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Sacred Boundaries in Prehistoric Japan: Reinterpreting the Kasori Shell Midden through Jomon Cosmology and Comparative Religious Urbanism

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Abstract

This study reinterprets the spatial structure of the Kasori Shell Midden—one of the largest and best-preserved archaeological sites from Japan's Jomon period—as a consciously constructed sacred boundary, or *kekkai*. Contrary to the long-held functionalist view that shell middens were mere refuse deposits, this paper proposes that the circular formation of the Kasori site embodies a symbolic cosmology rooted in boundary sanctity and spiritual protection. By employing a comparative and interdisciplinary approach that draws from structural anthropology, sacred geography, and indigenous spatial concepts across East and Southeast Asia, the study identifies striking structural parallels between the Kasori shell midden and various forms of sacred precincts: from Islamic haram to Balinese *desa adat*, from Ainu *chise* arrangements to Okinawan *utaki.* These exhibit physical, ritual, and symbolic boundaries separating sacred interiors from profane exteriors. The analysis reveals that Jomon people possessed a highly sophisticated spatial consciousness, encoded in material forms and ritual practice. Far from being primitive or merely functional, their spatial logic reflects a deep metaphysical worldview that challenges conventional assumptions about prehistoric societies. The Kasori Shell Midden thus emerges as a non-literate but ideologically rich expression of social order, spiritual cohabitation, and cosmological design.

Keywords: Shell Midden, Kekkai, Animism, Ancestral Cult, Environmental Embedding, Jomon Cosmology, Sacred Geography, Indigenous Spatial Concepts

Introduction

The Jomon period (ca. 14,000–300 BCE) of Japanese prehistory has traditionally been characterized as a long-lasting, non-literate hunter-gatherer culture known for its pottery and environmental adaptation. Among the archaeological remains from this era, shell middens

have been predominantly interpreted through functionalist lenses as refuse sites, bearing witness to the subsistence strategies of coastal communities (Watanabe, 1986; Harunari, 1996).

However, the monumental scale and spatial configuration of certain shell middens—most notably the Kasori Shell Midden in present-day Chiba—demand a more nuanced interpretation that goes beyond mere subsistence archaeology. The site's deliberate circular layout, enclosing residential and burial areas, suggests a spatial order that transcends utilitarian purposes. This study proposes that the shell midden may have functioned as a sacred boundary (kekkai), serving not only to structure daily life but also to mediate spiritual and cosmological forces.

To explore this hypothesis, the study adopts a multidisciplinary framework that integrates structural anthropology (Lévi-Strauss, 1966), sacred geography (Eliade, 1959), and comparative analysis of indigenous spatial concepts across East and Southeast Asia. While previous studies have touched upon the symbolic aspects of Jomon material culture (Shitara, 2010; Fujio, 2015), none have systematically examined shell middens through the lens of sacred boundary-making or compared them with analogous spatial practices in other cultural contexts.

This study aims to fill this gap by positioning the Kasori Shell Midden within a broader comparative framework that includes not only distant examples like Islamic urbanism but also more culturally proximate cases from the Pacific Rim. By doing so, it challenges the lingering assumption that prehistoric societies lacked symbolic or metaphysical sophistication, arguing instead that the Jomon people engaged in complex spatial reasoning, using natural materials—especially shells—not just to survive, but to define identity, establish order, and sanctify their world.

Kasori Shell Midden is one of the longest-standing and most extensive archaeological sites in the Japanese archipelago, dating back at least 3,000 years and possibly as far back as 7,000 years, and providing evidence of human activity during that period. There were two shell midden, one circular with a diameter of 140 meters and the other horseshoe-shaped with a long axis of 190 meters. The interior of the circle was once a village where people lived.

Estimated that the population during its peak period, approximately 4,000 to 3,000 years ago, was around 200 to 300 people. This estimate is based on the number of dwelling sites found at the site, including over 100 pit-dwelling sites, some of which are believed to have been used simultaneously. The number of people per household is estimated to be approximately 3 to 5 people per dwelling during the Jomon period. In terms of stratification, it is believed that dwellings were rebuilt on the same site and used by multiple generations, though the number of dwellings existing simultaneously is limited. Food supply capacity is also considered, taking into account the natural resources (shellfish, fish, and plants and animals) available in the Chiba Prefecture's Boso Peninsula and the Tokyo Bay area, which would have supported a sustainable population.

Figure 1 shows that Kasori Shell Midden location map was provided by Kasori Shell Midden Museum (2023) and edited by the authors.

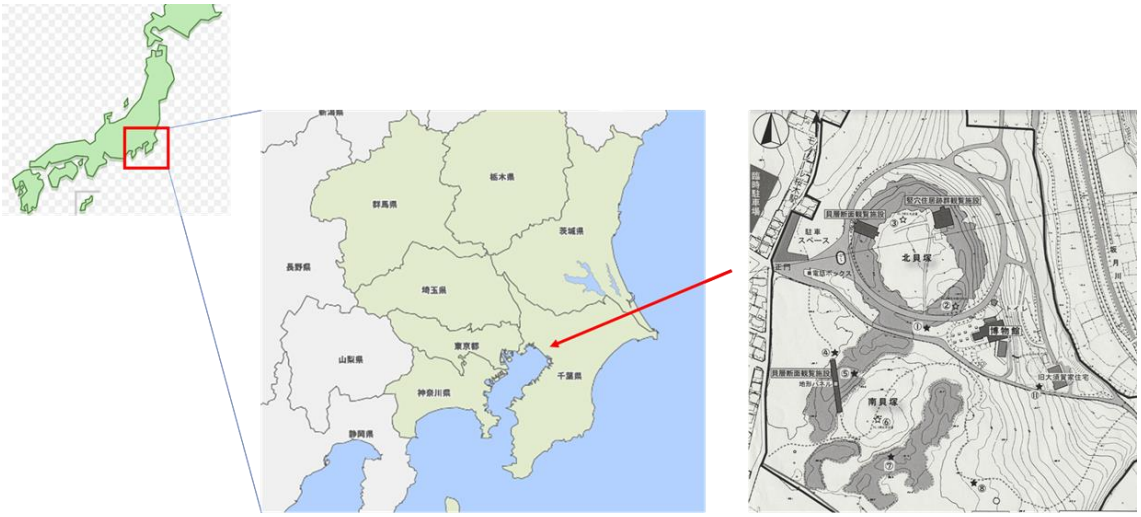

Figure 1 Kasori Shell Midden location (Kasori Shell Midden Museum, 2023)

