour and transformation" (2015:57). However, this model does not represent the full relevance of her research for Maya ritual caves.

The similarities of the Italian ritual cave deposit materials and their geomorphological associations to those of the ancient Maya are surprising. In one publication, Whitehouse explicitly delimits her consideration to only the water-associated rituals that took place in a number of Italian caves during the Neolithic and Copper Age (2015:50). Whitehouse identified stone circles, human remains, carbonized grains, calcified pottery, ceramic cups placed upside down in cracks, speleothem breakage, a hearth, animal bones, and ceramic sherd scatters; all having some association with water in one form or another (2015:51-55). Similar and equivalent materials with water associations are found among ancient Maya ritual cave assemblages, and

various interpretations have been posited. Among these are the collection of zuhuya (virgin) water (Thompson 1959:124-127), a "Late Classic Drought Cult" (Moyes 2006:567; Moyes et al. 2009), and petitions to various deities for rain (Morehart 2002:279). Influenced by the "abnormal" mineral characteristics of some of these waters, Whitehouse considers the role of "transformation" in such ancient ritual cave practices (2015:58-59).

Although Whitehouse speculates on the symbolism that water-related cave feature colors may have to the fluids of the human body (2015:57-58), what is potentially her most important contribution to ritual cave studies is the notion that the formation of speleothems from water may have led to ritual veneration of these cave areas as places of transformation (2015:58-59). With transformation as a starting point, Whitehouse speculates as to the perceptions and ritual practices that may be linked to this conception. These include: a perception of speleothems likened to human bones, informing the practice of secondary burial for the completion of a cycle; and a perception of calcium carbonate waters as transformative, with their consumption potentially utilized in rites of passage (2015:59). While secondary burials appear relatively common in ancient Maya cave settings (McAnany 2001:133; Prufer 2002: 231) and possible rites of passage have been identified by Maya cave research (Heyden 1975:138), the theory that caves represented foci of transformation may extend to other known ancient Maya ritual aspects such as the role of shamans, and the ritual burning of material offerings. Its potential value in linking with a variety of ancient Maya ritual cave practices renders Whitehouse's theoretical perspective of transformational metaphors meaningful for this thesis.

3.4 RITUAL THEORY - Roy A. Rappaport

Citing his studies of the Tsembaga and related groups of New Guinea (1967), as well as notable cross-cultural examples of ritual practice, Roy Rappaport posits a theory of religion as an

adaptive system of humanity (1971:23). He considers ritual as a means of transmitting status information which may then be used in adjustments to decision-making (1971:25-26). Additionally, Rappaport considers that some non-calendric rituals may reflect a change in context, necessitating a correction (1971:24, 27, 38). His examples include non-calendric ritual festivals in New Guinea that are undertaken to curb pig populations (1967:22, 1971:38), and the potlatches of the Northwest Coast in the United States that balanced levels of prosperity among groups (1971:37). Such examples have potential equivalencies with ancient Maya ritual feasts conducted outside of caves (Lucero et al. 2016). Based in systems theory, Rappaport's analysis emphasizes the function of religion and ritual within the larger society, articulating ways in which religion and ritual may affect other social systems (1971:29).

Key to Rappaport's model is his concept of the sacred, which he considers to be employed in ritual practice to reaffirm support. In other spheres, he indicates it is used to "sanctify" and mark decisions in arenas outside of religion as unquestionable (1971:29,35-36). Rappaport associates the sacred and sanctification with the highest forms of political authority, stating: "the higher the level of control, the greater the importance of moral and mythic terms in its cognized model" (1971: 34). He illustrates how religion, ritual, and the sacred are based upon "unverifiable propositions" (1971:29), and that this affords the authority and flexibility needed to control and regulate other societal systems (1971:34). For the ancient Maya of the Classic Period, the infusion of religious ideology and ritual into subsistence practices (Morehart, 2002:289-290), trade (Woodfill and Andrieu 2012), economic (Brady 2005), and political (Lucero 1999:240; Moyes 2001:585) systems is accepted. Andrea Stone illustrates how these categorical divisions even appear iconographically and practically merged among the ancient Maya in representations of travel (2014:49-51).

Rappaport's ritual theoretical contribution also provides a model of societal development in which religious ritual plays a substantial role in the rise, consolidation, and collapse of hierarchical power. He contends that:

> "religious ritual played an important role is social and ecological regulation during a time in human history when the arbitrariness of social conventions was increasing but it was not yet possible for authorities, if they existed at all, to enforce compliance." (1971:38)

Rappaport further notes that sanctity "has permitted the progressive centralization of regulatory authorities," resulting in the subsequent acquisition of more tangible means of enforcement (1971:39). Most importantly, Rappaport links acceptance of the sacred and sanctity with the material circumstances of the populace. He suggests that groups may invoke new "sacred propositions" that legitimate new authorities, or they may find new interpretations that "encourage organizational change in response to changed circumstances and at the same time provide continuity through such changes" (1971:39-41). Rappaport's model echoes those positing ancient Maya political appropriation of ritual throughout the Preclassic periods (Awe et al. 2021b:3-12; Moyes 2006:60-62), as well as notions of failed kingship during the droughts of the Late and Terminal Classic periods (Moyes 2001:571-574). Overall, Rappaport provides a systems-based framework that bears resemblance to known ancient Maya ritual and societal developments. This framework may prove useful for articulating relationships between ancient Maya ritual changes and societal events.

3.5 RITUAL THEORY - Catherine Bell

In her seminal work, *Ritual Theory, Ritual Practice* (1992), Catherine Bell forges a new path for ritual theorists by fundamentally restructuring the approach used to separate ritual from other social behaviors. Rather than attempting to order what ritual is or how it functions

universally (Bell 1992:70), Bell's theory focuses on how and why an activity is made ritual; the strategy behind this differentiation of actions. This focus on "ritualization" resolves a number of conceptual and ethical problems that Bell finds to be prevalent among ritual theories (1992:25,47,69), by effectively relocating ritual within the larger sphere of all social action (1992:74). This reformulation has a number of implications that are valuable for this thesis.

Bell indicates that several problems with ritual theories come as a result of both their "definitional" and "universal" approaches (1992:69-70). The first problem is that these universalist definitions fail to account for the fullness of human innovations, and "additional categories are needed to account for all the data that does not fit neatly into the domain" (1992:69). Bell lays out only a general theory of ritualization as a cultural strategy, and suggests that to fully understand the strategy, one must look to the specific culture, its circumstances, its logic, and its aims (1992:7,74,81,93). This affords Bell's theory the ability to be utilized in combination with more culturally specific information such as data from ethnohistoric, ethnographic, epigraphic, iconographic, and theoretical sources which may include those of the aforementioned ritual theorists. This inclusion also partially solves the second problem.

The second problem involves ritual theories lack of the emic perspective. In place of the emic, Bell notes that ritual theorists first introduce a dichotomy of "thought and action" in order to isolate and define ritual as an object for analysis (1992:47-49). This initial dichotomy is then used in constructing additional cultural and/or social oppositions (1992:47). Some of those listed by Bell include: "tradition and change, order and chaos, the individual and the group, subjectivity and objectivity, nature and culture, the real and imaginative ideal" (1992:16), "the synchronous, continuous, traditional or ontological in opposition to the diachronic, changing, historical, or social" (1992:20), "individual experience and social forms" (1992:25), "conceptual

versus dispositional forces" (1992:32), and "ritual and instrumental activity" (1992:71). Theorists then utilize ritual again as the means for both reintegrating the original dichotomy (1992:20,23) and resolving these oppositions (1992:36). Bell views this method as questionable, as it carries "an assumption about thought and action that runs particularly deep in the intellectual traditions of Western culture" (1992:25). This is to say that ritual theorists impose a structure of logic and "categories rather alien to the people involved" (1992:72). Additionally ritual theory analyses often focus on ritual function within the sociopolitical sphere, versus what the participants themselves think ritual does. One connotation of 'strategy' concerns the external purpose or the possibility of ritualization's utilization by different agents serving different agendas. In this way, ritualization affords the possibility of analyzing ritual from both the religious ideological and the sociopolitical perspectives.

Another connotation of 'strategy' suggests the internal means or methods of achieving a purpose. Bell offers a general outline for two main strategies and a description of their "basic dynamics" (1992:101). Her strategies include: "the generation of a privileged opposition between ritualized and other activities and the production of ritualized agents through the generation of a structured environment experienced as molding the bodies acting within it" (1992:101). Bell considers three steps internal to these strategies:

> "first, the physical construction of schemes of binary oppositions; second, the orchestrated hierarchization of these schemes whereby some schemes come to dominate or nuance others; and third, the generation of a loosely integrated whole in which each element 'defers' to another in an endless circular chain of reference." (1992:101).

At first glance, these steps appear to mirror those taken by earlier ritual theorists, for which Bell offered critique. However, the binary oppositions introduced here would be based on an emic perspective and the specific cultural context. Surprisingly, Bell's description and example of a

Catholic mass invoking oppositions involving vertical, horizontal, and internal/external relations are reminiscent of Eliade's universal cosmological model (Eliade 1959:42-45) and the Maya quincuncial form that has been used for interpreting the distribution of deposits in Actun Tunichal Muknal cave (Moyes 2001). Bell suggests that these same oppositions may be applied to interrelations among regional groups (1992:124-125). The introduction of binary oppositions also recalls Coggins' findings amidst other analyses of Maya iconographic and epigraphic representations (Coggins 1988:67,69). In Maya literature, such oppositions are variously referred to as "complimentary concepts" (Coggins 1988:67), "complementary oppositions" (Woodfill and Henderson 2016:189), "functional dualism" (Ashmore 1988:273), and "functional complementarity" (Ashmore 1991:200). The absence of complete opposition in these concepts is indicative of Bell's second and third steps within ritualization strategies. What Bell refers to as "a minimalist logic" (1992:104), may afford great interpretive value to the analysis of ancient Maya ritual cave deposits.

In sum, Catherine Bell's theory of ritualization provides a number of valuable perspectives and tools for this thesis. It allows space to incorporate the emic perspective and to investigate ritual cave practices from different strategic points of view that may include both the religious ideological and the sociopolitical perspectives. It also affords an outline of basic strategies and their characteristics which may prove useful for analyzing ritual cave deposits. Importantly, Bell's theory can be utilized as an umbrella for other theories that have specific relevance to the ancient Maya. In addition to the aforementioned ritual theories, these may include certain practice theories.

3.6 PRACTICE THEORY

Practice Theories first came forward in response to processualist, positivist theories that had considered only adaptation and evolution as the causes of cultural change (Preucel and Mrozowski 2010). Practice Theorists sought to formulate models that would demonstrate how individual practices and societal structures interrelate so as to effect cultural change (Preucel and Mrozowski 2010). To address whether changes in ancient Maya ritual cave practices articulate with larger societal change, Practice Theories seem to afford the appropriate framework. However, there are a number of models from which to choose.

Various models have expressed how cultural change derives from the interrelationship of societal structures and practices. Widely known and influential are the models of Pierre Bourdieu (1977, 1990) and Anthony Giddens (1979, 1984). Bourdieu posits a theory of practice that incorporates historically-developed habitual dispositions of actors, or habitus, "as the strategy-generating principle enabling agents to cope with unforeseen and ever-changing situations" (1977:72). This implies the manner in which Bourdieu's theory accounts for cultural change; change he indicates is not fully intended (1977:73). His notion of agents using habitus as "structured structures predisposed to function as structuring structures" (1977:72) foreshadows Gidden's theory (1979). Giddens posits a theory of "structuration", wherein agents play a more conscious role in shaping and reshaping structure, indicative of a recursive relationship between individuals and structure (Preucel and Mrozowski 2010; Spiegel 2005:119; Dornan 2002:307). He notes that structuration originates from "temporality, and thus in one sense, history" (Giddens 1984:122), and that structures are far more malleable to circumstances than previous theories suggest (Giddens 1984:133-134,139). Bourdieu's theory considers the material elements that affect practice, whereas Giddens focuses on the nature of practitioners' agency opposite structure

(Preucel and Mrozowski 2010:129) These theories are often considered in tandem as complimentary components in Practice Theory (Preucel and Mrozowski 2010:129; Spiegel 2005:120; Dornan 2002:305).

Numerous theorists have built upon the themes presented by Bourdieu and Giddens, and have conceived of practice in a variety of manners (Ortner 1984:146). Utilizing the historical example of Captain Cook's encounter with native Hawaiians, Marshall Sahlins demonstrated how a ritual structure can be changed by a novel encounter stemming from differentiated perceptions among practicing agents (Sahlins 1981:35; Sahlins 2005:116-118; Howard 1982:414). Sahlins found that traditional Hawaiian ritual practices were applied intentionally but inconsistently due to different religious interpretations given to contact with the Cook expedition (Sahlins 2005:116-118). This displacement among the native populace ultimately effected change to both the structure and meaning of ritual (Dornan 2002:323; Ortner 1984:155-156). Based on her studies of Sherpa Buddhists in Nepal, Sherry Ortner posited "a theory of practice as a theory of history" (1989:193) in which structural and cultural change comes about in much the same way that Sahlins had found (1989:200-201). Ortner relates how external events reconfigure the landscape so that "alternative perspectives" and practices become possible (1989:200-201). Differing from other Practice theories, this formulation does not seek resolution of the opposition of structure and action, but instead accepts a continual tension between the two (Bell 1992:79). Despite the wide-variety of Practice theories, for this thesis, I incorporate the Practice theory developed by Timothy Pauketat in tandem with Catherine Bell's more specific consideration of ritualization as practice.

3.7 PRACTICE THEORY – Timothy Pauketat

Timothy Pauketat defines practice as "people's actions and representations", guided by their dispositions, and generative of social and cultural change (2001:74). Like Bourdieu, Sahlins, and Ortner before him, Pauketat acknowledges that practices are susceptible to the impact of novel contexts, but he also invokes the relationship that practices may have with political power, and thereby concludes that practices are "always negotiations" (2001:80). This view of practice allows Pauketat to posit that traditions are not static, but rather are continually in development and that this is a historical process (2001:80). Echoing Giddens (1979), Pauketat indicates that change occurs through practices when they act as "structuring events", and that explanations of change thereby rely on "reference to the genealogy of practices" (2001:80).

Pauketat's Practice Theory, "historical processualism", looks to explain social and cultural change utilizing the historical context in which change occurs (2001:73). Archaeologically, this translates to searching for "evidence of changing practices at all scales" (Preucel and Mrozowski 2010:131). Pauketat indicates that the use of "cumulative, data-rich, multi-scalar studies of proximate causation" are necessary (2001:87). In his own study of the adoption of crushed shell ceramic temper in the Mississippi river basin, Pauketat examined the history of studies and interpretations for this development that occurred between 1000-1050 AD (2001:81-82; Preucel and Mrozowski 2010; 131). He concludes that the rapid adoption of crushed shell ceramic temper at the microscale was undertaken in emulation of its use at the macroscale; the founding of the political capital of Cahokia around 1050 AD (2001:82,85). While both Pauketat's theory and research approach are taken into account for this thesis, one aspect of his interpretative model comes into question.

Pauketat's theoretical treatment of intentionality in practice skews toward the unintended or "unconscious basis of action" (Dornan 2002:313). He suggests that strategy and intention must be separated, because "The motivations to act were not the same as the end results that may be observed" (2001:79) and, archaeologically, his point is well-taken. His reasoning is meant to extricate practice from teleological, behaviorist logics, for which Pauketat equates strategy with behavior in this instance (2001:79). Conversely, Pauketat indicates that instances of practice are "always negotiations" that transform traditions insofar as political power may affect practice (2001:80). In this manner, strategy, intention, and conscious action are considered active. His own interpretation for the rapid adoption of shell-temper ceramics as "emulation" suggests strategy, intention, and consciousness behind changes in practice. What calls Pauketat's theory into question is that change is only rendered possible in negotiating the sociopolitical aspect. While he considers that practices are open to change from various social influences (2001:80), Pauketat's theory only explicates change in terms of negotiations with power. As such, practices being "literally the embodiment of people's 'habitus' or dispositions" (2001:80) would remain relatively static absent any sociopolitical stimulus. Pauketat's theory linking practice and changes in practice to sociopolitical history at different societal scales is critical for this thesis. In researching ancient Maya ritual cave practices, however, I would add consideration of the conscious actions, intentions, and strategies underlying ritual practices from the ancient Maya religious perception of a supernatural hierarchy and landscape.

3.8 PRACTICE THEORY - Catherine Bell

Catherine Bell delineates the act of "ritualization" as practice, and analyzes this form of practice in particular. In doing so, she lays out four general features, describing practice as:

> "(1) situational; (2) strategic; (3) embedded in a misrecognition of what it is in fact doing and (4) able to reproduce or configure a vision of order of power in the world, or what I will call 'redemptive hegemony' " (1992:81).

As characteristics of ritualization, Bell's first two features have already been touched upon in the Ritual Theory section of this thesis. The crossover between strategy and the third feature, misrecognition, speaks to Pauketat's separation of strategy from intention (2001:79). Bell's fourth feature, "redemptive hegemony", works in concert with the other three features as the structured orientation and experience that motivates practitioners, who in turn replicate the structure through practice. These features may be viewed from both the perspectives of practice in its relationship to sociopolitical power and constraints, and practice in its relationship to power conceived of as supernatural.

Bell's concept of misrecognition that occurs during ritual practice establishes an opposition between the intention and the outcome of practice. For Bell, ritualization "sees itself responding to a place, event, force, problem, or tradition" (1992:109). In the 16th century Popul Vuh origin story, earlier creations of humanity are destroyed because they fail to remember or honor the gods (Christenson 2007:72-73; notes 115 and 120). This differentiation from earlier peoples implicitly obligates the Maya to acknowledge deities, and suggests the consequences of not doing so. The response of ritualization to this problem of acknowledgement is merely one of its practice manifestations addressed to supernatural forces, but it aligns with Bell's contention that ritualization "tends to see itself as the natural or appropriate thing to do in the circumstances" (1992:109). Archaeologically, consideration of misrecognition may take a limited form such as the economic effects of removing material culture from circulation (Brady 2005:124-126). For Bell, misrecognition as a feature of practice goes further:

> "what ritualization does is actually quite simple. It temporarily structures a space-time environment through a series of physical movements (using schemes described earlier), thereby producing an arena which, by its molding of the actors, both validates and extends the schemes they are internalizing." (1992:109-110).

This is to say that ritualization as practice in responding to an issue, recasts the issue in new terms and socially conditions actors to replicate this method (1992:109-110), generating an entire genre of action. Cross-culturally, ritual practice directed towards the supernatural is understood as the petitioning of supernatural power for some desired outcome or against one that is undesirable. This is the conceptual landscape in which ritualization as practice is reproduced, expanded upon, and perpetuated. Iteratively, Bell notes that practice also produces and/or alters a state of consciousness that she calls "redemptive hegemony" (1992:81).

For actors socially conditioned to reproduce ritualization as practice, Bell notes an understanding or view of their particular culture's power relations, and that this contributes to the reproduction of that view as actors "envision the efficacy of acting within that order of relations." (1992:84). She calls this "redemptive hegemony" and associates it with a practical recognition of "obligations", "a state of prestige within this ordering of power", and "an envisioning of personal empowerment" (1992:84). This fourth feature of Bell's theory of practice might be considered in relation to ancient Maya ritual cave practices from the practitioner's point of view of either the supernatural or sociopolitical powers. This flexibility in the notion of "redemptive hegemony" may help to interpret changes in ancient Maya ritual cave practices, as a framework to understand how religious ritual crossed into the sociopolitical and other structures through its appropriation over space and time.

4.0 METHODOLOGY

As with science in general, Maya archaeology shows long periods of slight, incremental advances that culminate to a critical mass of knowledge before understanding is propelled forward. This punctated equilibrium is true of research regarding the function of ancient Maya caves and their archaeological deposits. For example, over 100 years passed from the time of the first Maya cave explorations until the acceptance that these ancient sites functioned as religious ritual venues (Moyes 2006; Scott 2009). With ideology understood to permeate various levels of society, researchers began to include cave studies in regional settlement surveys (Demarest 1997; Laporte and Torres 1987; Hoggarth et al. 2020), and Maya cave archaeology flourished from 1989 until the regional introduction of canopy-penetrating LiDAR in 2009 (Chase et al. 2011; Helmke 2009; Hoggarth et al. 2020; Scott 2009). This thesis will address one primary research question: whether changes to practices in ancient Maya ritual caves articulate with societal developments. Some examples of key societal developments that may be considered include warfare, political re-alignments, fluctuations in centralization, shifts in trade routes, changes in population, and drought. Changes over time in ceramic deposit frequencies and in their associations with specific cave areas and features can signal that such societal developments have occurred. The present study focuses on patterns that might be discerned by comparing the quantitative and temporal attributes of ceramic deposits with their associated geomorphological cave features emplacements.

4.1.1 Previous Studies

A number of researchers have observed shifts in the spatio-temporal area of focus for ancient Maya ritual cave practitioners, demonstrating different artifact distribution patterns in the Early Classic (250-600 AD) versus the Late Classic Periods (600-950 AD) (Helmke 2009;

Moyes et al. 2017; Reents-Budet and MacLeod 1997; Woodfill 2011). Spatio-temporal areas of focus are the places that the ancient Maya concentrated ritual practices during specific periods of time. Shifts of these areas have often been interpreted in terms of broad-stroke, ideological changes in the larger society, but some researchers have connected changes to regional and even interregional culture history. For instance, Brent Woodfill (2007) matched temporal changes in distributional patterns, ceramic style, and ceramic composition from the Candelaria Caves of Guatemala, interregionally, with sociopolitical changes at Tikal. Holley Moyes (2006) demonstrated how ritual practice changes in the Late Classic Period correlated with epigraphically-known local history and climatological stress near the Macal River of Belize. Moyes later extrapolated some of these patterns to the larger region (Moyes et al. 2017). Such reconstructions show promise for further articulation with Maya culture history.

4.1.2 Addressing Deficiencies and Building on Previous Studies

Despite the establishment of epigraphically and paleoclimatically-known historical links to changes in ritual cave practice (Moyes 2006; Lucero and Kinkella 2015:178; Woodfill 2007), previous studies have not been used to frame ritual cave practices in correlation with societal developments at the pan-regional level. In this study, I synthesize data from 116 caves, across four ancient Maya regions. This approach allows for a more extensive reconstruction of ritual cave depositional patterns by temporal period and region. In turn, macro-level cultural and historical events may be shown to temporally match with changes to ritual cave practices as seen through ceramic deposits, across regions. Further synthesis and integration of cave data constitute a logical trajectory and extension of previous ancient Maya ritual cave studies.

4.1.3 Significance of this Study

If we understand how ritual cave practice changes and use-intensification correlate with societal developments and stress across societal scales, we may progress toward explaining how ideology structures social, economic, political, and ritual systems, how these structures attempt to address novel situations and crises, and how such interrelations may create path-dependency in decision-making (Kintigh et al. 2014; Hodder 2014:31). Diachronically reconstructing ancient Maya societal development through ritual contexts may provide answers to such questions, and afford value for predicting the likelihood of success for large, transformational changes that are intended to address contemporary crises (Kintigh et al. 2014).

