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ARTICLE

New Research at Monte Negro, Oaxaca

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Abstract
Between 1937 and 1940, a team of Mexican archaeologists led by Alfonso Caso excavated at Monte Negro, a defensible mountaintop settlement in western Oaxaca. Their foundational insights into the Late Formative period (ca. 300–100 BC) were later augmented by surveys and excavations in other valleys of western Oaxaca, which revealed the emergence of contemporaneous hilltop centers. Archaeological research at Monte Negro resumed in the early 2000s with total station mapping and intensive surface collections, followed in 2023–2024 by the first excavations outside of the monumental core. In this article, we present the first complete site map along with GIS analyses, which offer new ideas about Monte Negro's settlement layout including possible neighborhood divisions and the social functions of ceremonial plazas. We also publish the site's first accelerator mass spectrometry (AMS) radiocarbon dates, which confirm that Monte Negro's relatively brief occupation was in the final centuries BC. In addition, we report the discovery of two nearby sites, including a set of walls likely dating to the Late Postclassic. With further analysis of the most recent excavations forthcoming, the findings presented here refine understanding of Monte Negro's chronology, social organization, regional role, and enduring cultural significance.

Resumen
Entre 1937 y 1940, un equipo de arqueólogos mexicanos dirigido por Alfonso Caso realizó excavaciones en Monte Negro, un asentamiento ubicado en la cima de una montaña fácilmente defendible en el occidente de Oaxaca. Sus aportaciones pioneras al conocimiento del período Formativo tardío (ca. 300-100 aC) fueron posteriormente complementadas por reconocimientos arqueológicos y excavaciones efectuados en otros valles del occidente de Oaxaca, los cuales documentaron el surgimiento de centros contemporáneos establecidos en cimas de cerros. La investigación arqueológica en Monte Negro se reanudó a principios de la década del 2000 con el mapeo con estación total y la recolección de materiales en superficie, y en 2023 y 2024 se realizaron las primeras excavaciones fuera del núcleo monumental. En este artículo, presentamos el primer mapa completo del sitio y varios análisis SIG, que revelan información sobre la organización del asentamiento, incluyendo posibles divisiones de barrios y las funciones sociales de sus plazas ceremoniales. También publicamos las primeras fechas de radiocarbono obtenidas por AMS, que confirman una ocupación limitada a los últimos siglos aC. Finalmente, reportamos el descubrimiento de dos sitios cercanos, incluyendo un conjunto de muros que probablemente datan del Posclásico tardío. Con el análisis de las excavaciones más recientes aún en curso, los hallazgos aquí presentados profundizan la comprensión de la cronología, la organización social, el papel regional, y la perdurable importancia cultural de Monte Negro.

Keywords: Formative; GIS; neighborhoods; Oaxaca

Palabras clave: Preclásico; SIG; barrios; Oaxaca

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The rugged terrain of western Oaxaca, shaped by the Sierra Mixteca mountains, features deep valleys and steep hills rising above 2,000 m. Despite varied environmental conditions, this region has been a cultural and demographic heartland for over 3,000 years (Borejsza et al. 2021; Flannery and Marcus, eds. 1983; Pérez Rodríguez 2013; Spores 1984; Winter 1989). By 1500 BC, the first villages emerged, with archaeologists inferring the presence of social inequality by 900–300 BC at sites such as Tayata, Etlatongo, and Nuundaa (Balkansky et al. 2009; Blomster 2004:113; Byland 1980:135–140). Around 300 BC, populations consolidated on hilltops including Cerro Jazmín, Huamelulpan, Yucuita, and Monte Negro, marking the start of the Ramos phase (Table 1; Figure 1).

The settlement shifts associated with the Ramos phase reflect a dramatic period of reorganization in western Oaxaca. In a trend toward regional political hierarchization, smaller hamlets and villages became subservient to primary centers (Balkansky 1998; Gaxiola González 1984:15–16; Kowalewski et al. 2009:336; Plunket 1983:359–372; Robles García 1988:1–14; Spores 1972:175–182, 1983a; Winter 1982:12–15). The move to hilltops also signals heightened interpolity tension, though the nature of these dynamics remains debated. Most scholars argue that Monte Negro and its contemporaries were rival centers that traded but also engaged in raiding and episodes of hostility (Winter 1989:38), militarization (Kowalewski et al. 2009:301), and warfare (Workinger and Joyce 2009), likely linked with elite prerogatives (Joyce 2014:129–135). Others, however, interpret relationships, particularly among elites, as an "alliance network" (Spores 1983a:123). As explored in the discussion section, the possible influence of Monte Albán as a catalyst for these developments remains an intriguing and open question (Balkansky 1998; Flannery 1983; Joyce 2003:53–63; Marcus and Flannery 1996:198; Pérez Rodríguez 2013:83–87; Spores 1983b:77).

Architectural innovations suggest that religious and civic life also underwent transformation during the Ramos phase. Monumental construction increased dramatically compared to Late Cruz phase sites, supported through systems of corvée labor. Although sites such as Huamelulpan, Yucuita, Cerro Jazmín, and Monte Negro each present distinct layouts (Balkansky et al. 2004:Figure 11; Pérez Rodríguez et al. 2011:Figure 3; Plunket 1983:Figure 10), they all exhibit clusters of plazas and ceremonial buildings with adjacent elite residences. As with other regions in Oaxaca, emerging elites likely sought to appropriate ritual practices to consolidate authority within these new architectural settings (Joyce 2009:193; Marcus 1989:154; Marcus and Flannery 2004:18259). Household-level ritual continued, as explored below, but elite and specialist activities expanded in both scale and diversity, incorporating exotic goods, animal sacrifice, feasting, and ballcourts (Pérez Rodríguez 2013).

Table 1. Monte Negro Chronology.

Years	Mesoamerica	Western Oaxaca	Valley of Oaxaca
AD 1000–1521	Late Postclassic	Natividad	Monte Albán V
AD 800–1000	Early Postclassic		Monte Albán IV
AD 500–800	Late Classic	Las Flores	Monte Albán IIIb
AD 200–500	Early Classic		Monte Albán IIIa
100 BC–AD 200	Late Formative	Late Ramos	Monte Albán II
300–100 BC		Early Ramos	Monte Albán Ic
500–300 BC	Middle Formative	Cruz D (Late Cruz)	Monte Albán Ia
700–500 BC			Rosario
900–700 BC		Cruz C (Middle Cruz)	Guadalupe
1100–900 BC	Early Formative		San José
1400–1100 BC		Cruz A and B (Early Cruz)	Tierras Largas
1500–1400 BC			Espiridión

Sources: Based on Balkansky et alia (2004) and Pérez Rodríguez (2013).

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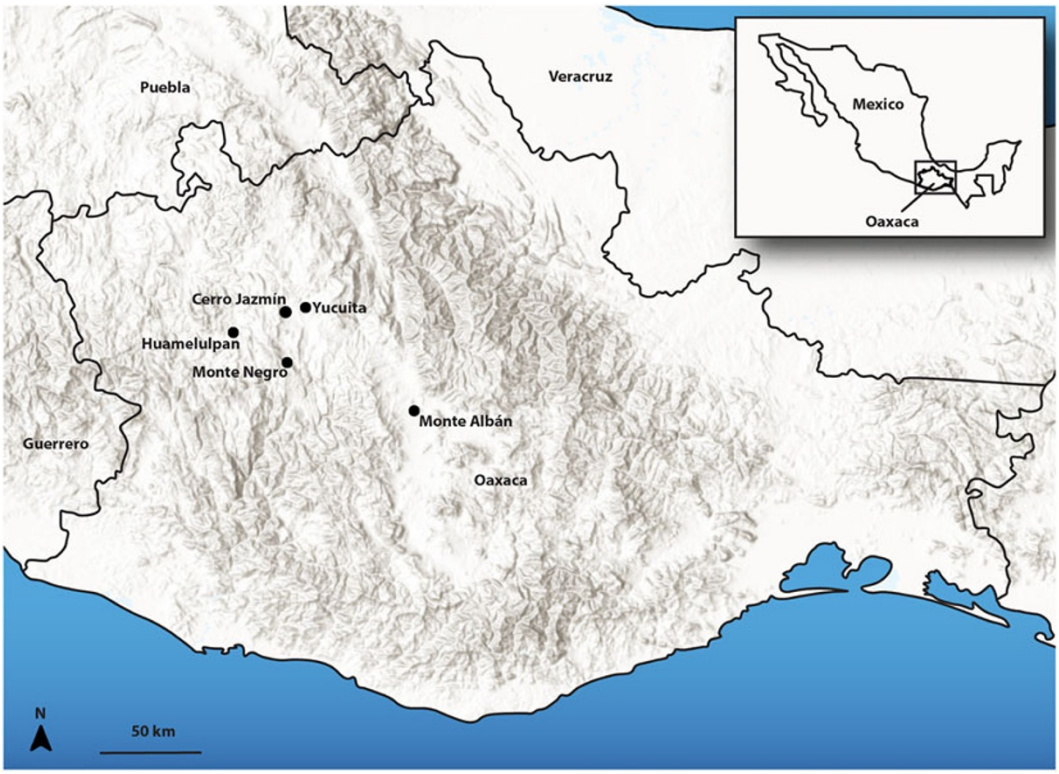


Figure 1. The state of Oaxaca with the location of several sites mentioned in the text.

