

Visual Communication in Prehistoric Public Spaces: A Linguistic Landscape Study of Liangkabori Cave

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Abstract

Background:

Linguistic landscape studies have predominantly focused on written texts in contemporary public spaces. This study extends the concept of Semiotic Landscapes to pre-literate contexts by examining the pictograms of Liangkabori Cave in Muna as a form of prehistoric public communication. This study aims to analyze how the pictograms in Liangkabori Cave function as elements of a prehistoric semiotic landscape that convey visual communication and social meaning.

Methodology:

This qualitative study applies a visual semiotics approach integrated with archaeological analysis. Data were obtained from hematite-based pictograms, supported by 3D scanning and spectroscopic analysis to examine painting techniques on karst surfaces.

Findings:

The pictograms appear to serve both informational and symbolic functions. Hunting and boat motifs suggest representations of subsistence strategies and maritime orientation. The kite motif may indicate an understanding of basic aerodynamic principles and communal practices, while the sun symbol can be interpreted as reflecting cosmological beliefs. These findings are interpretive and do not directly represent verifiable historical intentions.

Conclusion:

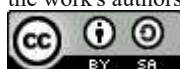
Liangkabori Cave can be understood as a form of prehistoric visual communication system. The findings suggest that visual representations were likely used to convey ecological knowledge, maritime practices, and belief systems. However, these interpretations remain tentative and highlight the importance of further interdisciplinary research and conservation efforts.

Originality:

This study contributes to linguistic landscape research by extending its scope to prehistoric contexts and proposing rock art as a form of semiotic landscape in pre-literate societies.

Keywords : Semiotic landscape; Visual semiotics; Prehistoric communication; Rock art; Liangkabori Cave.

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1. INTRODUCTION

The study of Linguistic Landscapes (LL) has traditionally focused on written texts in modern public spaces to examine social, cultural, and political dynamics, including identity and power relations ([Landry & Bourhis, 1997](#)). This perspective has gradually expanded into Semiotic Landscapes (SL) and geosemiotics, which recognize images, symbols, spatial arrangements, and other visual artifacts as integral components of public communication ([Gorter, 2013](#); [Mooney & Evans, 2023](#); [Shohamy & Ghazaleh-Mahajneh, 2012](#)). While these developments have enriched the analysis of contemporary urban environments, their application remains largely limited to literate societies that rely on formal writing systems.

In contrast, the communicative practices of pre-literate societies have received comparatively little attention within linguistic and semiotic landscape research. Prior to the emergence of writing systems, early human communities used shared physical spaces to construct and transmit meaning ([Artawa et al., 2023](#); [Barni & Bagna, 2010](#)). Within this context, prehistoric rock art can be understood not merely as aesthetic production, but as a form of visual representation embedded in specific spatial and social environments. However, most existing studies approach such materials primarily as archaeological artifacts, emphasizing chronology, technique, and material composition rather than their communicative or semiotic functions ([Herdiani & Yondri, 2024](#); [Cindi Claudia Aridin & Syahrin, 2024](#)).

The karst region of Liangkabori in Muna Island, Southeast Sulawesi, offers a significant site for examining this gap. The area consists of a network of prehistoric caves formed by uplifted seabed formations and characterized by steep limestone cliffs. Archaeological surveys have identified more than 38 cave sites in this region, including caves containing numerous pictograms produced using hematite pigments through finger-painting and spraying techniques ([Ali Okto et al., 2023](#)). The motifs include human figures, hunting scenes, animals, boats, kites, and abstract symbols such as the sun, reflecting a wide range of visual representations associated with everyday practices and belief systems.

Although the antiquity and diversity of rock art in Sulawesi have been widely recognized, including findings that place Indonesian cave art among the oldest in the world, studies have rarely examined these pictograms as part of a broader semiotic system situated in a shared spatial context. As a result, the potential of these visual forms to be understood as elements of structured communication in communal spaces remains underexplored.

This study addresses this gap by examining the pictograms of Liangkabori Cave through the lens of semiotic landscapes. In this study, the concept of a prehistoric public space refers

to a shared physical environment where visual markings were produced, displayed, and potentially interpreted within a community as part of meaning-making practices. Based on this perspective, the study is guided by the following research question: How can the pictograms in Liangkabori Cave be interpreted as elements of a prehistoric semiotic landscape that convey visual communication and social meaning?