4.1.4 Purpose of the Proposed Study

The purpose of this thesis is to examine ancient Maya ritual cave practices diachronically and inter-regionally to discover whether ritual cave practices articulate with developments in ancient Maya culture history. To accomplish this, I collected and compiled datable ritual cave ceramics data that can demonstrate: 1) Temporal use-life range of caves, individually, by drainage basin, and region; 2) Temporal period frequency changes of ritual cave deposits for caves, individually, by drainage basin, and region; 3) Changes in intra-cave spatial utilization by temporal period for caves by region. Temporal ranges for caves in all regions span the Early to Middle Preclassic (1200 BC-300 BC), Late Preclassic (300 BC – 250 AD), Early Classic (250 AD – 600 AD), and the Late Classic Periods (600 AD – 950 AD). This study uses descriptive statistics to achieve study objectives. Data collection was reliant on secondary source, peer-reviewed publications, and samples were determined according to the degree that reports included temporal and cave feature (spatial) association data for ceramic artifact deposits. The key variables for this study

include two categorical, temporal range variables for each ceramic entry, and 23 dichotomous, cave feature association variables.

4.1.5 Objectives and Hypotheses

In demonstrating how patterns of ritual practice match with societal developments, I first anticipate that individual caves will show similarities foremost with caves in the same drainage basin, and then with caves in the same region. Different patterns within a region may be based upon the differing culture history of individual settlement areas, but it is posited that the combined chronologies and temporal frequencies of ceramics from the caves in a region will demonstrate a pattern of changes to ritual cave ceramic practices that signifies historical events. While these temporal patterns may show material differences across regions, reflecting different ritual applications, it is hypothesized that ritual changes in all regions will occur at periods of near temporal equivalence. Accordingly, my objectives are:

Objective 1: to utilize the quantities and temporal dating ranges of ceramic deposits to establish the use-life chronological ranges and ritual intensity changes for each cave and to compile these data for each of four Maya regions.

> Hypothesis 1: Ritual intensity patterns of increase and decrease will demonstrate temporal patterns for each region that may show similarities with those of other regions.

Objective 2: to utilize the quantities, temporal range, and spatial associations of ceramic deposits to demonstrate changes of spatial use and focus by temporal period.

> Hypothesis 2: Changes in the cave feature [speleothems, boulders, entrance area, deep cave, etc.] associations of ceramic deposits will occur from one temporal period to another, and these changes will demonstrate some temporal alignments across regions.

4.2.0 Methods

To create a data set that would satisfy the research objectives, initial aims included the collection of data reflecting each ceramic artifact's condition (completeness), temporal range, and cave feature emplacement (spatial) associations. Secondary source, peer-reviewed

publications on Maya cave investigations constitute the main sources of data, and these were mined and cross-referenced by the author in San Ignacio, Belize and Flagstaff, Arizona between May and September of 2022. The methods of collection involved in-depth readings of ceramic quantification methods, ceramic type-variety chronological designations, provenience descriptions for each ceramic artifact, reviews of plan and cross-sectional maps illustrating the spatial contexts of artifacts, and reviews of the researchers' temporal findings for the ritual use-life of each cave.

4.2.1 Research Design

This study largely represents a Descriptive Research Design, albeit with some Historical Research design elements. The research design type was selected to gain an accurate portrayal of cave chronologies at the local, regional, and global scales. Additionally, this research design aids in quantifying the spatial feature associations of ceramic artifacts by temporal period. Frequencies of ceramic spatial associations should indicate some spatio-temporal differences for ritual practices and will thereby suggest which variables may be most important for further testing. While some variables of importance were known from the outset, discovering and incorporating new variables into the data set during collection was an additional goal. Results of this approach were: 1) Data assessment of individual caves sometimes required the creation of new variables, necessitating that all earlier cave data entries be reassessed; and 2) Differences in the reporting protocols across studies sometimes required the development of new categories within a variable to ensure comparability. An example of the former is the Wall Adjacency variable, which was created after data from several caves had already been entered. This addition required that all previous ceramic entries be revisited to assess if deposits met this new criterion. For the latter, two categories for ceramic sherds were added to account for differences in

reporting. While researchers tend to report ceramic sherd counts as representing vessels, some have reported sherd counts as representing scatters of sherds, or have given full sherd counts without a vessel quantity estimate. Such cases are included in this dataset as separate categories and can be excluded from any statistical analyses. However, these cases are reported at the extreme minimum quantification of one artifact per instance. This method of quantification favors undercounting of ceramic vessels versus overcounting.

4.2.2 Sample Size, and Samples

The choice of samples from each region was determined by the ability of the secondary sources to provide the data needed. Caves were excluded if publications afforded only summary statements for quantitative, temporal, or spatial elements of data. Inclusion criteria consisted of a system of ceramic quantifications, ceramic type-variety analyses and/or temporal ranges, and both descriptions and maps illustrating the provenience and context of individual ceramic artifacts. The absence of temporal or spatial elements of data reported for a minority of ceramic deposits was not exclusionary for the entire cave. The goal was to collect data from as many caves as possible within each of four regions. The results are that 32 caves from Central Belize (Region 1), 50 caves from Southern Belize (Region 2), 28 caves from the Pasión River region in Guatemala (Region 3), and 6 caves from the Northern Honduran Highlands (Region 4) constitute the primary dataset. The samples include caves of different types, sizes, and geomorphological feature affordances. Ceramic deposits from the Late Preclassic (300 BC – 250 AD), Early Classic (250 AD – 600 AD), and the Late Classic Periods (600 AD – 950 AD) are represented in all regions, and the late Early to Middle Preclassic (1200 BC-300 BC) is represented in all but Region 2. Samples from Regions 1 and 3 provide better ceramic representation of all temporal

periods than does Region 2, which is relegated to mostly Late Classic Period cave use. Region 4 is limited by the low number of caves and associated ceramic deposits documented.

4.2.3 Measured Variables, Materials, and Procedures

Table 1 lists the key variables for each ceramic entry. These include: Region Code Identifier (categorical) for the cave; Temporal Range 1 (categorical) for the manufacture dates of the ceramic type; Temporal Range 2 (categorical) for the ceramic seriation or radiocarbon dating associated with the ceramic; the Ceramic Condition variable (categorical) which classifies the ceramic artifact as 1) a sherd representing a whole vessel, 2) a partial vessel representing a whole vessel, 3) a complete vessel representing a whole vessel, 4) a partial or complete rim representing a whole vessel, 5) a sherd representing a scatter of sherds of the same type, or 6) a sherd representing an unspecified number of whole vessels of the same type; and 23 Cave Feature Association variables (dichotomous) with which each ceramic entry either was, or was not depositionally associated.

Of these, the Temporal Range and the Cave Feature Association variables are the most important for identifying patterns. The Temporal Range 2 variable was developed using reported micro-seriation date ranges available for some Late Classic ceramic types (LeCount et al. 2002), and radiocarbon date ranges associated with some ceramic artifacts. This variable narrows the date range for some ceramic artifacts into subdivisions within the main temporal periods. It is important for establishing Objective 1 cave chronologies, including increases and decreases of cave use as measured by the frequencies of ceramics that fit into each temporal sub-period. Temporal Range 1 is the more general of these two variables, and matches with a ceramic type's complex, or date range of manufacture. This variable is more useful for identifying patterns

within the larger temporal periods only. Together with the Cave Feature Association variables, this variable is best suited for addressing Objective 2.

The Cave Feature Association variables include three separate elevation variables which designate the ceramic deposit entry's position relative to the main floor level of each cave, a Difficulty of Access variable that relies on the researchers' descriptions of the ceramic entry's place of deposition, and 19 variables that name a specific geomorphological cave feature with which a ceramic artifact may have been associated. All of these were initially entered as dichotomous variables indicating presence or absence. Some, such as the three elevation-related variables, could be aggregated into one categorical variable for the purpose of later studies, but all were kept separate in the interest of maintaining separation during initial data collection. If spatio-temporal patterns are identified using the Temporal Range 1 and Cave Feature Association variables, variables of secondary importance, such as the Ceramic Condition variables may be subsequently assessed in relation to these patterns, potentially helping to identify qualitative aspects of ritual practice, and whether specific behaviors changed in tandem with spatial changes.

*4.2.4 Data Analysis Procedures**

Objective One: Descriptive statistics will be calculated for individual caves to determine cave-use chronological ranges, and to characterize temporal sub-portions of these ranges as containing increased or decreased ceramic frequencies. These data will be compiled into regional tables in order to identify pattern similarities within and across regions

Objective Two: Descriptive statistics will be calculated to determine geomorphological cave feature associations of ceramic deposits by temporal period for each region. Frequencies of cave feature associations of ceramic deposits, grouped by temporal period, may provide indications of differential artifact distribution patterns by comparing each cave feature association's percentage of ceramic deposits for that temporal period with percentages across temporal periods.

*Statistical analyses were conducted using SPSS Statistics Version 28.

4.3.0 Results

4.3.1 Descriptive Statistics for Objective 1

Objective 1 entails the development of timelines of use for each cave, and recording periods of increase and decrease across each timeline. Typological dating of all ceramic deposits within a cave establishes a use-life timeline of that cave. The date ranges for individual ceramic deposits were assigned to one of fourteen possible subdivisions of the main temporal periods using the Temporal Range 2 variable. To reiterate, the Temporal Range 2 variable uses reported micro-seriation date ranges available for some Late Classic ceramic types (LeCount et al. 2002), and radiocarbon date ranges associated with some ceramic artifacts. Use of this variable establishes temporal frequencies across narrower bands of time within the use-life timeline of each cave. Compiling these cave data into regional tables affords inter-regional comparisons which can illuminate patterns, and intra-regional comparisons that may indicate pan-regional connections. Tables 1.1 through 1.4 contain the data for Regions 1 through 4. Each table displays the temporal periods in chronological sequence at the top, and lists the cave names along the left side. Beneath any temporal period for which a cave contained ceramic deposits, there is a count of the ceramics and the percentage this count represents of the total number of datable ceramic deposits recorded for that cave. At the bottom of each table are regional totals for the ceramic counts of each temporal period.

For Central Belize / Region 1, there are 32 caves, and 2383 ceramic entries assigned to one of eleven temporal periods. Region 1 data show a bimodal pattern of cave use, with one peak that begins in the Late Preclassic rising into the Early Classic, and the other peak occurring during the Late Classic 2 and 3 periods. Initial analyses identified a more nuanced pattern within the data and this was accomplished by plotting histograms from the Temporal Range 2 variable.

Figure 1 provides an example from this region. As a result of these plots, nine caves (28%) exhibited a pattern of decreased deposit frequencies in the Late Classic 1 period, with frequency increases in the Late Classic 2 and 3 periods. Four caves (12.5%) signal either abandonment at the end of the Early Classic, or the cave's first deposits appear in the Late Classic 2 period, with either corresponding to one portion of the aforementioned pattern. Nine other (28%) caves exhibited steady use or increases of frequency spanning the Early Classic, Late Classic 1, and Late Classic 2 and 3 periods.

For Southern Belize / Region 2, there are 50 caves, and 461 ceramic deposits assigned to one of eleven temporal periods. The temporal periods for this region differ from those of Region 1 due to ceramic chronologies that cross temporal period boundaries. As a result, patterns of frequency are more difficult to discern for this region. Region 2 data exhibit a bimodal pattern of peak cave use similar to that of Central Belize /Region 1, but ceramic dates that cross over the Late Preclassic boundary into the Early Classic create difficulty for precisely defining when the first peak begins. Table 1.2 shows data for the Temporal Range 2 variable and shows the largest peak occurring during the Early Classic. However, 98 (76.5%) of the 128 deposits assigned to the Early Classic using the Temporal Range 2 variable have dates that straddle the Late Preclassic -Early Classic boundary, dated 217-331 AD. The ceramic deposits for Southern Belize / Region 2 are more sparsely distributed, with many caves containing only a few ceramic deposits. Patterns are therefore more difficult to discern by comparing individual caves, but some caves exhibit one aspect of the Late Classic 1 decrease found in Central Belize / Region 1, either showing an absence of use in the Late Classic 1 period, or the cave's first deposits occurring in the Late Classic 2 or 3 periods. In reviewing data for the entire region, the same pattern of

decline immediately following the Early Classic and subsequent increase after the Late Classic 1 period is evident, and this dichotomy is recognizable in Table 1.2.

The Pasión River, Guatemala / Region 3 includes 28 caves and 3013 ceramic deposits assigned to one of ten temporal periods. The temporal period divisions are slightly different from those of both Region 1 and 2, but a more unimodal Late Preclassic through Early Classic peak for the region is evident. Table 1.3 shows data for the caves of this region, and these follow several patterns. Three caves (10.7%) show increased frequencies of deposits spanning the Early Classic through the Late Classic 1-2 periods. Ten caves (35.7%) show peak frequencies in the Early Classic and decreases occurring in the Late Classic 1-2 periods with no cave use thereafter. Four caves (14.28%) have peak frequencies in the Early Classic with no deposits in any later period. Two caves (7.1%) contain deposits in the Middle Preclassic and Late Classic 1-2 periods only. Four caves (14.28%) closely resemble the pattern of decrease in the interval between the Early Classic and Late Classic 2-3 periods that was identified in Regions 1 and 2. Additionally, three caves (10.7%) show bimodal peaks with a Late Preclassic through Early Classic-Late Classic 1 period, and another peak in the Late Classic 2-3 period.

In Northern Honduras / Region 4, there are 6 caves and 71 ceramic deposits assigned to one of 7 temporal periods. Region 4 is similar to Region 2 in terms of ceramic date ranges that cross over temporal periods. The small number of caves and ceramic deposits limit the possibility of detecting patterns, but it is clear that peak cave use occurred during the Middle Preclassic crossing over into the Late Preclassic period. The next highest concentration of ceramics occurs in the Late Classic 2-3 period, but there are so few caves and ceramic deposits recorded in this region, that it would be difficult to claim a pattern,

4.3.2 Descriptive Statistics for Objective 2

Objective 2 was undertaken to demonstrate changes in ceramic deposit associations with geomorphological cave features over time. To do this I utilized the Temporal Range 1 variable which assigns ceramic deposits to only the larger, main temporal periods, and split the data output by these temporal periods. From this, ceramic counts and percentages were determined for each of the Cave Feature Association variables. Tables 2.1 through 2.4 display these data, with temporal period headings at the top and the Cave Feature Association variables listed to the left. The tables have been separated into two subsets, the first for attributes of cave features and the second for cave features themselves. The ceramic count associated with each cave attribute or feature and this count's percentage of the region's total number of ceramic deposits for that temporal period are listed below the temporal period headings. At the bottom of each table are the region's total number of ceramic deposits for each temporal period.

In reviewing the data from Tables 2.1 through 2.4 it became clear that larger ceramic quantities during periods of peak cave use may deflate the percentages for ceramic counts. In an attempt to address this issue, the tables were re-formulated replacing the region's total count of deposits for each temporal period with the total count of cave feature associated deposits. These data are shown in tables 3.1 through 3.4 and while they may partially correct for the outsized influence of larger ceramic quantities, some issues remain.

Central Belize / Region 1 data are shown in Table 3.1. Nearly all cave feature attributes and cave features show ceramic deposit associations for every temporal period. The Surface and Subsurface attribute variables show greater percentages of surface finds in more recent periods, and greater percentages of subsurface finds for older periods. A diachronic increase in the Elevated, Descent, and Ledge variables is as expected. Counts and percentages for the Cache

variable decline over time, and are limited to the Late Preclassic and Early Classic periods. The Ledge, Alcove, Crawl, Deep Cave, and Transition Point variables show steady count and/or percentage increases over time. The Niche, Focal Point, and Pooled Water variable show steady decreases in percentage over time, despite lower counts in the Middle Preclassic and Early Classic periods. A substantial increase in the count with a drop in percentage occurs with some variables in the Late Classic column, including the Difficult Access, Niche, Entrance, Focal Point, Pooled Water, Drip Water, Speleothem, and Boulder variables. For Central Belize / Region 1, the much higher deposit counts of the Late Classic Period impact percentages, so both should be considered when interpreting the data.

Southern Belize / Region 2 data are shown in Table 3.2. These data fall under an expanded range of the main temporal periods due to ceramic chronologies that are not as precise as in other regions. The Late Preclassic-Early Classic and the Late Early Classic-Late Classic 1 temporal periods overlap with the periods that precede and follow. The counts and percentages of these two periods must be understood in this table as chronologically non-sequential, as they may represent deposits made in one or both of the adjacent columns. There are no Middle Preclassic deposits recorded from the caves in this sample. The Surface and Subsurface variables show greater percentages of surface finds in more recent periods, and greater percentages of subsurface finds for older periods. Overall, there are diachronic increases for the Slightly Elevated, Descent, Difficult Access, Ledge, Alcove, Crawl, Deep Cave, and Circuit variables. Diachronic decreases include the Cache, Pooled Water, and Speleothem variables. The Cache variable counts and percentages decrease sharply after the Late Preclassic period. The Slightly Elevated, Elevated, Depression, Ledge, Niche, Circuit, Pooled Water, and Drip Water variables indicate possible gaps between the Preclassic and Late Classic Periods. In addition, the Difficult

Access, Niche, Circuit, Focal Point, and Transition Point variables indicate a decrease in the Early Classic followed by an increase in the Late Classic period, suggesting a bimodal temporal distribution. The Entrance and Exterior variables show peaks within the Late Preclassic transition to the Early Classic period with decreases thereafter. All other variables show mixed results.

The Pasión River / Region 3 data are shown in Table 3.3. This table is similar to Table 3.1 in that it contains only the four main temporal periods. The caves sampled hold the largest ceramic deposit quantities of any region, and these are concentrated in the Early Classic period. As a result, percentages may be affected and individual counts must be considered in interpretations. There are a small number of cave features which lack ceramic deposit associations for some temporal periods. The Surface and Subsurface variable results defy expectations, with surface and subsurface ratios remaining steady for most temporal periods. The Slightly Elevated, Difficult Access, Ledge, Niche, Deep Cave, and Boulder variable percentages decrease over time with all but the Difficult Access variable showing a ceramic count peak increase in the Early Classic period. The Depression, Circuit, and Drip Water variable percentages increase over time, with each variable showing a ceramic count peak increase in the Early Classic period. The Elevated, Alcove, Focal Point, and Speleothem variable counts and percentages increase until the Early Classic, decreasing thereafter. The Descent, Entrance, Exterior, and Pooled Water variable percentages decrease in the Early Classic and increase in the Late Classic, whereas ceramic counts for all but the Pooled water variable decrease only in the Late Classic Period. The Cache variable only shows data for the Late Classic period.

Northern Honduras / Region 4 data are shown in Table 3.4. This table is similar to that of Southern Belize / Region 2 in that it contains an expanded temporal range beyond the main

temporal periods. Poor ceramic chronological resolution is a problem for this region, but Objective 2 cannot be met due to the lack of ceramic deposits and cave feature associations across temporal periods. Table 3.4 shows that the majority of cave features have no ceramic deposits associated for any period following the Middle Preclassic. As a result, the data are deemed insufficient for this study.

4.3.3 Discussion: Objective 1

The primary research question of this study was whether changes in ancient Maya ritual cave practices articulate with societal developments and through Objective 1, I sought to provide examples of when changes and societal developments coincided. Data showing a peak frequency in one temporal period relative to others offers an indication for such a critical juncture, but not without ambiguity as to its cause. Due in part to the wide temporal ranges that ceramic typologies afford, some of the least ambiguity can be found in the absence of data for a specific temporal period. Utilizing both peak frequencies and absences of data, temporal patterns of ancient Maya ritual cave use show articulations with societal developments across 3 of the four regions in this study. Samples from the fourth region, Northern Honduras, do not contain enough evidence to show a pattern or a temporal correlation.

In Central Belize / Region 1, I identified two seemingly conflicting patterns of ritual cave use. One showed an abrupt decline in the Late Classic 1 period, and the other showed continuity and/or increase from the Early Classic through the Late Classic 2-3 periods. Moyes (2006) demonstrated that a "hiatus" during the Late Classic 1 period was linked to war between Naranjo and Caracol, (Moyes 2006: 552). Southern Belize / Region 2 shows evidence of the same decline seen in Central Belize / Region 1. The Naranjo - Caracol war followed directly upon the defeat of Tikal by Calakmul and Caracol in 562 AD (Moyes 2006). In the Pasión River / Region 3,

Woodfill (2007; 2011) ties this abrupt decline of ritual cave use to Tikal's defeat, a shift of trade routes, and an influx of immigrants (Woodfill and Andrieu 2012: 198, 204-205). Ritual practices continue in the Late Classic 1-2 period, but these employ different ceramic materials, cave functions, and cave spaces. The Pasión River / Region 3 pattern shows an earlier abandonment of ritual cave practices, with many of the caves of this region terminating practices before the Late Classic 3 period. This aligns temporally and geographically with the earliest of Lowland Maya centers to collapse in the Late Classic period. Conversely, ritual practices continue into Late Classic 3 for caves in Central Belize / Region 1, Southern Belize / Region 2, and four caves of the Chapayal river drainage in The Pasión River / Region 3 which are near to the Late Classic center of Cancuén.

Many individual cave patterns appear to be variations on the hiatus theme. I interpret these patterns as representing the variable repercussions of the Tikal event, which include the shift in trade routes, population movements, and the Naranjo-Caracol war that came with Tikal's defeat. Continuity exhibited by some caves over the same periods may be attributable to different alliances or subsistence arrangements, and whereas some communities would lose the benefit of trade routes that Tikal had developed and managed, others might gain advantages or not be affected at all. So, there are patterns of ritual cave use that articulate with macro-level events, but with variability. It can be said that the results support Hypothesis 1: Cave ritual intensity increases and decreases demonstrate temporal patterns for regions, which show similarity to those of other regions.

4.3.4 Discussion: Objective 2

Through Objective 2, I sought to address the primary research question of whether changes to ancient Maya ritual cave practices articulate with societal events by providing

evidence of how these changes manifested across temporal boundaries. The results for Objective 2 are more difficult to interpret. Central Belize / Region 1 shows an increase of ceramic deposits at elevated points, descents, ledges, crawls, exteriors, deep recesses, and transition points of caves during the Late Classic period. These factors align with two patterns noted by previous researchers. Moyes (2006:567-568) reported that caves in Central Belize exhibited increased use of elevated areas during the Late Classic, and researchers have indicated both a transition to the exteriors of caves for public rituals during the Late Classic, as well as a transition venturing further inward than had the Maya of previous periods (Halperin 2002; Helmke 2009; Mirro and Mirro 2001; Woodfill 2007; Woodfill et al. 2012).

That eleven of twenty-three variables show increased counts with decreased percentages for the Late Classic Period further suggests these dual expansions for Central Belize / Region 1. Southern Belize / Region 2 provides indications of cave expansions inward, with Late Classic increases in alcove, crawl, deep cave, focal point, transition point, and boulder-associated deposits. However, use of the exterior and entrance areas of caves decreases. I would posit this is a likely representation of the extensive looting of Southern Belize caves (Prufer 2002:190), as well as resulting from the absence of spatial affordance for audiences that many of the difficult, mountain cave locations offer. Moreover, Prufer (2002:631) indicates that the Late Classic center, Muklebal Tzul, did utilize the exterior of the Mayehal Xheton cave, but discontinued the ritual smashing of ceramics practiced by its predecessor, Ek Xux, and this would also impact the findings. Pasión River / Region 3 shows an increase by percentage of both exterior and entrance space use in the Late Classic. This region is in contrast with others in that the spatial elements that would suggest interior cave expansion such as areas that are elevated, of difficult access,

ledges, crawls, deep recesses, focal points, transition points, and boulder-associations all show decreases of use during the Late Classic period.