As the first intensively studied Late Formative site in western Oaxaca, Monte Negro remains central to understanding Ramos phase transformations. In 2023 and 2024, the lead author directed the first excavations outside of the monumental sector in diverse contexts, including a plaza, households, and in the vicinity of a previously unknown series of walls about 1 km from the main site. With full analysis of these recent excavations to come in a forthcoming dissertation, the findings presented here build on nearly a century of archaeological work at Monte Negro. They serve to refine the site's chronology, illuminate neighborhood-level organization, and offer new perspectives on its regional role and enduring symbolic significance.

Previous Work at Monte Negro

During a visit to Santiago Tilantongo in 1936, Alfonso Caso was guided by local residents to the remains of an ancient settlement atop a nearby mountain range. The site's defensible mountaintop location provoked comparisons to Monte Albán—where Caso had excavated since 1931—and surface ceramics closely resembled its Late Period I pottery. Believing the settlement might hold clues about Monte Albán's origins, he organized a team of Mexican archaeologists including Jorge Acosta, Martín Bazán, Juan Valenzuela, Javier Romero, and Alberto Ruz to excavate Monte Negro's monumental sector. Between 1937 and 1940, the team uncovered numerous buildings, patios, and plazas, along with tombs, burials, and offerings (Acosta and Romero 1992; Caso 1938, 1942).

Contrary to early expectations, Monte Negro did not predate Monte Albán, and the latter's origins were ultimately traced locally to the Valley of Oaxaca. Even so, parallels in ceramics, architecture, and funerary practices emerged between the two sites (Acosta and Romero 1992; Bernal 1965; Caso 1942; Flannery 1983). Weighing these similarities against Monte Negro's significantly smaller scale, Ignacio Bernal suggested that "the Monte Negro culture which is related to Monte Alban I appears to be less complete and less developed" (Bernal 1965:798), a prescient observation with which archaeologists continue to grapple.

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Javier Romero and Bioarchaeological Studies

Beyond its short occupational history—which did not appear to outlast Period Ic at Monte Albán—Monte Negro's bioarchaeological evidence stood out as especially enigmatic. Excavations by Caso and colleagues recovered the remains of 28 individuals whose physical traits differed from any other known Oaxacan population (Acosta and Romero 1992; Romero 1951). These differences ranged from biological—the individuals were taller than known populations and with different cranial morphology—to cultural, as many presented annular cranial modification and some trepanation and dental inlays.

Recently, Romero's original analyses of elite burials have been reexamined by biological anthropologists. Unexpectedly, Serrano Sánchez and Corona Sánchez (2020) and Corona Sánchez (2024) propose connections with prehispanic Aymara populations of Peru and Bolivia. While most scholars believe that Monte Negro's founding population came from somewhere closer—including Cruz phase settlements in the local Santiago Tilantongo Valley (Balkansky et al. 2004)—more information is needed to examine the origins of the individuals buried at Monte Negro. Excavations in 2023 and 2024 increased the sample size, but moving the conversation forward will likely require data from new approaches (e.g., isotopic and paleogenomic), as well as excavations at local antecedent sites to assess biological and cultural continuity.

Later Assessments of Monte Negro

Monte Negro stayed on the radar of archaeologists following Caso's work. Marquina (1951) included Monte Negro in his study of prehispanic architecture. Flannery (1983) later reevaluated the mountaintop site in light of known militaristic incursions by Monte Albán into the nearby Cuicatlán Cañada (Redmond and Spencer 2006), proposing that Monte Negro might have served as an outpost of the expanding Zapotec state.

During archaeological survey in the Santiago Tilantongo valley, Bruce Byland and John Pohl visited Monte Negro. Based on aerial photographs, they produced a schematic map of the site and made the first population and area estimates for the site, at 35 ha and 2,000 people, respectively (Byland and Pohl 1994:53). Describing the site as "categorically different from any other Ramos phase site known anywhere in the Mixteca" (Byland and Pohl 1994:54), they also propose that one of the *danzante* figures at Monte Albán may refer to conquest of a nearby site, suggesting that Oaxaca's first urban center wielded influence in the Sierra Mixteca during this time. While the specific *danzante* in question has not been reevaluated, the debate continues around the carved slabs at Monte Albán and their implications for Monte Albán's territorial reach (e.g., Marcus 1976, 2020:121–191; Marcus and Flannery 1996:195–207; Redmond and Spencer 2006) or alternative meanings (e.g., Carter 2017; Urcid and Joyce 2014).

Mapping by the University of Leiden

A University of Leiden team mapped 40.5 ha of Monte Negro in 2000, documenting its best-preserved architecture and evaluating preservation (Van Broekhoven et al. 2000). Their work, complementary to INAH maintenance activities taking place at the same time (Matadamas 2000), resulted in a detailed reconstruction of the monumental sector, which is presented in Geurds's (2007) dissertation. A publication by Geurds and Jansen (2008) interprets Monte Negro's monumental architecture through Indigenous Mixtec notions of sacrality and rulership. The map presented here builds on the reconstruction of monumental buildings by the 2000 team.

Regional Settlement Surveys and Defensive Relocation

Systematic surveys of western Oaxaca's highland valleys, carried out since the 1960s, have been crucial for reconstructing regional dynamics of the Late Formative (Balkansky et al. 2000; Byland 1980; Byland and Pohl 1994; Finsten 1996; Kowalewski et al. 2009; Plunket 1983; Spores 1972). The surveyed areas indicate widespread demographic relocation to hilltop locations at the onset of the Ramos phase, accompanied by unprecedented demographic growth and architectural works. In the Nochixtlán Valley, the

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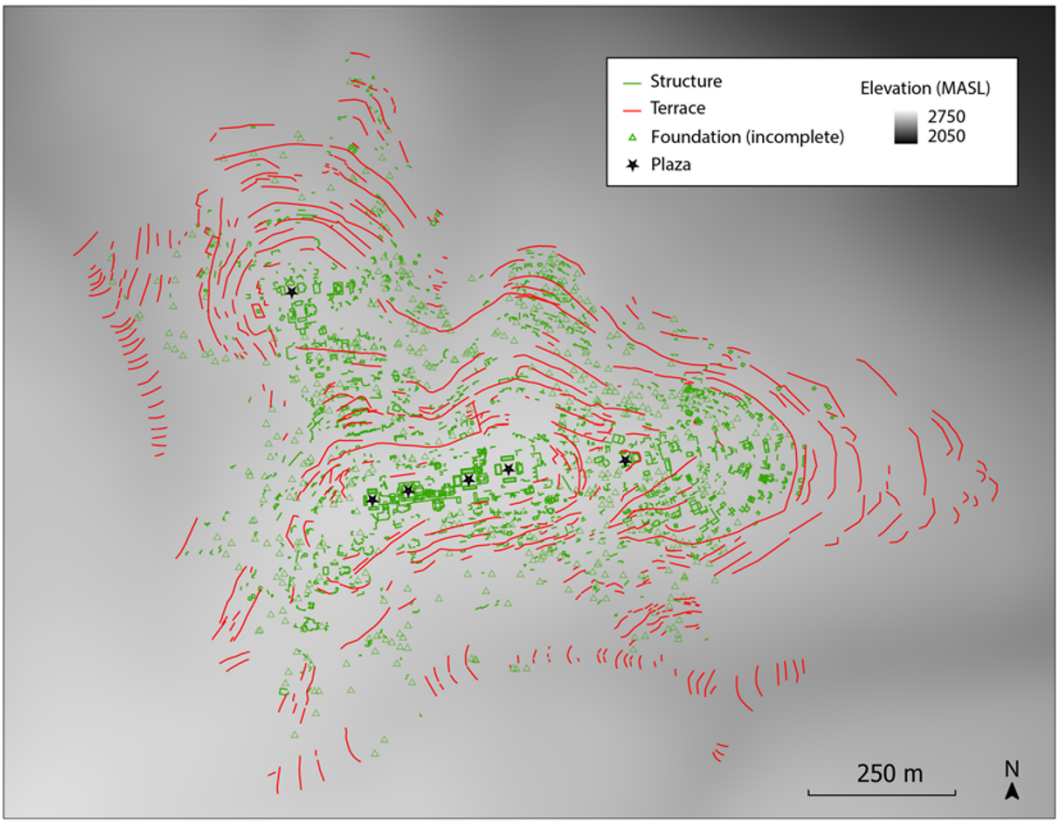


Figure 2. Site map of Monte Negro, which builds on efforts by Acosta and Romero (1992), Balkansky et alia (2004), Byland and Pohl (1994), and Van Broekhoven et alia (2000). (Color online)

population of Xacañi relocated to Cerro Jazmín, where 4,000–8,000 people settled an area of roughly 86 ha (Kowalewski et al. 2009:31–34; Pérez Rodríguez et al. 2011). Yucuita experienced similar explosive growth, with a population that grew approximately 430% to as many as 3,000 inhabitants (Plunket 1983:359; Winter 1982:12). Nearby, a portion of Etlatongo's population also relocated to a previously unoccupied hilltop (Blomster 1998a:638). In a valley to the west, Huamelulpan expanded from 6 ha in the Late Cruz phase to 155 ha by the start of the Ramos phase (Balkansky 1998).