To answer this question, this research applies a qualitative visual semiotics approach integrated with archaeological data. Rather than treating the pictograms solely as material artifacts, this study interprets them as visual signs situated within a spatial and cultural context. This approach allows for an analysis of how specific motifs may function in conveying information, representing practices, and expressing symbolic meanings.

The contribution of this study is twofold. First, it extends the application of semiotic landscape theory to a pre-literate context by examining rock art as part of a spatial system of visual communication. Second, it offers a more interpretive reading of Liangkabori pictograms that complements existing archaeological studies, which have primarily focused on material and historical aspects. While the findings are necessarily interpretive, they provide a more focused framework for understanding how prehistoric visual representations may have functioned within communal settings.

2. LITERATURE REVIEW

2.1 From Linguistic Landscapes to Semiotic Landscapes: Scope and Limits

The Linguistic Landscape (LL) studies have traditionally focused on the visibility of written language in public spaces, particularly in relation to identity, power, and language policy ([Mooney & Evans, 2023](#)). The subsequent development into Semiotic Landscapes (SL) broadened this scope by incorporating visual images, spatial arrangements, and non-verbal signs as integral components of meaning-making ([Gorter, 2006, 2013](#)). This expansion allows researchers to move beyond text-centered analysis and consider how multiple semiotic resources interact within a given environment.

However, the transfer of LL/SL frameworks to prehistoric contexts is not without limitations. These theories were originally developed for literate and contemporary societies, where the producers and audiences of signs can often be identified or inferred. In contrast, prehistoric contexts lack direct ethnographic access, making interpretations more speculative. As a result, applying SL to rock art requires methodological caution, particularly in avoiding the projection of modern communicative assumptions onto ancient visual practices. This study

adopts SL as an analytical lens but treats it as an interpretive framework rather than a definitive model for explaining prehistoric communication.

2.2 Rock Art Interpretation: Between Symbolism and Uncertainty

The Interpretations of prehistoric rock art have evolved from aesthetic and descriptive approaches toward more symbolic and communicative readings. Earlier studies often framed rock art as ritualistic expression or “art for art’s sake” ([Barni & Bagna, 2010](#)), while more recent approaches emphasize its potential role in symbolic communication and knowledge transmission. The theory of “cross-modal information transfer” ([Miyagawa et al., 2018](#)) suggests that cave art may reflect early cognitive processes linking sound, space, and visual representation ([Vesya & Datang, 2022](#)).

Nevertheless, such interpretations remain debated. Archaeologists caution against overgeneralizing the communicative function of rock art, noting that meanings may have been context-specific, transient, or even inaccessible to modern observers. The absence of written records and the temporal distance involved mean that any reading of pictograms must remain tentative. Therefore, while this study considers rock art as a potential form of visual communication, it does not assume a fully structured “language” system in the modern sense, but rather explores how visual motifs may have functioned within a shared symbolic environment.

2.3 Ethnoarchaeology and Contextual Interpretation

Decoding Ethnoarchaeology provides a useful bridge for interpreting prehistoric materials by drawing cautious analogies with documented cultural practices ([Van Mensel & Vandenbroucke, 2016](#)). In rock art studies, this approach has been used to relate visual motifs—such as animals, hunting scenes, or boats—to subsistence practices, environmental knowledge, and belief systems. In the broader Australasian context, such motifs are often interpreted as part of cultural transmission systems, though these interpretations depend heavily on contextual and comparative data ([Wang & Xu, 2018](#); [Beeh et al., 2023](#)).

At the same time, ethnoarchaeological analogies have limitations. Direct equivalence between past and present societies cannot be assumed, and there is a risk of oversimplifying or homogenizing diverse cultural practices. For this reason, this study uses ethnoarchaeology not to claim definitive meanings, but to support plausible interpretations grounded in environmental and cultural context.

2.4 Positioning the Present Study

Building on these perspectives, this study integrates Semiotic Landscape theory with ethnoarchaeological insights to examine Liangkabori rock art as part of a spatial system of visual meaning-making. Unlike conventional archaeological studies that prioritize material classification, chronology, and technique, this research focuses on how pictograms may function as visual signs within a shared environment.

