Scientific Research Publishing

Advances in Anthropology, 2026, 16(3), 83-107
https://www.scirp.org/journal/aa
ISSN Online: 2163-9361
ISSN Print: 2163-9353

# Deliberate Closure of Constructed Spaces: An Anthropological Analysis of Backfilling and Sealing in the Ravne Tunnel System (Bosnia and Herzegovina) and Göbekli Tepe (Türkiye)

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**How to cite this paper:** Osmanagich, S. (2026). Deliberate Closure of Constructed Spaces: An Anthropological Analysis of Backfilling and Sealing in the Ravne Tunnel System (Bosnia and Herzegovina) and Göbekli Tepe (Türkiye). *Advances in Anthropology, 16,* 83-107.
https://doi.org/10.4236/aa.2026.163005

**Received:** May 7, 2026
**Accepted:** June 26, 2026
**Published:** June 29, 2026



## Abstract

The deliberate closure of constructed spaces represents a recurring but insufficiently examined phenomenon in archaeological and anthropological research. This study explores patterns of intentional backfilling and sealing in two distinct contexts: the Ravne tunnel system in the Visoko region of Bosnia and Herzegovina and the Neolithic site of Göbekli Tepe in southeastern Türkiye. Archaeological investigations conducted between 2006 and 2025 within the Ravne tunnel complex have documented extensive anthropogenic backfill deposits composed of pebbles, sand, and rubble, as well as numerous dry-stone walls constructed to block or stabilize subterranean passages. Stratigraphic analysis indicates that these features are not the result of natural processes but rather represent repeated, structured episodes of infilling and closure. The presence of clearly defined boundaries between natural geological formations and introduced material further supports the interpretation of deliberate human activity. In addition, the complete vertical extent of infill within enclosed tunnel passages and the absence of sedimentary patterns consistent with natural collapse or water transport provide further evidence against non-anthropogenic explanations. Comparable patterns of intentional infilling have been documented at Göbekli Tepe, where monumental stone enclosures were systematically buried using heterogeneous material, including stone fragments, soil, and cultural debris. Although differing in architectural form and environmental setting, both sites exhibit evidence for deliberate closure of constructed spaces through organized deposition of material and, in the case of Ravne, additional structural sealing. Rather than proposing a direct cultural or chronological connection between these sites, this study approaches closure as a form of human behavior observable across different contexts. The analysis focuses

on the processes, scale, and material characteristics of backfilling and sealing, and considers possible anthropological interpretations, including ritual closure, controlled decommissioning, and transformation of space. The results suggest that the intentional closure of constructed environments reflects a broader pattern of human activity, with complex interactions among architecture, landscape, and social practice. The Ravne tunnel system provides a large-scale subterranean example of this phenomenon, contributing to a wider comparative framework for understanding how and why human societies terminate the use of built spaces.

## Keywords

Archaeology, Deliberate Closure, Anthropogenic Backfill, Stratigraphy, Subterranean Archaeology, Ravne Tunnel System, Göbekli Tepe, Dry-Stone Walls, Site Transformation, Multi-Phase Closure

## 1. Introduction

The deliberate closure of constructed spaces represents a recurring phenomenon in archaeological contexts, yet it has received relatively limited systematic attention as a distinct form of human behavior. Across different periods and cultural settings, archaeological evidence indicates that built environments—whether monumental, domestic, or subterranean—are not always abandoned passively. Instead, they are often intentionally filled, sealed, or otherwise transformed through structured human intervention. Such processes, including backfilling, material deposition, and architectural blocking, form part of what has been described as the life cycle of built environments (Schiffer, 1987; Cameron & Tomka, 1993).

In this context, it is essential to distinguish between natural subterranean formations and spaces modified or organized by human intervention. The present study treats the Ravne tunnel system as a constructed or intentionally modified environment based on observable archaeological criteria, including the geometry of passages, stratigraphic relationships, and the presence of architectural features such as dry-stone walls.