Survey in the Santiago Tilantongo Valley, home to Monte Negro, revealed a similar trajectory. Earlier in the Formative period, the valley's principal settlement shifted from Early Cruz phase Diuxi to the slightly higher and Late Cruz phase La Providencia (Balkansky et al. 2004). Then, around 300 BC, 91.57 ha La Providencia was abandoned in favor of the Monte Negro site, several kilometers away and nestled on a mountaintop 400 m above the valley floor (Kowalewski et al. 2009:69–70; Supplementary Figures 1 and 2).

Mapping Monte Negro

Building on previous mapping efforts by Caso and colleagues (Acosta and Romero 1992:29–71), Byland and Pohl (1994:55), and Van Broekhoven et al. (2000), Christopher Glew made the first complete map of Monte Negro in 2002. After conducting a topographic survey of the entire site at a scale of 1:1000, Glew recorded all mounds, walls, stone foundations, terraces, ramps, and other features visible on the surface. These efforts added significant detail in the areas outside of the monumental core. Minor additions were made in 2023 and 2024, and our current map covers 85 ha (Figure 2), a slight increase over the 77.76 ha estimated by Balkansky et al. (2004:44).

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Site-Level Organization

The founders of Monte Negro settled on a triangular ridge extending north from Cerro Negro, a mountain cluster at the head of the Santiago Tilantongo Valley. Cerro Negro lies at a southeastern bend in what Kowalewski et al. (2009:76) call the "Sierra de Nochixtlán," a longer range that begins near the modern town of Yanhuitlán. Although not the tallest peak in the range, Cerro Negro offered an expansive, flat summit suitable for large buildings and commanding views to the north, northeast, and northwest.

From the summit, three ridgelines extend north, northeast, and east. GIS analyses suggest that Monte Negro's social organization contoured to this natural topography, producing at least four distinct sectors. We have defined these as (1) the flat, mountaintop "Monumental Sector," (2) the broad slopes of the "East Sector," (3) the broad slopes of the "North Sector," and (4) the steeper slopes of the "Northeast Sector." In addition to these sectors, which saw diverse architectural works, large surrounding drainages were transformed into massive *lama-bordo*, or check-dam, terraces, among the most extensive agricultural systems ever built in western Oaxaca (Pérez Rodríguez 2008:97) and still in use today.

Neighborhoods—defined as areas of recurrent face-to-face interaction (Smith 2010)—are widely recognized cross-culturally as meaningful units of social life (e.g., Talen 2018; York et al. 2011). However, identifying units of community organization presents inherent challenges in archaeological contexts (Marcus 2000). In western Oaxaca, historic Mixtec models of intermediate organization offer valuable points of comparison, but their application to earlier periods is problematic. As such, neighborhoods remain poorly understood before the Classic period (Kowalewski et al. 2009:337–339). Even so, tracing the emergence of such social units is essential for understanding the sociopolitical transformations that defined the Late Formative.

Based on surface architecture (following Thompson et al. 2022; see also Whittington and Frykholm 2025), we used the Kernel Density and Average Nearest Neighbor tools in ArcGIS Pro to identify potential neighborhoods at Monte Negro (Figure 3). In this case, the short-lived nature of the settlement caters to such sitewide analyses, in contrast to longer-lived sites where construction and ceramics span multiple phases. Combined with artifact distributions, our spatial analyses suggest the presence of socially meaningful units, even if the ways in which residents defined or experienced them remain unknowable. In the following sections, we examine each sector in greater detail.

Intensive Surface Collection

After mapping all of Monte Negro's visible architecture, Glew conducted an intensive surface collection program in a random sample of 100 m^2 units across the site, excluding most of the Monumental Sector, which had been excavated between 1937 and 1940 and is open to the public. All surface artifacts—pottery, chipped and ground stone, burned clay, shell, mica—were collected during the survey. The 216 units represent approximately 2.54% of the total site area (Supplementary Figure 3). Over the course of mapping the site, Glew also recorded opportunistic finds of artifacts including metates, manos, braziers, and figurines.

Interpreting patterns from surface collections presents inherent challenges and must be approached thoughtfully (Flannery 1976a:51–61). At Monte Negro, erosion and modern agricultural activity have significantly affected artifact distributions. However, the site's particular topography also serves as a mitigating factor, preventing material displacement from one ridge to another. As a result, interpretations at a coarse, sector-level resolution offer valuable insights into broader spatial trends.

Patterns we observed from surface collection data include

1. Metates and manos, ground-stone tools important for food preparation, occur across the site, with marked concentrations in the four sectors.
2. The Northeast Sector exhibits hot spots in multiple domestic ceramic categories, pointing to an extensive residential area.
3. Concentrations of chipped stone and axes in the Northeast and East Sectors likely reflect household-level economic activity, or multicrafting.

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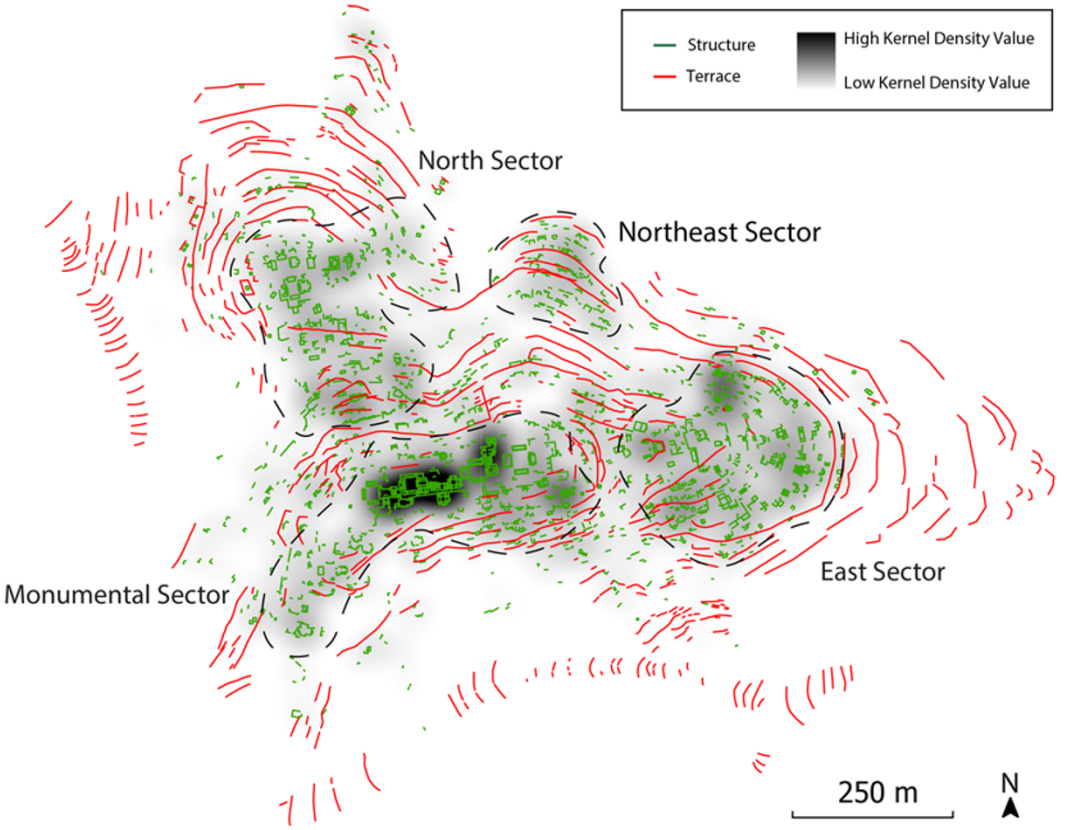


Figure 3. A kernel density map for architectural features at Monte Negro. The dashed lines indicate hypothetical neighborhoods. (Color online)

4. Ceramic braziers and figurines are more frequently encountered away from ceremonial plazas and in the context of domestic architecture, suggesting that ritual practices were practiced on a household level in these areas.