Rather than proposing a comprehensive model of prehistoric “language,” this study offers a more modest contribution: it explores how SL concepts can be cautiously adapted to interpret rock art as situated visual communication. In doing so, it seeks to complement, rather than replace, existing archaeological approaches by foregrounding the interpretive potential of visual semiotics in understanding prehistoric cultural expression.

3. METHODOLOGY

3.1 Research Design

This study adopts a qualitative descriptive-analytical design within an interdisciplinary framework ([Creswell, 2016](#)). It integrates Semiotic Landscape (SL) theory, visual semiotics, and ethnoarchaeology to examine rock art as situated visual signs within a shared spatial environment. In this study, SL is used as an interpretive lens rather than a deterministic model, allowing for cautious analysis of pictograms as potential communicative elements while acknowledging the limits of inference in prehistoric contexts.

3.2 Sampling Strategy and Research Scope

The broader dataset of this study comprises more than 38 caves and approximately 2,000 recorded pictograms in the Liang Kabori karst region. Given the scale of the dataset, a purposive sampling strategy was employed using clearly defined criteria. These criteria included the visibility and preservation of motifs to ensure they were sufficiently intact for visual analysis, the repetition and distribution of motifs across multiple caves or panels, the clarity of form in terms of distinguishable shapes and compositional structure, and their contextual relevance, particularly motifs associated with identifiable activities (e.g., hunting and boating) or symbolic forms (e.g., the sun). Based on these criteria, a total of 50 pictograms were selected from five caves—Gua Kabori, Metanduno, Pominsa, Lakulombu, and Marewu—with approximately 10 examples representing each motif category. The selected motifs were grouped into five analytical categories: anthropomorphic figures, hunting scenes, boat motifs, kites, and sun symbols. This selection does not imply that these motifs are inherently more

important; rather, they were chosen because they provide sufficient visual clarity and contextual consistency to support systematic and comparative analysis.

3.3 Data Collection and Sources

Data for this study were gathered through a combination of primary field observations and secondary data integration.

a. **Primary Data Collection:** Primary data were collected through direct field observation and photographic documentation conducted between 2025 and 2026. The researcher acted as the main instrument, supported by a structured visual observation checklist. The checklist included:

1. motif morphology (shape, size, composition)
2. spatial placement (wall/ceiling, height, clustering)
3. pigment characteristics (color intensity, layering)
4. relational positioning (proximity to other motifs / panel structure)

b. **Secondary Data Integration**

This study did not conduct laboratory-based analyses such as 3D scanning, spectroscopy, or radiometric dating. Instead, these data were drawn from existing archaeological reports, particularly from the Cultural Preservation Office (BPCB) and related research projects. These sources were used to support contextual understanding of material composition, technique, and chronology. In addition, ethnographic and historical literature on Muna hunting practices, maritime activity, and local belief systems were selectively used to support contextual interpretation. Ethnographic parallels were applied cautiously and only where environmental and cultural continuity could be reasonably inferred.

3.4 Data Analysis Techniques

The analysis combines visual semiotics and hermeneutic interpretation, structured into four stages with an explicit distinction between descriptive observation (low inference) and interpretive reading (higher inference), based on [Gorter \(2018\)](#).

a. **Descriptive Identification (Low Inference)**

Each motif was first described empirically based on observable features without assigning meaning.

b. **Typological Classification**

Motifs were categorized into figurative and abstract types and grouped into the five predefined categories.

c. Contextual and Comparative Analysis

Motifs were compared across caves and cross-referenced with ethnographic and archaeological data. Ethnographic analogy was used only as supporting context, not as direct evidence of meaning.

d. Semiotic Interpretation (Higher Inference)

Interpretation was conducted by distinguishing between:

Informational function (e.g., depiction of activities such as hunting or boating)

Symbolic function (e.g., possible cosmological or social meanings) Interpretations were formulated as probabilistic (suggestive), not definitive claims.

3.5 Analytical Matrix (Coding Framework)

To reduce interpretive subjectivity and ensure analytical transparency, this study applies a three-level coding framework that distinguishes between different degrees of inference in the interpretation process. This framework is designed to separate what is directly observable from what is contextually and symbolically interpreted, thereby making the analytical steps more explicit and methodologically accountable.