Ritual deposits associated with focal points within caves decreases dramatically in the Late Classic in Pasión River / Region 3, and this may be interpreted as a shift away from a supernatural focus toward the political (Woodfill et al. 2012:112-113) or "from the literal to the symbolic" (Woodfill 2014:115). However, underlying this shift is an entire change in function for many of the caves in this region, changing from their Early Classic use by traders to their Late Classic use by locals (Woodfill et al. 2012:112-113). Such a shift is not evident in Central Belize / Region 1 and Southern Belize / Region 2, where deposits associated with focal points in caves increase in count if not by percentage during the Late Classic. I interpret this as a Late Classic revival in ritual cave practices, whereas the data for both regions indicate a Late Preclassic peak increase, followed by a slight decline in the Early Classic and subsequent increase in the Late Classic.

For Central Belize / Region 1 and Southern Belize / Region 2, ritual cave practices continue after many of the Pasión River / Region 3 caves have been abandoned. Central Belize / Region 1 data support Late Classic dual expansions, both to the interior and the exterior of caves, while Southern Belize / Region 2 data support only the interior expansion. The Pasión River / Region 3 data indicate a greater emphasis on cave exterior use following the Early Classic. Despite these nuanced differences in cave feature association changes during the Late Classic, we may say that the data support Hypothesis 2: that changes in the cave features associated with ceramic deposits occur from one temporal period to another, and that these changes demonstrate some temporal alignments across regions.

4.3.5 Discussion: General

The results of this study contained surprises and exposed some limitations. Recognition of the Late Classic 1 hiatus pattern within the Southern Belize / Region 2 data was unexpected, as the data appeared problematic in terms of temporal representation and chronological resolution of the ceramics. Another surprise was the seemingly subtle increase of cave exterior use in the Late Classic for Central Belize / Region 1 and Pasión River / Region 3. The potential impact of having more than one ritual change occurring had not been considered. Some limitations became apparent in the process of this study. The presence of large, individual caves and/or temporal periods with higher volumes of ceramic deposits may complicate temporal comparisons of intra-cavern spatial use. Additionally, I suspect a cave that is singular in its Middle Preclassic component may have skewed data for the Pasión River / Region 3, and that another cave of unusual geomorphology may have inflated Early Classic entrance counts for the same region. The latter issue may relate to the difference between practical definitions and the ancient Maya emic definitions of features. In essence, while having more data would aid this study for Southern Belize / Region 2 and Northern Honduras / Region 4, more data proves to not be as useful in Pasión River / Region 3. I would posit that this study has aspects which are generalizable, but also that more work could be done in addressing the perceived definitional deficiencies in Pasión River / Region 3.

The spatial association frequencies of ritual ceramic deposits illustrated in this study only address one aspect of ritual practices, and in a manner that generalizes ritual cave use. As Catherine Bell indicates, "the 'universal' always impoverishes the 'particular.'" (Bell 1992:70). The next section attempts to rectify this deficiency to some degree by reviewing some preliminary, diachronically-viewed, and detailed findings for other aspects of ritual. These

include the differential treatments of the ceramics used in ritual, the association of ceramic deposits with various anthropogenic cave modifications, and the other artifacts associated with ceramic deposits.

Table 1
Key Variables

Variable Use	Name of Variable	Coding	Description
Identifier	Region Code	Categorical (1,2,3,4)	Deposit found in one of 4 Maya regions
Identifier	Ceramic Case Number	Numeric/ Scale	Number of the deposit within each cave
Temporal Designator	Temporal Range 1	Nominal	Paired dates marking period deposit manufactured
Temporal Designator	Temporal Range 2	Nominal	Paired dates that narrow range of deposit period
Temporal Designator	Temporal Period 1	Categorical/ Nominal	Macro Temporal Period names for Range 1
Temporal Designator	Temporal Period 2	Categorical/ Nominal	Micro Temporal Period names for Range 2
Temporal Designator	Temporal Period 1 Code	Categorical/ Numeric	Codes for Temporal Period names, Range 1
Temporal Designator	Temporal Period 2 Code	Categorical/ Numeric	Codes for Temporal Period names, Range 2
State of Ceramic Designator	Condition of Ceramic	Categorical (1,2,3,4,5,6)	Sherd, partial, whole, rim, scatter, sherd # unclear
Cave Feature Association	Surface	Dichotomous (0,1)	Deposit on ground level
Cave Feature Association	Subsurface	Dichotomous (0,1)	Deposit underground
Cave Feature Association	Cache	Dichotomous (0,1)	Deposit buried and/or walled in
Cave Feature Association	Ledge	Dichotomous (0,1)	Deposit on surface over ground
Cave Feature Association	Niche	Dichotomous (0,1)	Deposit in wall inlay too small for entry
Cave Feature Association	Alcove	Dichotomous (0,1)	Deposit in wall inlay large enough for entry
Cave Feature Association	Slightly Elevated	Dichotomous (0,1)	Deposit just above ground level; supported
Cave Feature Association	Elevated	Dichotomous (0,1)	Deposit well above ground level; > human height
Cave Feature Association	Descent	Dichotomous (0,1)	Deposit below main ground level of cave
Cave Feature Association	Difficult Access	Dichotomous (0,1)	Deposit located in a place difficult to reach
Cave Feature Association	Crawl	Dichotomous (0,1)	Deposit located where access requires crawling
Cave Feature Association	Entrance	Dichotomous (0,1)	Deposit near cave mouth
Cave Feature Association	Exterior	Dichotomous (0,1)	Deposit outside of cave mouth
Cave Feature Association	Deep Cave	Dichotomous (0,1)	Deposit located near furthest extent of cave
Cave Feature Association	Focal Point	Dichotomous (0,1)	Deposit near feature of greatest interest in area
Cave Feature Association	Circuit	Dichotomous (0,1)	Deposit within tunnel linking parts of cave
Cave Feature Association	Wall Adjacent	Dichotomous (0,1)	Deposit next to walls furthest from spatial center
Cave Feature Association	Transition Point	Dichotomous (0,1)	Deposit at a place of change in size or elevation
Cave Feature Association	Pooled Water	Dichotomous (0,1)	Deposit near area of pooling water
Cave Feature Association	Drip Water	Dichotomous (0,1)	Deposit near area of dripping water
Cave Feature Association	Speleothem	Dichotomous (0,1)	Deposit near a column or speleothem
Cave Feature Association	Boulder	Dichotomous (0,1)	Deposit on, under, or adjacent to large rockfall

Table 1.1

Frequencies and Percentages of Ceramic Deposits by Temporal Period for Central Belize (Region 1) Caves

	Middle Preclassic	Late Preclassic	Late Preclassic-Early Classic	Early Classic	Early Classic-Late Classic All	Late Classic 1	Late Classic 1-2	Late Classic 2	Late Classic 2-3	Late Classic 3	Late Classic All
Checham Ha	17(3.6%)	75(15.7%)	6(1.3%)	124(26%)		7(1.5%)	10(2.1%)	3(.6%)	229(48%)	6(1.3%)	
Actun Halal	7(3.2%)	13(5.9%)		20(9%)	1(.5%)	43(19.4%)	11(5%)	8(3.6%)	95(43%)	18(8.1%)	5(2.3%)
Actun Chapat	1(1.7%)	5(8.5%)		4(6.8%)		8(13.6%)	7(11.9%)		24(40.7%)	4(6.8%)	6(10.2%)
Rio Frio E				1(.7%)		3(2%)	6(3.9%)	101(66%)	30(19.6%)	11(7.1%)	1(.7%)
Moth Cave	1(3.8%)	2(7.7%)		1(3.8%)		1(3.8%)	7(27%)	2(7.7%)	6(23.1%)	1(3.8%)	5(19.2%)
Actun Isabella		18(90%)		1(5%)			1(5%)				
Actun Luubul											9(100%)
Barton Creek Cave		1(.7%)		10(7.4%)		6(4.4%)			117(86.7%)		1(.7%)
Actun Nak Beh		1(1.4%)		22(31.4%)		10(14.3%)		24(34.3%)	2(2.9%)	11(15.7%)	
Tarantulas				9(9.3%)		4(4.1%)			61(62.9%)	23(23.7%)	
Actun Tunichal Muknal				6(1.5%)		15(3.9%)			312(80.2%)	56(14.4%)	
Footprint Cave									2(22.2%)	7(77.8%)	
Caves Branch Rock Shelter	2(11.1%)		12(66.7%)	4(22%)							
Overlook Rock Shelter			4(57.1%)		2(28.6%)	1(14.3%)					
Actun Neko				5(38.5%)					8(61.5%)		
Actun Chanona	19(12.6%)	42(27.8%)		18(11.9%)		33(21.9%)			39(25.8%)		
Glenwood Cave	1(1.3%)	16(21.3%)		17(22.7%)		17(22.7%)	1(1.3%)		22(29.3%)	1(1.3%)	
Pine Torch Rock Shelter		2(50%)		1(25%)						1(25%)	
K'in Rock Shelter	1(12.5%)	7(85.5%)									
Actun Ik	1(1.8%)	18(32.7%)		12(21.8%)		10(18.2%)	1(1.8%)		13(23.6%)		
Tiger Cave		2(28.6%)				1(14.3%)			2(28.6%)	2(28.6%)	
Pottery Cave		3(30%)		1(10%)					6(60%)		
Chrissy's Crawl Through								2(100%)			
Just Two Cave		2(100%)									
Kate's Whistle Cave						1(100%)					
Usrey Cave									3(100%)		
Ek Waynal	2(2.2%)	42(45.7%)		27(29.3%)		4(4.3%)			17(18.5%)		
Shoe Pot Cave		1(50%)				1(50%)					
Metate Cave				1(100%)							
Arch Cave		1(8.3%)		4(33.3%)			1(8.3%)		6(50%)		
Petroglyph Cave				45(33.6%)		43(32.1%)			45(33.6%)	1(.7%)	
Actun Balam				1(.8%)		2(1.7%)		1(.8%)	16(13.2%)	101(83.5%)	
TOTAL	52	251	22	334	3	210	45	141	1055	243	27

Table 1.2

Frequencies and Percentages of Ceramic Deposits by Temporal Period for Southern Belize (Region 2) Caves

	Late Preclassic	Late Preclassic-Early Classic	Early Classic	Early Classic-Late Classic 1	Late Early Classic-Late Classic All	Late Classic 1	Late Classic 1-2	Late Classic 2	Late Classic 2-3	Late Classic 3	Late Classic All
Kahil Kab Pek				3(100%)							
Unnamed Looters Cave						4(100%)					
U'kal Pek Cave									3(42.8%)	2(28.6%)	2(28.6%)
Pachingo Cave		1(11.1%)				1(11.1%)			2(22.2%)	1(11.1%)	4(44.4%)
Hulizotz Cave									1(20%)	3(60%)	1(20%)
So'lul Cab Pek										1(50%)	1(50%)
Altar Cab Pek									4(100%)		
Ka'bil Sak'unak							9(100%)				
Toq'bil Roq-ikal Kab Pek							17(100%)				
Utuch Qui			1(100%)								
Chui Hix				42(95.5%)					2(4.5%)		
Bite Your Head Off Cave				1(33.3%)			2(66.7%)				
Raspaculo	1(100%)										
Chab'il Sek								1(100%)			
Poht'zil Cab Pek									1(16.7%)	2(33.3%)	3(50%)
Teul Bil Uk'al			1(100%)								
Chab'il Eke Uk'al			1(100%)								
Chiclero Cave									1(100%)		
Chel Pot Cave							1(100%)				
Holul Uk'al Cab Pek									1(100%)		
Kulibal Cave						1(25%)			1(25%)	2(50%)	
Unnamed Rock Shelter									1(100%)		
Cha'bil Uk'al Rock Shelter			1(1.6%)		58(93.5%)	1(1.6%)				1(1.6%)	1(1.6%)
Mayahek Kab Pek	3(75%)		1(25%)								
Mohibal Kanch Rock Shelter	1(11.1%)								8(88.9%)		
Warrie Cave			2(50%)						1(25%)		1(25%)
Holomi Tzi	1(100%)										
Chaqi Cab Pek			1(100%)								
Xkulal Nimli Ukal											1(100%)
Xkulal Maj'ma									3(100%)		
Xpulat Bejom									1(100%)		
U'uqal Ka'ab Pek									2(100%)		
Holom Kaminak	1(50%)		1(50%)								
Ha'ral K'op											1(100%)
Kulal Ka									2(100%)		
Itzam Ka'ab Pek	1(50%)								1(50%)		
Dos Ollas and Red Bowl Cave							1(100%)				
Zeklebal Ka'abl Pek									4(80%)		1(20%)
Mayehal Xheton										8(100%)	
Holomi Batz	1(7.1%)								5(35.7%)	3(21.4%)	5(35.7%)
Sebaleb Xheton									2(100%)		
Wood Bench Cave									1(50%)		1(50%)
Otz'il Cabil Cave											1(100%)
Tusbil Pek									1(100%)		
Xumuqlebal Xheton	2(9.5%)	3(14.3%)	1(4.8%)			1(4.8%)	2(9.5%)		8(38%)	1(4.8%)	3(14.3%)
Balam Na 1	15(25%)	41(68.3%)	4(6.7%)								
Balam Na 2	8(88.9%)	1(11.1%)									
Balam Na 4	2(100%)										
Bats'ub Flight 25 Cave		1(20%)	4(80%)								
Kayuko Naj Tunich			110(100%								
TOTAL	36	47	128	46	58	8	32	1	56	24	26

Table 1.3

Frequencies and Percentages of Ceramic Deposits by Temporal Period for Pasion River Region (Region 3) Caves

	Middle Preclassic	Late Preclassic	Late Preclassic-Early Classic	Early Classic	Early Classic-Late Classic 1	Late Classic 1-2	Late Classic 2	Late Classic 2-3	Late Classic 3	Late Classic All
Hun Nal Ye		6(8.2%)		14(19.2%)		24(32.9%)			2(2.7%)	27(37%)
Entrada del Sol				14(100%)						
Ventana de Seguridad		5(2.7%)		176(95.6%)		3(1.6%)				
El Venado Seco			16(100%)							
Veronica	2(.5%)	10(2.6%)		359(94.7%)		5(1.3%)	3(.8%)			
Ventana de Veronica				16(100%)						
La Illuminada				56(88.9%)		4(6.3%)	3(4.8%)			
Raton de los Dientes				24(36.4%)		41(62.1%)	1(1.5%)			
Los Metates				26(49%)		23(43.4%)	3(5.7%)			1(1.9%)
Cueva de los Murcielagos		9(37.5%)		15(62.5%)						
Cueva de los Chuchos			1(16.7%)	4(66.7%)			1(16.7%)			
Cueva del Queso Suizo		1(14.3%)		5(71.4%)		1(14.3%)				
Cueva de las Manos	4(21.1%)	6(31.6%)		7(36.8%)		1(5.3%)	1(5.3%)			
Cueva del Coche	2(9.5%)	2(9.5%)		16(76.2%)		1(4.8%)				
Kaaminaq So'tz	6(7.9%)	8(10.5%)		59(77.6%)		3(3.9%)				
Cueva del Aguila				6(85.7%)		1(14.3%)				
Cueva de la Barba Rock Shelter	1(50%)					1(50%)				
14 Rock Shelter	11(40.7%)	6(22.2%)		6(22.2%)		1(3.7%)	3(11.1%)			
Cueva de los Bordes	6(85.7%)					1(14.3%)				
Hix Pek		1(9.1%)		4(36.4%)				4(36.4%)	2(18.2%)	
Cueva de Tinajas Rock Shelter										3(100%)
China Otoch Rock Shelter				1(25%)				3(75%)		
Ventana Maya		6(75%)		2(25%)						
Torre Quib				38(67.9%)				18(32.1%)		
Torre Hun		76(5.6%)		65(4.8%)	937(69.3%)	6(.4%)		264(19.5%)	4(.3%)	
Saber Cave	3(2.4%)	9(7.1%)			89(70%)			24(18.9%)	2(1.6%)	
Ocox Rock Shelter				6(40%)				9(60%)		
CHOC-05 Rock Shelter	1(.3%)	57(15.1%)			191(50.7%)			128(33.9%)		
TOTAL	36	202	17	919	1217	116	15	450	10	31

Table 1.4
Frequencies and Percentages of Ceramic Deposits by Temporal Period for Northern Honduras (Region 4) Caves

	Middle Preclassic	Late Middle Preclassic-Late Preclassic All	Late Preclassic	Late Preclassic-Early Classic	Early Classic-Late Classic 1	Late Classic 2-3	Late Classic All
Gordon's Cave 3	15(46.9%)		4(12.5%)	3(9.4%)	3(9.4%)	7(21.9%)	
Guerra Cave	1(16.7%)				2(33.3%)	3(50%)	
Talgua Cave	7(100%)						
Cuyamel Cave		9(100%)					
Cueva del Portilla		14(100%)					
Cueva de las Aranas	2(66.7%)						1(33.3%)
TOTAL	25	23	4	3	5	10	1

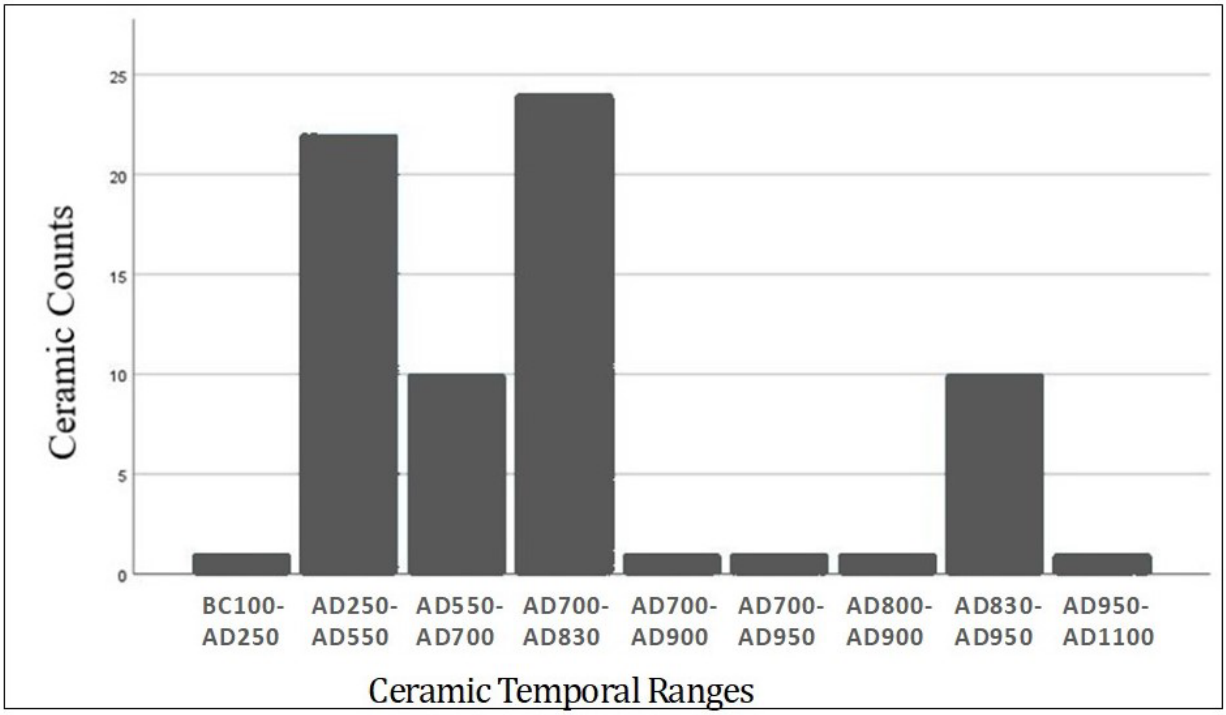

Figure. 1. Histogram showing the ceramic count frequencies by temporal period for Actun Nak Beh in Central Belize, Region 1.

Table 2.1

Cave Feature - Ceramic Deposit Association as Percentage of All Ceramic Deposits of the Temporal Period: Central Belize Region 1

	Middle Preclassic	Late Preclassic	Early Classic	Late Classic
Surface	28 (52.8%)	231 (66.2%)	199 (72.8%)	1173 (68%)
Subsurface	22 (41.5%)	115 (33%)	55 (21%)	259 (15%)
Slightly Elevated	15 (28.3%)	23 (6.5%)	23 (8.8%)	84 (4.9%)
Elevated	5 (9.4%)	59 (16.9%)	56 (21.4%)	349 (20.2%)
Descent	0	3 (.9%)	10 (3.8%)	159 (9.2%)
Difficult Access	2 (3.8%)	34 (9.7%)	30 (11.5%)	77 (4.5%)
VALID COUNT FOR PERIOD	53	349	261	1726

	Middle Preclassic	Late Preclassic	Early Classic	Late Classic
Depression	0	10 (2.9%)	5 (1.9%)	46 (2.7%)
Cache	0	13 (3.7%)	4 (1.5%)	0
Ledge	1 (1.9%)	36 (10.3%)	41 (15.7%)	203 (11.8%)
Niche	2 (3.8%)	48 (13.8%)	30 (11.5%)	65 (3.8%)
Alcove	9 (17%)	26 (7.4%)	31(11.9%)	186 (10.8%)
Crawl	1 (1.9%)	5 (1.4%)	8 (3.1%)	47 (2.7%)
Entrance	2 (3.8%)	46 (13.2%)	41 (15.7%)	168 (9.7%)
Exterior	1 (1.9%)	27 (7.7%)	11 (4.2%)	71 (4.1%)
Deep Cave	0	1 (.3%)	3 (1.1%)	44 (2.5%)
Focal Point	34 (64.2%)	113 (32.4%)	45 (17.2%)	196 (11.4%)
Circuit	2 (3.8%)	49 (14%)	25 (9.6%)	186 (10.8%)
Wall Adjacent	21 (39.6%)	101 (28.9%)	78 (29.9%)	602 (34.9%)
Transition Point	6 (11.3%)	45 (12.9%)	48 (18.4%)	261 (15.1%)
Pooled Water	12 (22.6%)	56 (16%)	27 (10.3%)	144 (8.3%)
Drip Water	15 (28.3%)	87 (24.9%)	84 (32.2%)	200 (11.6%)
Speleothem	19 (35.8%)	81 (23.2%)	69 (26.4%)	311 (18%)
Boulder	3 (5.7%)	21 (6%)	51 (19.5%)	223 (12.9%)
VALID COUNT FOR PERIOD	53	349	261	1726

Table 2.2

Cave Feature Association of Ceramic Deposits as Percentage of All Ceramic Deposits of the Temporal Period: Southern Belize Region 2

	Late Preclassic	Late Preclassic – Early Classic	Early Classic	Late Early Classic – Late Classic 1	Late Classic
Surface	9 (23.7%)	4 (3.1%)	17 (38.6%)	44 (93.6%)	128 (87.1%)
Subsurface	29 (76.3%)	41 (31.7%)	6 (13.6%)	0	1 (.7%)
Slightly Elevated	1 (2.6%)	1 (.8%)	0	0	8 (5.4%)
Elevated	1 (2.6%)	0	0	0	1 (.7%)
Descent	0	0	1 (2.3%)	0	24 (16.3%)
Difficult Access	3 (7.9%)	0	1 (2.3%)	0	23 (15.6%)
VALID COUNT FOR PERIOD	38	129	44	47	147