Literature Review

The Functionalist Paradigm and its Limitations

The scholarly interpretation of shell middens in Japan has been dominated by functionalist perspectives since the early 20th century. Pioneering archaeologists such as Torii Ryuzo and Yawata Ichiro established the paradigm that shell middens were primarily refuse heaps, reflecting dietary patterns and resource exploitation strategies of coastal Jomon communities (Torii, 1919; Yawata, 1960).

This functionalist interpretation was further developed by Watanabe Makoto (1986), whose comprehensive study of shell midden formation processes emphasized ecological adaptation and subsistence economics. Watanabe's meticulous analysis of species composition, seasonality, and caloric yields provided valuable insights into Jomon dietary practices but explicitly rejected symbolic interpretations as "speculative" and "unscientific." Similarly, Harunari Hideji (1996) argued that the circular arrangement of shells at sites like Kasori resulted from practical considerations—specifically, the convenience of disposing shells at the periphery of living spaces while maintaining clear pathways between dwellings.

However, these functionalist interpretations face several empirical challenges that have not been adequately addressed.

First, the practice of selective deposition indicates that not all shells consumed were deposited in the middens, suggesting the presence of deliberate selection criteria (Shitara, 2010).

Second, the spatial regularity observed in the shell formations—particularly their precise circular or horseshoe shapes—exceeds what would be expected from random disposal patterns, implying intentional design (Taniguchi, 2005).

Third, the discovery of associated ritual objects, including figurines and ceremonial tools deliberately placed within shell layers, points to purposes beyond the purely utilitarian (Fujio, 2015).

The Emergence of Symbolic Interpretations

Recent archaeological research has begun to challenge the functionalist monopoly, emphasizing the symbolic and ritual dimensions of shell middens. Shitara Hiromi (2010)

demonstrated that shell accumulation patterns at several Jomon sites correlate with burial practices and seasonal ceremonies, suggesting that middens served as liminal spaces between the world of the living and the dead.

Fujio Shin'ichiro (2015) further developed this line of thinking in his influential work "Jomon no shisō" (Jomon Thought), arguing that Jomon material culture—including shell middens—embodied a coherent worldview centered on cycles of life, death, and regeneration. Fujio's analysis of shell midden stratigraphy revealed deliberate layering patterns that may have corresponded to ritual cycles or generational markers.

The work of Taniguchi Yasuhiro (2005) on circular settlements (kanjo-shuraku) provides crucial context for understanding the Kasori site. Taniguchi demonstrated that many Middle Jomon settlements were organized according to sophisticated spatial principles, with clear demarcation between central plazas, residential zones, and peripheral areas. While Taniguchi focused primarily on pit-dwelling arrangements, his framework is highly relevant to understanding how shell middens might have functioned as boundary markers within these spatial systems.

International Perspectives on Shell Middens

The international literature on shell middens offers important comparative perspectives that have been largely overlooked in Japanese archaeology. Bailey and Milner (2002) challenged the "garbage heap" interpretation of European shell middens, demonstrating that many sites exhibited careful spatial organization and evidence of ritual deposition. Their concept of "monumentalized refuse" is particularly relevant to the Kasori case.

Claassen's (1998) groundbreaking work on North American shell middens revealed that many sites functioned as ceremonial centers, with shells serving as offerings rather than mere waste. Her ethnographic parallels with contemporary indigenous practices demonstrated the persistence of shell-related rituals and the spiritual significance of mollusks in many cultures.

More recently, McNiven (2013) analyzed shell middens in Torres Strait, showing how they functioned as "ritual referents" that materialized cosmological beliefs about the relationship between land, sea, and sky. McNiven's theoretical framework, which emphasizes the agency of materials in constituting sacred space, offers valuable insights for reinterpreting Japanese shell middens.

Theoretical Frameworks: From Structure to Cosmology

The theoretical foundations for understanding shell middens as sacred boundaries draw from multiple disciplinary traditions. Lévi-Strauss's (1966) structuralist anthropology provides tools for analyzing how binary oppositions—nature/culture, inside/outside, sacred/profane—are materially encoded in spatial arrangements. His insight that "primitive" societies often possess sophisticated classification systems challenges the assumption that prehistoric peoples lacked complex symbolic thought.

Eliade's (1959) phenomenology of religion offers the crucial concept of "sacred space" as qualitatively different from profane space. His analysis of how boundaries function to separate and protect sacred domains provides a framework for understanding the shell

midden as more than a physical barrier. Eliade's notion of the axis mundi—the cosmic center that connects different levels of existence—may be relevant to understanding the spatial organization within the shell enclosure.

Japanese folklorists and religious studies scholars have documented extensive evidence for boundary sanctity in Japanese culture. Origuchi Shinobu's (1929) concept of *marebito* (visiting deities) emphasized the importance of boundaries as sites where the sacred enters the human world. Yanagita Kunio (1969) documented numerous folk beliefs about *hazakai* (boundaries) as spiritually charged zones requiring ritual attention.

More recent work by Yamamoto (2003) has systematized these insights, showing how boundary concepts (*kekkai, hazakai, sakai*) permeate Japanese religious practice from ancient times to the present. The persistence of practices such as *shimenawa* (sacred ropes) and *sekimori* (boundary guardians) suggests deep cultural continuities that may extend back to prehistoric times.