Kernel Density and Hot Spot Analysis

Integrating surface artifact distributions with spatial and architectural data allowed us to further explore patterns related to social organization and economic and ritual activity at Monte Negro. Specifically, kernel density was applied to the opportunistic finds of conspicuous artifacts encountered in the mapping of the site. The tool works by producing a smooth surface where density is highest and gradually decreases with distance (ESRI 2025a). In contrast, hot spot analysis works by identifying statistically significant clusters of high or low artifact or attribute densities by comparing local values to expected distributions (ESRI 2025b). We applied this tool to artifacts collected in the surface survey units, isolating attributes like ceramic form and surface decoration, to determine where statistically significant clusters appeared across the site.

A kernel density map of manos and metates, kitchen tools used for grinding, reveals concentrations within the four previously defined sectors (Figure 4). Unsurprisingly, there were households in all four sectors that participated in everyday food preparation. The Northeast Sector, in particular, stands out for its domestic patterning. This sector presents hot spots for multiple artifact classes including ollas and bowls (as represented by diagnostic rim sherds), ceramics associated with food preparation, storage, and consumption (Figure 5; Supplementary Figure 4). By contrast, the East Sector yielded surprisingly little cooking and serving ware in surface survey—perhaps a reflection of its lower residential

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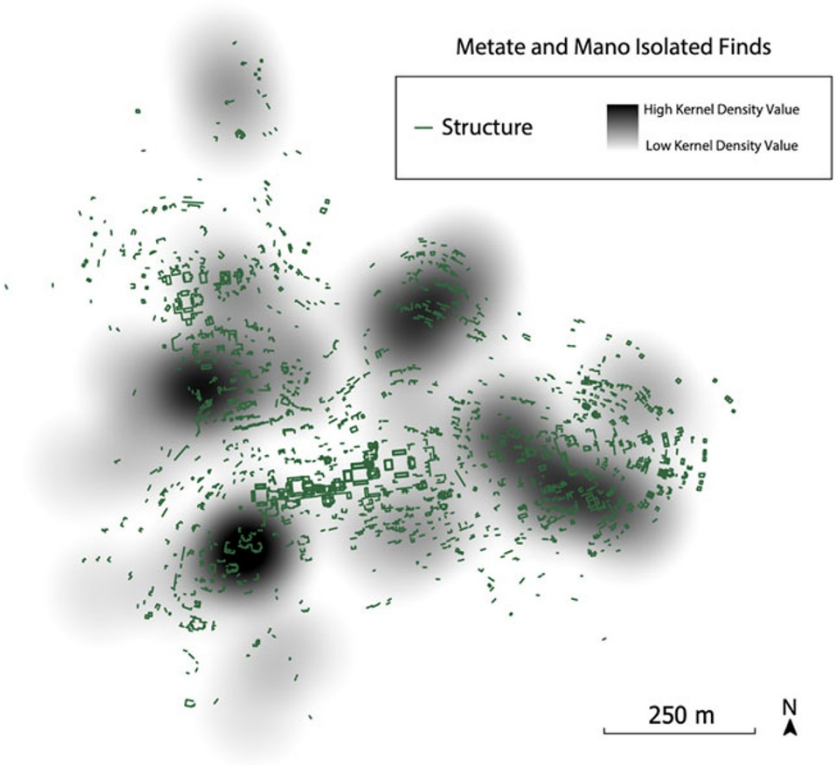


Figure 4. A kernel density map for isolated metate and mano finds points to four main concentrations, generally aligning with the proposed four neighborhood sectors. (Color online)

density—though excavations in 2024 did document multiple residences. Here, as in the Northeast Sector, high densities of chipped stone artifacts (Figure 6) nevertheless suggest household-level economic production. Isolated axe finds, most densely concentrated between the Northeast and East Sectors (Supplementary Figure 5), further point to multicrafting activities being carried out.

Ritual artifacts recovered during the surface survey were unevenly distributed across the site. Brazier and *incensario* fragments—ceramic artifacts associated with burning—show strongest concentrations southwest of the monumental core, as well as in the Northeast Sector (Supplementary Figure 6). Similarly, figurines, which might have played a role in household rituals, are most densely clustered in the Northeast Sector (Figure 7), a pattern explored in the next section.

Plazas and Social Organization

Monte Negro contains six small, square plazas, first numbered by Van Broekhoven et al. (2000). Five are arranged along a roughly east–west axis (Geurds 2007:64). Four of these are in the Monumental Sector, possibly associated with the paved "avenue" documented by Caso, which also runs east–west. Plaza 5, excavated in 2023, is located 180 m downslope in the East Sector. Plaza 6, the northern outlier, occupies a flat ridge roughly 350 m beyond the Monumental Sector.

Each plaza consists of a sunken open space framed by four cardinally oriented buildings. Without exception, the largest and most elaborate structure is on the east side. Plaza buildings in the Monumental Sector are largest volumetrically, and encircle an average 571.75 m^2 of central open space. By comparison, Plazas 5 and 6 have smaller open spaces of 375 m^2 and 328 m^2. The prominence of plazas at Monte Negro indicates that these spaces were integral to the settlement's original layout and foundational to daily life. Their placement across multiple sectors further suggests that community coalesced around several architectural nodes rather than a single center.

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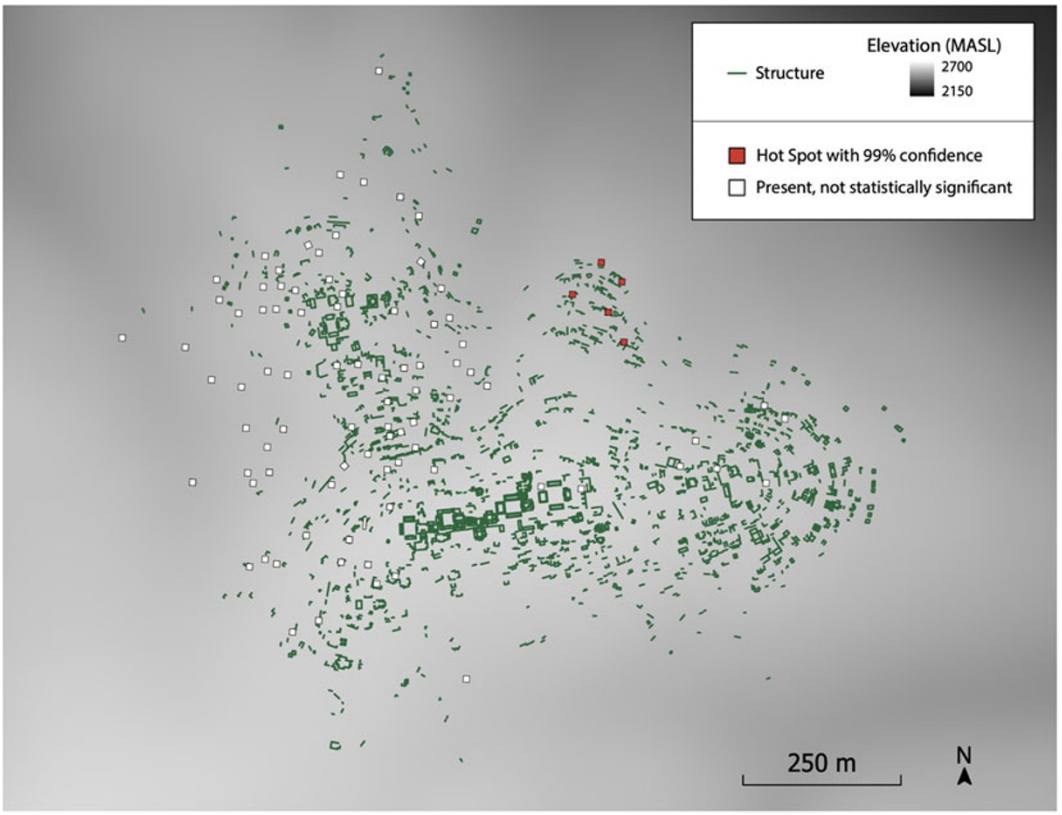


Figure 5. Hot spots for olla rim sherds are found in the Northeast Sector, with presence noted across the rest of the site, particularly in the North Sector. (Color online)

Decentralized layouts are widely attested across Ramos phase centers, holding important implications for political organization and urban development (Balkansky 1998; Marcus 1983). At Huamelulpan, monumental construction was dispersed across five separate foci, segmented by the local topography (Winter 1984:11). Gaxiola González (1984:80) interprets this dispersed public architecture and the adjacent residential zones as "integrative mechanisms" for urbanism. At Yucuita, Spores reports "unprecedented emphasis on elaborate, highly organized ceremonialism, with major structural complexes constructed" (1984:24). Plunket believes these ceremonial precincts at Yucuita—with small resident populations, plazas, and "temple-like" structures—"may have functioned as the administrative and ceremonial foci for sub-areas" (1983:75, 102). Meanwhile, at Cerro Jazmín, rapid demographic growth coincided with the construction of "several clusters of monumental buildings and plazas that were the sites of specialized economic, political, and ritual activity" (Pérez Rodríguez et al. 2011:84). These sectors are surrounded by terraced residential areas that reveal evidence of craft production, but each presents unique accessibility and function (Pérez Rodríguez et al. 2011:89).