In archaeological interpretation, these practices are commonly discussed in relation to site formation processes, abandonment behavior, and ritual termination of structures. Stratigraphic analysis plays a key role in identifying such processes, particularly where clear distinctions can be made between natural deposits and anthropogenic infill (Harris, 1989). In this context, deliberate closure may be understood as an active and meaningful transformation of space rather than a passive end to occupation. From an anthropological perspective, such actions may reflect broader social, symbolic, or functional processes associated with the reorganization of space and the redefinition of its use (Hodder, 1999; Ingold, 2000).

Comparable practices of intentional infilling and structural transformation

have been documented at several archaeological sites worldwide. At Göbekli Tepe, circular megalithic enclosures dating to the Pre-Pottery Neolithic period were systematically filled with heterogeneous material following their use. At Çatalhöyük, domestic structures were repeatedly buried and rebuilt, creating a stratified accumulation of occupation layers. Similar patterns of modification and partial infilling have been observed at sites such as Skara Brae and Stonehenge, where construction, reuse, and transformation occurred over extended periods. These examples suggest that the deliberate alteration and closure of built spaces are not isolated but form part of a broader pattern of human interaction with constructed environments.

This study examines this phenomenon through a comparative analysis of two distinct archaeological contexts: the Ravne tunnel system in the Visoko region of Bosnia and Herzegovina and the site of Göbekli Tepe in southeastern Türkiye. While these sites differ significantly in form, chronology, and environmental setting, both exhibit clear evidence of intentional closure through the deposition of material and, in some cases, structural sealing.

The Ravne tunnel system represents an extensive network of subterranean passages excavated within Quaternary conglomerate formations. Systematic archaeological investigations conducted between 2006 and 2025 have documented more than two kilometers of cleared passages, along with a complex sequence of stratified deposits, dry-stone walls, and architectural modifications. Within this system, large volumes of backfill material—primarily pebbles, sand, and rubble—have been identified as anthropogenic. Stratigraphic profiles reveal sharp boundaries between natural geological layers and introduced material, indicating deliberate emplacement rather than natural accumulation. In addition, numerous dry-stone walls have been constructed within the tunnels, frequently positioned to block or segment passages (Osmanagich, 2026a; Osmanagich, 2026b) (**Figure 1**, **Figure 2**).

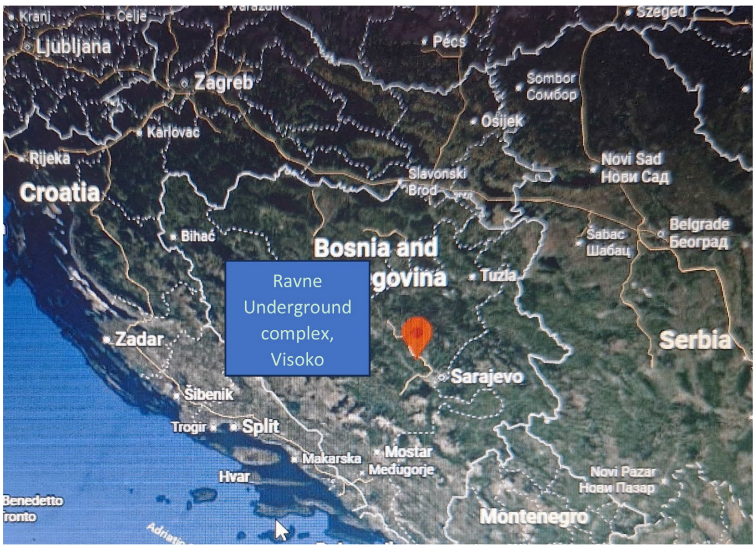


**Figure 1.** Location of the Ravne underground complex in the Visoko region, central Bosnia and Herzegovina, and its position within the broader Balkan region.