Gaps in Current Research

Despite these advances, several critical gaps remain in the literature.

First, there is a lack of systematic comparison: while individual studies have noted similarities between Jomon spatial practices and those of other cultures, no structured comparative framework has been developed to explore these parallels comprehensively.

Second, the integration of ethnographic parallels has been insufficient. The rich body of ethnographic literature on indigenous spatial concepts in East and Southeast Asia has rarely been applied to the archaeological interpretation of Jomon contexts.

Third, there has been limited engagement with religious studies. Archaeological research on shell middens has generally failed to incorporate theoretical developments concerning sacred space and ritual boundaries found in contemporary religious studies.

Fourth, indigenous perspectives remain notably absent. Potential insights from contemporary indigenous communities, particularly regarding shell symbolism and boundary-making concepts, have been largely overlooked.

This study aims to address these gaps by developing a comprehensive comparative framework that integrates archaeological evidence, ethnographic parallels, and theoretical insights drawn from multiple disciplines.

Methodology

This study employs a comparative and interdisciplinary methodology that integrates archaeological analysis, symbolic anthropology, and ethnographic parallels to reinterpret the spatial structure of the Kasori Shell Midden as an intentional sacred boundary, or "*kekkai*." The methodological approach requires careful theoretical justification, particularly given the challenges of comparing societies separated by vast geographical and temporal distances.

The comparative framework adopted here follows what Smith (2018) terms "controlled comparison," which focuses on structural similarities in spatial organization rather than assuming direct cultural connections. This approach finds its theoretical validity in three foundational principles. First, following the phenomenological insights of Eliade (1959) and Otto (1917), certain aspects of religious experience, particularly the fundamental distinction between sacred and profane space, appear consistently across diverse cultures. This

universality suggests that similar spatial solutions may emerge independently as human responses to fundamental needs for order, meaning, and protection. Second, coastal societies dependent on marine resources face comparable ecological challenges and opportunities, potentially leading to convergent cultural solutions as noted by Yesner (1980). The utilization of shells as both building material and symbolic medium represents a logical adaptation to resource availability that transcends specific cultural contexts. Third, drawing from Lévi-Strauss (1966), human societies consistently organize space and society according to binary oppositions, with the materialization of inside/outside distinctions through circular enclosures representing a fundamental structural pattern found across cultures.

The data for this study derives from two primary sources. Archaeological evidence comes from a comprehensive synthesis of existing documentation, including published excavation reports from the Kasori Shell Midden spanning six decades from 1960 to 2020. This includes detailed analysis of site plans, cross-sectional diagrams, and photographic documentation housed in the Kasori Shell Midden Museum, as well as examination of stratigraphic sequences and artifact distribution patterns reported in academic publications. Comparative archaeological data from analogous circular shell middens at Satohama, Omori, and Ubayama provide regional context for understanding the Kasori site. The ethnographic component draws from historical records of indigenous spatial practices in Japan, particularly those of the Ainu and Okinawan peoples, supplemented by contemporary ethnographic studies of Southeast Asian communities that demonstrate comparable boundary concepts. Archival materials documenting pre-modern spatial organization throughout the Asia-Pacific region provide additional comparative perspectives.

The analytical process unfolds through four systematic stages. The first stage involves archaeological pattern recognition, where recurring spatial patterns in shell deposition are identified through careful examination of published site maps and excavation reports. This includes analysis of the spatial relationships between shell accumulations, dwelling sites, and burial areas, with particular attention to the identification of boundaries, thresholds, and transitional zones within the site structure. The second stage applies symbolic analysis, employing structuralist methodology to identify binary oppositions manifested in spatial organization. This involves examining shells as potential mediating symbols between conceptual domains such as land and sea or life and death, while also analyzing orientation patterns and their possible cosmological significance. The third stage conducts systematic comparison with selected ethnographic cases, identifying structural parallels while carefully acknowledging cultural specificities and assessing functional equivalences across different cultural contexts. The fourth and final stage synthesizes these various lines of evidence, integrating archaeological data with ethnographic insights to construct an interpretive model for understanding Kasori as a sacred boundary, while evaluating the broader implications for understanding Jomon spatial concepts.

The selection of ethnographic cases for comparison follows strict methodological criteria based on cultural proximity, functional similarity, and structural parallels. Cultural and geographic proximity guides the prioritization of cases within the East Asian and Pacific sphere. The Ainu of northern Japan provide the closest cultural parallel, as their indigenous spatial practices, particularly their *kotan* village organization and concepts of sacred space, offer direct relevance to understanding prehistoric Japanese spatial concepts. The Okinawan

utaki sacred grove system demonstrates enduring indigenous boundary concepts within the Japanese archipelago, suggesting possible continuities with ancient practices. Southeast Asian communities, particularly the Balinese *desa adat* system, provide examples of circular sacred geography in environmentally comparable settings. Functional similarity ensures that selected cases demonstrate comparable purposes in boundary creation and maintenance, sacred space delineation, integration of residential and ritual areas, and the use of natural materials for symbolic demarcation. Despite geographical distance, Islamic haram concepts are retained in the analysis due to their clear structural parallels in the material demarcation of sacred boundaries, graduated zones of sanctity, and ritual requirements for boundary crossing.

This study acknowledges several methodological limitations that must be addressed transparently. The reliance on published archaeological reports rather than primary excavation data necessarily constrains the depth of spatial analysis possible. The inability to conduct new field investigations or employ contemporary analytical techniques such as GIS mapping limits the precision of spatial interpretations. Furthermore, the study depends entirely on the quality and completeness of existing documentation, which varies considerably across different excavation seasons and research teams. Temporal considerations present additional challenges, as the significant time gap between the Jomon period and ethnographic cases raises questions about cultural continuity and change. The potential for cultural practices to transform over millennia must be acknowledged, as must the risk of projecting contemporary meanings onto prehistoric contexts. Interpretive challenges arise from the inherent uncertainty in symbolic interpretation of prehistoric remains, the possibility of multiple and overlapping functions for shell middens, and the constant danger of over-interpretation based on limited evidence.