Even Monte Albán, whose Main Plaza defined the city's epicenter during the Classic period, probably began more heterogeneously. Blanton (2004:37) argues that three neighborhoods initially developed along the edges of the Main Plaza, perhaps reflecting different ethnic groups. Recent geophysical surveys offer supporting evidence that Monte Albán's earliest layout consisted of smaller, dispersed clusters of buildings and open spaces (Levine et al. 2021).

Such cases suggest that neighborhoods in Oaxaca's first proto-urban centers formed around discrete clusters of monumental buildings. Monte Negro, too, had residential buildings adjacent to plazas, suggesting that different corporate groups may have held semiautonomous authority in these spaces, perhaps an early iteration of Marcus's (1983) "multiple nuclei" urban model. Plazas were clearly

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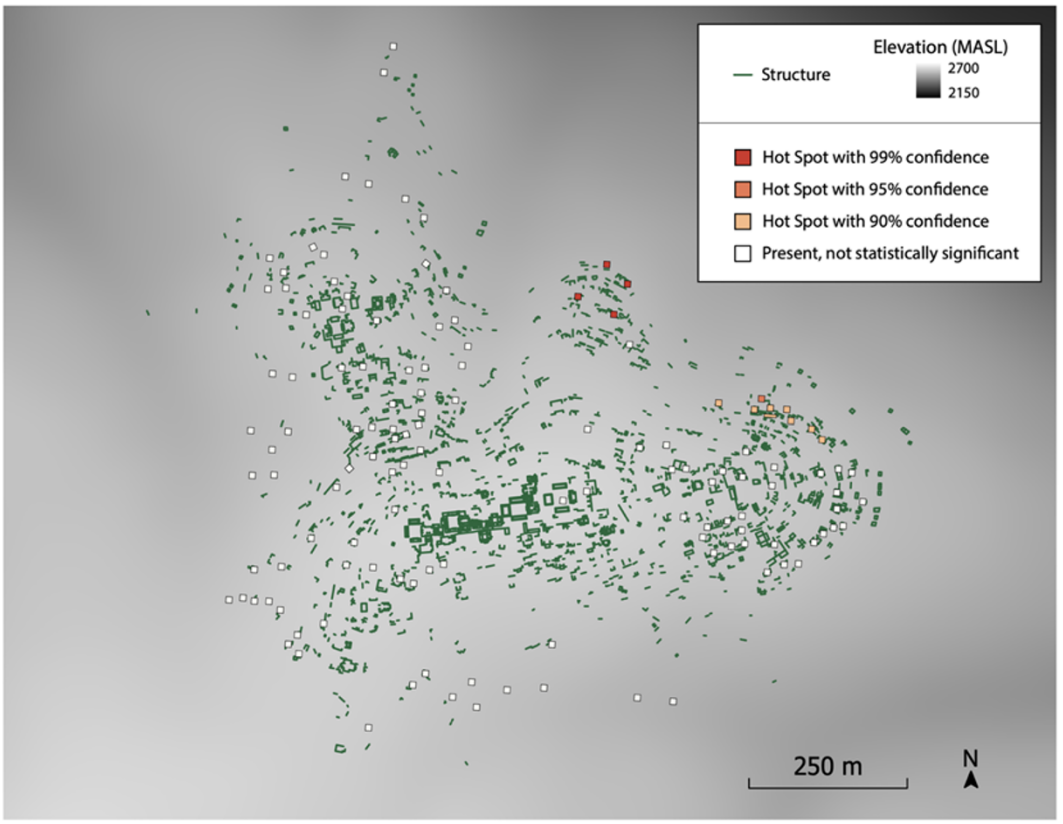


Figure 6. Hot spots for chipped stone are found in the Northeast and East Sectors, with presence noted in collection units across the site. (Color online)

fundamental to Monte Negro's overall organization, but their importance, we believe, was not only logistical. Plazas were key ideological spaces through which emerging elites sought to appropriate sacred relationships and legitimate new forms of authority.

Plazas and Ritual

As Norwood and Smith (2022) observe, plazas in Mesoamerica integrated society. They were inherently multifunctional, witnessing diverse activities including political assemblies, ritual performances, and daily gatherings. In the Late Formative, when such spaces were taking on new dimensions, plazas likely carried heightened ideological weight. At La Laguna in Tlaxcala, for example, Carballo (2012) demonstrates how ritual practices evolved in the context of—and further promoted—growing social complexity. Joyce similarly characterizes 700–100 BC as "a time of major changes in power relations in Oaxaca and other regions of Mesoamerica that were in part driven by struggle over peoples' relations to the sacred" (2000:75). By controlling access to ceremonial spaces and elaborating existing rituals that probably involved powerful ancestors, elites positioned themselves as mediators between ordinary people and the supernatural (Marcus 1989). In the Formative period, ritual acts and spaces thus became ideological tools of authority.

Archaeological findings suggest that this process was happening at Monte Negro. Caso and colleagues' excavations of the site's monumental core revealed four plazas as well as civic-ceremonial and other monumental buildings associated with elite residences and burials (Acosta and Romero 1992). Marcus and Flannery (1996:168) interpret the roofed corridors of Monte Negro's monumental buildings as passageways for chiefly individuals—privileged access to sacred spaces. Adjacent to Plaza 3, the Temple T-South building presented Ofrenda 1, two 14 cm bifacial obsidian daggers

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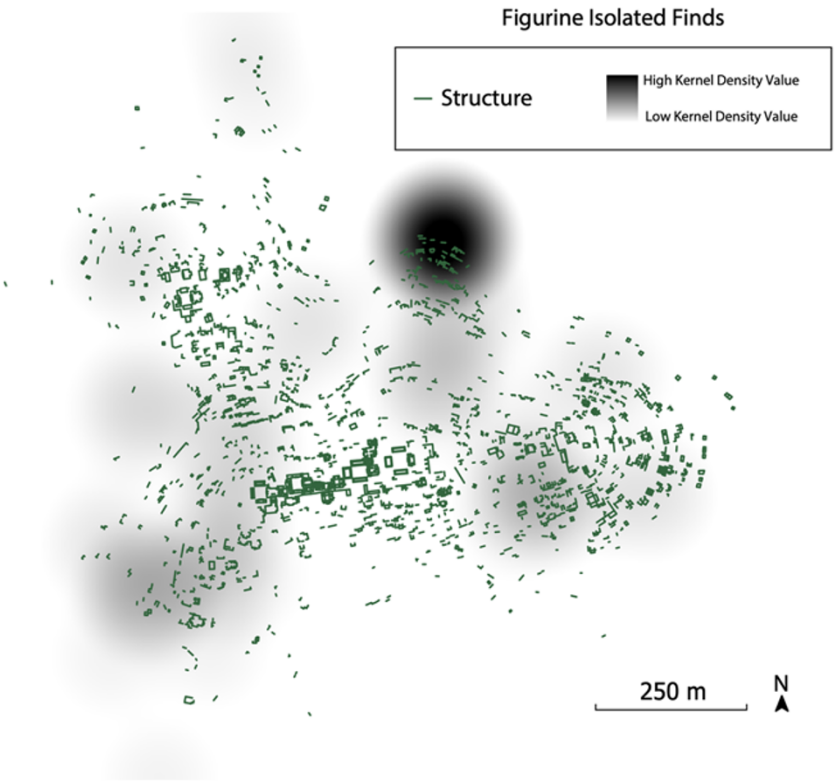


Figure 7. A kernel density map for isolated figurine finds shows heavy concentration in the Northeast Sector. (Color online)

(Acosta and Romero 1992:125) similar to knives later used to remove the hearts of human sacrificial victims (Marcus and Flannery 1996:167). Temple T's eastern steps also bear a triangular "blood drop" motif, further evoking sacrifice (Flannery 1983). As archaeologists have documented, bloodletting, particularly among elites, was central to ritual life and worldview in Oaxaca and Mesoamerica more broadly (e.g., Boone 1984; Flannery 1976b; Grove 1987; Joyce 2000; Schele and Miller 1986:175–208).