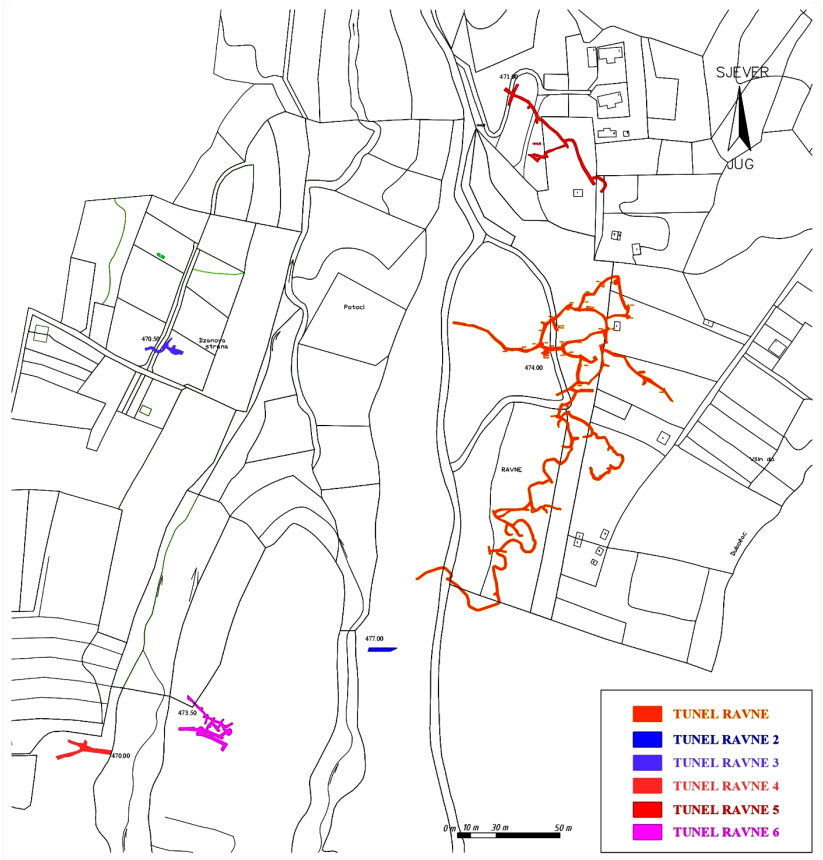


**Figure 2.** Plan of the Ravne tunnel system indicating the spatial distribution of explored passages (Ravne 1-6) and the extent of the subterranean network documented during archaeological investigations.

The interpretation of the Ravne passages as constructed or deliberately modified spaces is based on several lines of evidence. These include the consistent morphology of tunnel corridors, the presence of intersections and chambers with defined spatial organization, and the occurrence of structural elements not attributable to natural processes. In particular, the repeated documentation of dry-stone walls within the system, often positioned across passageways, indicates intentional architectural intervention.

These observations indicate that the Ravne tunnel system underwent multiple phases of use, modification, and closure. The scale and organization of backfilling, spanning considerable distances within the underground network, suggest a sustained, structured process rather than isolated activity. Previous analyses have emphasized the stratigraphic complexity of these deposits and their association with architectural features, supporting the interpretation of repeated anthropogenic intervention (Osmanagich, 2026a; Osmanagich, 2026c). In addition, multi-method dating of associated features in the broader landscape has established a long chronology of human activity in the region, further supporting the interpretation of multi-phase site use.

Alternative explanations for the observed deposits, such as natural collapse, wa-

ter transport, or gradual sediment accumulation, were considered during analysis. However, several characteristics of the Ravne infill are not consistent with these processes. The frequent occurrence of complete filling from floor to ceiling within enclosed passages, the presence of sharp boundaries between natural substrate and introduced material, and the variability in composition and compaction of the infill collectively argue against natural depositional mechanisms. These features instead support the interpretation of deliberate, anthropogenic backfilling.