	Late Preclassic	Late Preclassic – Early Classic	Early Classic	Late Early Classic – Late Classic 1	Late Classic
Depression	1 (2.6%)	0	0	0	2 (1.4%)
Cache	11 (28.9%)	1 (.8%)	1 (2.3%)	0	1 (.7%)
Ledge	1 (2.6%)	0	0	0	6 (4.1%)
Niche	8 (21%)	6 (4.7%)	0	1 (2.1%)	9 (6.1%)
Alcove	0	0	3 (6.8%)	0	8 (5.4%)
Crawl	1 (2.6%)	0	1 (2.3%)	0	8 (5.4%)
Entrance	4 (10.5%)	87 (67.4%)	27 (61.4%)	0	25 (17%)
Exterior	0	84 (65.1%)	26 (59.1%)	0	2 (1.4%)
Deep Cave	1 (2.6%)	0	5 (11.4%)	0	31 (21.1%)
Focal Point	3 (7.9%)	9 (7%)	1 (2.3%)	0	10 (6.8%)
Circuit	2 (5.3%)	0	0	0	11 (7.4%)
Wall Adjacent	21 (55.3%)	36 (27.9%)	10 (22.7%)	45 (95.7%)	31 (21.1%)
Transition Point	6 (15.8%)	9 (7%)	2 (4.5%)	1 (2.1%)	33 (22.4%)
Pooled Water	1 (2.6%)	4 (3.1%)	0	0	2 (1.4%)
Drip Water	2 (5.3%)	5 (3.9%)	0	0	5 (3.4%)
Speleothem	7 (18.4%)	24 (18.6%)	1 (2.3%)	2 (4.3%)	2 (1.4%)
Boulder	0	0	3 (6.8%)	1 (2.1%)	9 (6.1%)
VALID COUNT FOR PERIOD	38	129	44	47	147

Table 2.3

Cave Feature - Ceramic Deposit Association as Percentage of All Ceramic Deposits of the Temporal Period: Pasion River Region Guatemala Region 3

	Middle Preclassic	Late Preclassic	Early Classic	Late Classic
Surface	22 (61.1%)	50 (24.6%)	617 (28.7%)	156 (25.1%)
Subsurface	4 (11.1%)	148 (72.9%)	1532 (71.2%)	482 (77.6%)
Slightly Elevated	1 (2.8%)	2 (1%)	20 (.9%)	4 (.6%)
Elevated	1 (2.8%)	12 (5.9%)	169 (7.8%)	6 (1%)
Descent	0	6 (2.9%)	18 (.8%)	14 (2.3%)
Difficult Access	0	6 (2.9%)	6 (.3%)	0
VALID COUNT FOR PERIOD	36	203	2153	621

	Middle Preclassic	Late Preclassic	Early Classic	Late Classic
Depression	4 (11.1%)	8 (3.9%)	102 (4.7%)	44 (7.1%)
Cache	0	0	0	4 (.6%)
Ledge	1 (2.8%)	0	6 (.3%)	1 (.2%)
Niche	0	3 (1.5%)	21 (1%)	4 (.6%)
Alcove	1 (2.8%)	1 (.5%)	16 (.7%)	9 (1.4%)
Crawl	0	0	5 (.2%)	0
Entrance	11 (30.5%)	94 (46.3%)	686 (31.9%)	284 (45.7%)
Exterior	6 (16.7%)	87 (42.9%)	525 (24.4%)	255 (41.1%)
Deep Cave	0	12 (5.9%)	126 (5.9%)	20 (3.2%)
Focal Point	1 (2.8%)	18 (8.9%)	275 (12.8%)	7 (1.1%)
Circuit	4 (11.1%)	58 (28.6%)	798 (37.1%)	238 (38.3%)
Wall Adjacent	1 (2.8%)	45 (22.2%)	532 (24.7%)	139 (22.4%)
Transition Point	10 (27.8%)	80 (39.4%)	1296 (60.2%)	260 (41.9%)
Pooled Water	0	3 (1.5%)	9 (.4%)	16 (2.6%)
Drip Water	0	54 (26.7%)	682 (31.7%)	197 (31.7%)
Speleothem	2 (5.6%)	61 (30%)	979 (45.5%)	210 (33.8%)
Boulder	5 (13.9%)	28 (13.8%)	317 (14.7%)	29 (4.7%)
VALID COUNT FOR PERIOD	36	203	2153	621

Table 2.4

Cave Feature - Ceramic Deposit Association as Percentage of All Ceramic Deposits of the Temporal Period: Northern Honduras Region 4

	Middle Preclassic	Late Middle Preclassic-Late Preclassic	Late Preclassic	Late Preclassic-Early Classic	Early Classic-Late Classic 1	Late Classic
Surface	14 (56%)	23 (100%)	0	0	0	4 (36.4%)
Subsurface	11 (44%)	0	4 (100%)	3 (100%)	5 (100%)	7 (63.6%)
Slightly Elevated	0	0	0	0	0	0
Elevated	1 (4%)	0	0	0	0	0
Descent	0	0	0	0	0	0
Difficult Access	0	0	0	0	0	0
VALID COUNT FOR PERIOD	25	23	4	3	5	11

	Middle Preclassic	Late Middle Preclassic-Late Preclassic	Late Preclassic	Late Preclassic-Early Classic	Early Classic–Late Classic 1	Late Classic
Depression	4 (16%)	0	0	0	0	0
Cache	1 (4%)	0	0	0	0	0
Ledge	1 (4%)	0	0	0	0	0
Niche	2 (8%)	0	0	0	0	0
Alcove	23 (92%)	0	0	0	0	0
Crawl	0	0	0	0	0	0
Entrance	0	0	0	0	0	1(9.1%)
Exterior	0	0	0	0	0	0
Deep Cave	16 (64%)	23(100%)	0	0	2(40%)	1(9.1%)
Focal Point	0	0	0	0	0	0
Circuit	0	0	0	0	0	0
Wall Adjacent	11 (44%)	0	0	0	0	1(9.1%)
Transition Point	0	0	0	0	0	0
Pooled Water	0	0	0	0	0	0
Drip Water	5 (20%)	23 (100%)	0	0	0	0
Speleothem	0	0	0	0	0	0
Boulder	0	0	0	0	0	0
VALID COUNT FOR PERIOD	25	23	4	3	5	11

Table 3.1

Cave Feature - Ceramic Deposit Association as Percentage of All Cave Feature Associations for Temporal Period: Central Belize Region 1

	Middle Preclassic	Late Preclassic	Early Classic	Late Classic
Surface	28 (38.9%)	231 (49.7%)	199 (53.4%)	1173 (55.8%)
Subsurface	22 (30.6%)	115 (24.7%)	55 (14.7%)	259 (12.3%)
Slightly Elevated	15 (20.8%)	23 (5%)	23 (6.2%)	84 (4%)
Elevated	5 (6.9%)	59 (12.7%)	56 (15%)	349 (16.6%)
Descent	0	3 (.6%)	10 (2.7%)	159 (7.6%)
Difficult Access	2 (2.8%)	34 (7.3%)	30 (8%)	77 (3.7%)
TOTAL COUNT	72 (100%)	465 (100%)	373 (100%)	2101

	Middle Preclassic	Late Preclassic	Early Classic	Late Classic
Depression	0	10 (1.3%)	5 (.8%)	46 (1.6%)
Cache	0	13 (1.7%)	4 (.7%)	0
Ledge	1 (.8%)	36 (4.7%)	41 (6.8%)	203 (6.9%)
Niche	2 (1.6%)	48 (6.3%)	30 (5%)	65 (2.2%)
Alcove	9 (7%)	26 (3.4%)	31(5.1%)	186 (6.3%)
Crawl	1 (.8%)	5 (.7%)	8 (1.3%)	47 (1.6%)
Entrance	2 (1.5%)	46 (6%)	41 (6.8%)	168 (5.7%)
Exterior	1 (.8%)	27 (3.5%)	11 (1.8%)	71 (2.4%)
Deep Cave	0	1 (.1%)	3 (.5%)	44 (1.5%)
Focal Point	34 (26.6%)	113 (14.8%)	45 (7.5%)	196 (6.6%)
Circuit	2 (1.6%)	49 (6.4%)	25 (4.2%)	186 (6.3%)
Wall Adjacent	21 (16.4%)	101 (13.2%)	78 (13%)	602 (20.4%)
Transition Point	6 (4.7%)	45 (5.9%)	48 (8%)	261 (8.8%)
Pooled Water	12 (9.4%)	56 (7.3%)	27 (4.5%)	144 (4.4%)
Drip Water	15 (11.7%)	87 (11.4%)	84 (14%)	200 (6.8%)
Speleothem	19 (14.8%)	81 (10.6%)	69 (11.5%)	311 (10.5%)
Boulder	3 (2.3%)	21 (2.7%)	51 (8.5%)	223 (7.6%)
TOTAL COUNT	128 (100%)	765 (100%)	601 (100%)	2953 (100%)

Table 3.2

Cave Feature Association of Ceramic Deposits as Percentage of All Ceramic Deposit Associations of the Temporal Period: Southern Belize Region 2

	Late Preclassic	Late Preclassic – Early Classic	Early Classic	Late Early Classic – Late Classic 1	Late Classic
Surface	9 (20.9%)	4 (8.7%)	17 (68%)	44 (100%)	128 (69.2%)
Subsurface	29 (67.4%)	41 (89.1%)	6 (24%)	0	1 (.5%)
Slightly Elevated	1 (2.3%)	1 (2.2%)	0	0	8 (4.3%)
Elevated	1 (2.3%)	0	0	0	1 (.5%)
Descent	0	0	1 (4%)	0	24 (13%)
Difficult Access	3 (7%)	0	1 (4%)	0	23 (12.4%)
TOTAL COUNT	43 (99.9%)	46 (100%)	25 (100%)	44 (100%)	185 (99.9%)

	Late Preclassic	Late Preclassic – Early Classic	Early Classic	Late Early Classic – Late Classic 1	Late Classic
Depression	1 (1.5%)	0	0	0	2 (1%)
Cache	11 (15.9%)	1 (.3%)	1 (1.2%)	0	1 (.5%)
Ledge	1 (1.5%)	0	0	0	6 (3.1%)
Niche	8 (11.5%)	6 (2.3%)	0	1 (2%)	9 (4.6%)
Alcove	0	0	3 (3.8%)	0	8 (4.1%)
Crawl	1 (1.5%)	0	1 (1.2%)	0	8 (4.1%)
Entrance	4 (5.8%)	87 (32.8%)	27 (33.8%)	0	25 (12.8%)
Exterior	0	84 (31.7%)	26 (32.5%)	0	2 (1%)
Deep Cave	1 (1.5%)	0	5 (6.3%)	0	31 (16%)
Focal Point	3 (4.3%)	9 (3.4%)	1 (1.2%)	0	10 (5.1%)
Circuit	2 (2.9%)	0	0	0	11 (5.6%)
Wall Adjacent	21 (30.4%)	36 (13.6%)	10 (12.5%)	45 (90%)	31 (16%)
Transition Point	6 (8.7%)	9 (3.4%)	2 (2.5%)	1 (2%)	33 (16.9%)
Pooled Water	1 (1.5%)	4 (1.5%)	0	0	2 (1%)
Drip Water	2 (2.9%)	5 (1.9%)	0	0	5 (2.6%)
Speleothem	7 (10.1%)	24 (9.1%)	1 (1.2%)	2 (4%)	2 (1%)
Boulder	0	0	3 (3.8%)	1 (2%)	9 (4.6%)
TOTAL COUNT	69 (100%)	265 (100%)	80 (100%)	50 (100%)	195 (100%)

Table 3.3

Cave Feature - Ceramic Deposit Association as Percentage of All Cave Feature Associations for Temporal Period: Pasion River Region Guatemala Region 3

	Middle Preclassic	Late Preclassic	Early Classic	Late Classic
Surface	22 (78.5%)	50 (22.3%)	617 (26.1)	156 (23.6)
Subsurface	4 (14.3%)	148 (66%)	1532 (64.9%)	482 (72.8%)
Slightly Elevated	1 (3.6%)	2 (.9%)	20 (.8%)	4 (.6%)
Elevated	1 (3.6%)	12 (5.4%)	169 (7.1%)	6 (.9%)
Descent	0	6 (2.7%)	18 (.8%)	14 (2.1%)
Difficult Access	0	6 (2.7%)	6 (.3%)	0
TOTAL COUNT	28 (100%)	224 (100%)	2362 (100%)	662 (100%)

	Middle Preclassic	Late Preclassic	Early Classic	Late Classic
Depression	4 (8.7%)	8 (1.4%)	102 (1.6%)	44 (2.6%)
Cache	0	0	0	4 (.2%)
Ledge	1 (2.2%)	0	6 (.1%)	1 (.1%)
Niche	0	3 (.5%)	21 (.3%)	4 (.2%)
Alcove	1 (2.2%)	1 (.2%)	16 (.3%)	9 (.5%)
Crawl	0	0	5 (.1%)	0
Entrance	11 (23.9%)	94 (17%)	686 (10.8%)	284 (16.5%)
Exterior	6 (13%)	87 (15.8%)	525 (8.2%)	255 (14.9%)
Deep Cave	0	12 (2.2%)	126 (2%)	20 (1.2%)
Focal Point	1 (2.2%)	18 (3.3%)	275 (4.3%)	7 (.4%)
Circuit	4 (8.7%)	58 (10.5%)	798 (12.5%)	238 (13.9%)
Wall Adjacent	1 (2.2%)	45 (8.2%)	532 (8.3%)	139 (8.1%)
Transition Point	10 (21.7%)	80 (14.5%)	1296 (20.3%)	260 (15.1%)
Pooled Water	0	3 (.5%)	9 (.1%)	16 (.9%)
Drip Water	0	54 (9.8%)	682 (10.7%)	197 (11.5%)
Speleothem	2 (4.3%)	61 (11.1%)	979 (15.4%)	210 (12.2%)
Boulder	5 (10.9%)	28 (5%)	317 (5%)	29 (1.7%)
TOTAL COUNT	46 (100%)	552 (100%)	6375 (100%)	1717 (100%)

Table 3.4

Cave Feature - Ceramic Deposit Association as Percentage of All Cave Feature Associations for Temporal Period: Northern Honduras Region 4

	Middle Preclassic	Late Middle Preclassic-Late Preclassic	Late Preclassic	Late Preclassic-Early Classic	Early Classic-Late Classic 1	Late Classic
Surface	14 (53.8%)	23 (100%)	0	0	0	4 (36.4%)
Subsurface	11 (42.3%)	0	4 (100%)	3 (100%)	5 (100%)	7 (63.6%)
Slightly Elevated	0	0	0	0	0	0
Elevated	1 (3.8%)	0	0	0	0	0
Descent	0	0	0	0	0	0
Difficult Access	0	0	0	0	0	0
TOTAL COUNT	26 (100%)	23 (100%)	4 (100%)	3 (100%)	5(100%)	11 (100%)

	Middle Preclassic	Late Middle Preclassic-Late Preclassic	Late Preclassic	Late Preclassic-Early Classic	Early Classic–Late Classic 1	Late Classic
Depression	4 (6.3%)	0	0	0	0	0
Cache	1 (1.6%)	0	0	0	0	0
Ledge	1 (1.6%)	0	0	0	0	0
Niche	2 (3.2%)	0	0	0	0	0
Alcove	23 (36.5%)	0	0	0	0	0
Crawl	0	0	0	0	0	0
Entrance	0	0	0	0	0	1(33.3%)
Exterior	0	0	0	0	0	0
Deep Cave	16 (25.4%)	23(50%)	0	0	2(100%)	1(33.3%)
Focal Point	0	0	0	0	0	0
Circuit	0	0	0	0	0	0
Wall Adjacent	11 (17.5%)	0	0	0	0	1(33.3%)
Transition Point	0	0	0	0	0	0
Pooled Water	0	0	0	0	0	0
Drip Water	5 (7.9%)	23 (50%)	0	0	0	0
Speleothem	0	0	0	0	0	0
Boulder	0	0	0	0	0	0
TOTAL COUNT	63 (100%)	46	0	0	2 (100%)	3 (99.9%)

5.0 DISCUSSION: Ritual Cave Practices by Region and Temporality

In this section, I discuss the ritual cave practices of each region in greater depth, along with the societal developments that may temporally articulate with them. For certain ritual practices, I include interpretations which may help to delineate the ritual strategies and/or ritual styles for a given temporal period. For some temporal periods in certain regions, little may be known of any corresponding culture history or societal developments. In such cases, ritual cave practices provide information that can add to our understanding of the context (Rissolo 2001:343-345), but new findings may be necessary to more fully illuminate links between ritual cave practices and societal developments.

To produce a chronological and genealogical sequence of ritual cave practices, I review the four regions in the reverse order of their numbering. Northern Honduras / Region 4 affords the highest concentrations of the earliest, Early to Middle Preclassic, ritual cave ceramic deposits. The Pasión River / Region 3 is more notable for its Early Classic deposits, but ritual cave use declines in both regions earlier than it does in Southern Belize / Region 2 and Central Belize / Region 1. Regions 1 and 2 show pulses of ritual cave use in the Late Preclassic, the Early Classic, and again in the Late Classic, with the highest ceramic quantities deposited at this time. Central Belize / Region 1 appears as the last holdout for ritual cave practices before abandonment of these spaces in the Terminal Classic / Early Postclassic periods.

5.1.1 Northern Honduras / Region 4 - The Early and Middle Preclassic Periods

The caves included in this sample spread far across the highlands of Northern Honduras. Despite the distances between them, they all bear one or more similarities in their ritual assemblages. The Cuyamel caves (Matilde's, Cuyamel, and Portillo) contain some of the earliest ceramics, dating as far back as the late Early Middle Preclassic period (Healy 1974:440). Some

of the ceramic forms imitate gourds, squash, and pumpkins (Healy 1974:438; 1993:198), linking them to earlier Archaic practices when these vegetables were used as containers (Awe et al. 2021a:528; MacNeish 1972; Flannery 2009; Flannery and Marcus 1983). In our sample, these forms are recorded for the Cuyamel caves, Talgua, Gordon's Cave 3, and Guerra Cave (Beaudry-Corbett et al. 1997:55; Gordon 1898:Plate 1; Healy 1974:438; Rue et al. 1989:400), and this may be interpreted as marking an important transition point in subsistence practice and strategies.

Connections between the cave assemblages and social developments of this region and period may be further indicated by the fact that some of the ceramics in these caves have potential links with Olmec ceramic traditions (Healy 1974:438-440; Veil 1993:14; but see Joyce and Henderson 2010). Ceramic forms, incising, color schemes, techniques, and even iconographic representations have suggested an association between Northern Honduras and Olmec centers (Healy 1974:438-440; Veil 1993:14). Trade relations may thereby be reflected in the ritual cave assemblages, and the development of such relations has been implicated as a potential catalyst to social stratification (Healy 1974:442).

The majority of caves in this sample are designated as kin-group ossuaries, but similarities and differences among the ritual assemblages indicate variability in cave function. Ceramic vessels in Talgua cave were found to be in direct association with individual human remains (Brady et al. 2000:111), whereas Gordon's Cave 3, the Cuyamel caves, and Cuevas de las Arañas exhibit less individualized treatment. Brady suggests that the Talgua remains indicate some degree of social stratification, with those of the other caves being characterized as "communal offerings to ancestors" (Brady and Hasemann 1995:39; Brady 1995:36; Brady et al. 2000:111;), thereby demonstrating less stratification. These differences are significant if we

consider the Early – Middle Preclassic periods as representing a critical societal juncture. Healy characterizes the late Early Preclassic and Middle Preclassic as:

> "the turning point from simple village life to ranked societies with complex ceremonial centers and the concomitant rise of the arts, religions, and calendar, and, most probably, long distance trade." (1974:440-442).

During this period, ritualization and thus ritual practices would similarly stand at such a threshold, and the use of caves as repositories for kin-based human remains was ritualized, and likely related to signifying land rights (Gillespie 2002:70; McAnany 1995:65).

From a sociopolitical vantage point, the ossuary, kin-group function of caves in this region and time may represent one of Bell's strategies of ritualization (1992:74), but it is not the only ritual practice evident from the caves in this sample. A distinctive ritualized act documented from Talgua Cave is that of placing a human skull in a bowl with long bones in close proximity (Dixon et al. 1998:333). For this sample, it is the earliest example of an ancient Maya ritual practice that is repeated, elaborated upon, and altered in later times (Ricketson and Ricketson 1937; Awe 2013:38; Chase et al. 2017:43-45; Mathews and Garber 2004:53). In one Late Preclassic variant in western Belize, a second bowl is placed upside down over the skull and lower bowl, and the long bones are arranged around four sides, forming a Maya cosmogram (Awe 2013:38). The dual-bowl construct is interpreted as representing a mountain-cave (Awe 2013:139). Talgua's single bowl could be interpreted as representing one half of the dual-bowl construct, symbolizing a depression in the earth, the opposing shape to that of a mountain, or as a cave floor, and the latter matches with the Maya practice of nesting forms and symbols at multiple scales (Gillespie and Joyce 2000:158-159; Marcus 2007:62; Moyes 2021:285). The skull's placement within the dual-bowl construct was interpreted in relation to the Popul Vuh creation story's resurrection from within a cave (Awe 2013:139), and the Talgua deposit's

association with calcium carbonate water is in keeping with this theme. For this early period, I would posit this ritualized act more generally as an agriculture-based metaphor, conceptualizing humans in equivalence to seasonal crops in a petition to the supernatural for regeneration of the individual.

Another ritual practice in this region that remains temporally controversial is that of human remains cremations documented in Gordon's Cave 3 (Gordon 1898:11; Rue et al. 1989:398-399; Brady 1995:35). The ossuary function of this cave matches with the other caves' Middle Preclassic dating in this region, and Brady notes that this function "seems to disappear by or before the Late Formative (Brady et al. 2000:113). However, cremation of human remains in ossuaries as a ritual practice is known mostly for the Postclassic (Brady 1995:35). Cremation of human remains is not evident for the other caves of this Northern Honduras sample, but Gordon's Cave 3 is different in that its being a dryer cave could promote a different ritual strategy. The burning of old growth in slash-and-burn agriculture can be seen to effect new plant growth (Erickson 2010:113; Pohl 1981:524) or as a transformation, and the cremations of Gordon's Cave 3 are interesting in that burning is relegated to the bones of adults and of children older than six (Rue et al. 1989:398). Brady (1995) posits that the sacrifice of children in Gordon's Cave 3 may have been undertaken upon or near the death of an adult, citing an ethnographic example provided by Scholes and Roy (1938:608), where children were sacrificed "for the recovery of a prominent man" (Brady 1995:35). The cremation rituals of Gordon's Cave 3 again suggest a dualist conceptualization of life, wherein the ritual burning of one part, releasing the soul (Gillespie 2002:71), might be performed in petitioning for the other part. In this case, I would hypothesize that the mature bones were ritually burned as a request for the deceased adults to be reborn in accordance with the Maya concept of *k'ex*, or substitution

(Gillespie 2002:71-72). The unburnt children's remains here may represent the desired, in what is conceivably a two-part ritual, formulaic expression.

There are additional practices and ritual considerations for this region's Middle Preclassic cave deposits that are worth mentioning. One is the placement of a "killhole" on a vessel in Talgua Cave (Brady and Hasemann 1995:39), and on a marble bowl from Cuyamel (Healy 1974:440). Another is the use of whole vessels versus ritual smashing, which is notably absent in the Northern Honduras cave deposits of this period (Beaudry-Corbett et al. 1997:54; Brady and Hasemann 1995:34). Additionally, the Middle Preclassic whole vessels in Gordon's Cave 3 are considered as having been afforded "reverence" in that the ritual practitioners of later times did not appear to have disturbed them (Rue et al. 1989:402). However, Brady (1995) argues these vessels were placed atop amassed skeletal remains and on the same level as Late Classic sherds, suggesting the likelihood that they were moved (Brady 1995:35). Lastly, there is a predominance of plain, unslipped, monochrome wares in Gordon's Cave 3 and the Cuyamel caves (Rue et al. 1989:397; Joyce and Henderson 2001:17; Healy 1974:438; Healy 1993:196-200), where burials are considered more communal (Brady and Hasemann 1995:39). Polychromes are absent for this period, but jade and marble wares found in Talgua and Cueva de las Arañas and associated with individual remains suggest that differences in status had developed in some areas at this time (Brady and Hasemann 1995:40; Brady et al. 2000:111).