Most recently, work in Plaza 5 (Supplementary Figure 7) uncovered human burials, sacrificed dogs, ceramic offerings, deer antlers, and the remains of textiles burned in limestone cavities (Frykholm 2023). Such practices resonate with emerging regional traditions—animal sacrifice, feasting, and ballgames (Pérez Rodríguez 2013)—that elites adopted and elaborated locally.

As was probably the case at other Formative period sites, the plazas at Monte Negro embodied a fundamental paradox. They were spatially and socially integrative spaces distributed in three sectors across the site that also, we believe, served as exclusionary stages where elites controlled important rituals. In this sense, they simultaneously fostered social cohesion and reinforced stratification (Joyce and Winter 1996). Nevertheless, this model was not consistent across Monte Negro, as the Northeast Sector conspicuously lacks a plaza. Based on surface collection data, it is possible that household-level ritual practices played a more prominent role in this sector.

The Northeast Sector

The Northeast Sector is the most isolated of the four identified "neighborhoods" at Monte Negro. It is furthest from the monumental core and on a relatively steep hillside. *Lama-bordo* terraces in the small drainages on either side separate it from the East and North Sectors. Our mapping of this sector revealed no monumental construction or plazas, even while the steeper terrain would not have precluded such construction. The smaller, less elaborate structures recorded here, considered alongside the abundance of utilitarian ceramics and proximity to agricultural terraces, point to this sector being a neighborhood

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of commoners. While we do not know if residents here had access to the ceremonial spaces of other sectors, the absence of a plaza within the Northeast Sector likely points to social differentiation at Monte Negro.

Nevertheless, ritual life in the Northeast Sector was clearly not absent. Alongside high representation of brazier and *incensario* fragments, opportunistic surface collections reveal the highest density of ceramic figurines in this sector. Figurine use was widespread across multiple Mesoamerican regions during the Formative period, with archaeologists convincingly tying their use to evolving social dynamics (Blomster 1998b; Cyphers Guillén 1993; Drennan 1976; Flannery and Marcus 2005:88–93; Harlan 1987). In the Valley of Oaxaca, Marcus (1998) documented the importance of figurines in domestic rituals, particularly among women, who used them to communicate with ancestors. In the context of solidifying hereditary rank and the emergence of ritual specialists, household figurines might have helped negotiate social change. In this context, the concentration of figurines in the Northeast Sector of Monte Negro may reflect household-level ceremonies that compensated for the absence of a formal plaza. As Joyce (2000) observes, commoners were not wholly dependent on elites for engagement with the sacred; female figurines may even represent household-level resistance to elite appropriation of ritual (King 1988:43).

Other Discoveries

A least-cost analysis model based on topography and land cover (White and Barber 2012) suggests that Monte Negro and the Santiago Tilantongo Valley were not well integrated into western Oaxaca's main mobility corridors. Sites such as Yucuita, Cerro Jazmín, Etlatongo, and Huamelulpan, meanwhile, are found in more accessible valleys. These valleys also present a higher density of secondary centers—what Kowalewski et al. (2009:24–27) describe as large villages or towns (Figure 8). In contrast, the Tilantongo Valley has few other Ramos phase settlements. While there is not yet complete survey coverage to the south of Monte Negro, existing results, considered alongside Cerro Negro's rugged setting, underscore the site's dramatic isolation.

Slope, elevation, and intersite visibility all contribute to a site's defensibility. At Monte Negro, the north, east, and west flanks drop steeply, but the southeast is more accessible, where the Cerro Negro massif continues for several kilometers. If the ridge is gained from this direction, it offers a flat—even downhill—final approach to Monte Negro. Investigating this potential vulnerability in 2023, a pedestrian survey documented two previously unrecorded walls about 1 km southeast at a bottleneck along Cerro Negro (Figure 9). Wall 1 extends 225 m with a 3.1 m gap at the ridge crest, flanked by a 5.06 m "curtain" wall set 1.81 m behind. Wall 2, further downslope, runs 103 m and includes at least one staircase.

These features could have served an administrative (traffic-control) or defensive role. The gap at the ridge crest would have permitted controlled access with the extended walls providing defensive cover against attack from the southeast. Excavations, however, raised questions about their temporal relationship to Monte Negro's Late Formative occupation. The coarse limestone masonry is different from Monte Negro's finely cut blocks, and artifacts were sparse and nondiagnostic. Beyond this, the two charcoal deposits recovered during 64 m^2 of excavations taken to limestone bedrock yielded Late Postclassic and Early Colonial radiocarbon dates. While acknowledging the problem of dating walls without embedded and datable materials, we tentatively conclude that these fortifications postdate Monte Negro's Ramos phase, perhaps by more than a millennium.

Late Postclassic Activity at Monte Negro

If built during the Late Postclassic, as suggested by the radiocarbon dates, the walls would fall within broader architectural practices in western Oaxaca during this time (Pérez Rodríguez and Heredia Espinoza 2020:182–188). Though Monte Negro had long been uninhabited at that point, historical accounts portray ancestral sites as refuges in times of upheaval. Friar Francisco de Burgoa described Monte Negro as a defensive stronghold (1989 [1674]:275–276), and Manuel Martínez Gracida (1883:24) later recorded oral traditions in Santiago Tilantongo that recounted alliances with leaders from Achiutla and mountaintop fortresses that served in times of "combat." Remarkably, modern oral history suggests that Monte Negro was used as a refuge as recently as the Mexican Revolution.

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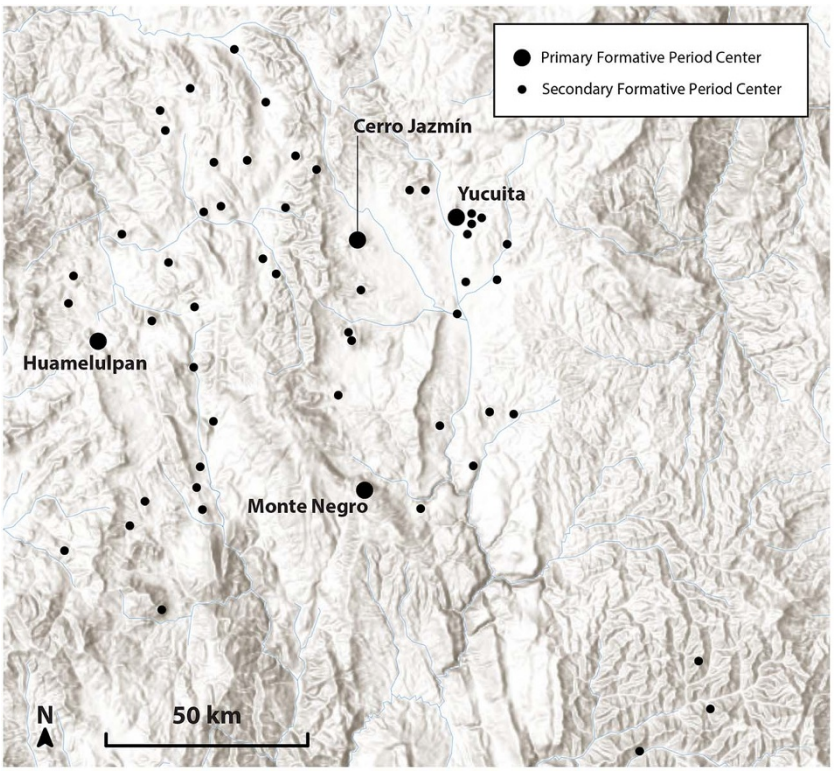


Figure 8. Settlements contemporaneous with Monte Negro (based on surveys by Balkansky et al. 2000; Byland 1980; Byland and Pohl 1994; Finsten 1996; Kowalewski et al. 2009; Plunket 1983; Spores 1972).



Figure 9. Wall 1 (*top*) and Wall 2 (*bottom*) after the removal of moss from the hewn limestone blocks. The "curtain wall" is out of view in the upper right-hand corner. Photograph courtesy of Soren Frykholm. (Color online)

An alternative is that the walls held ritual or symbolic functions. Evidence of Classic and Postclassic ritual at the site indicates that Monte Negro retained ancestral significance long after its abandonment (Balkansky et al. 2004; Caso 1942). At nearby Yucundaa, Spores and Robles García (2017:43–44)

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interpret Postclassic walls as ceremonial pathways to caves. The Cerro Negro walls may have played a similar role, as they are situated between Monte Negro and Vehe Ndute ("House of Water"), a cave reported by Geurds and Jansen (2008:397) that is still venerated by local communities today.