At Göbekli Tepe, a comparable process of closure is observed in a different architectural and environmental context. Excavations have demonstrated that monumental enclosures were deliberately filled with a mixture of stone fragments, soil, and cultural material. These deposits are not consistent with natural processes but reflect intentional infilling following periods of use. In many cases, new structures were constructed above earlier, buried enclosures, indicating repeated cycles of construction, use, and closure.

Despite the differences between these sites—surface monumental architecture at Göbekli Tepe and subterranean passages at Ravne—the material evidence in both cases points to deliberate and organized processes of closure. These similarities provide a basis for comparative analysis, not in terms of cultural or chronological connection, but as expressions of comparable patterns of human behavior.

The approach adopted in this study is therefore analytical and comparative. It does not seek to establish direct links between the two sites, nor to propose a single explanatory model for the process of closure. Instead, it focuses on the material characteristics of backfilling and sealing, including stratigraphy, deposit composition, spatial organization, and associated architectural features. By examining these elements, the study aims to identify shared patterns and to situate them within a broader anthropological framework.

This paper evaluates the deliberate closure of constructed spaces as a form of human activity, using the Ravne tunnel system as a primary case study and Göbekli Tepe as a comparative example. In doing so, it contributes to a more systematic understanding of how built environments are intentionally transformed at the end of their use-life and how such processes can be recognized and interpreted in the archaeological record.

Göbekli Tepe was selected as a comparative case due to the well-documented evidence for deliberate infilling of constructed spaces within an archaeological context. The comparison is analytical rather than cultural, focusing on shared material patterns of closure, including the organized deposition of fill, preservation of structural elements beneath infill, and repetition of closure processes. This approach allows for the identification of broader behavioral parallels without implying direct historical or cultural connections between the two sites.

## 2. Materials and Methods

### 2.1. Research Framework

This study adopts a comparative analytical approach to the phenomenon of de-

liberate closure of constructed spaces, focusing on two distinct archaeological contexts: the Ravne tunnel system in Bosnia and Herzegovina and the site of Göbekli Tepe in southeastern Türkiye. The analysis is based on the identification and evaluation of material evidence for backfilling and sealing, including stratigraphy, deposit composition, spatial organization, and associated architectural features.

The Ravne tunnel system constitutes the primary dataset, derived from long-term archaeological investigations conducted between 2006 and 2025. Comparative data for Göbekli Tepe are drawn from published archaeological reports and secondary literature.

### 2.2. Archaeological Data from the Ravne Tunnel System

Archaeological investigations within the Ravne tunnel system were carried out under the direction of the Archaeological Park: Bosnian Pyramid of the Sun Foundation and led by the principal investigator (the author). Fieldwork involved systematic excavation of sediment infill within subterranean passages, with attention to stratigraphy, sediment composition, and the presence of architectural features.

Excavation was conducted in controlled sections, typically within defined trench units, allowing for detailed observation of vertical and horizontal relationships between sediment layers. Profiles were cleaned and documented to identify boundaries between natural geological formations and introduced material. Emphasis was placed on distinguishing compacted conglomerates from unconsolidated infill deposits.

The dataset used in this study is based on more than two kilometers of cleared and documented tunnel passages, encompassing multiple excavation sectors within the Ravne tunnel system (Ravne 1-6). A total of 85 dry-stone walls have been recorded across the system, distributed as follows: 64 within the primary Ravne tunnels, 5 in Ravne 3, 4 in Ravne 4, and 12 in Ravne 6 (identified to date). In addition, numerous stratigraphic profiles have been documented through controlled excavation units, providing the empirical basis for analysis of depositional sequences and structural relationships.

### 2.3. Identification of Anthropogenic Backfill

The identification of backfill as anthropogenic is based on a set of operational criteria applied consistently across excavation contexts. A deposit is classified as anthropogenic when it meets one or more of the following conditions:

- clear and abrupt stratigraphic boundaries between natural geological formations and introduced material.
- composition of fill inconsistent with in situ geological processes, including the presence of rounded river pebbles within enclosed tunnel spaces.
- absence of gradual sedimentary transitions typical of natural deposition processes such as slope wash or water transport.
- internal organization of material, including layering, sorting, and compaction

patterns indicative of controlled deposition.