At the low-inference level, the analysis focuses strictly on observable visual features without attaching meaning. This includes the description of shapes, lines, composition, and spatial arrangement of the motifs. For example, a pictogram may be described as “an elongated horizontal figure with vertical extensions,” without assuming that it represents a specific object. This stage ensures that the analysis is grounded in empirical visual evidence.

At the medium-inference level, the analysis begins to consider patterns such as repetition, spatial grouping, and distribution across panels or caves. At this stage, the researcher may identify potential functional indications based on recurring visual structures. For instance, repeated boat-like motifs across different cave sites may suggest their relevance to mobility, navigation, or recurring communal practices. However, interpretations at this level remain cautious and are framed as functional possibilities rather than fixed meanings.

At the high-inference level, interpretation incorporates broader contextual references, including ethnographic parallels and symbolic associations. Here, motifs are analyzed as part of a wider cultural and semiotic system. For example, boat motifs may be interpreted as indicating a maritime orientation or aspects of social identity. However, such interpretations are explicitly presented as probabilistic and interpretive, not as definitive claims about prehistoric intention.

By structuring the analysis across these three levels, this study aims to maintain a clear boundary between description and interpretation, while allowing for a gradual and justified progression from visual evidence to symbolic meaning.

Table 1 Analytical Matrix (Coding Framework)

Analytical Level	Visual Evidence	Interpretation Type	Example Output
Low inference	Shape, lines, composition	Description	“A boat-like figure with elongated hull and vertical lines”
Medium inference	Repetition, spatial grouping	Functional indication	“Repeated boat motifs suggest relevance to mobility or navigation”
High inference	Ethnographic & symbolic linkage	Interpretive meaning	“May indicate maritime orientation or social identity”

3.5.1 Worked Example from Description to Interpretation

Motif: Boat pictogram (Gua Kabori)

- a. **Visual Description (low inference):** elongated horizontal form with vertical extensions resembling masts; positioned among multiple similar motifs.
- b. **Contextual observation:** appears repeatedly across different cave panels.
- c. **Comparative reference:** similar forms documented in Austronesian maritime representations.
- d. **Interpretation (higher inference):** the motif *may suggest* a representation of water transport and indicate the importance of maritime practices.

This stepwise approach demonstrates how interpretation is grounded in observable data and gradually extended through contextual reasoning.

3.6 Ethical Considerations

This research was conducted with respect for cultural heritage and site preservation. Field access and documentation were carried out in coordination with relevant local authorities and cultural preservation institutions. No physical alteration or interference with the rock art was performed. All visual data were collected using non-invasive methods, and the study acknowledges the cultural significance of the Liangkabori site for local communities.

4. FINDINGS

Based on field observations and visual documentation conducted in the karst region of Liang Kabori Village, Muna Regency, more than 38 prehistoric cave sites containing approximately 2,000 pictograms have been identified. All pictograms were created using natural red hematite pigments applied to cave walls and ceilings through finger-painting and spraying techniques.

This study focuses on a purposively selected sample of 50 pictograms drawn from five caves (Gua Kabori, Metanduno, Pominsa, Lakulombu, and Marewu). The analyzed sample is distributed across five motif categories, with approximately 10 pictograms per category. Table 2 summarizes the typology, visual characteristics, and distribution of the selected motifs.

Table 2 Typology and Visual Description of Liangkabori Cave Rock Art

No	Motif Category	Number of Samples	Objective Visual Description	Primary Location(s)
1	Hunting and Fauna	10	Human figures interacting with animals (wild boars, anoa, deer, dogs, horses); dynamic compositions	Gua Metanduno
2	Maritime Transportation (Boats)	10	Elongated hulls with sails, oars, rudders, and human figures inside	Gua Kabori, Gua Metanduno, Gua Pominsa, Gua Lakulombu, Gua Marewu (Multiple caves)
3	Kites	10	Rhombus-shaped geometry with intersecting lines and a trailing line	Gua Kabori
4	Sun Symbols	10	Concentric circles with radiating lines; symmetrical and abstract	Multiple caves
5	Human Figures and Social Interaction	10	Anthropomorphic figures in grouped formations, sometimes holding objects	Multiple caves

The descriptive elaboration of the findings presented in Table 2 is as follows:

a. Hunting and Fauna Motifs

A total of 10 hunting-related pictograms were analyzed, primarily from Gua Metanduno. At the descriptive level, these motifs show clear visual interaction between human and animal figures, often arranged in dynamic compositions suggesting movement (e.g., chasing or surrounding). Animals are depicted in varying scales, with some figures reaching up to approximately 2 meters in length. Domesticated animals

such as dogs and horses consistently appear in close proximity to human figures,



Figure 1 Hunting and Fauna Motifs

forming repeated compositional patterns.