Studies of Indigenous documents from western Oaxaca would support either interpretation. Many scholars identify the black hill on page 22 of the Codex Tonindeye (Nuttall) as Monte Negro (Anders et al. 1992:135–136; Byland and Pohl 1994:56; Geurds and Jansen 2008; Hamann 2008). The scene depicts a royal Mixtec couple seated on top of a platform built atop Monte Negro, evoking a place of authority and protection. Though Hermann Lejarazu's (2011) alternative identification cautions against a definitive reading, Monte Negro's probable depiction in Mixtec codices underscores its enduring role as a place of ancestral significance and cultural memory long after its abandonment. More investigation of the walls and the adjacent hilltop, where material culture was also recovered in 2024 test pits, promises to clarify the nature of these enigmatic constructions.

The Olla de Agua Site

On a hillside south of Monte Negro lies a previously unreported site, designated "Olla de Agua" due to its proximity to an open-air water storage tank (Figure 10). After clearing foliage, the site appears to be another plaza with buildings on four sides, though their orientation relative to the other plazas at Monte Negro is unknown. The leveled open space is much smaller, under 200 m^2. Excavations will be required to confirm the site's temporality and function.

AMS Carbon Dates for Monte Negro

Seventy-five years ago, two samples from burned beams recovered during Caso's excavations of Temple T were dated with solid carbon methods to the seventh century BC (Arnold and Libby 1950). However, archaeologists have always regarded these dates with skepticism, as Monte Negro's ceramics align with those from Monte Albán Period Ic (Flannery 1983).

Recently, we produced the first radiocarbon dates from Monte Negro via accelerator mass spectrometry at the Laboratorio Nacional de Espectrometría de Masas con Aceleradores (LEMA) physics lab (Table 2). The 13 samples come from secure contexts excavated in 2023 and 2024 and are indicated in Figure 10. These are Plaza 5, Areas A and B (domestic terraces excavated in 2024), and the aforementioned Curtain Wall.

With results of recent excavations still forthcoming, radiocarbon dates confirm the long-held view that Monte Negro was a Late Formative settlement, with 300–100 BC remaining a reasonable occupational range. Beyond limited chronological ceramic markers, excavations in 1937–1940 and 2023–2024 did not reveal evidence of multiple construction episodes or major demographic shifts, in contrast to the sequence represented by Huamelulpan "I," "II," and "III" (Gaxiola González 1984) and other sites in the Mixteca Alta, supporting Balkansky et alia's perspective that Monte Negro's "short-lived existence" was an "urban flashpoint frozen in time" (2004:37). Whether Monte Negro was a single- or multigenerational settlement remains unknown, but it is clear that the site's occupation stands out as unusually brief compared to Yucuita, Huamelulpan, and Cerro Jazmín, all of which persisted into the Terminal Formative.

Importantly, evidence does not suggest that there was another major occupation prior to modern times; this also contrasts with the aforementioned centers, many of which housed significant Postclassic period populations (Kowalewski et al. 2009:316–329; Plunket 1983:391–398). However, an anomalous date from Area A, likely associated with a jade offering recovered in 2024, considered alongside the two dated samples from the Curtain Wall, point to persistent (if ephemeral) cultural activity at Monte Negro.

Discussion: Monte Negro's Origins

The founding of Monte Albán around 500 BC reverberated across Oaxaca and likely beyond. In addition to transforming the political dynamics of the Valley of Oaxaca, Monte Albán's founding also stimulated demographic growth and cultural change in adjacent regions in subsequent centuries (Balkansky 1998; Feinman and Nicholas 1990; Joyce 2003; Marcus and Flannery 1996; Spencer and

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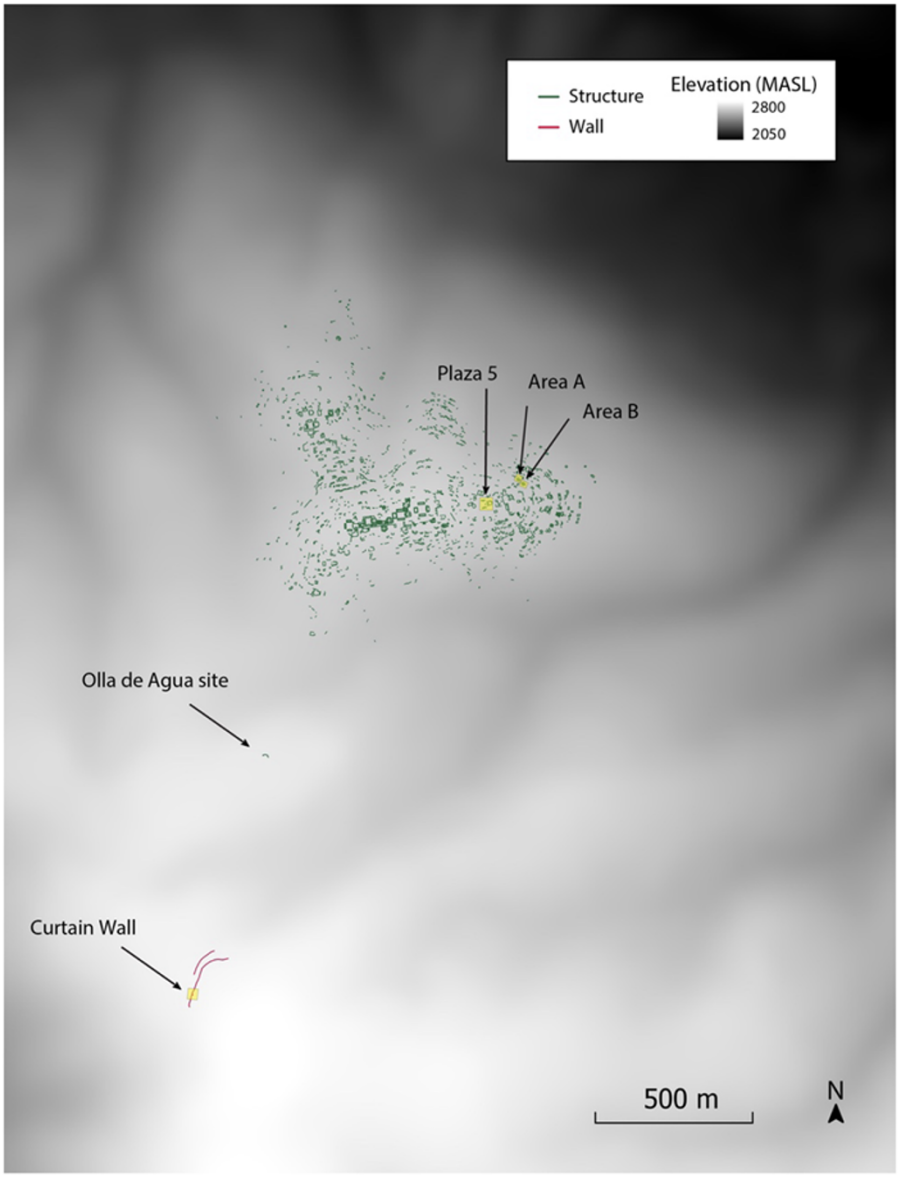


Figure 10. Sites discovered and areas excavated at Monte Negro since 2023. (Color online)

Redmond 2004; Winter 1989:34–38). Alongside the circulation of material goods such as ceramics, political and religious concepts pioneered at Monte Albán diffused widely (Joyce 2003).

The precise nature of Monte Albán's influence in western Oaxaca during the Late Formative, however, remains unknown. Archaeologists have proposed varied models for Ramos phase developments, including conquest by Monte Albán (Byland and Pohl 1994; Plunket 1983), synoecism or aggregation into defensible centers in response to external threats (Balkansky 1998), autonomous local development (Spores 1984), and "concordant" change in which frequent interaction between the two regions stimulated parallel growth (Kowalewski et al. 2009). Such diverse models point to the multiplicity of processes at play in the region around 300 BC. Based on the available evidence, we interpret Monte Negro's founding as an extension of local cultural and demographic trajectories that was nevertheless intimately affected by broader developments radiating from Monte Albán.

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Table 2. AMS Radiocarbon Dates from Monte Negro.