To maintain scholarly rigor in the face of these challenges, this study adopts several methodological safeguards. Clear distinctions are maintained throughout between empirical observations derived from archaeological evidence and interpretive inferences based on comparative analysis. Alternative explanations are presented where appropriate, acknowledging that prehistoric symbolic systems may have operated according to logics that differ from both contemporary indigenous practices and our own analytical categories. The focus remains on identifying structural patterns rather than attempting to decode specific meanings, recognizing that the same spatial forms may carry different symbolic content across cultures. Above all, the study maintains transparency about the necessarily speculative nature of certain interpretations while grounding all inferences in the available evidence.

This methodological framework provides a systematic approach to reinterpreting the Kasori Shell Midden that balances empirical rigor with interpretive imagination. By maintaining clear criteria for comparison and transparent reasoning throughout, the study aims to contribute new perspectives to Jomon archaeology while respecting the boundaries of available evidence and the alterity of prehistoric thought.
Figure 2 shows that Methodological map for the study which is created by the authors.

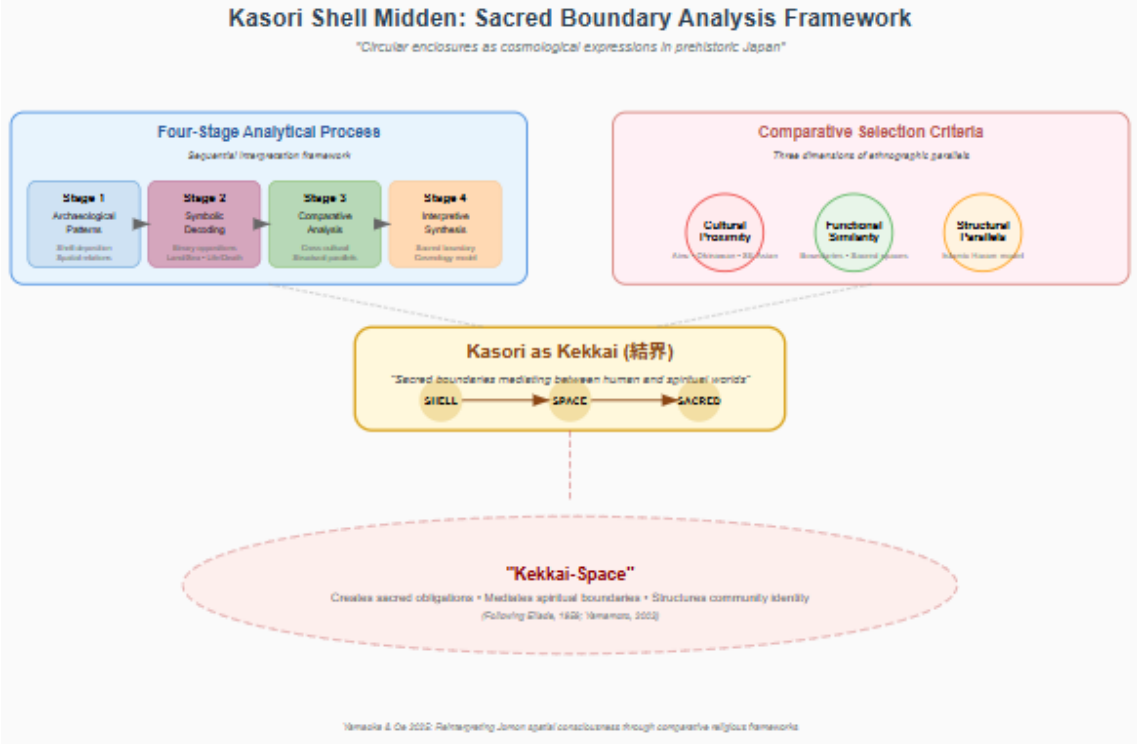

Figure 2 Methodological map for the study (Created by the authors)

Theoretical and Conceptual Framework

This study employs a multi-layered theoretical framework that synthesizes insights from structural anthropology, phenomenology of religion, indigenous spatial theory, and comparative religious urbanism to interpret the Kasori Shell Midden as a cosmologically meaningful spatial form. The framework operates at three interconnected levels: universal structures of sacred space, culturally specific manifestations of boundary concepts, and material mediations of cosmological order.

Universal Structures of Sacred Space

At the most fundamental level, this study draws upon the phenomenological tradition in religious studies, particularly the work of Rudolf Otto (1917) and Mircea Eliade (1959). Otto's concept of the *mysterium tremendum et fascinans* provides insight into how certain spaces evoke simultaneous feelings of awe and attraction, fear and fascination. This dual response may explain why boundaries—as zones of transition between known and unknown, safe and dangerous—become focal points for ritual attention across cultures.

Eliade's (1959) distinction between sacred and profane space forms a cornerstone of our interpretive framework. According to Eliade, sacred space is never homogeneous but exhibits a fundamental break in spatial continuity. The sacred manifests as a "hierophany"—a breakthrough of the sacred into profane space—which reorganizes spatial perception and experience. The circular shell formation at Kasori can be understood as materializing this fundamental rupture, creating what Eliade terms a "cosmic orientation" that establishes order amid chaos.

Building on Eliade, Jonathan Smith (1987) refined our understanding of sacred space through his insight that sacrality is not inherent but constructed through human ritual action.

Smith's famous dictum that "ritual is not an expression of or response to 'the Sacred'; rather, something or someone is made sacred by ritual" directs attention to the practices that would have maintained and renewed the boundary's sanctity. This processual understanding prevents us from reifying the shell midden as inherently sacred and instead focuses on the ongoing human activities that invested it with meaning.