5.1.2 Northern Honduras / Region 4 – Preclassic Through Late Classic Periods

The evidence presented for later period ritual activity in this region is somewhat less definitive than that of the Early to Middle Preclassic. Healy notes two ceramics purportedly looted from the Cuyamel caves, with one being from the Early Classic, but these have no known provenience within the caves themselves (Healy 1974:438). Brady indicates that ceramic sherds

at the entrance to Cueva de las Arañas "appear to date to the Late Classic Period" (Brady et al. 2000:111). Rue et al. recovered a nearly whole Early Classic vessel, and Late Classic sherds in Guerra Cave, a wet cave near Gordon's Cave 3 (Rue et al. 1989:400). In this study, the most complete examination of cave use covering these periods is provided by James Brady for Gordon's Cave 3 (Brady 1995).

Brady (1995) found an absence of polychromes for Gordon's Cave 3, as well as evidence of burning on the unslipped or monochrome ceramics from the Classic Period (Brady 1995:34). He determined that the small quantity of sherds for the Classic periods was at odds with Lowlands practices, where the ritual practice of smashing ceramics is more extensive (Brady 1995:34). Jamasquire Cave in the Talgua drainage, however, contains Late Classic evidence of this practice (Dixon et al. 1998:334). Most significantly, the ceramic frequencies from Brady's excavations indicated that the cave was used most during the Classic Period (Brady 1995:35). Specifically, Brady's chronology shows a pattern of Early Classic increase with Late Classic decline, and this pattern matches that of Naj Tunich (Brady 1989) as well as many of the caves in the Pasión River / Region 3 (Woodfill 2007:3).

One ritual practice evident for the Late Classic period is the offering of small, or immature maize cobs. Gordon's Cave 3 contained 10 small burnt cobs ostensibly assigned to the Late Classic, but this is implicit (Brady 1995:32, 34). A small burnt cob was recovered from Cueva de las Arañas in association with Late Classic sherds near the cave entrance. This practice has been interpreted as a first fruits rite, held early in the planting season to petition the supernatural for further growth (Brady et al. 2000:112; Morehart and Butler 2010:599-600; Robbins 2005:19; Brady 1995:36). As first fruits, immature cobs represent one half of a conceptual whole with the other half being the mature cobs, and together they form a "functional

dualism" (Ashmore 1988:273). Using fire as a transformative measure upon first fruits in order to feed the gods (Woodfill 2014:112), the ancient Maya petitioned the supernatural for reciprocation in allowing the crops to reach full maturity (Robbins 2005:19). As one seasonal component of a two-part petition, archaeologists might expect a ritual counterpart occurring later in the year. Possible evidence of such a ritual occurring in the Late Classic period was recovered from Barton Creek Cave, Belize where mature cobs, stalks, husks, and other domesticates appeared to have been wrapped in a cloth "bundle," however these were also burned suggesting complexity beyond these dual ritual components (Morehart and Butler 2010:599).

5.2.1 Pasión River / Region 3 – Middle Preclassic

In this study's sample, there are nine caves that contain Middle Preclassic deposits. These include Cueva Veronica, 14 Rockshelter, Cueva del Coche, Cueva de los Bordes, Cueva de los Manos, Kaaminaq So'tz, Cueva de la Barba Rockshelter (Woodfill 2007), Saber Cave, and Choc-05 Rockshelter (Spenard 2006). For the Middle Preclassic period of this region, much of the evidence comes from the Chapayal drainage, whereas the Candelaria drainage system demonstrates little ritual activity.

There are only two ceramic sherds representing the Middle Preclassic for the Candelaria caves. Both come from units excavated in Cueva Veronica, with one near an entrance passageway and the other nearby, in association with rockfall and a large column (Woodfill 2007:99, 102-103). Exact vessel quantifications are more difficult to determine for the Chapayal drainage cave deposits, as two of the caves contain sherd scatters. For the eight caves / rockshelters of the Chapayal drainage with Middle Preclassic deposits, the more open, entrance areas appear to be favored for ritual practices (Woodfill 2007: 152-158, 164-166; Spenard 2006:

68-70, 75-76, 187, 198) with boulders and transition points following (Woodfill 2007; 153-156, 158, 160; Spenard 2006:69-70, 187).

Bowls and plates seem to predominate over other forms, although jars, cups, and tecomates are evident. Additionally, these ceramic deposits are most often in association with other artifact types, of which chert appears to be the most common. Obsidian, shell, and mano or metate fragments appear in several of the caves, with charcoal scatters and human or faunal bone evident in some instances (Woodfill 2007:151-153,165; Spenard 2006:70-72, 74-76). In Cueva Veronica, a flake of quartz is found (Woodfill 2007:102), and in CHOC-05 Rockshelter, iron pyrite is among the deposits (Spenard 2006:75-76). Such assortments have been associated with shamanic activity in other parts of the Maya world (Prufer 2002:112, 389).

A more open-air preference for ritual during this time aligns with the use of other outdoor venues for ritual, including hilltops and aguadas (Woodfill 2007:292), and this may reflect an "open-air habitation" lifestyle for the region in this era (Prufer and Kennett 2020:28; Stemp et al. 2021:424-425). That a number of the deposits are surface finds (Woodfill 2007:153-154, 158; Spenard 2006:70, 187) could indicate curation and deposit in later times, although thin soils have likely contributed to this (Woodfill 2007:11; Garrison et al. 2008:2772, 2775). Unfortunately, the surface and subsurface findings shown in *Table 3.3* could be used to support either conclusion. The Middle Preclassic ceramic scatters of the 14 Rockshelter, interpreted as a "dump for the local village" (Woodfill 2007:165), admittedly, increase the findings that suggest a bowl / plate predominance for the caves. However, deposits collected from Kaaminaq So'tz and Cueva de los Bordes in particular, support this notion (Woodfill 2007: 157-158, 160, 166).

The presence of quartz and pyrite in two of the deposits could be interpreted as shamanistic, but perhaps the only thing that can be said with certainty is that the other artifact deposits represent materials and technologies that were known in this time. Alternatively, they could be simple reciprocations for materials taken from the land, and we might think of this as the reverse of "social enchainment" across the landscape (Morton et al. 2019; Chapman 2000), whereas these materials are taken from the landscape and consolidated at a cave. Mills (2008:370) notes how such material aggregations link together different relationships of peoples from across the landscape. Lawres and Sanger (2023), however, indicate that placing these materials together bundles the relations of different non-human entities that inhabit the landscape, ritually opening communication lines so that knowledge may be revealed. The placement of these materials near cave entrances may be afforded different interpretations from simple offerings to potentially complex ritual petitions.

5.2.2 Pasión River / Region 3 – Late Preclassic

The number of caves and instances of ritual cave utilization during the Late Preclassic increases from nine to 15 caves, and from a minimum of 35 to a minimum of 204 ceramic deposits. The geographic subsection with the greatest increase is the northernmost, Chapayal drainage, with the Candelaria Caves showing a lesser quantitative increase. The southernmost cave of this sample, Hun Nal Ye, represents the lowest frequency increase of ceramic deposits while containing the highest quantity of whole vessels for this period. From these north to south decreasing proportions, it could be inferred that this is the direction of movement, and in fact, Woodfill (2007) indicates that the ceramic material of this period is primarily lowland (Woodfill 2007:9). Trade is one possible catalyst for the expansion of ritual cave use in this region, and caves are certainly implicated in trade activities (Adams and Brady 2005:307; Woodfill

2007:567), but it may be difficult to separate trade activity from other intersite/interregional relationships, such as pilgrimage or politics (Stone 2014:49-51). Barbara Macleod has indicated that alliances for the control of trade motivated pilgrims during the Late Classic (MacLeod 2022: 11:52).

One important example of such an intersite/interregional relationship that is demonstrated by ritual cave deposits is the relationship between Ixcun and the Chapayal drainage area. Ixcun is a site located in the southeastern Petén, and its immediate area is tied to a ceramic type known as Ixobel Orange (Spenard 2006:149). This ceramic type is geographically limited to Ixcun and a small number of caves in the southeastern Petén, but among these are Naj Tunich (Brady 1989:170), Cueva Este de Ixcun (Escobedo 1993:126), and Balam Na Cave 1 (Brady et al. 2009:282-287). The exact relationship of Ixcun with the Chapayal drainage area in the Late Preclassic is unknown, but it has clear political overtones during the Late Classic, as epigraphically illustrated from the hieroglyphics in Naj Tunich (Spenard 2006:149; MacLeod 2022: Slide 47).

The Ixobel Orange deposits are limited to two caves of the Chapayal drainage, Ventana Maya and Torre Hun. There are 6 bowl sherds from Ventana Maya that were placed in an elevated location of difficult access (Spenard 2006:61). These sherds exhibited burn residue, but Spenard suggests this treatment may be modern (Spenard 2006:99). Torre Hun contained 1 bowl sherd, placed within the first quarter of the entrance tunnel and in proximity to an active speleothem (Spenard 2006: 62-66).

The majority of the Chapayal drainage caves demonstrate only minor quantities in terms of Late Preclassic ceramic representation, although three of these caves contain ceramic scatters

for which exact quantities are undetermined. This majority of caves includes 14 Rockshelter, Saber Cave, Ventana Maya, Cueva de los Murcielagos, Hix Pec, Cueva de las Manos, Cueva del Coche, and Kaaminaq So'tz. Except for Ventana Maya, and the deposits of these caves all suggest preference for open areas at or near the entrances (Woodfill 2007; Spenard 2006). In contrast, Cueva de los Murcielagos held two whole mushroom pots with "killholes" that were placed deep within the cave in an elevated niche (Woodfill 2007:149; Spenard 2006:136).

In considering all of the Chapayal drainage caves containing Late Preclassic deposits, plates and bowls still appear to predominate among the ceramic offerings for this time. In the larger ceramic assemblages of Torre Hun and CHOC-5 Rockshelter, however, the form for a large number of sherds is unidentified. In the CHOC-5 Rockshelter, cup sherds surpass the quantity of bowl sherds. Jar forms appear to be the least ceramic form represented, but in light of the unidentified forms and jar sherd scatters at three caves, their numbers certainly increase, relative to the Middle Preclassic quantities.

Another shift that appears is an increase of ritual practices in areas of caves that have dripwater and active speleothems. Hix Pec, Cueva del Queso Suizo, Cueva de las Manos, Kaaminaq So'tz, and Torre Hun all exhibit evidence of ritual deposits in association with these cave features (Woodfill 2007:150-154, 156, 159; Spenard 2006:55-56, 62-67). In Kaaminaq So'tz, such deposits represent movement that is much further into the cave than during the previous era. Torre Hun contains two active speleothems with high concentrations of ceramic deposits, and one of these in at the furthest extent of the cave. Some of its deposits were associated with burials (Spenard 2006:62-67), and Spenard makes a convincing argument that this cave is an ancestral shrine for the Late Classic Cancuén polity (Spenard 2006:146). Such an interpretation calls to mind the kin-based ossuaries of Northern Honduras / Region 4 and

particularly those with water, but the artifact types associated with the ceramic deposits of the Chapayal drainage caves suggest ritual differences between these regions.

There are a number of artifact types that are novel for this region and time, and most notable are those associated with aquatic fauna. Fish scales, crab claws, marine shell, and jute appear in the ritual deposits of this Chapayal drainage caves sample. Moreover, these artifact types are most often in deposits that are not directly associated with active speleothems or drip water (Spenard 2006:66-67, 70-71, 76; Woodfill 2006:153), although one of the deposits contains a broken speleothem (Spenard 2006:67). At a minimum, the presence of marine shell points to a broader interaction with the Pacific coast. The aquatic fauna also indicate that water was invoked for these rituals in addition to those performed near active speleothems, and the Late Preclassic is known to have experienced drought (Bonnafoux 2011:37; Ebert et al. 2017:212). The prevalence of water fauna that includes marine life may afford an interpretation as to the petition and meaning of these rituals, as their inclusion calls to mind the primordial waters from which the earth was born (Christenson 2007:12; Estrada-Belli 2006:62; Garcia-Zambrano 1994:217-218; Bassie 2002:3). This suggests an area for further study, as a ritual invoking the waters of creation is fundamentally different than the agricultural metaphors ostensibly seen in Northern Honduras / Region 4. As "precreation era myths...became the ideological foundation of the Snake Kingdom," Calakmul (Reents-Budet 2023:29:08-29:15), there are potential implications for the relationship moving forward in time between the Chapayal drainage, Ixcun, and Calakmul that merit further examination. If such an inference can be drawn from these aquatic remains, it would follow that each artifact type should have both a meaning and role in the ritual acts.

For the Chapayal drainage during the Late Preclassic, chert is among the most frequent artifact type in ritual cave deposits. Chert represents the 'lightning' or 'fire' stone, which relates this material with water (Jaime Awe, personal communication). Obsidian, faunal bones, mano or metate fragments, and human bones remain common. Iron pyrite is found in the CHOC-05 Rockshelter, and Quartz flakes appear in Saber Cave (Spenard 2006:71, 76). Newly added ritual components for this period include jute, broken speleothems, pebbles, rocks, worked bone, and the aforementioned aquatic fauna: shell, fish scales, and crab claws.

Two caves in the Candelaria system contain Late Preclassic deposits: Ventana de Seguridad and Verónica. Ventana de Seguridad contains approximately five ceramic deposits for this period, and four of these are placed in association with an elevated platform near the entrance, with three of the four in proximity to a speleothem and a hearth (Woodfill 2007:70, 73-74). Artifacts associated with these three deposits include shell, chert, a scatter of charcoal, faunal bone, and obsidian (Woodfill 2007:65, 68, 70, 71, 73-74, 76, 81). The fourth deposit includes these artifact types plus human bone (Woodfill 2007:70,76). The fifth deposit is deeper within the cave, placed adjacent to the wall in a passageway, and also associated with a speleothem and hearths. It is a fragment of a Sierra Red bowl, with Early Classic sherds, chert, greenstone, a burnt maize cob, and copal resin in the same deposit (Woodfill 2007:81-82).

Veronica Cave contains 10 Late Preclassic ceramic deposits, but nine of these deposits are minimum designations, as the vessel quantity represented is unclear (Woodfill 2007:99-101, 103-104). Half of the forms are unknown, but bowls outnumber other forms of those identified. The deposits are near the cave entrance, a transition point between the leveled cave interior and an upward slope preceding this. Most are opposite the focal point of one of two large columns, with one deposit opposite a group of speleothems between these columns (Woodfill 2007:99).

Some deposits are in proximity to rockfall boulders. Plaster floors overlayed one of these deposits, while others were part of leveling construction fill (Woodfill 2007:99-101). The bottoms of three units contained jute, crab claws and bivalve mussels (Woodfill 2007:99-101), and greenstone was found in one of the units (Woodfill 2007:104).

Hun Nal Ye is the southernmost and final cave containing Late Preclassic deposits, and these appear entirely different from those of the more northern caves. Five of the deposits are whole jars, and one has two killholes (Woodfill 2007:39-41, 43, 48). The sixth is a partial jar Woodfill, 2007:56). Access to all of these vessels involves a tunnel descent, and half are placed along this circuit in pooled calcium carbonate water (Woodfill 2007:35, 37, 39-41). The partial vessel is in its own alcove. The final two are placed near columns in a transitionally higher chamber. There are no other artifact types associated with these vessels.

During the Late Preclassic, the Chapayal and Candelaria Caves of the Pasión River / Region 3 exhibit ritual practices that are evolving from the Middle Preclassic, and which demonstrate relationships to the east and west of this region. Representing the area nearest to the highlands, Hun Nal Ye shows a markedly different ritual practice and/or style. Woodfill notes that the Hun Nal Ye ceramic types for this and the subsequent period, correspond with highland areas further south (Woodfill 2007:57). More explicitly, Woodfill states that it is during this time that highlanders begin to use this cave (Woodfill 2007:291). Generally, these group patterns achieve their fullest expressions in the Early Classic.

5.2.3 Pasión River / Region 3 – Early Classic

The Early Classic is the period of peak frequency for ritual cave use in this region, and the statistical findings of this study support Woodfill's assertion that the Early Classic ritual

deposits were concentrated in interior spaces that were the focal points, or "most impressive parts of the cave" (Woodfill et al. 2012:113). Deposits correspond to ritual practices focused more so on the supernatural, relative to Late Classic spatial characterizations (Woodfill and Andrieu 2012:199; Woodfill et al. 2012:112). However, there are important ritual practice changes that appear during the Early Classic.

Hun Nal Ye is utilized in much the same manner as it had been in the Late Preclassic. There are 14 additional whole vessels and one partial vessel deposited in the Early Classic, but this assemblage is dominated by cups. In fact, there are 10 cups to two jars and one bowl. One cup is inverted, and the bowl is stacked on top of a cup (Woodfill 2007:44, 47, 51, 52). The prevalence of cups with one being inverted recalls a similar context from Ruth Whitehouse's study of Neolithic and Copper Age Italian caves, wherein she speculates that visitors were potentially drinking calcium carbonate water as rites of passage and personal transformation (Whitehouse 2015:55, 59). As there is a pool outside of this cave, they may not have been drinking from the interior. The possibility of mining for dietary calcium has been suggested for Tzibte Yux in Southern Belize (Prufer and Kennett 2020:26), so drinking the calcium carbonate water may not be far-fetched. Two ceramic boxes constitute a new artifact type for ritual deposits at Hun Nal Ye, deposited alongside a carved stone coffer. Notably, these boxes are stylistically linked to the Petén region (Woodfill et al. 2012:94, 385-386). From the Cahabon Flaky Ware group, seven vessels that include two Cajeta ceramic boxes, a Chichicaste Bowl, two Javier Cups and Two Punazo cups, are placed in niches beyond an interior cave descent (Woodfill 2007:35, 47-48, 51). Six of these are slightly elevated and associated with a focal point. Three vessels, including one of the Cajeta ceramic boxes, one Javier cup, and a K'uk' jar, are associated with drip water, and two vessels including the K'uk' jar and the other Cajeta box are associated with

speleothems (Woodfill 2007:42, 47, 48). Five Languin Unslipped Ware K'uk' cups, equaling one-third of all the Early Classic vessels, are near the entrance (Woodfill 2007:51, 52). As in the Late Preclassic, there are no other artifacts associated with these ceramic deposits.

There are eight caves in the Candelaria Cave System that show Early Classic deposits. Because the spatial associations of deposits have already been addressed for this and the subsequent period, I will focus on the vessel forms, treatments, and other associated artifact types. Many of the vessel deposits are sherd scatters, for which no estimated vessel counts are given, and there are some indications of in-situ ritual smashing at this time (Woodfill 2007:64, 120, 123). Jar forms are more prevalent than bowls, but new forms are evident in this period, including shoepots, highland comals, and incensarios (Woodfill 2007:69-78, 88-105, 138-139, 303, 307). Altars and platforms are more common in this period, but the increased frequency of hearths and burning of ceramic vessels is especially notable (Woodfill 2007: 64- 122). The artifact types from the previous era remain, but new types are added. These include a ceramic disc (Woodfill 2007:104), a celt, worked greenstone (Woodfill 2007:102), a modified conch shell (Woodfill 2007:136), burnt corn cobs (Woodfill 2007:80-81), and copal incense (Woodfill 2007:80).

There may be a pattern of association in the Early Classic deposits of the Candelaria caves, whereas frequent pairings of grey, unslipped wares with red or orange ceramic types occur. There are no fewer than twenty such couplings where the red or orange ceramic type is Aguila Orange or Aguila Red-Orange (Woodfill 2007:64, 72-73, 75-77, 80-82, 92, 96, 108-110, 116, 118, 120, 135) and no fewer than seventeen instances where the red or orange ceramic type is Dos Arroyos Orange Polychrome (Woodfill 2007:64, 68-69, 71-73, 75, 79, 84-85, 91, 94, 96, 108, 116, 119, 122, 135, 137, 140-141). Most often, the unslipped ware is the Quintal Unslipped

type, which is gray in color (Woodfill 2007:298-300), although a related type, Triunfo Striated, is also found (Woodfill 2007:71-73, 75-76), as are unidentified, unslipped ceramics (Woodfill 2007:64, 80, 85, 94, 96, 108, 116, 122). In a few cases, Balanza Black vessels appear in association with one or all of the other types (Woodfill 2007:72-73, 79, 109, 116, 120). I suggest that these pairings and their ritual treatments may be symbolic, but this would depend on the meaning ascribed to the unslipped ceramic types.

Woodfill et al. note that at Hun Nal Ye, all but two of the unslipped vessels are found within the cave, and they go on to relate how this pattern has been generally recognized in other parts of the Maya world (Woodfill et al. 2012:108). Prufer states that "unslipped jars are the most common artifact preserved in caves (2002:253). The Middle Preclassic ceramics from Gordon's Cave 3 are described as "primarily plain, usually unslipped, unpainted" (Rue et al. 1989:397). James Brady also alludes to this state, showing a spatial dichotomy in cave use between the "utilitarian types," that include the unslipped wares, and the "types with polychrome and fine slipped pottery" (Brady 1989:212, 406-407). Keith Prufer, however, indicates that this dichotomy may be "more complex" (Prufer 2002:204). The Candelaria Caves Early Classic deposits suggest the possibility of an additional, 'nested' dichotomy among the utilitarian ceramics types.

Both Aguila Orange and Quintal Unslipped vessels are designated utilitarian ceramic types, as are Balanza Black and Triunfo Striated (Iglesias Ponce de León 2003:179-180) which sometimes appear with these deposits. However, Aguila Orange bowls are afforded a privileged status at Uaxactun where they are used in cache deposits and burials within the eastern and western buildings of the site's E-group (Chase et al. 2017:43-45). Many of the Aguila Orange vessels at Uaxactun are arranged in lip-to-lip constructs, with human bones contained within

(Chase et al. 2017:43-45) - a practice seen earlier, at Late Preclassic Cahal Pech, and interpreted in terms of ancestor resurrection (Awe, 2021: 105). In Uaxactun's western building, Structure E-VII, Aguila Orange and Balanza Black vessels were excavated, (Chase et al. 2017:45). For the ancient Maya, red/orange and black are symbolic of east and west, respectively (Coggins 1988:70-71; Mathews and Garber 2004:71), and they are of primary importance for the Maya (Ashmore 1991:216). While color is the operating principle for ancient Maya directional semiotics above ground, this may not represent the ancient Maya's full conceptualization.

There are numerous allusions, beyond the temple-pyramid replication (Vogt 1964:194), that ancient Maya residential structures were also modeled after mountain-caves (Mathews and Garber 2004:51; Brady and Ashmore 1999:127, 139; Vogt 1998:26; Woodfill 2021:2 of 15; Kunen et al. 2002:200; Stone 1992:128, Note 4; Moyes 2001:84-85). Rissolo suggests that the enclosed nature of caves constitutes a fundamental difference between these and other natural spaces (Rissolo 2003:347; Stone 2001:250), so the building of enclosed residential structures after long periods of open-air habitation would have likely held profound meaning for the ancient Maya. Additionally, caves and residential households bear similarities to one another in being 'roofed' structures that escape the sun's rays. Notably at Tikal, the northern-most structure of the Great Plaza, which is associated with the sun's zenith, is unroofed (Ashmore 1991:201). The western, southern, and eastern structures are all roofed, representing underworld spaces, whereby the sun symbolically emerges from the eastern structure, and reenters the underworld through the western structure.