Figure 1 illustrates a representative example, where human figures are positioned around a central animal figure. The spatial arrangement and directional lines (e.g., limbs and tools) visually indicate coordinated activity, providing concrete evidence for identifying this motif category.

b. Maritime Transportation (Boat) Motifs

The dataset includes 10 boat pictograms distributed across multiple caves. These motifs are characterized by elongated horizontal structures with additional vertical and diagonal lines. Observable elements include hull-like bases, vertical extensions resembling masts, and smaller internal figures interpreted as human occupants based on proportional differences.



Figure 2 Maritime Transportation (Boat) Motifs

Figure 2 shows a boat motif from Gua Kabori, where the relationship between the large structural form and smaller internal figures is clearly visible. The repetition of similar structural features

across different sites supports the classification of these motifs as a consistent visual type within the dataset.

c. Kite Motifs

A total of 10 kite-like pictograms were identified, primarily concentrated in Gua Kabori. These motifs are visually distinct due to their geometric configuration: a rhombus-shaped outline intersected by perpendicular lines and accompanied by a single elongated line extending downward.



Figure 3 Kite Motifs

Figure 3 presents a clear example of this motif. At the descriptive level, the geometric structure and the presence of a trailing line differentiate it from both anthropomorphic and zoomorphic representations, supporting its classification as a separate motif category.

d. Sun Symbol Motifs

The study analyzes 10 sun symbol pictograms distributed across several caves. These motifs consist of concentric circular forms surrounded by radiating linear elements. The compositions are generally symmetrical and non-figurative.

A consistent spatial pattern was observed: these motifs are frequently located in elevated positions on cave walls or ceilings, separated from figurative scenes. Figure 4 demonstrates this placement, showing the motif positioned above other pictorial elements. This recurring spatial arrangement provides observable evidence for distinguishing this motif category within the dataset.

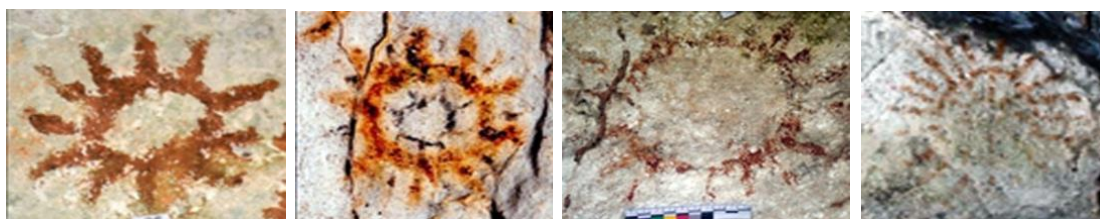


Figure 4 Sun Symbol Motifs

e. Human Figures and Social Interaction Motifs

The final category includes 10 anthropomorphic pictograms depicting individual and grouped human figures. These figures vary in form, including linear “T-shaped” structures, triangular bodies, and outlined or filled silhouettes.

In several cases, figures are arranged in groups with consistent orientation and spacing, sometimes connected to linear elements resembling objects. Figure 5 illustrates a composition where multiple figures are aligned and appear to interact within a shared scene. The repetition of such grouped formations across the dataset supports their classification as motifs of social interaction.