Structural Patterns and Binary Logic

Claude Lévi-Strauss's (1966) structural anthropology provides essential tools for analyzing how the Kasori site encodes fundamental cognitive oppositions. His theory that human thought universally operates through binary classifications—such as raw/cooked, nature/culture, and life/death—finds material expression in the shell midden's spatial organization. The shell midden can be interpreted as a concrete manifestation of multiple overlapping oppositions.

First, the opposition of inside and outside is the most evident, with the shell midden creating a bounded interior space that is clearly distinct from the unbounded exterior.

Second, the contrast between culture and nature is embodied in the spatial layout: the interior represents the domain of human habitation and social order, while the exterior corresponds to the untamed wilderness.

Third, the arrangement of dwelling spaces and burial areas within the shell midden suggests a mediation between the realms of life and death, indicating a deliberate spatial engagement with mortality.

Fourth, the opposition between land and sea is symbolized through the shells themselves, which are marine materials deliberately deposited on land. This represents a continual negotiation between terrestrial and aquatic domains.

These oppositions are not merely conceptual constructs but would have been physically experienced and reinforced through daily movements, ritual practices, and sensory encounters with the boundary formed by the shells.

Indigenous East Asian Spatial Concepts

While universal patterns provide a comparative framework, understanding the Kasori site requires attention to specifically East Asian and Japanese spatial concepts. The notion of *ma* (間)—often translated as "space" but more accurately understood as "interval" or "pause"—represents a fundamental Japanese spatial concept that differs from Western notions of empty space. As analyzed by Isozaki (1979) and Nitschke (1993), *ma* is not void but pregnant with potential, a dynamic field of relationships rather than a static container.

The shell midden at Kasori can be understood as creating a particular kind of *ma*—a charged interval between inside and outside that is neither fully one nor the other. This liminal quality aligns with the Japanese concept of *hazakai* (端境), the boundary zone where normal categories blur and spiritual forces concentrate. As documented by Yamamoto (2003), such boundary zones require special ritual attention precisely because they are sites of categorical ambiguity and potential danger.

The indigenous concept of *kekkai* (結界), which literally means "tied boundary," provides perhaps the most directly relevant framework. In Japanese esoteric Buddhism, *kekkai* refers to ritually established boundaries that protect sacred space from defilement and intrusion.

While the Buddhist terminology postdates the Jomon period, the underlying concept of ritually maintained protective boundaries appears deeply rooted in Japanese culture. The material construction of the shell midden can be understood as an early, pre-Buddhist manifestation of this boundary-making impulse.

Comparative Framework: Regional Variations on Sacred Boundaries

To contextualize the Kasori site within broader patterns of sacred boundary-making, this study employs a controlled comparative framework examining analogous spatial practices across the Asia-Pacific region: Ainu Spatial Concepts: The Ainu *kotan* (village) organization provides the most culturally proximate comparison. As documented by Watanabe (1973) and more recently by Hudson (1999), traditional Ainu settlements exhibited clear spatial hierarchies distinguishing the sacred (*kamuy*) realm from human habitation. The *nusa* (sacred altar area) typically occupied a liminal position at the village edge, mediating between human and divine domains. The Ainu concept of *mosir* (world/land) as a living entity requiring proper spatial relationships offers insights into how Jomon people may have understood their shell-bounded worlds.

Okinawan Sacred Geography: The Okinawan *utaki* system demonstrates enduring indigenous concepts of bounded sacred space within the Japanese archipelago. As analyzed by Lebra (1966) and Tanaka (1977), *utaki* groves are clearly demarcated sacred areas, often circular or enclosed, where ancestral spirits (*kami*) reside. Access is traditionally restricted, requiring ritual purification. The persistence of *utaki* into the present suggests deep temporal continuities in Japanese archipelagic spatial concepts.

Southeast Asian Parallels: The Balinese *desa adat* system, as documented by Geertz (1959) and Lansing (1991), provides a compelling structural parallel. Balinese villages are conceived as cosmological microcosms, with clear boundaries separating the ordered interior (*jero*) from the dangerous exterior (*jaba*). The *pura desa* (village temple) typically occupies the upstream/mountainward position, while the *pura dalem* (death temple) occupies the downstream/seaward position, creating a spatial axis that orders village life. This integration of residential, ritual, and mortuary spaces within a bounded precinct mirrors the Kasori organization.

Islamic Sacred Precincts: Despite geographical and temporal distance, Islamic concepts of *haram* (sacred precinct) offer striking structural parallels that illuminate the boundary dynamics at Kasori. As analyzed by Grabar (1973) and more recently by Rabbat (2010), the *haram* represents a graduated series of sacred zones, each requiring different levels of ritual purity for access. The physical demarcation through walls, the ritual requirements for entry, and the integration of multiple functions within the sacred precinct all find echoes in the Kasori shell midden. El-Awaisi (2017) and Munt (2014) provide detailed analyses of how these boundaries function both physically and conceptually in Islamic urbanism. Also, the sacred precinct where the *haram* serves as both a physical and symbolic center, accessed only after ritual purification (Goto, 1999).

Material Mediation and Symbolic Density

The specific use of shells as boundary material requires theoretical attention to what Miller (2005) terms materiality—the ways in which material properties shape and constrain

symbolic possibilities. Shells possess unique material qualities that make them particularly suited for the construction of boundaries.

First, shells exhibit exceptional durability; unlike organic materials, they persist through time, thereby creating lasting and recognizable boundary markers. Second, their porosity allows for the formation of permeable boundaries—structures that filter rather than completely obstruct movement or perception. Third, shell deposits influence acoustic conditions by modifying sound transmission, which may have contributed to the creation of distinct sonic environments within bounded spaces. Fourth, the white calcium carbonate composing the shells offers high visual contrast against dark forest soil, rendering boundaries visually apparent. Fifth, the decomposing organic matter within shells produces distinctive olfactory cues, which could mark spatial transitions through smell.