Given the highly ritualized nature in the building of residential structures (Gillespie 2001; Lucero 2010:142), their potential cognitive analogue to caves, the use of directional symbolism in household dedications (Kunen et al. 2002:208; Robin 1999:196), and colors as "geographic

mnemonic[s]" (Mills 2008:372) designating cardinal directions, it is plausible that the ancient Maya ritualized certain ceramic types for use in both caves and their residential structures, and unslipped, undecorated wares are among the earliest ceramic types. While unslipped ceramic types have been previously characterized as 'domestic' (Woodfill 2007:541), the term "utilitarian" may continue to privilege quotidian-use over other potential ancient Maya meanings.

With each cardinal direction associated with both a color (Coggins 1988:70-71; Mathews and Garber 2004:71) and an assumed vertical association (Ashmore 1989, 1991), the color associated with the south and ostensibly the underworld, yellow, appears absent from ritual cave ceramic assemblages. Woodfill notes that the paste of the Quintal Group vessels can be yellow, although firing "to varying shades of grey on the surface" (Woodfill 2007:299-300). If we tentatively consider that the color grey and/or unslipped vessels in general may have signified the underworld, then an interpretation of these ceramic pairings is possible. What makes this interpretation potentially more compelling is that these none of these vessels were simply what local inhabitants owned, rather these were locally produced in foreign styles as commercial products (Woodfill 2011:222), suggesting these ceramic pairings were actively chosen.

In Entrada del Sol, there is a smashed Quintal Unslipped vessel with an Aguila Red-Orange sherd (Woodfill 2007:64), and in La Iluminada there are three Quintal Unslipped jar rims placed together with an Aguila Red-Orange rim on stalagmites (Woodfill 2007:118). In Ventana de Seguridad, there are sherds of Quintal Unslipped and Aguila vessels in association with charcoal, and a hearth (Woodfill 2007:78, 82), with one instance of this pair accompanied by a Dos Arroyos Orange polychrome rim (Woodfill 2007:77). In Veronica, there are examples of burnt Quintal Unslipped sherds with unburnt Aguila Red-Orange vessels (Woodfill 2007:92, 96,

109), a case where both types are burnt (Woodfill 2007:108), and pairings where neither type is burnt (Woodfill 2007:109-110). The aforementioned are the more discrete pairings, but if we include instances where Dos Arroyos Orange, Balanza Black, Triunfo Striated, and unidentified, unslipped types are associated, the number of potential pairing activities vastly increases.

I would hypothesize that these rituals practices are referencing adjacent stages of the sun's path, through the use of "opposing and....complimentary concepts" (Coggins 1988:74), with each represented by one of these ceramics. While the grey, Quintal unslipped vessels may represent the sun's passage beneath the earth, the Aguila Orange vessels signify the sun's emergence from the Underworld (Christenson 2007:11). This would represent one half-cycle of the whole (Coggins 1988:74). Burning may have been intended to "promote the transit of the sun" (Garcia-Zambrano 1994:220), toward re-emergence in cases when Quintal Unslipped vessels were burnt or smashed, or toward the subsequent stage when Aguila Orange or both vessels were burnt. Notably, there are some instances of Quintal Unslipped sherds burnt in isolation from other types (Woodfill 2007:80, 96, 107, 110) in what may be considered a symbol, or *pars pro toto* of the paired whole. The inclusion of Balanza Black sherds with these pairings would signify a whole-cycle representation (Coggins 1988:74). The possibility that these ceramic pairings represent adjacent stages of the sun's path may have a further connotation for ancient Maya ideas about travel, as the Candelaria Caves of this period were "trade shrines" (Woodfill 2007:575). Whereas both travel and the sun's transit share conceptualizations as cyclical patterns with two parts, I am positing that the ancient Maya ritualized these ceramic pairings, either to reenact the birth of the sun from a cave, or perhaps as a strategy to petition the supernatural for a subsequent leg and/or emergence from their journey. It is important to stress that this interpretation is tenuous in that it is derived solely from secondary sources, and it remains to be

tested. There are, however, other examples in the Chapayal drainage that may help to support this hypothesis.

The Chapayal drainage area caves share aspects of the Candelaria system during this time. Jars are far more prominent than in the preceding period, while bowls remain common. Associated artifact types largely remain the same. A "mend hole" in an Aguila Orange bowl is seen for the first time in this study (Spenard 2006:165). Some of the ceramic types deposited at this time are not seen in the Candelaria system, suggesting differences in origin. There is also an extraordinary increase in the number of deposits at Torre Hun, exceeding 1000 ceramic entries for this period. Of these, Quintal Unslipped sherds appear with the greatest frequency at 596, and as the highest number of any ceramic type sherds that are burnt, at 222 (Spenard 2006:166-186). Triunfo Striated comes second in terms of burning, at 39. The 23 burnt sherds of Tinaja Red: Aduana, which Woodfill and Spenard assign to the late Early Classic (Woodfill 2007:375; Spenard 2006: 95-96), exceed those of burnt Aguila Orange: Aguila type, registering at only 12. Generally, there appear to be both similarities and differences between the Candelaria and Chapayal areas at this time.

Kaaminaq So'tz is spatially unique among the caves, containing a labyrinth that leads up to a high opening above the valley (Woodfill 2007:155). Woodfill draws his interpretation of the cave's use from Suhler et al. (1988), who posited certain architectural structures as "resurrection-accession" buildings (Suhler et al. 1988:262). The implication is that this cave was "used to recreate the path of the sun ...with an audience seeing the practitioner enter below, in the Underworld, and appear above in the heavens." (Woodfill 2007:549-550). The labyrinth leads up into a larger room with evidence of ritual smashing of ceramic vessels (Woodfill 2007:156). The deposits within this room contain elements of the aforementioned grey/red-orange color and/or

unslipped/slipped oppositions (Woodfill 2007:159-160), and these are also found in lesser quantities nearer to the entrance (Woodfill 2007:156-158).

In the labyrinth itself leading to the larger room, Woodfill notes that the sherds are "all unslipped and undecorated" (Woodfill 2007:550). Moving sequentially through the labyrinth, a fork appears with the left branch leading westward, and away from the sherd room. Quintal Unslipped sherds were deposited at this juncture. Following the right branch toward the "Sherd Room," at approximately 7 meters there is another juncture and a deposit of Aguila Red-Orange and Dos Arroyos Orange Polychrome sherds (Woodfill 2007:156, 158). If the proposed color and/or slip opposition hypothesis is correct, the placement of these deposits could suggest a vertical direction wayfinding or navigational use of ceramics, similar to that posited for abstract forms of rock art in the Maya sphere (Bonor Villarejo and Sanchez y Pinto 1991:49; Stone 1995:150, 187; Woodfill and Henderson 2016:177, 183-185). Lucero indicates that ancient Maya color-directionality for commoners was akin to a form of language before writing (Lucero 2010:161). Overall, the hypothesized oppositions would support Woodfill's solar emergence interpretation for this cave's ritual use. However, further study is needed to determine whether, or to what geographic and temporal extent this hypothesized ritual practice might be supported by the ancient Maya ritual cave deposits data.

5.2.4 Pasión River / Region 3 – Late Classic

The Late Classic cave deposits for this region demonstrate that ritual change has occurred in transitioning from the preceding era. At Kaaminaq So'tz, the labyrinth and entryway to the "Sherd Room" were walled shut at the end of the Early Classic, and ritual was thereafter restricted to the entrance (Woodfill 2007:157). Most of the caves and rockshelters in the Chapayal area exhibit significantly reduced quantities of deposits, with only CHOC-05

Rockshelter and Torre Hun showing relatively sizable quantities (Spenard 2006:163-200). A stone circle is associated with ceramic deposits at CHOC-05 rockshelter (Spenard 2006:74-77, 191-200), and incensarios increase at Torre Hun during this time (Spenard 2006:179-180). The Ventana Maya deposits suggest that this cave falls out of use at the end of the Early Classic (Spenard 2006:164). The abandonment or walling off of cave spaces might have been a way to ritually separate one time from another. The walling off of caves has also been suggested as a way to contain malevolent forces (Prufer 2002:610-613). Notably, the entrance to Chechem Ha in Central Belize / Region 1 is also walled off at this time, although ritual practices later recommence (Moyes 2006:531).

Similarly, the Candelaria caves exhibit a great reduction in deposit volumes. Ritual activities appear to cease entirely in Entrada del Sol and El Venado Seco at the close of the Early Classic. In this study's sample, only Raton de los Dientes and Los Metates caves contain quantities similar to those of the previous era. Most of the deposits in Raton de los Dientes are associated with a platform at the higher of two entrances, and there is one Late Classic burial associated with pooled water (Woodfill 2007:133,137). Both of these caves contain a ceramic sherd scatter deposit typed Osoquin Unslipped: Osoquin, and found elsewhere only at Salinas de los Nueve Cerros, to the west of these caves (Woodfill 2007:436-437). Ventana de Seguridad, Veronica, and La Iluminada each contain less than ten Late Classic deposits. As Woodfill makes clear, the function of the caves in this area has changed from that of trade shrines to local-use ritual caves, as the trade route has shifted and highland people have moved into the area (Woodfill et al. 2012:113).

Late Classic ceramic deposits for Hun Nal Ye show some differences from those of earlier periods. There are nine whole vessels and one partial vessel, with three placed near the

entrance, and the others within the inner chambers. Two of the three entrance vessels were placed in front of the entrance, and buried as a cache under smashed Late Classic vessels (Woodfill 2007:52-53). A similar buried cache of two vessels was placed in front of those of earlier periods in Chamber 1, with one of the vessels containing a partial sub-adult femur (Woodfill 2007:48-49; Woodfill et al. 2012:110). Two additional whole vessels were set on the wall of Chamber 1 (Woodfill 2007:45). The buried caches are especially noteworthy, as neither ritual smashing nor burial caches had been practiced at Hun Nal Ye previously. The burial of whole vessels combined with the smashing of vessels could be interpreted as both dedicatory and terminating (Kunen et al. 2002:198). The combination could also be read as social commentary, whereby the burial of two whole vessels, representing past practice, are overlain by the ritual smashing of vessels, more characteristic of Late Classic practices. I would suggest that their placement in front of the cave entrance and the earlier vessels indicates some form of reverence for the past. The Late Classic period brings change and, ultimately, collapse to the social, political, economic, and ritual structures of this region.

5.3.1 Southern Belize / Region 2 – Middle Preclassic

In this study's Southern Belize sample of ritual cave deposits, the Middle Preclassic period is not represented through ceramics. However, two caves have provided some tantalizing osteological evidence with some temporal proximities to the Middle Preclassic. There are obvious differences between these burials and the ossuaries of Northern Honduras at this time, possibly related to a lack of circumscription in this area (Prufer 2002:390). Study of the human remains recovered from Mayahak Kab Pek and Saki Tzul have afforded insights into the spread of maize consumption, indicating it was regularly consumed after 2000 BC (Kennett et al. 2020:2-3 of 11). The study, however, suggests "possible hiatus between 3200 and 2700 cal B.P."

(Kennett et al. 2020:3 of 11), or roughly from 1200 to 700 BC. Keith Prufer's study of Mayahak Kab Pek found that the earliest ceramics dated to the Late Preclassic (Prufer 2002:387) and that the earlier burials were Preceramic in date. More recently, Prufer has found ceramics dating to the late Early to Middle Preclassic in some rockshelters that he is investigating, although much of this data remains unpublished (Jaime Awe, personal communication 2023).

There are other avenues of inquiry that have been pursued in relation to this region and period. There is isotopic and linguistic evidence of both maize influx and group migrations into the Maya area from South America, and these changes may be related to Chibchan speakers from lower Central America (Brady and Hasemann 1995:40; Kennett et al. 2020:8 of 11; Kistler et al. 2020:33125, 33128l; Awe et al. 2021a:524). Some of the evidence points to a period of long drought around 2200 BC (Awe et al. 2021a:526; Kennett et al. 2020:8 of 11; Rosenwig 2015:134, 143-147). If the Olmec were trading in Northern Honduras at the beginning of Mayahak Kab Pek's posited hiatus (1200 BC), we might speculate that such activity could have drawn people who had familial ties back south, into that area. Regardless, gaps remain in our knowledge of Southern Belize / Region 2 for this period.

5.3.2 Southern Belize / Region 2 – Late Preclassic and Transition to Early Classic

Defining the Late Preclassic for Southern Belize / Region 2 is difficult due to ceramic typologies with date ranges that cross into the Early Classic. Balam Na Caves 1, 2, and 4 afford some level of differentiation from later periods, while simultaneously providing a direct link with two of the caves from the Pasión River / Region 3 for comparison. To reiterate, the Ixobel Orange deposits that link these regions are limited to two caves of the Chapayal drainage in Pasión River / Region 3: Ventana Maya and Torre Hun. Ventana Maya contained six bowl sherds that were placed in an elevated location of difficult access (Spenard 2006:61), and these

exhibited burn residues that may be modern (Spenard 2006:99). Torre Hun contained one bowl sherd, placed within the first quarter of the entrance tunnel and in proximity to an active speleothem (Spenard 2006: 62-66).

The Balam Na 1 ceramics that are specifically associated with the Late Preclassic are all Paso Caballo Waxy Ware sherds or sherd scatters. Of the 15 deposits, two were found near the entrance and nine were associated with pooled water, drip water, or speleothems (Brady et al. 2003; 2009). Of the ceramics that temporally cross into the Early Classic, including Ixobel Orange, there are 41 sherd or sherd scatter deposits. Similarly, two were near the entrance, while a majority were found in association with pooled water, drip water, or speleothems. One difference between the other artifact types of this cave and those of Pasión River / Region 3 for this period is the absence of marine shell in Balam Na 1, although freshwater aquatic remains are observed (Brady et al. 2003:147; Brady et al. 2009:285). Burnt corn cob fragments are also evident (Brady et al. 2009:285). More notable, however, is that Balam Na 1 contains petroglyph rock art. Most are of the more "vernacular" style of rock art (Stone 1997:38), with the exception of an *akbal* glyph, which signifies darkness and, perhaps, a more elite level of knowledge (Brady et al. 2009:286).

Balam Na 2 ceramics that are specifically associated with the Late Preclassic include a variety of types and forms. There are two bowls, two censers, two plates, a cup and a pot, and the vessels are whole or partial. Two vessels were near the entrance, and all are associated with subsurface caches in association with burials (Brady et al. 2003; 2009). Balam Na 2 also contained a whole, Late Preclassic to Early Classic transition Sierra Red Plate near the entrance.

Balam Na 4 ceramics are specifically associated with the Late Preclassic, and include two partial Sierra Red: Sierra vessels: one bowl and one plate. These are also cached in association with a burial that was walled in, along with jade and pyrite beads (Garza et al. 2001:15). This unique manner of interment is suggested as a possible Late Preclassic antecedent to those at Late Classic Naj Tunich (Garza et al. 2001:15). The possible relationship between the ritual practices in these caves and the Late Classic marriage of high art, hieroglyphics, and elite tombs at Naj Tunich is intriguing, especially from a political strategy perspective. We might also consider this burial type in contrast with those at Cancuén's proposed ancestral cave, Torre Hun (Spenard 2006:146), recognizing the dichotomy of whole vessels in the burial caves of Balam Na 2 and 4, with only ceramic sherds in Balam Na 1. In this context, the Late Preclassic burial caves of Balam Na 2 and 4 appear status-differentiated, possibly representing early elite interment.

Two other burial caves for this region and period indicate mortuary variability. One is Holomi Tzi, a cave of difficult access near the later center of Muklebal Tzul (Prufer 2002:459-460). A Late Preclassic Sierra Red dish sherd was collected as well as an undated conch shell disk from an area strewn with degraded human bones (Prufer 2002:459-460). The other cave is Mayahak Kab Pek, which contained multiple burials with few grave goods. One of the burials was that of an adult lying face down, with the cranium resting in what was likely a Caribal Red bowl (Prufer 2002:382, 387). This recalls the cranial-bowl emplacement at Talgua Cave, northern Honduras (Dixon et al. 1998:333), with the important difference in treatment for individual remains. A minimum of three additional ceramic deposits demonstrates the Late Preclassic use of this cave (Prufer 2002:387).

There are seven additional caves within this study's sample, that have ceramic deposits which are discretely Late Preclassic. All are in proximity to the earlier site center of Ek Xux or

the later site center of Muklebal Tzul, and contain only one or two ceramic deposits (Prufer, 2002). In three separate instances, deposits are found in niches (Prufer 2002:479-481, 538, 573-575), while one is placed on a ledge of difficult access (Prufer 2002:501,506). A large scatter of sherds found in depressions at Raspaculo cave, showed signs of interior burning, possibly as censers, in a depression lined with large river cobbles (Prufer 2002:320-322).

In addition to Balam Na 1 and 2, Xmuqlebal Xheton contained ceramic deposits with dating that spans the Late Preclassic to Early Classic. Three partial jars show evidence of burning, and are closely associated with wood, dated 0-350 A.D. (Prufer 2002:500-501, 505, 509). These were found in association with a leveled, terraced area, and Late Classic vessels, with the latter indicating the possibility that materials were reused (Prufer 2002:500, 509). As droughts are known for both periods, these associations could signify social memory (Kunen et al. 2002:209), which might also be considered for the Late Preclassic and Late Classic vessels found at Shoepot Cave, in Central Belize (Peterson 2006:84-86). The two interpretations are not mutually exclusive.

Overall, the ritual cave deposits for this period in Southern Belize / Region 2 demonstrate contrasts in mortuary treatment, and differential spatial foci attributable to cave function. Comparing the walled-in, subsurface cache deposits associated with burials at Balam Na 2 and 4 to the cached-bowl burial at Mayahak Cab Pek, the former practices appear to address the sociopolitical, and land tenure (Villa Rojas 1946:17 in Dixon et al. 1998:334), implying social stratification and aggrandizement (Awe et al. 2021b:3; Stemp et al. 2021:427). The latter seems to address the supernatural, interpreted as a ritual petition for regeneration. In contrast, deposits in the non-burial cave of Balam Na 1 are most often in association with speleothems or water. Much of the ritual activity for this period remains closer to cave entrances, with only a few

forays into areas of difficult access. Areas of difficult access within caves have been interpreted as denoting a greater "sense of purity" (Woodfill and Henderson 2016:183). I would add that the use of these spaces may represent early rites of passage, operating along a continuum toward later, artificial constrictions to ritual circuit passages (Woodfill 2021:8 of 15; Moyes 2020).

5.3.3 Southern Belize / Region 2 – Early Classic

The Early Classic ritual deposits of this region exhibit greater varieties of treatment, with an overall reduction of ceramic quantity. Balam Na 1 shows only minimal ceramic quantities that can be assigned to this period (Brady et al. 2009:286). Similarly, each of the eight caves from Keith Prufer's 2002 survey that contained Early Classic ceramic deposits show only one or two examples (Prufer 2002:308-309, 340-343, 366, 454-481, 502-503, 508). Kayuko Naj Tunich is the only cave within this study's sample which relies on radiocarbon dating, as this cave was extensively looted prior to its study (Moyes and Prufer 2009:194-196; Moyes et al. 2016:149). Conversely, Bats'ub / Flight 25 Cave provides five Early Classic ceramic deposits amidst a sealed ritual assemblage, affording a unique window to ritual beliefs and practices of this period (Prufer and Dunham 2009).

An overview of this sample indicates that ritual practitioners continued to favor cave entrances, but there is a slight increase in the use of deep cave areas. Generally, areas of difficult access and speleothem association decline (Prufer 2002:502 Brady et al. 2009:285), whereas the ceramic deposits of this period are increasingly found in association with altars (Prufer 2002:340, 342, 361, 480; Moyes and Prufer 2009:195). One instance of a vessel with a killhole was found at Chab'il Eke Uk'al (Prufer 2002:343). There is evidence of extensive public ritual smashing of ceramics at Chab'il Uk'al rockshelter, with no vessels allowing for complete refit (Prufer 2002:

363, 368; see Morton et al. 2019:5, 6, 8). Overall, the deposits of this period seem to indicate greater ritual formality and political appropriation.

Bats'ub / Flight 25 Cave contains the walled-in remains of one individual who is interpreted as a shaman (Prufer and Dunham 2009:295). The burial contents included four whole and one partial vessel, as well as a wood bench, beads of conch, jadeite, and hematite, worked shell disks, a hematite ear spool, cacao seeds, burnt wood, and a burnt maize cob (Prufer and Dunham 2009:297-299). Additionally, the burial was placed beneath a plaster floor. Radiocarbon dates overlap, confirming the burial is Early Classic (Prufer and Dunham 2009:305). Notably, the cranium was removed from the body and placed near the left hip, and in its place was the base of a jar or bowl containing a jadeite bead (Prufer and Dunham 2009:298, 300). This has been interpreted as, potentially, an expression of fear and defense against the individual (Prufer and Dunham 2009:313), suggesting a ritual petition in opposition, and possibly a decapitation sacrifice. Alternatively, this could be interpreted as a petition of transformation in lieu of regeneration. In this study, the juxtaposition of cranium and vessel demonstrates ritual variation on the symbolic theme seen at Talgua (Dixon et al. 1998:333), Cahal Pech (Awe 2021:105), Uaxactun (Chase et al. 2017:43-45), and Mayahak Cab Pek (Prufer 2002:382, 387). This particular expression can be interpreted as an antistructure, in contrast with the increasing formalization and political appropriation of ritual.

Kayuko Naj Tunich is indicative of political appropriation, as it is directly linked to the ancient Maya site of Uxbenka. This study relies on the findings from the cave's exterior mound structure (Moyes et al. 2016), and on radiocarbon dates serving as proxies for ceramic typologies inside the cave (Moyes 2013:194-196). Within the cave was an altar, a wooden basin, leveled floors, and plastered, partitioned walls that included wood posts (Moyes 2013:193-196). The

radiocarbon dates are all confined to the Early Classic period, and two radiocarbon dates indicate that this cave's use-life ended "no later than AD 601" (Moyes 2013:197). As a center epigraphically known to have had relations with Tikal (Prufer et al. 2006:265), the end date is significant. This corresponds with the end of the Early Classic period, and to ritual changes and use-life terminations for caves from Pasión River / Region 3, which are also linked to Tikal.

From this Southern Belize/ Region 2 sample, ceramic cave deposits that reflect the period spanning the late Early Classic and Late Classic 1, and/or the Late Classic 1 in particular, are very few. Xmuqlebal Xheton contained one partial ashware deposit associated with rockfall, terracing, and burnt wood dated to this period (Prufer 2002:499-500, 504). Two plates from Bite Your Head Off cave (Prufer 2002:319), and a third from Kahil Cab Pek date to this time (Prufer 2002:259). Chiue Hix Cave contained a number of eroded sherd scatters, with dates spanning this time frame (Prufer 2002:316). Chab'il Uk'al rockshelter contained one, partial Dolphin Head red dish from the Late Classic 1 period (Prufer 2002:364). This particular rockshelter is associated with public ritual for the site of Ek Xux, and contained multiple effigy censers that were smashed in-situ (Prufer 2002:366-369). Unfortunately, their typological dating is unclear, spanning the later Early Classic through the entirety of the Late Classic.