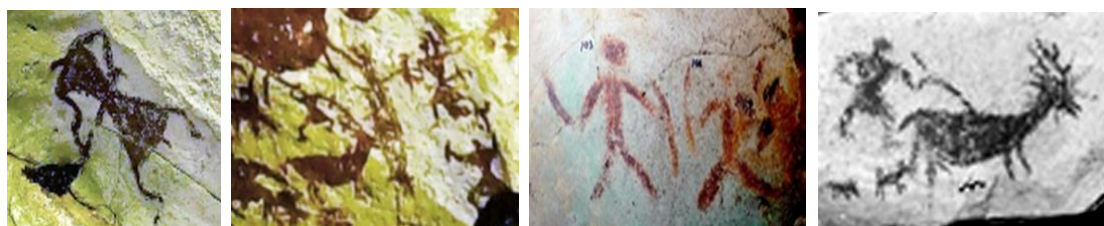


Figure 5 Human Figures and Social Interaction Motifs

4.1 Integration of Visual Evidence

Across all categories, the classification is grounded in observable visual features, including shape, scale, spatial arrangement, and repetition across sites. The figures included in this study serve not only as illustrations but as empirical references that support the identification of motif types. Each figure has been selected as a representative example of recurring visual patterns within the dataset, ensuring a direct link between visual evidence and analytical claims.

5. DISCUSSIONS

The visual findings from the Liang Kabori karst region suggest that these prehistoric cave walls may have functioned as more than physical shelters, potentially serving as a shared visual environment where meanings were produced and interpreted. Through the lens of Semiotic Landscapes (SL), the pictograms can be approached as elements of a spatial semiotic system

([Jaworski & Thurlow, 2010](#); [Gorter, 2013](#)). However, it is important to emphasize that such an interpretation remains analytical and inferential, rather than direct evidence of intentional communication in the modern linguistic sense. The following discussion therefore distinguishes between observable patterns and interpretive possibilities, while also considering alternative readings and the limits of the available data.

a. Hunting Motifs as Multifunctional Ecological and Ritual Representations

The hunting scenes identified in the dataset consistently depict interactions between human and animal figures, often arranged in dynamic compositions (see Results, Figure 1). At a descriptive level, these motifs clearly represent human–animal relationships. One plausible interpretation is that they reflect forms of ecological knowledge, such as familiarity with animal behavior or hunting strategies ([Mühlhäusler, 2001](#)). At the same time, archaeological interpretations have frequently linked similar motifs to ritual practices, including the concept of “sympathetic magic,” where visual representations are believed to influence real-world outcomes ([Barni & Bagna, 2010](#)). While this interpretation cannot be directly verified in the Liang Kabori context, it remains a relevant comparative framework. Ethnoarchaeological references to Muna hunting practices provide contextual support, although they should not be assumed as direct continuities across time ([Van Mensel & Vandenbroucke, 2016](#)). Therefore, these motifs are best understood as potentially multifunctional, combining practical, symbolic, and possibly ritual dimensions.

b. Boat Motifs as Visual Representations of Mobility and Potential Symbolic Identity

The repeated presence of boat-like structures across multiple caves (see Results, Figure 2) indicates that this motif type held visual significance within the dataset. At a descriptive level, the structural consistency supports their identification as watercraft representations.

From one perspective, these motifs may relate to mobility and navigation in an archipelagic environment, aligning with broader interpretations of maritime imagery in Austronesian contexts ([Wang & Xu, 2018](#)). However, alternative interpretations suggest that such images may function symbolically, representing identity, territoriality, or group affiliation rather than literal documentation. Previous archaeological studies in the region have generally emphasized material and stylistic aspects rather than communicative functions ([Herdiani & Yondri, 2024](#)). This study extends that perspective by suggesting that these motifs may also operate within a

semiotic landscape, while acknowledging that their exact meaning cannot be conclusively determined.

c. Kite Motifs as Geometric Forms with Interpretive Ambiguity

The kite-like motifs identified in Gua Kabori (see Results, Figure 3) are visually distinct due to their geometric configuration. Their classification as “kites” is based on formal resemblance rather than direct evidence of function.