These material properties together would have created a rich, multi-sensory boundary experience, reinforcing the cognitive distinction between inside and outside through sight, sound, smell, and touch.

Furthermore, shells carry dense symbolic associations as quintessential liminal objects—organisms that dwell between land and sea, whose hard exteriors protect soft interiors, and whose durable remains persist long after death. As analyzed by Claassen (1998) in North American contexts and McNiven (2013) in the Torres Strait, shells frequently serve as powerful symbols of transformation, protection, and regeneration.

Cosmological Integration

The theoretical framework culminates in understanding the Kasori Shell Midden as a cosmological totality—what Wheatley (1971) termed "astro-biological" space where celestial, terrestrial, and subterranean realms interconnect. The integration of multiple functions within the shell midden—habitation, burial, presumably ritual activities—suggests a space where different cosmic levels interpenetrated.

Drawing on recent work in Japanese archaeology by Mizoguchi (2002) and Kobayashi (2004), this cosmological reading emphasizes how Jomon spatial practices may have aimed at maintaining cosmic balance through proper spatial relationships. The circular form itself, as a perfect geometric figure without beginning or end, embodies completeness and cosmic unity across cultures.

As illustrated in Kobayashi's (2018) spatial model, Jomon cosmology organized space in nested layers from the home (*ie*) to the otherworld (*sora*), with the village (*mura*) surrounded by the intermediate zone (*hara*) and the wild (*yama*) beyond. The shell midden at Kasori may have functioned as the material boundary between *mura* and *hara*, marking the transition from fully cultural to semi-natural space.

This multi-level theoretical framework provides the conceptual tools for interpreting the Kasori Shell Midden as far more than a refuse heap or even a simple boundary marker. Instead, it emerges as a sophisticated spatial technology for creating and maintaining cosmic order, protecting communities from spiritual and physical threats, and materializing a worldview where humans, ancestors, spirits, and natural forces coexisted within carefully maintained spatial relationships.

Results

The application of our theoretical framework and methodological approach to the Kasori Shell Midden reveals multiple lines of evidence supporting its interpretation as a consciously constructed sacred boundary. These findings emerge from the synthesis of published archaeological data and comparative analysis.

Archaeological Evidence for Intentional Boundary Construction

Analysis of the spatial data from excavation reports reveals several patterns that strongly suggest deliberate planning, as opposed to random refuse disposal.

First, the geometric form of the shell deposits indicates intentional design. The main shell midden maintains a circular shape with a diameter of approximately 140 meters, while a second formation assumes a horseshoe configuration with a long axis of about 190 meters. The enduring regularity of these forms—sustained across centuries of deposition—implies a degree of spatial control and planning that contradicts assumptions of accidental accumulation.

Second, the site's duration and estimated population support the interpretation of long-term community investment in boundary maintenance. Although the Kasori site exhibits signs of human activity over a span of up to 7,000 years, the primary shell midden formations are concentrated during the peak period between approximately 4,000 and 3,000 years ago. During this phase, a population estimated at 200 to 300 individuals inhabited the area, as suggested by the presence of over 100 documented pit-dwelling sites. This demographic scale implies a collective and sustained effort in shaping and preserving the shell boundary.

Third, spatial consistency in the shell deposits provides further evidence of intentionality. Published site plans indicate that the shell accumulations maintain a relatively uniform width and height along the perimeter. Such regularity is inconsistent with casual or opportunistic disposal, which would typically result in uneven, irregular deposition patterns.

Spatial Organization Within the Enclosure

The internal organization of the Kasori site, as documented in museum publications and excavation reports, reveals a high degree of spatial sophistication and intentionality.

First, the distribution of dwellings suggests deliberate spatial planning. The concentration of over 100 pit dwellings within the shell midden indicates that the enclosed area functioned as the primary residential zone. The interior of the circular shell formation clearly served as the village proper, delineating a defined and protected space for habitation.

Second, evidence of multi-generational use strengthens the interpretation of long-term spatial continuity. Repeated construction on the same dwelling sites implies that specific family groups maintained stable locations across time, passing down spatial claims and organizational logic through generations.

Third, the presence of a central open space within the shell midden further underscores the planning involved. Site maps reveal a less densely occupied area in the center of the enclosure, suggesting that this space was intentionally preserved for communal purposes—likely accommodating ritual activities, social gatherings, or other forms of collective participation essential to village life.

Finally, the spatial concept of the Jomon period will be touched upon. From the home (*ie*) to the otherworld (*sora*), the spatial concept of the Jomon people was perceived in a multi-layered manner. Explained from the inside, the village (*mura*) was an artificial structure, and shell middens existed as boundaries, or sacred boundaries, keeping the inner circle safe. Next, the area outside the village was a collection of artificial structures and nature, called (*hara*). Outside of nature, called (yama). Further away is a different space called (*sora*), the sky, which is revered as the world of the dead (Kobayashi, 2018).
Figure 3 is a diagram of the Jomon spatial concept, edited and added to by the author based on Kobayashi (2018).