Site Location, PAMN Lot Number, Lab Code	Material Dated and Archaeological Context	^{14}C Yrs ± σ BP[a]	Cal Yrs 2σ Range[b]
Plaza 5[c]			
T8–241, LEMA–2308.1.1	Collagen, extracted from upper left central incisor (human), isolated find in constructive fill of North Structure	2189 ± 30	369–163 BC
T8–244, LEMA–2320.1.1	Collagen, extracted from fragment of occipital bone (human), superficial find in East Structure	2113 ± 30	341–46 BC
T8–123, LEMA–2306.1.1	Collagen, extracted from long bone (canine) associated with ceramic Offering #2, sunken central area	2102 ± 30	337–43 BC
T8–33, LEMA–2268.1.1	Charcoal, burning activity in limestone bedrock in sunken central area	2081 ± 25	170 BC–AD 2
T8–26, LEMA–2305.1.1	Collagen, extracted from long bone (canine) associated with ceramic Offering #1 and human burials, sunken central area	2106 ± 35	343–1 BC
Ladera Este, Área A (LEAA)			
LEAA–76, LEMA–2302.1.1	Charcoal, Feature #1 (hearth)	2273 ± 35	400–207 BC
LEAA–29, LEMA 2304.1.1	Charcoal, possibly associated with adjacent ritual activity	93 ± 30	AD 1686–1928
Ladera Este, Área B (LEAB)			
LEAB–112, LEMA–2313.1.1	Charcoal, Feature #5 (hearth) in West Room	2095 ± 30	197 BC–AD 1
LEAB–43, LEMA–2310.1.1	Charcoal, sunken patio living floor	2126 ± 30	344–50 BC
LEAB–99, LEMA–2266.1.1	Charcoal, Feature #3 (hearth), located beneath sunken patio living floor	2112 ± 30	341–46 BC
LEAB–111, LEMA–2315.1.1	Charcoal, Feature #4 (hearth), located south of main LEAB architectural unit	2140 ± 30	351–52 BC
Cañada del Lagarto, Wall 1, Curtain Wall (CLM1EA)			
CLM1EA–29, LEMA–2267.1.1	Charcoal, deposit found in open space between Wall 1 and Curtain Wall	367 ± 35	AD 1451–1635
CLM1EA–31, LEMA–2303.1.1	Charcoal, deposit abutting north end of Curtain Wall	613 ± 30	AD 1299–1402

[a] These dates have been corrected for isotopic fractionation.
[b] The radiocarbon age was corrected for variations in atmospheric ^{14}C content using the program OxCal v4.2.4 (Ramsey 2013), using the calibration curve IntCal20 (Reimer et al. 2020).
[c] Plaza 5 carried the designation "Terrace 8" or "T8" during excavations.

Late Formative Period Tensions

Archaeological evidence speaks to a fluctuating and tense sociopolitical environment in core demographic areas of Oaxaca during the Late Formative. New dynamics are reflected in widespread settlement shifts, often to defensible hilltops, and broader trends toward centralization and urbanization (Joyce 2014; Kowalewski et al. 2009:336–337; Redmond and Spencer 2006; Sherman et al. 2010; Winter 2005:92). Defensive walls are documented at Monte Albán (Blanton 2004:52–54) and in western Oaxaca at Huamelulpan (Balkansky 1998:42), Yucuita (Winter 1989:37), and Cerro de las Minas (Winter 2007:31–33). Rare but striking evidence of violence includes human sacrifice at Yucuita (Spores 1984:24), and practices associated with decapitation and trophy skulls at Monte Negro (Romero 1951:318) and Huamelulpan (Gaxiola González 1984:51), as well as at Yucunama and Cerro de las Minas (Winter 2005:92).

Unlike the Cuicatlán Cañada, however—where archaeologists have recovered burned buildings, a fortress, a skull rack, and an associated conquest monument at Monte Albán's Building J (Marcus 1992:175–176; Redmond and Spencer 2006)—no unequivocal evidence of subjugation exists in

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western Oaxaca. This leaves open the possibility that local tensions drove the move to defensible hilltops (Joyce 2014), echoing the rise of intervalley rivalries witnessed several centuries prior in the Valley of Oaxaca (Marcus and Flannery 1996:121–126).

Ideological and Material Strategies

This period also witnessed profound ideological and religious changes. While not mutually exclusive with a more defensive interpretation, Monte Albán's mountaintop establishment has also been proposed as a monumental expression of Otomanguean cosmology—a "mountain of creation," where the Main Plaza functioned as a stage for sacrifice, offerings, and public reaffirmations of sacred authority (Joyce 2000:81–83).

Such ideological models may help explain the rise of other mountaintop centers such as Monte Negro, where elites adopted other symbolic practices tied to Monte Albán (Flannery 1983). At Monte Negro, anthropomorphic urns showcase iconographic similarities, while vessels like combed-bottom bowls, eccentric-rimmed plates with fish motifs, tall-necked bottles, and shoe-shaped *patojos* reflect further affinities to established valley traditions (Balkansky et al. 2004; Caso 1942; Flannery 1983; Spencer et al. 2008). In architecture, too, Monte Negro's temples and elite residences recall forms seen at Monte Albán and even earlier at San José Mogote, from shared stairways and platform layouts to transitional buildings that bridged chiefly houses and later royal palaces (Acosta and Romero 1992:29–71; Flannery and Marcus 1983a, 1983b). Similar patterns appear at sites across western Oaxaca and beyond, where local elites sought legitimacy through access to prestige goods and by adopting ritual practices associated with Monte Albán (Joyce 2003). Formative period developments in western Oaxaca thus show striking parallels to those in the Valley of Oaxaca, though they emerged several centuries later and within the context of smaller mountain valleys that never rivaled the scale of Monte Albán.

Political Shifts and Monte Negro's Abandonment

By the Terminal Formative, Monte Albán achieved its greatest territorial extent, employing a range of strategies from military conquest to peaceful incorporation (Marcus and Flannery 1996:195–207). It had largely incorporated Oaxaca's entire Central Valley system by this point, although nearby San Martín Tilcajete was a recalcitrant polity that resisted subjugation until the final century BC (Spencer and Redmond 2001). Archaeological evidence suggests that polities in adjacent regions experienced a renewed period of instability around 100 BC, reflected in shifting trade networks, changes in governance, and uneven growth and decline among regional centers.

Perhaps like San Martín Tilcajete, some polities in neighboring regions evidently leaned into local identities and traditions during the Terminal Formative. At Cerro Jazmín and in the Río Verde Valley, for instance, imported Valley of Oaxaca graywares were gradually replaced by locally produced variants, and governance and ritual also took on more collective forms, as suggested by communal feasting, more accessible civic spaces, and shared burial practices (Joyce 2013; Levine 2013; Pérez Rodríguez and Martínez Tuñón 2020; Pérez Rodríguez, Martínez Tuñón, Minc, et al. 2017; Pérez Rodríguez, Martínez Tuñón, Stiver Walsh, et al. 2017).

Monte Negro, however, did not persist into the Terminal Formative. Its abrupt abandonment remains unexplained, and where its population relocated to is not clear (Kowalewski et al. 2009:303–304). Unlike contemporaneous centers that adapted to political turbulence, Monte Negro and its leaders may have been unable to navigate shifting interpolity dynamics, disruptions in long-distance exchange, or local sociopolitical pressures. Its brief period of prominence underscores the inherent instability of new sociopolitical experiments in western Oaxaca, where defensive considerations, ideology, and elite strategies were closely intertwined.

Conclusion and Future Directions

Nearly a century of archaeological research in western Oaxaca confirms that Monte Negro was a central node among emerging Late Formative centers. The findings presented here continue to highlight its significance as a short-lived case study founded under unprecedented sociopolitical conditions around 300 BC. Forthcoming results promise to shed further light on Monte Negro's internal

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development and broader interactions. Beyond Plaza 5, excavations in the East Sector (2023–2024) explored multiple household contexts, producing insights into domestic activities, burial practices, skeletal health, and abandonment rituals. Ongoing instrumental neutron activation analysis of over 100 pottery sherds, alongside clay samples from the Tilantongo Valley, aim to clarify the relationships between local and regional ceramic traditions and broader exchange networks. Finally, ongoing study of archaeological and ethnohistoric evidence promises to explore how Monte Negro held significance as a sacred and ancestral site within Mixtec ritual landscapes for thousands of years.

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Data Availability Statement. The data that support the findings of this study are available from the corresponding author upon request.

Competing Interests. The authors declare none.

Supplementary Material. For supplementary material accompanying this article, visit https://doi.org/10.1017/laq.2026.10194.

Supplementary Figure 1. The rugged Santiago Tilantongo Valley as seen from the summit of Monte Negro.

Supplementary Figure 2. La Providencia (Late Cruz Period; area based on survey by Balkansky et al. 2004) and Monte Negro (Early Ramos Period), two archaeological sites in the Santiago Tilantongo Valley.

Supplementary Figure 3. Quadrants and collection units from Glew's 2002 intensive surface collection program at Monte Negro.

Supplementary Figure 4. Hot spots for serving bowl rim sherds are also found in the Northeast Sector, with presence noted across the rest of the site.

Supplementary Figure 5. A kernel density map for isolated axe finds reveals highest concentration in the area between the East, Northeast, and Monumental Sectors.

Supplementary Figure 6. A kernel density map for brazier isolated finds indicates a strong presence southwest of the site's main monumental buildings, as well as in the Northeast Sector.

Supplementary Figure 7. Plaza 5 prior to excavation, with surface architecture visible.

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