One possible interpretation is that these motifs relate to objects used in interaction with environmental elements such as wind. However, given the absence of supporting archaeological or ethnographic confirmation, alternative explanations—such as abstract symbolism or geometric representation—remain equally plausible. Studies in visual semiotics caution against assigning fixed meanings to geometric forms without sufficient contextual evidence ([Gorter, 2013](#)). Therefore, interpretations suggesting technological knowledge (e.g., aerodynamics) should be treated as tentative and exploratory.

d. Sun Symbols as Spatially Elevated Motifs with Cosmological Implications

The sun-like motifs, characterized by concentric circles and radiating lines, show a consistent pattern of elevated placement within cave spaces (see Results, Figure 4). This spatial positioning is an observable feature that distinguishes them from other motifs. Within semiotic and archaeological studies, elevated or spatially separated symbols are often interpreted as carrying symbolic or cosmological significance ([Shohamy & Ghazaleh-Mahajneh, 2012](#)). However, alternative interpretations—such as decorative patterning or marking of spatial zones—cannot be excluded. Without corroborating evidence, it is not possible to confirm a specific theological system. Thus, while a cosmological reading is plausible, it remains one of several interpretive possibilities.

e. Spatial Negotiation and Power Dynamics in Human Figures

Anthropomorphic motifs in the dataset display variation in form and are sometimes arranged in grouped compositions (see Results, Figure 5). The presence of linear extensions resembling tools or weapons may suggest structured interaction.

One interpretation is that these scenes represent forms of social organization, including cooperation or conflict. However, alternative readings—such as narrative depiction, ritual activity, or symbolic representation—are equally viable. Ethnoarchaeological approaches emphasize that visual representations of human figures do not always correspond directly to social hierarchy or institutional structures ([Van Mensel &](#)

[Vandenbroucke, 2016](#)). Therefore, claims regarding power dynamics or social stratification should be approached cautiously and remain interpretive rather than definitive.

f. Toward a Cautious Interpretation of Prehistoric Visual Communication

Taken together, the motifs in Liang Kabori demonstrate recurring visual patterns in form, placement, and composition, suggesting that they were not produced randomly. From a semiotic landscape perspective, these patterns may indicate the existence of a shared visual environment in which meaning was negotiated ([Jaworski & Thurlow, 2010](#)). However, it is essential to acknowledge the limitations of visual-semiotic interpretation, particularly in prehistoric contexts. The absence of written records and the reliance on material traces mean that interpretations cannot be empirically verified. The concept of “cross-modal information transfer” ([Miyagawa et al., 2018](#)) provides a useful theoretical lens, but its application remains speculative in this context.

Rather than proposing a fully developed “visual language,” this study suggests that the pictograms may have functioned as forms of visual representation with communicative potential. In this sense, the study complements existing archaeological research by offering a semiotic perspective, while recognizing that multiple interpretations remain possible and that further interdisciplinary research is needed.

6. CONCLUSION

The findings from the Liangkabori cave complex in Muna suggest that these prehistoric rock art assemblages can be understood as more than archaeological remains or aesthetic expressions. Through the lens of Semiotic Landscapes, the pictograms may be interpreted as elements of a spatial visual system situated within a shared prehistoric environment. The analyzed motifs—such as hunting scenes, boat representations, geometric forms, and sun symbols—indicate recurring visual patterns that may reflect aspects of ecological knowledge, mobility, social interaction, and symbolic meaning. However, these interpretations remain inferential and context-dependent, rather than direct evidence of a fully structured “visual language” in the modern sense.

Theoretically, this study contributes by cautiously extending Semiotic Landscape frameworks to a pre-literate context and by offering an interdisciplinary perspective that brings together applied linguistics, visual semiotics, and ethnoarchaeology. Rather than proposing a definitive model, the study demonstrates the potential of this approach to complement existing archaeological interpretations, particularly in exploring how visual forms may function within

shared spatial settings. At the same time, this study has several limitations. The analysis is based on a purposively selected sample and relies on visual interpretation supported by secondary archaeological and ethnographic sources.

The absence of direct historical records means that the meanings of the motifs cannot be empirically verified, and alternative interpretations remain possible. These constraints should be considered when interpreting the findings. Despite these limitations, the study highlights the cultural and historical significance of the Liangkabori karst region. The pictograms provide valuable insight into early forms of visual representation and human–environment interaction. Therefore, efforts to preserve these fragile cave sites are important, not only for their archaeological value but also for their potential to support ongoing interdisciplinary research on prehistoric communication and cultural heritage.

DECLARATION OF GENERATIVE AI

During the preparation of this manuscript, the authors used AI-assisted tools, including ChatGPT, Grammarly, and QuillBot, to support language editing and improve grammatical accuracy. The authors carefully reviewed and edited the output generated by these tools and take full responsibility for the content of the manuscript

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