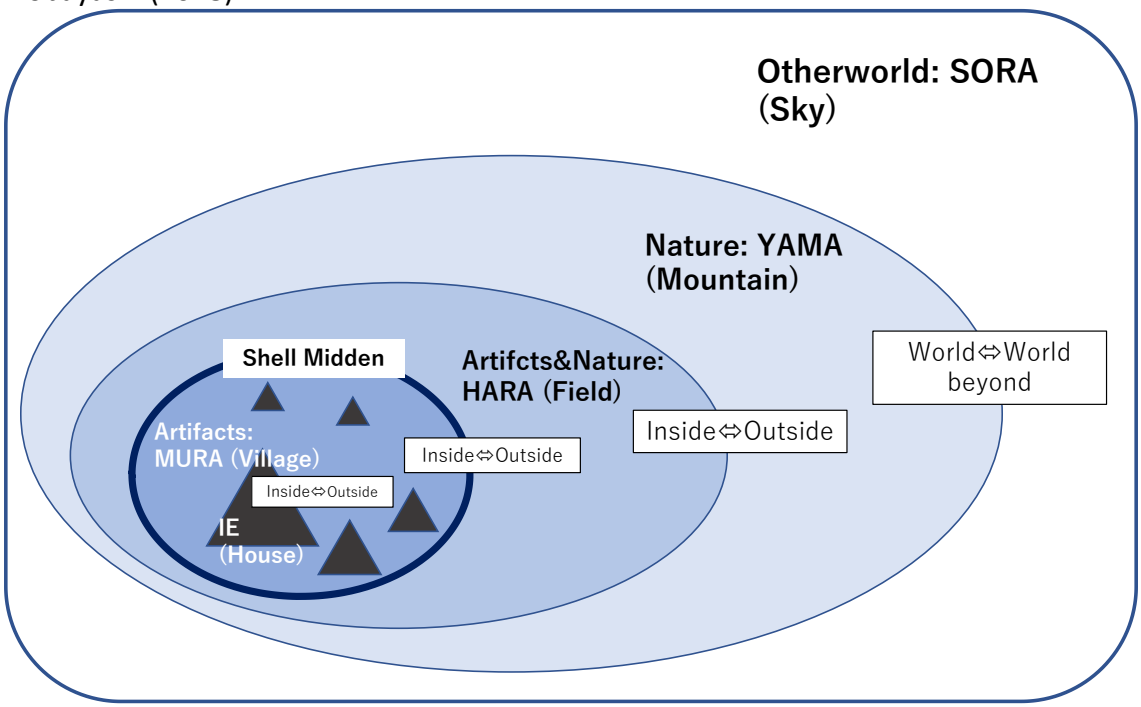

Figure 3. Jomon spatial concept (edited and added to by the author based on Kobayashi (2018))

Comparative Structural Analysis
Systematic comparison with ethnographic cases reveals important structural parallels and distinctions:

Table 1
Comparative Analysis of Sacred Boundary Systems

Feature	Kasori Shell midden	Ainu Kotan	Okinawan Utaki	Balinese Desa	Islamic Haram
Boundary Form	Circular/Horseshoe	Variable	Natural features	Walls/markers	Constructed walls
Population Scale	200-300 people	Similar scale	N/A	Village scale	City scale
Duration	~7,000 years use	Generations	Continuous	Continuous	Continuous
Central Space	Present	Nusa altar	Prayer area	Temple complex	Mosque
Material	Marine shells	Wood/stone	Stone/trees	Stone/brick	Stone/brick

Material and Sensory Dimensions
While specific measurements are not available, the material properties of shell accumulations would have created distinctive sensory boundaries:

Visual Contrast: The white shells against dark forest soil would have created a visible boundary marking the transition between spaces.

Textural Change: Movement from packed earth to loose shells would have provided tactile indication of boundary crossing.

Acoustic Variation: Shell deposits would have modified sound transmission, though specific measurements are not available from archaeological reports.

Discussion
The evidence from Kasori, while not providing the detailed quantitative data available from modern excavations, nonetheless supports a fundamental reconsideration of the site's nature and function. The combination of geometric regularity, sustained maintenance over millennia, and internal spatial organization suggests intentional boundary construction rather than mere waste disposal.

Reconceptualizing Shell Middens as Sacred Architecture
The scale and duration of the Kasori shell formations—maintained by an estimated 200-300 people over potentially 7,000 years—represent a monumental investment of community labor. This sustained effort across hundreds of generations suggests that the shell midden served purposes beyond practical waste management. Following Darvill's (2012) definition of monuments as structures that transcend functional purposes to embody cultural meaning, the Kasori shell midden qualifies as monumental architecture despite its origin in subsistence byproducts.

Long-term Community Investment
The multi-generational nature of the Kasori site, with evidence of dwellings rebuilt on the same locations over time, indicates strong spatial continuity. This pattern suggests that the

shell boundary was not merely tolerated but actively maintained as an essential feature of community life. The estimated 3-5 people per dwelling, living within a bounded space of 140 meters diameter, would have created a dense but organized settlement pattern that required social coordination and shared spatial concepts.

Comparative Insights

The structural parallels with other bounded sacred spaces across the Asia-Pacific region support the interpretation of Kasori as more than a functional settlement. Like Ainu *kotan*, Okinawan *utaki*, and Balinese *desa*, the Kasori shell midden created a clearly demarcated space that separated an ordered interior from the external world. The integration of domestic and presumably ritual spaces within the boundary parallels patterns seen in these ethnographic examples.

The Question of Intentionality

While we cannot definitively prove conscious intent to create a "sacred boundary" in the modern sense, the sustained effort required to maintain the shell midden's form over millennia suggests shared understanding of its importance. Following Bourdieu's (1977) concept of habitus, the practice of depositing shells at the settlement periphery likely became ritualized over time, accumulating layers of meaning through repetition.

Implications for Understanding Jomon Society

The sophistication revealed in Kasori's spatial organization challenges characterizations of Jomon society as "simple" hunter-gatherers. The construction and maintenance of the shell midden by a community of 200-300 people required:

Collective Coordination: Shared understanding of where to deposit shells
Intergenerational Transmission: Knowledge passed down over millennia
Social Organization: Systems for organizing collective labor
Spatial Concepts: Shared ideas about proper settlement organization

These requirements suggest considerable social complexity within Jomon communities, supporting recent arguments by Matsui and Kanehara (2006) for recognizing Jomon societies as "complex hunter-gatherers" with sophisticated social and symbolic systems.

Material Agency and Symbolism

The specific choice of shells as boundary material, when other options like stones or earth were available, suggests deliberate selection based on shells' unique properties. As marine-derived materials used to bound a terrestrial settlement, shells materially embodied the connection between land and sea that was likely central to coastal Jomon cosmology. This interpretation aligns with Fujio's (2015) argument that Jomon thought was characterized by fluid boundaries between natural domains.