5.3.3 Southern Belize / Region 2 – Late Classic

This study's sample shows the highest frequencies of ceramic deposits for this region occur during the Late Classic Period. There are 35 caves with ceramic deposits dated to this period. Jars, Bowls, and dishes dominate assemblages, but censers (Prufer 2002:298-299), censer stands (Prufer 2002:304, 557, 572), a censer lid (Prufer 2002:303-304), and tripod vessels with the *Ik* glyph sign for wind appear (Prufer 2002:299, 330, 468-469, 501-506, 558, 572, 594). There are minimal indications of in-situ smashing of vessels (Prufer 2002:290, 363), while

killholes are prevalent (Prufer 2001:331, 472-507, 558), and the use of vessels as lids for other vessels appears (Prufer 2002:330, 501-506, 536).

Although there is no real pattern of color or slipped/unslipped dualism (Keith Prufer, personal communication 2019), there is at least one instance of a black/red vessel pairing. A black jar and a red jar are placed on opposing boulders within Dos Ollas and Red Bowl Cave (Prufer 2002:541). Association of ceramic deposits with altars is common in this period (Prufer 2002: 297-300, 468, 475, 550, 583-594, 817), as are their association with areas of difficult access, crawls, descents, and deeper parts of caves (see Table 3.2). What seem to be missing for this period are ceramic deposits associated with burials. Although Mohibal Kanchi rockshelter ceramics and a radiocarbon date indicate its use during the Late Classic period, both the human remains and ceramics were disturbed by looters, nullifying their association and the ability to assume equivalence in the dating of these different artifact types (Prufer 2002:410).

The lack of ceramic deposits associated with ritual cave burials during the Late Classic is explained by Prufer's findings with regard to burial practices at the site centers of Ek Xux and Muklebal Tzul (Prufer 2002:560-561, 632). This is, potentially, one of the most significant elements providing evidence for ritual change during the Late Classic. Although the exact date ranges for the two site centers is unclear, Prufer clarifies that Ek Xux predates Muklebal Tzul and that both seem to have coexisted during at least the early part of the Late Classic (Prufer2002:626). For Ek Xux, burials appear to have been placed in rockshelters, while the households of Muklebal Tzul held their own underground burial chambers (Prufer 2002:633-637). Prufer also notes differences in the constructed modifications within caves associated with each site (Prufer 2002:630), and a contrast in the ritual practices at caves linked directly to the

site centers (Prufer 2002:631). It is possible that religion, ritual practice, and social differentiation play a more visible role in the sociopolitical strategies during the Classic period.

5.4.1 Central Belize / Region 1 – Middle Preclassic

In the Central Belize sample, the Middle Preclassic ritual cave deposits are quantitatively more substantial than those of the other regions. However, characterizing these ritual deposits is confounded by evidence that some of these materials were ritually reused in later times (Moyes 2006:226, 254). Additionally, published reports for a few of the caves that contained Middle Preclassic deposits lack precise provenience data. Subsurface, stratigraphically positioned deposits may be the most reliable. From these deposits, geomorphological focal points within the caves appear to have been the most common places of ritual activity. Such focal points might include pooled water, drip water, speleothem columns, and boulders, as seen at Actun Chechem Ha (Moyes 2006:200-207, 311, 424-426, 449, 454), or the most unique features of the cave, as seen at Actun Halal (LeCount 2007:43-45; Lohse 2007:8,12-13, 38-39). At Actun Chanona, the focal point for some of the Middle Preclassic deposits appears to have been the "Great Platform" (Peterson 2006:40, 258). Additional Middle Preclassic sherds were found in Actun Chanona, within rimstone dams and in association with Late Preclassic sherds, charcoal, jute, faunal bones, and obsidian – all with evidence of burning (Peterson 2006:37, 136).

At Chechem Ha, Middle Preclassic ceramics were discovered in association with broken speleothems, chert, shell, and slate (Moyes 2006:207). A few subsurface deposits were found in association with stone circles and zea maize kernels (Moyes 2006:424-426). Moyes suggests that the combination of maize kernels and water-related cave features is indicative of agriculture-related ritual for this time (Moyes 2006:449). At Actun Halal, subsurface Middle Preclassic

ceramic deposits were found in association with speleothems, shell, chert, slate, cobbles, charcoal, faunal bone, obsidian, and crystals (Griffith et al. 2002:29-31; Ishihara 2002a:45-48).

Middle Preclassic cave surface deposits appear far less frequently in the cave sample from this region. Chechem Ha contained four such deposits. One Middle Preclassic sherd was found near the wall surrounding Chamber 1's large speleothem (Moyes 2006:207, 311). Another was found at a transition point in Chamber 3, below Crawl 3 (Moyes 2006:251). Two were at elevated positions within the cave: in an alcove in Elevated Passage 4 (Moyes 2006:265) and stacked with sherds of later periods on Ledge 8 (Moyes 2006:338-339). At Actun Nak Beh, Middle Preclassic sherds were recovered from an alcove in association with drip water and speleothems (Halperin 2002:61, 137), and at Actun Chapat, a sherd was found in a boulder-strewn area (Ishihara 2002b:53).

5.4.2 Central Belize / Region 1 – Late Preclassic

The Late Preclassic represents a pulse of ritual cave use and increase of deposits for this region. Actun Chanona, Ek Waynal, Actun Ik, and Actun Chapat's Chamber 3 all show peaks in ceramic deposit frequencies at this time. Additionally, Caves Branch, Overlook, K'in, and Pine Torch rockshelters show peak activity for this period. Cave areas with water or speleothems remain focal areas of ritual practice (Moyes 2006: 200-206, 235, 416-423; Peterson 2006:35-36, 43-45, 84, 136, 190; Mirro and Mirro 2001:103; Halperin 2002: 61, 136; Griffith et al. 2002:28; Ishihara 2002a:45; Griffith and Morehart 2001:197, 206-207; Ishihara 2001:255-257; Lohse 2007:8, 12-13, 43-46). Deposits in association with boulders are also seen (Moyes 2006:219, 229; Peterson 2006:39-45(C21-5-3), 54, 98; Wrobel et al. 2012:128-130).

Carbon dating more firmly establishes links between the deposits of this period and cave modifications, such as platform construction and stone monuments (Moyes and Awe 2010:144, 147, 151, 157; Moyes 2006:681). Burning and associations with hearths and/or charcoal are increasingly common with Late Preclassic ceramic deposits (Moyes 2006:219, 234, 244, 261, 417-422; Peterson 2006:43-52, 97, 106; Halperin 2002:63, 136), Moyes and Awe 2010:146-148), although some instances may reflect material reuse in later times (Prufer 2002:456, 509; Peterson 2006:107). Stone monuments with associated Late Preclassic deposits or carbon dating appear in two of the caves in this sample; Chechem Ha and Actun Chanona (Moyes 2006:283; Peterson 2006:39).

Other artifacts that appear in association with Late Preclassic ceramic deposits vary by cave and cave function. Materials that are common to many of the ritual cave deposit assemblages in this sample are: jute, speleothems, chert, cobbles, cave spall, rocks, faunal bone, and charcoal scatters. Materials deposited with seemingly less frequency include shell (Moyes 2006:208; Peterson 2006:52, 203; Griffith et al. 2001:31-32; Ishihara 2002a:45; Griffith and Morehart 2000:199, 203-205/ Ishihara 2001:256), slate (Moyes 2006:207, 656; Griffith et al. 2001:31/ Ishihara 2002a:45; Wrobel et al. 2012:129), obsidian (Moyes 2006:420-422; Peterson 2006:135, 136; Griffith et al. 2002:31-32/ Ishihara 2002a:45; Wrobel et al. 2011:129), granite (Moyes 2006:207; Peterson 2006; Griffith et al. 2002:32), crystals (Griffith et al. 2002:31/ Ishihara 2002a:45), and human bone (Peterson 2006:187; Griffith and Morehart 2001:205). Among the less frequent are freshwater crab claw deposits, occurring in Actun Chanona, Ek Waynal, and Actun Ik (Peterson 2006:203).

Late Preclassic deposits are found in association with burials at both Overlook and Caves Branch rockshelters. These deposits imply some distinctly different ritual practices. Overlook

Rock Shelter contains only a few Late Preclassic ceramic deposits (Wrobel et al. 2011:130), in a mixed stratigraphy that includes one Early Classic secondary interment, and sherds from the Early and Late Classic periods. Finding few ceramic sherds that could refit with others, Wrobel et al. suggest that this site may represent one stop along a ritual circuit, where the ancient Maya would deposit a single offering (Wrobel et al. 131-133). This pattern has been interpreted as a ritual "enchainment" (Morton et al. 2019:4), that may occur both within caves and across larger scales of the landscape (Prufer 2002:623). In terms of Late Preclassic deposits in the caves of this sample, there are examples of refits found in different parts of individual caves (Moyes, et al. 2006:220, 264-265; Lohse 2001:12).

Cave Branch Rockshelter demonstrates a unique pattern variant among other ancient Maya mortuary cave settings (Wrobel 2008:5-6). This rockshelter contained a large number of primary burials, with the remains from later burials having disturbed those of earlier interments (Hardy and Wrobel 2007:188-189). In terms of Late Preclassic associations, whole ceramic vessels were included as grave goods for the interments in the Late Preclassic (Hardy et al. 2009:202), with only a few whole vessels in the Early Classic (Wrobel and Tyler 2006:6). Interments continued without vessels thereafter, and this has been interpreted as ritual change (Wrobel 2008:11). This break in ritual tradition may be related to larger societal changes.

5.4.3 Central Belize / Region 1 – Early Classic

While ritual practice in some caves appears to decline, cease, or go into a hiatus, other caves enter into use during this time as a second wave. Based on ceramic frequencies, ritual activity substantially decreases for two larger of the caves that had peaks of activity in the previous period, Actun Chanona and Ek Waynal. Ritual cave use also decreases for smaller cave venues such as Actun Chapat Chamber 3, Caves Branch Rockshelter, Overlook Rockshelter, and

Pine Torch Rockshelter, enters a hiatus for Tiger Cave, and ceases at K'in Rockshelter and Just Two Cave. Meanwhile, Rio Frio E, Moth Cave, Laberintos de Tarantulas, Actun Tunichal Muknal's Entrance Chambers and Sinkhole Tunnels, Actun Neko, Shoepot Cave, Metate Cave, Arch Cave, Petroglyph Cave, and Actun Balam all enter into use, and Actun Nak Beh shows peak ceramic frequencies for this period. Chechem Ha is unique for the substantial increase in deposit frequencies from its initial Late Preclassic peak, and a number of its 'Late Preclassic' deposits may actually have been deposited in the Early Classic (Moyes 2006:162-163, 234). There are at least 75 of these deposits (Moyes 2006:163, 660-668). Assigning these to the Early Classic would suggest a peak in the earlier part of the Early Classic with a potential decline in the latter half, and Moyes suggest this possibility with regards to Chamber 2 (Moyes 2006:524-531). Overall, the contrasts and complexity of ritual cave deposits for this period suggest the likelihood of greater societal shifts occurring during this time.

Regarding Caves Branch Rockshelter, Hardy et al. indicate that the changes to ceramic grave deposits transitioning into the Early Classic, "likely suggest a change in mortuary symbolism" (Hardy et al. 2009:205). Hardy et al. state that "Most of the vessels found with burials are unslipped and often are decorated with appliqués and incised lines." (Hardy et al. 2009:202), and this includes the few Early Classic vessels which were typed as Socotz Striated (Wrobel and Tyler 2006:6), belonging to the Uaxactun Unslipped Ware group. While ceramic deposits declined at Caves Branch Rockshelter, ritual offerings in nearby Petroglyph Cave, a pilgrimage site (Reents-Budet 1997:91), and Actun Neko, a cave within earshot of Caves Branch Rockshelter (Morton et al. 2012:87) began. Considering the overall decline of rockshelter use in this period, coupled with a second wave of ritual cave activity that includes many larger, and settlement center-linked caves, I would posit that ritual cave ceramic practices shifted in favor of

offerings to the gods over individual-associated grave goods, and towards the larger, more communal, more institutionalized, and polity-based ceremonies and venues.

A review of the Early Classic ceramic types from the other caves of this Central Belize / Region 1 sample revealed that many of these are the same as those found in the Pasión River / Region 3 caves. These types include Dos Arroyos Orange Polychrome, Aguila Orange, Pucte Brown, Balanza Black, and Pita Incised. Notably absent is the Quintal Unslipped type, which I had tentatively posited as signifying the south and underworld for Pasión River / Region 3. There is a pattern of ceramic depositions in some of the Central Belize / Region 1 caves which may help explain this.

Actun Chanona, Actun Ik, and Ek Waynal all contain Early Classic ceramic deposits that appear to be predominantly red or orange. Actun Chanona deposits include Actuncan Orange Polychrome, Aguila Orange, Dos Hermanos Red, Fowler Orange-Red, and Minaha Red with only one sherd of Socotz Striated of unspecified color (Peterson 2006:98). Actun Ik held ceramic deposits of Actuncan Orange Polychrome, Dos Arroyos Orange Polychrome, Aguila Orange, Minaha Red, and one sherd of Pita Incised (Peterson 2006:98). Ek Waynal's Early Classic ceramic deposits include Dos Arroyos Orange Polychrome, Fowler Orange-Red, Socotz Striated (Red), Dos Hermanos Red, Aguila Orange, Caves Branch Unslipped, with a larger number of sherds that are Socotz Striated White (Peterson 2006:98). This red-dominant pattern has been previously identified in the Late Classic period cave deposits at Footprint Cave and Petroglyph Cave (Morton et al. 2015:109; Graham et al. 1980; Reents-Budet and Macleod 1997). Additionally, the opposing patterns of predominant black ceramic deposits versus predominant red ceramic deposits have been utilized archaeologically to identify settlement center associations with caves for the Belize Valley during the Late Classic period (Mirro 2007:110-

121). For the Early Classic (Hermitage) deposits from the Central Belize / Region 1 sample, Chechem Ha contained the largest quantity of black ceramics, and most of these were the Balanza Black type. These deposits are similar in quantity to Pucte Brown deposits at Chechem Ha, but both are exceeded in quantity by Dos Arroyos Orange Polychrome deposits (Moyes 2006).

Politically, the red-dominant deposits in Central Belize / Region 1 during the Early Classic may signify a burgeoning identification with the cardinal space, East (red-orange), relative to the larger Maya region. Gifford indicates that the Hermitage ceramic complex of this period can be described "by strong ceramic integration with the Central Petén" (Gifford 1976:154). For Southern Belize / Region 2, Prufer states:

> "At both Ek Xux and Muklebal Tzul, large open caves located to the east of the site cores were modified for what were likely public ceremonial activities.... It may be significant that caves used for public rituals are to the east of the sites, where the sun rises, rather than the west, the place of death and dangerous forces." (Prufer 2002:629).

Jaime Awe (personal communication) has relayed that the site centers in the Belize Valley are mostly located in the north, with ritual caves more relegated to the south. This settlement structure aligns with Ashmore's e-group architectural symbolism (Ashmore 1989, 1991), whereby northern structures are associated with the sun's zenith, and the southern buildings are linked to caves; the underworld. The implication is that the ancient Maya may have perceived themselves in accordance with their geographic location, and that position being relative to other Maya regions. With the Early Classic influx of Petén materials across regions, self-identifications with cardinal location would likely have been enhanced, and ritual practices may have reflected this.

A ritualized red ceramic dominance would appear to be in contrast with the ritual ceramic practices exhibited by the caves of Pasión River / Region 3, albeit with elements still adhering to a color-associated directionality and, ostensibly, the movements of the sun. During the Early Classic, there does not appear to be any regular association or coupling of vessels according to a color or slipped/unslipped principle in Central Belize /Region 1. At Chechem Ha, the possibility exists that Dos Arroyos Orange Polychrome and Balanza Black vessels from the Hermitage Ceramic Complex were paired in Alcove 3 (Moyes 2006:200, 658), Ledge 10 (Moyes 2006:233-235, 661), and at levels 5 and 6 of the Chamber 2 excavations (Moyes 2006:419-422, 661, 667). However, the inclusion of the Floral Park ceramics, which Moyes argued were deposited during the Early Classic (Moyes 2006:163, 234, 660-668), complicates these associative relationships, and the addition of Chan Pond Unslipped ceramics to the Early Classic assemblage (Moyes 2006:661-667) potentially renders ceramic pairings resembling those seen in Pasión River / Region 3. Mirro indicates that during the Late Classic, Chechem Ha showed higher quantities of black wares versus red, associating this cave more clearly with the Xunantunich sphere at that time (Mirro 2007:113-114). Overall, Mirro's thesis implies an east-west (red-black) logic was extant for Central Belize / Region 1 during the Late Classic. For the Early Classic, one other direction-associated color ceramic is worth noting.

For a few caves of this sample, there are reports of white Early Classic ceramic deposits. White is the color associated with the north and the sun's zenith, representing the subsequent stage to red-orange, the east, or (re)birth (Coggins 1988:67). Pine Torch Rockshelter and Ek Waynal each held sherds typed as Socotz Striated: Unspecified (White) Variety (Peterson 2006:98), and Actun Balam contained a Red and Black on White tripod (Pendergast 1969:14-16). Unfortunately, it is unclear whether there were other ceramics paired with these ceramic

types, but it appears from this sample that if such color-directional representations in ritual cave practice were created, they are not among the primary representations.

Early Classic ceramic deposit associations with pooled water, drip water, and speleothem columns remain common practice at Chechem Ha (Moyes 2006:181, 229-235, 419-422), Actun Nak Beh (Halperin 2002:53,57-61; Helmke and Halperin 2001:41) and Actun Halal (Griffith and Helmke 2000:204-205; Griffith and Morehart 2001:195-205/ Ishihara 2001:55-56; Lohse 2007:8-14; LeCount 2007:43) and these geomorphological foci are also important at Barton Creek (Mirro and Mirro 2001:100-106, 118), Arch Cave (Peterson 2006:92-95), and Petroglyph Cave (Reents-Budet and MacLeod 1997:4-8, 12-26, 37-47) in the Early Classic. Early Classic ceramic deposit associations with boulders occur at Chechem Ha (Moyes 2006:229, 659), Actun Chanona (Peterson 2006:39, 98: C21-1-3), Pine Torch Rockshelter, (Peterson 2006:54, 98), and the Actun Tunichal Muknal sinkhole tunnels (Helmke 2009:335-336, 375-376; 441-415; Helmke 1999:160), but ceramic associations with boulders are most frequent at Laberintos de Tarantulas (Helmke 2009:215-224, 240; Helmke et al. 1999:217-218), Actun Chapat (Ishihara 2002:52-55) and Petroglyph Cave (Reents-Budet 1997:6-10, 30-41). Ledge depositions are significant in this period at Chechem Ha and Barton Creek Cave, while niche and alcove deposits remain at levels comparable to the Late Preclassic (see Table 3.1).

Early Classic ceramic deposits occur more frequently in association with cave modifications, including stone walls, platforms, levelled floors, and construction fill. Actun Chanona (Peterson 2006:40, 98: C21-1-2/C21-1-3/C21-1-7/C21-7-2/C21-7-3), Barton Creek Cave (Mirro 2007:47-49; Mirro and Mirro 2001:101-106), Actun Ik (Peterson 2006:58-61), Actun Nak Beh (Halperin 2002: 63-67, 135-136), Actun Chapat (Ferguson 2001:187; Ishihara 2002:53, 56), the Actun Tunichal Muknal sinkholes and entrance chambers (Helmke 2009:369-

370, 415), Laberintos de Tarantulas (Helmke, 2009:224-227, 239), and Petroglyph Cave (Reents-Budet and MacLeod 1997:10-11, 33-35) show evidence of one or more of these constructions with Early Classic ceramic deposits. Additionally, Chechem Ha contains evidence of what Moyes believes might be a sweat bath constructed shortly before or at the beginning of the Early Classic, and in use thereafter (Moyes 2006:258).

Ceramic deposit treatments vary considerably during this time. Ritual burning of ceramics may generally be underreported, but it is fairly extensive at Chechem Ha (Moyes 2006:220, 236, 417-421, 660-661, 666-667). Burning also occurred at Actun Nak Beh (Halperin 2002:57-63, 135-136) and Petroglyph Cave (Reents-Budet and MacLeod 1997:17-18, 39, 41). Stacking of Early Classic sherds also occurs in these two caves (Moyes 2006:233-235; Reents-Budet 1997:27), but this ritual practice is not commonly seen overall, and this is likely due to the stacks' high susceptibility to disturbance over time. Moreover, the term 'stacking' has been utilized analytically in relation to ritual cleaning (Prufer 2002:620-621), and the practice itself has been documented for modern looting (Mirro 2007:47; Reents-Budet 1997:27), so context is an important consideration. Lastly, references to ritual destruction in the forms of in-situ smashing (Moyes 2006:187, 220, 236), and killholes (Peterson 2006: 92; Mirro 2007:74/ Mirro and Mirro 2001:119) of Early Classic vessels, generally appear in low frequencies, similar to Late Preclassic levels.

There are some changes to the other artifact types associated with ceramic deposits in the Early Classic. Hermitage era deposits at Chechem Ha suggest an absence of the shell, slate, and granite that was associated with deposits from the earlier period, and only one Early Classic associated deposit contained obsidian (Moyes 2006:422). These differences may be due only to changes in ritual practice, whereas Chechem Ha shows increased burning and the stacking of

sherds on ledges (Moyes 2006:233-235). Barton Creek, which only contained one Late Preclassic deposit, shows additional artifact types associated with the Early Classic ceramics, including rocks, human bone, worked shell, slate, and a mano (Mirro and Mirro 2001:100-106, 115-118). Glenwood Cave adds a Pachuca green obsidian blade deposit in association with Late Preclassic, Early Classic ceramic sherds, and one Late Classic sherd (Peterson 2006:135). A stone circle in Actun Isabella was carbon dated to this period (Moyes and Awe 2010:146). Actun Halal Early Classic deposits show an increase of associated obsidian and crystals (Griffith and Morehart 2001:200, 203, 205/Ishihara 2001:256; Griffith et al. 2002:28-31, 47-48). With significantly increased frequencies of Early Classic ceramic deposits, Actun Nak Beh and Petroglyph Cave also show expansions of associated artifact types. Actun Nak Beh artifact types include jute, chert, pebbles, cobbles, charcoal, obsidian, and human remains (Halperin 2002:55-65, 135-136). Petroglyph Cave's Early Classic associated deposits include jute, speleothems, shell, chert, cobbles, charcoal, faunal bone, obsidian, human bone, manos or metates, and copal incense (Reents-Budet 1997:7-12, 17-24, 29-41).

There is evidence of a decline or hiatus occurring at the end of the Early Classic for some of the caves in this region. Table 1.1 demonstrated ceramic deposit quantitative declines for Chechem Ha, Barton Creek, Actun Nak Beh, Laberintos de Tarantulas, Ek Waynal, Arch Cave, and Actun Neko in the Late Classic 1 period. The entrance to Chechem Ha appears blocked off at the end of the Early Classic, with a carbon dating return of 560 to 680 A.D. (Moyes 2006:525). Ek Waynal contains a series of walls blocking passage, with one that is similarly dated to 561-668 A.D. (Peterson 2006:82-83, 106). Two caves that maintain comparable frequencies in the Late Classic 1 include Glenwood Cave - opposite the Pakal Na settlement district (Peterson 2006:261), and Petroglyph Cave, an important pilgrimage site (Reents-Budet

1997:91). Of the three caves that show Late Classic 1 increases, two of these are associated with settlement centers: Actun Tunichal Muknal and Actun Chanona, linked with Cahal Uitz Na and the Hershey site respectively.