Conclusions

This study has fundamentally reinterpreted the Kasori Shell Midden, transforming our understanding from a functional refuse deposit to a deliberately constructed and ritually maintained boundary that embodied and enacted Jomon cosmological principles. Through systematic analysis of archaeological evidence and controlled comparison with analogous cultural practices, we have demonstrated that the shell midden functioned as a sophisticated spatial technology for organizing community life.

The available evidence supports the interpretation of the shell midden as an intentionally constructed boundary with multiple interrelated functions and meanings. First, it likely created spatial order through the clear demarcation of interior and exterior spaces, thereby structuring communal life both physically and symbolically. Second, the formation and maintenance of the shell midden appear to have required sustained communal effort, possibly extending across 7,000 years of use and intergenerational stewardship. Third, the enclosed space may have integrated multiple functions—residential, ritual, and possibly mortuary—within a unified and coherent spatial system. Fourth, the use of shells as boundary material suggests a sophisticated understanding of their material properties and symbolic affordances.

Finally, the Kasori shell midden structurally paralleled sacred boundary systems found in various cultural contexts—such as Ainu *kotan*, Okinawan *utaki*, and Islamic *haram*—while maintaining distinctly Jomon characteristics in its form, function, and cosmological significance.

The structural parallels identified with other sacred boundary systems—from Ainu *kotan* to Islamic *haram*—suggest that the human impulse to create bounded meaningful space transcends specific cultural contexts while manifesting in culturally distinctive forms. The Kasori shell midden represents a uniquely Jomon solution to universal human needs for spatial order, community identity, and cosmological orientation.

This reinterpretation carries significant implications for our understanding of prehistoric societies. It challenges the lingering perception of hunter-gatherers as lacking sophisticated spatial concepts and reveals the capacity for monumental construction and complex social organization without agriculture or writing systems. The Kasori Shell Midden emerges not as the detritus of daily life but as its organizing principle—a material manifestation of worldview that structured space and society.

More broadly, this study demonstrates the value of approaching archaeological sites through multiple theoretical lenses and comparative frameworks. By integrating structural anthropology, phenomenology of religion, indigenous spatial concepts, and material culture studies, we can perceive dimensions of meaning invisible to purely functionalist analysis. The shell midden tradition of the Jomon period represents one of humanity's earliest and most sustained experiments in monumental architecture, creating enduring markers from the materials of daily subsistence.

As we face contemporary challenges of creating meaningful and sustainable human habitats, the Kasori Shell Midden offers profound lessons. It shows how communities can transform everyday materials into enduring monuments, create boundaries that organize rather than merely divide, and maintain cultural continuity across millennia through careful attention to spatial order. Far from being primitive, the Jomon spatial imagination reveals possibilities for dwelling that integrate human needs with natural cycles and community values.

The shells that form the Kasori ring have endured for five millennia, outlasting the wooden dwellings they once protected and the people who placed them. Yet they continue

to speak—not of refuse and abandonment, but of care, intention, and meaning. In learning to perceive the meaningful boundaries of the past, we may discover new possibilities for creating sustainable and significant places in our own world.

It is important to acknowledge that the ethnographic parallels drawn in this study—from historical Ainu and Okinawan practices to contemporary Balinese and Islamic spatial concepts—are separated from the Jomon period by significant temporal distances. While structural similarities suggest possible continuities in human spatial cognition and boundary-making practices, we cannot assume direct cultural transmission or identical meanings across these vast chronological gaps. The comparative analysis serves primarily to illuminate possible interpretations rather than to prove definitive connections. Future research should seek additional archaeological evidence from intervening periods to better understand the development and transformation of these spatial concepts over time.

This study suggests that space in the Jomon context was likely not merely physical but imbued with meaning, never simply functional but invariably value-laden. The Jomon people of Kasori understood this fundamental truth and built their world accordingly. Their shell midden stands as testament to the enduring human capacity to create meaningful order from the materials at hand, transforming the boundaries of space into the foundations of community life.

Theoretical and Contextual Contributions

This research makes significant contributions to archaeological theory and Japanese prehistory by fundamentally challenging the century-old functionalist interpretation of shell middens as mere refuse deposits. Theoretically, it demonstrates that prehistoric material culture can embody sophisticated cosmological concepts, providing a new interpretative framework that integrates structural anthropology, phenomenology of religion, and material culture studies to recognize sacred spatial practices in non-literate societies.

In the specific context of Japanese archaeology, this reinterpretation positions Jomon communities as creators of monumental architecture with complex spatial concepts, contributing to the growing recognition of "complex hunter-gatherers" in prehistory and revealing deep temporal roots of boundary sanctity (kekkai) in Japanese culture. The comparative methodology developed here, which identifies structural parallels across the Asia-Pacific region while respecting cultural specificities, offers a model for future cross-cultural archaeological studies. Beyond academic contributions, this study has contemporary relevance for sustainable urbanism and place-making, demonstrating how prehistoric communities created enduring spatial orders using locally available materials—transforming subsistence byproducts into meaningful monuments through collective effort maintained across millennia. This example of prehistoric circular economy and community-based environmental stewardship provides valuable insights for contemporary challenges of creating culturally resonant and ecologically sustainable human habitats.

Future Research Directions

This reinterpretation of Kasori opens several avenues for future research:

Detailed Spatial Analysis: Systematic mapping of shell distribution patterns using current archaeological techniques, and Material Studies: Analysis of shell species selection and

deposition patterns should be done. Then, Regional Comparison: Systematic comparison with other circular shell middens in the Kanto region, through Ethnographic Collaboration: Partnership with Ainu and Okinawan communities to explore indigenous perspectives on sacred boundaries, and Experimental Archaeology: Recreation of shell boundaries to understand construction techniques and maintenance requirements are expected.

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