Crossing over into the Late Classic 2 and 3 periods, there appears to be a degree of spatial differentiation between rituals of the Early Classic, and those of these later periods. Actun Neko is characterized as having "functioned, not as one cave, but as two distinct loci." (Morton et al. 2012:87). This differentiation could be characterized as temporally reverential or sequestering, and it is a potential feature of Chechem Ha, Ledge 10 (Moyes 2006), and perhaps of Petroglyph Cave's Sa'atabe entrance (Reents-Budet 1997:46). Moreover, this spatial differentiation reflects ritual change between the end of the Early Classic and the Late Classic periods (Moyes 2006:516).

5.4.4 Central Belize / Region 1 – Late Classic

Of the 32 caves in the Central Belize / Region 1 sample, 29 are active during the Late Classic period. Only K'in Rockshelter, Just Two Cave, and Metate Cave lack ceramic deposits dating to this time (Peterson 2006:100-102). Spatial pattern changes in the form of ritual expansions both inward and outward have been previously noted, and the data support this dual expansion. As Moyes notes, the inward expansion is significant in Central Belize / Region 1, and corresponds to ledges and places that have difficult access (Moyes 2007:222). Additionally, increased whole jar deposits in these locations throughout the region are documented (Moyes 2006:567-568). The outward ritual expansion in Central Belize / Region 1 is more readily seen with caves that have a site center association or an entrance pavilion in use at this time, such as Actun Nak Beh and Actun Tunichal Muknal, respectively (Halperin 2007; Helmke 2009:332). Thus, sampling bias impacts the quantities of this study.

Ritual cave ceramic deposit quantities for this period are exceedingly high, precluding a case-by-case, detailed review. In lieu of these, I provide statistics indicative of the Late Classic quantitative increases, in terms of ceramic treatments (Table 4.1) and cave modification structure associations (Table 4.2). However, there may be little this study can add to previous ritual interpretations or sociopolitical articulations for the region. Holley Moyes has interpreted the increase of jar forms to rites invoking the moon goddess, Chac Chel (Moyes 2007:225), and articulated the Late Classic increase of cave deposits with a long period of drought (Moyes 2006:568, 2007:225; Moyes et al. 2009). Christopher Morehart and Noah Butler have studied ethnobotanical remains from a number of these caves, and interpret them as agricultural fertility rituals intended to reciprocally 'feed' the gods (Morehart and Butler 2010:594). Michael Mirro has articulated Garbutt Creek red and Mount Maloney black ceramic concentrations in caves with production centers and polity center realignments for this period (Mirro 2007).

Table 4.1
Temporal Comparison of Early Classic to Late Classic Ceramic Treatments

	Kill Holes	Burned	Censer Use	Inverted	Stacks	Jar Lidded with Bowl or Reverse	Broken in-situ Indication
Early Classic	2	45	1	6	28	0	4
Late Classic	37	60	14	17	32	12	33

Table 4.2
Temporal Comparison of Early Classic to Late Classic Ceramic Associations with Cave Modifications

	Altar	Hearth	Sweat Bath	Burial	Blocked Tunnel Wall	Leveled Floor	Terrace	Stone Wall	Platform
Early Classic	3	20	3	7	2	2	12	17	17
Late Classic	28	64	25	40	33	21	57	41	61

One observation that can be made is that some simple representations of dualism do occur during this time, often in the form of vessel offerings that recall the minimal deposits of some Southern Belize / Region 2 caves. Usrey Cave held two Late-Terminal Classic red jars in a niche near the entrance (Peterson 2006:78). Ek Waynal contained two Terminal Classic vessels placed together in an alcove (Peterson 2006:82). Shoe Pot cave contained a Late -Terminal Classic Macal Orange-Red jar paired with a Terminal Preclassic shoepot (Peterson 2006:86), potentially signifying social memory in relation to periods of drought. The rimstone dams at Petroglyph Cave housed 26 hearths (Reents-Budet and MacLeod 1997:17) – double the number 13 that represents the levels of the sky. A representation of dualism may be considered for the Late Classic 1 Petroglyph Red-rimmed and Duende Daub-striated jars which have unslipped exteriors with a red slip set only on the rims (Reents-Budet and MacLeod 1997:19). This ceramic style contains the dual symbolic elements posited for the Early Classic ceramic couplings in Pasión River / Region 3, but with the unslipped and red components consolidated into a single ceramic form. That these localized ceramic types were abundant at the pilgrimage site of Petroglyph Cave and in other nearby caves that plausibly form a ritual circuit (Reents-Budet and MacLeod 1997:19; MacLeod and Reents-Budet 2022) may further link this symbolism with travel.

Two additional ceramic treatments which have some antecedents appear more regularly during the Late Classic. These include the chipping off of vessel rim lips and the application of mend holes. Both treatments were observed at Petroglyph Cave in Late Classic deposits (Reents-Budet and MacLeod 1997:19, 36, 47, 55). Rim lip removal is posited as allowing for extended use (MacLeod and Reents-Budet, 2022), as are mend holes. These treatments may speak to

difficulties in ritual materials procurement during the Late Classic, implicating societal stress. They also indicate change in ritual strategy and practice.

Amidst these simple offerings, however, are the depositional patterns recognized by Holley Moyes (2006) and Michael Mirro (2007). Mirro's findings of an intercave red-black dichotomy, operating according to shifting trade networks suggests that a ritual red-black symbolism is overridden by economic convenience. At Chan No`ohol, a farming community for the Xunantunich polity of this period, Robin (1999) uncovered evidence demonstrating that common Maya knew of and utilized the quincuncial cosmogram and direction-associated colors in household ritual (Robin 1999:191, 196). The increase of ceramic stacking at Chechem Ha, and Moyes' findings of a regional increase in the use of ledges and areas of difficult access (Moyes 2006:532) indicate ritual practices that appear more focused on the vertical dimension than on horizontal directionality, or the cyclical, and perhaps more so on form rather than color. Prufer (2002:621) suggests that stacking of sherds may be intended to replicate world trees, a structure that intersects all world levels. Andrea Stone (1995:51) states: "the ancient Maya attached notions of sanctity and status to verticality." Curiously, Chechem Ha contained a Late Classic lip-to-lip vessel, or dual bowl construct (Moyes 2006:218-219, 329), not evident in any other cave of this sample, but found in elite settlement center tombs of earlier periods. These changes suggest a greater role played by the elite in ritual cave practices during the Late Classic, although remnant practices still occur throughout the region.

Interpreting the use of large jars for ritual as rites invoking the moon goddess, Chac Chel (Moyes 2007:225), implies a change in ritual practice. Chac Chel is a name commonly given to the Maya moon goddess whose actual name is unknown (Miller and Taube 1997:101, 118). This deity is also referenced on a carved stone box at Hun Nal Ye, Pasión River / Region 3. The box

is identified as late Early Classic, and stylistically linked with the Petén (Woodfill et al. 2012; 98; Woodfill 2007:547). While the exact Petén origin of the stone box is unknown, two ceramic boxes deposited in close proximity are potentially associated with Ixcun or Caracol (Woodfill 2007:385-386). Ritual invocation of the moon goddess may be associated with increased rainfall during full moon periods, and it could be seen as contrasting with practices petitioning the maize god and wind deities, or those that enact agricultural or solar cycle metaphors. However, zea mays remains are also found in association with ritual deposits of this region and period, with some that are indicative of first fruit rites (Moyes, 2006:211, 218, 222, 252-253, 263; Morehart and Butler 2010:599).

Naranjo's stela 46 commemorates 'Lady Six Sky' impersonating the moon goddess while her son "revives" the solar deity impersonation, with both performed amidst delegations from Dos Pilas and Calakmul in 682 A.D. (Matsumoto 2023; McKillop 2004:188). Matsumoto (2023) epigraphically demonstrates an eighth century concentration of such deity impersonations among the elite at settlement centers. Thus, ritual styles are not necessarily mutually exclusive of one another during the Late Classic period. The ritual cave practices of this time for Central Belize / Region 1 appear to reflect a variety of different strategies and petition types, and their content may be more dependent on the type of petition and economics than on any singular ritual style preference for this region and time.

6.0 CONCLUSION

This thesis set out to establish whether changes to ancient Maya ritual cave practice articulate with known ancient Maya societal events and developments. While specific ritual practices appear poorly delineated, defined, and understood, elements of cultural logic can contribute to operational definitions for ritual cave practices. By examining ritual cave deposits

diachronically, changes in ritual practice can be identified and practices may be associated with certain ritual strategies, styles, and perhaps even polities. The findings of this study suggest that ancient Maya ritual cave practice changes articulate with societal events, with articulations being especially evident during periods in which ritual has been politically appropriated.

The data collected and assembled from peer-reviewed publications for this study provides a valuable tool for examining whether changes in ancient Maya ritual cave practices reflect either changes in Maya society, or ecological changes that effected societal changes. A review of the data indicates that ritual cave use began in the late Early to Middle Preclassic, notwithstanding the possibility of preceramic ritual cave activity. Subsequently, there is a surge in both the number of caves in use and the quantities of ritual cave ceramic deposits during the Late Preclassic, with some evidence of crossover into the Early Classic. From this study's sample, there are Early Classic indications of ritual cave use decline for some caves, continuity for others, and peak ceramic deposit frequencies for still others, with the latter representing a second wave in ritual cave use. A recognizable hiatus and/or decline in ritual cave practices occurs in the Late Classic 1 period with a resurgence during the Late Classic 2 and 3 periods, although for much of the western Petén, ritual cave use ends before Late Classic 3 period. How can we incorporate these data into known diachronic changes in Maya culture history, spanning from the late Early Preclassic to the Late / Terminal Classic?

From an overview perspective of ancient Maya cultural development, we know that starting in the late Early Preclassic to Middle Preclassic (1200 BC-300BC), aggrandizers began creating systems of obligation through gifting and the sponsorship of public rituals (Awe et al. 2021b:27). Later in the Middle Preclassic, this continued with the appropriation of religious symbols including that of the 'mountain-cave' used in monumental architecture, the deification

of ancestors/ ancestral lines, and the presiding over ritual ceremonies by rulers (Awe et al. 2021b:27). In the Late Preclassic, kings continued to accumulate power through religious association, dedicating monuments that elevated their connections to the distant time of ancestors, deities, and creation (Awe et al. 2021b:27). E-Group architecture was converted to Eastern Triadic Assemblages, forgoing function for symbol (Woodfill 2014:115-116), rulers were depicted emerging from the mouths of supernatural creatures / landscapes, and ritual cave use declined with the increased establishment of elite power at site centers (Awe et al. 2021b:27). The Early Classic is witness to further consolidations of power, through coalition building and alliances, greater focus on kings in carved monuments, theonymic additions to royal titles, and sequential royal burials in Eastern Triadic Assemblage tombs that contained elite grave goods (Awe et al. 2021b:27). During the Late Classic, competition and coalition building among rival polities accelerates, especially in the Petén (Demarest 2004:257). Elites return to caves to perform public rituals as a new form of ritual appropriation. Kingships continue with representations that link them to the past and supernatural (Awe et al. 2021b:27), but their power is increasingly challenged and eventually overwhelmed.

Paleoclimate studies have indicated climatological shifts during the Late Preclassic and Late Classic periods (Ebert et al. 2017:212; Webster et al. 2007:14). We can ask how these changes impacted both ancient Maya society and the strategic responses of the Maya. During the Late Preclassic, drought affected Maya regions and drainages differently and it has been suggested that droughts were the ultimate cause for the fall of early monumental sites such as Nakbe, El Mirador, Seibal, Cerros, and others (Ebert et al. 2017:215; Delvendahl 2008:31)). The data from this study suggests a surge in ritual caves in use and ceramic deposits for three regions, Central Belize / Region 1, Southern Belize / Region 2, and Pasión River / Region 3, during this

time. Chronological resolutions for the ceramic deposits are not ideal, however, and the likelihood exists that this surge crossed over into the Early Classic. Thus, the Late Preclassic peak frequencies of ritual deposits may represent both ritual cave practice intensification in response to drought and/or foundation rituals as new sites sought to establish themselves following the collapse of the earlier centers.

The Late Classic droughts begin in the eighth century, around 780 A.D. (Moyes et al. 2009:200), and again there are peak frequencies for caves in use and ritual cave ceramic deposits for Central Belize / Region 1 and Southern Belize Region 2, as well as for some caves of the Chapayal drainage in Pasión River / Region 3. The end of ritual cave practices for most caves in Pasión River / Region 3, prior to the Late Classic 3 period, temporally and geographically articulates with the earliest center abandonments of Classic Maya era, which include Pomona, Palenque, Bonampak, Aguateca and Yaxha among others (Delvendahl 2008:61). Although warfare, overpopulation, and food insecurity are implicated as proximate causes for these center collapses (Demarest 1997:217; Delvendahl 2008:61), droughts are suggested as the ultimate cause for the decline and abandonment of all lowland Maya sites by the end of the Terminal Classic (Moyes et al. 2009:200).

Links between climate stress and ancient Maya cave ritual should not be surprising, as caves were thought to be both the houses of gods and the sources of fertility. In historic times, ethnohistorians have documented intensification of ritual sacrifice during periods of drought (Sahagun 1969; De Landa 1864). Given this information, it is interesting that regional frequency increases of ritual cave use and ceramic deposits coincide with the Late Preclassic and Late Classic periods of drought. Ritual cave use intensification in response to droughts has the further implication that ancient Maya ritual cave practices were utilized as a technology (Friedel and

Shaw 2000); a means of negotiating with the supernatural for rain, aligning these ritual cave practices in terms of ancient Maya emic perception and strategy with the ritual ecological manipulations in Rappaport's ritual studies (1971:24, 27, 38).

In this study, the most recognizable changes to ancient Maya ritual cave practices themselves articulate with changes to societal composition, implicating this as a driving mechanism. Specifically, the infusion of new peoples, changed relationships within groups, or changes of the group(s) in power appear to effect ritual cave practice changes. For example, in Northern Honduras / Region 4, ritual cave ossuaries likely reflected early elite appropriation of ritual, kin-based coalescence in near temporal proximity to change in subsistence strategy, with the possible catalyst having been long-distance trade near the time of these ritual practice beginnings. By the Late Preclassic, these ossuary practices appear to cease (Brady et al. 2000:113).

During the Late Preclassic, rockshelter and cave burials show variability in treatment and grave goods, indicating differential levels of social stratification across regions. Areas near cave entrances and those with active water were the spatial preferences for ritual practices, but cave modifications such as platforms and altars multiplied during this time that Moyes has characterized as a "labor-intensive" period (Moyes 2006:530). Societal stress resulting from drought led to increases in ritual cave use, the collapse of older centers, and perhaps newer settlement foundation cave rituals by the end of this period. As misfortune fell on the large, older centers, their smaller counterparts found advantage (Delvendahl 2008:31).

Uaxactun, Tikal, and Calakmul emerge from the Late Preclassic societal upheaval as clear beneficiaries during the Early Classic period. There is a fluorescence in architecture and

ceramics, with the latter characterized as “the first of the periods of maximum ceramic complexity in the Maya Lowlands” (Willey et al. 1967:298). This period also exhibits the first long-count dated monument with Stela 29 at Tikal in 292 A.D. (McKillop 2004:344; Delvendahl 2008:32). The Early Classic bears witness to changes in ritual for cave and rockshelter burials, with an end to elite tomb burials in Southern Belize / Region 2, the discontinuation of ceramic grave goods at Caves Branch Rockshelter in Central Belize / Region 1, and quantitative declines for these types of caves overall. At the same time, there was a second wave of ritual caves which came into use with peak frequency ceramic deposits and many of these appear to be more institutionalized. They include caves associated with centers such as Kayuko Naj Tunich at Uxbenka, Actun Nak Beh with Cahal Uitz Na, and Torre Hun near Cancuén, as well as pilgrimage venues such as Petroglyph Cave, and the trade shrines seen across the Pasión River / Region 3. We can presume that a perceived ritual efficacy following the Late Preclassic droughts led to the lionization of those leaders whose centers survived and prospered, and to further political appropriations of legitimizing ideological symbols and associations, including ritual caves and practices. In 373 A.D., Tikal conquered Uaxactun, then consolidated power in the Petén, and began to establish interregional trade links across the Maya Lowlands (Woodfill and Andrieu 2012:190). Over the course of the Early Classic, Tikal’s interregional relations came to include such centers as Teotihuacan, Kaminaljuyu, Copan, and Uxbenka among others (McKillop 2004:181-184; Woodfill and Andrieu 2012:190, 194; Prufer et al. 2011:218).

Tikal’s defeat by the Kaan dynasty of Dzibanche-Caracol alliance in 562 A.D. (Delvendahl 2008:40) set a number of societal change events in motion, and ritual cave practices exhibit great changes thereafter. Near the turn to the seventh century A.D. or the outset of Late Classic 1, a series of wars began between Naranjo and Caracol, the Kaan dynasty relocated to

Calakmul; just north of the Central Petén, Calakmul sacked Palenque, and the population of Pasión River / Region 3 dramatically increased with an influx of highland peoples (McKillop 2004:345; Woodfill and Andrieu 2012:205; Moyes 2006:552). Outside of the Lowland Maya area other major events also occur at this time, including Teotihuacan's collapse, and the El Salvador site of Ceren's burial under volcanic ash (Moyes 2006:125; McKillop 2004:346). Checham Ha is walled shut from the beginning of this period until around 680 A.D., Uxbenka ended its ritual cave practices at this time, ritual caves were walled shut or abandoned in Pasión River / Region 3, ritual cave use in Central Belize / Region 1 and Southern Belize / Region 2 declined overall, and it is mainly center and pilgrimage-associated ritual caves that maintained ceramic deposit quantities comparable to the those of the previous era, as is evident for the caves of this sample from Central Belize / Region 1 and those caves of Pasión River / Region 3 near to Cancuén. Essentially, ritual cave practices during the Late Classic 1 period reflect societal disruption, and this period is a century of volatility, with increased warfare between opposing polity coalitions. Naranjo is defeated in 626 and 631 A.D. by the Caracol-Calakmul alliance, but war between Naranjo and Caracol continues until 680, when Naranjo defeats Caracol but is decisively eliminated by the Caracol-Calakmul alliance (Delvendahl 2008:44, 48-49). The Naranjo royal family is slaughtered and replaced in 682 A.D. with a Dos Pilas princess and her son under Calakmul supervision (Delvendahl 2008:49; Matsumoto 2023). Over the course of the century, Tikal is defeated three times by Calakmul in 659 and 677 A.D., and by Dos Pilas - Calakmul in 679 A.D (McKillop 2004:346), before finally defeating Calakmul in 695 A.D. (McKillop 2004:346; Delvendahl 2008:51).

By the Late Classic 2 period, Calakmul and its Kaan dynasty are diminished in their interregional relations, but neither does Tikal entirely regain its former network and macrolevel

leadership position (Delvendahl 2008:54; Woodfill and Andrieu 2012:205). In a parallel to the shifts that occurred transitioning from the Late Preclassic to Early Classic periods, smaller settlement centers attempt to rise into higher positions of regional domination, initiating their own rivalries during the Late Classic 2 and 3 periods (Delvendahl 2008:41). The eighth century concentration of deity impersonation rituals transmitted through interpolity marriages further indicates ritual differentiations between rival polities (Matsumoto 2023). Ceramic complexes also show increased divergence into more regionalized and localized types during this time (Willey 1967:299-305). This 'balkanization' of the Maya political landscape is reflected through changes to ritual cave practice. Such changes include the Southern Belize / Region 2 ritual differentiations of cave burial practices, with those of Muklebal Tzul contrasted with those of Ek Xux, and further contrasted with those at Naj Tunich in the near proximity of southeastern Petén. Ritual cave practice change reflecting 'balkanization' also includes the geographic dichotomy of red and black ceramic vessels in the caves of Central Belize / Region 1.

The more widespread Late Classic spatial change patterns of external and internal cave expansions may be associated with political strategy and ritual strategy, respectively. The former articulates with the political instability of this time, and the requisite need for shoring up political support through the public performance of ritual. The latter articulates with societal stress-related ritual intensification, but there are also indications of increased elite involvement with these interior cave rituals. The earlier end to ritual cave practices in Pasión River / Region 3 likely precluded an interior expansion, as the Late Classic droughts that have been suggested as the ultimate cause of collapse began around 780, with center abandonments in this region having shortly followed. The interior cave expansions of Central Belize/ Region 1 and Southern Belize / Region 2 articulate with the political instability and balkanization that followed from Late

Classic 1 events, but these are compounded by food insecurity resultant from the Late Classic 2 and 3 period droughts.

In summary, this study has illustrated how quantitative, qualitative, and spatial changes in ancient Maya ritual cave practices articulate with societal changes and events. Ancient Maya ritual cave ceramic deposit frequencies demonstrate articulations with major societal changes and events at the regional and pan-regional scales, and these include droughts, increases in the political appropriation of ritual caves, and periods of societal conflict and instability. This study has also illustrated how spatio-temporal changes in ritual cave use articulate with societal stress during the Late Classic period. Lastly, this study provided additional ritual practice contexts and posited some preliminary characterizations for the ritual practices of specific time periods and regions. Future research that may expand upon these findings could involve the addition of numerous ritual caves to the current sample, and/or the delineation of ritual cave function through analyses of the ritual practices and their contexts.

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8.0 APPENDIX: CAVE DATA SOURCES BY REGION AND CAVE

Central Belize / Region 1

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Actun Halal

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Moth Cave

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Actun Balam

Pendergast, D.M.
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Southern Belize / Region 2

Kahil Cab Pek, Unnamed Looters Cave, Uk'al Pek Cave, Pachingo Cave, Hulizotz Cave, So'lul Cab Pek, Altar Cab Pek, Ka'bil Sak'unak, Toq'bil Roq'ikal Kab Pek, Utuch Qui, Chiue Hix Cave, Bite Your Head Off Cave, Raspaculo, Chab'il Sek, Poht'zil Cab Pek, Teul Bil Uk'al, Chab'il Eke Uk'al, Chiclero Cave, Chel Pot Cave, Holul Uk'al Cave, Kulibal Cave, Unnamed Small Rockshelter, Chab'il Uk'al Rockshelter, Mayahak Cab Pek, Mohibal Kanchi Rockshelter, Warrie Cave, Holomi Tzi, Chaqi Cab Pek, Xkulal Nimli Ukal, Xkulal Maj'ma, Xpulat Be'jom, U'uqal Ka'ab Pek, Holom Kaminak, Ha'ral K'op, Kulal Ka, Itzam Ka'ab Pek, Dos Ollas and Red Bowl Cave, Zeklebal Ka'abl Pek, Mayehal Xheton, Holomi Batz, Sebaleb Xheton, Wood Bench Cave, Otz'il Cabil Cave, Tusbil Pek, Xumuqlebal Xheton

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Pasión River / Region 3

Hun Nal Ye, Entrada del Sol, Ventana de Seguridad, *El Venado Seco, Veronica, Ventana de Veronica, La Illuminada, Raton de los Dientes, Los Metates, Cueva de los Murcielagos, Cueva de los Chuchos, Cueva del Queso Suizo, Cueva de las Manos, Cueva*

del Coche, Kaaminaq So'tz, Cueva del Aguila, Cueva de la Barba Rockshelter, 14 Rockshelter, Cueva de los Bordes

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Spenard, J.

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Northern Honduras / Region 4

Gordon's Cave 3

Gordon, G.B.

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Healy, P.F.

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