In addition, deposits that extend continuously from the floor to the ceiling of enclosed tunnel passages are treated as strong indicators of deliberate infilling, as such complete spatial filling is not consistent with known natural depositional mechanisms in confined subterranean environments.

### 2.4. Documentation of Structural Sealing

Structural features associated with closure were recorded alongside sedimentary data. These include dry-stone walls constructed within tunnel passages using locally available stone. The position, orientation, and construction techniques of these walls were documented relative to the surrounding sediment.

Particular attention was given to the stratigraphic relationship between walls and infill. In many cases, walls were encountered only after the removal of overlying backfill, indicating a sequential relationship between deposition and construction. These observations provide a basis for reconstructing the processes by which sections of the tunnel system were sealed.

The total number and spatial distribution of recorded dry-stone walls were incorporated into the analytical framework as indicators of repeated and organized sealing processes. The recurrence of these structures across multiple sectors of the tunnel system allows for evaluation of closure patterns beyond individual contexts.

### 2.5. Stratigraphic Analysis and Chronological Framework

Stratigraphic analysis follows established principles of archaeological stratigraphy (Harris, 1989), with emphasis on the identification of depositional sequences and layer relationships. The presence of multiple fill units, intrusions, and discontinuities within the Ravne tunnel system is interpreted as evidence for repeated episodes of infilling and modification.

Chronological interpretation is based on previously published radiometric dating of associated materials, including radiocarbon and uranium-thorium analyses. These results provide a temporal framework for human activity within the broader landscape and support the interpretation of multi-phase use and closure processes.

It should be noted that the chronological interpretation of closure processes within the Ravne tunnel system is based primarily on associated materials and broader landscape dating rather than direct dating of all individual infill events. As such, the identification of multi-phase closure is derived from stratigraphic relationships and depositional sequences, supported by available radiometric data from related contexts.

### 2.6. Comparative Methodology

The comparative component of this study focuses on identifying shared patterns of behavior rather than establishing direct cultural or chronological connections

between sites. Data from Göbekli Tepe are evaluated based on published descriptions of stratigraphy, infill composition, and architectural context.

Comparison is structured around the following parameters:

- method of infilling;
- composition of deposited material;
- presence or absence of structural sealing;
- spatial organization of closure;
- repetition of closure processes.

This framework allows for the identification of similarities and differences between the two sites as expressions of broader anthropological patterns related to the closure of constructed environments.

The selection of Göbekli Tepe as a comparative case is based on the availability of well-documented archaeological evidence for deliberate infilling of constructed spaces. The comparison is limited to analytical dimensions of closure processes, including method of deposition, material composition, and spatial organization, and does not imply cultural or chronological connection.

### 2.7. Scope and Limitations

This study is primarily based on macroscopic observations and stratigraphic interpretation. It does not include micromorphological analysis, geochemical sourcing, or experimental reconstruction of depositional processes. Interpretations of function and intention are therefore based on observable material characteristics and their spatial relationships.

Furthermore, the comparative analysis relies on published data on Göbekli Tepe and is limited to aspects of the site relevant to the phenomenon of closure. The study does not attempt a comprehensive reinterpretation of the site but uses it as a well-documented example for comparative purposes.

## 3. Ravne Tunnel System: Evidence of Backfilling and Sealing

### 3.1. General Characteristics of the Tunnel System

The Ravne tunnel system, located in the Visoko region of Bosnia and Herzegovina, consists of an extensive network of subterranean passages developed within Quaternary conglomerate formations. Systematic archaeological investigations conducted between 2006 and 2025 under the direction of the Archaeological Park: Bosnian Pyramid of the Sun Foundation and led by the principal investigator (the author) have resulted in the clearing and documentation of more than two kilometers of accessible tunnels, with additional sections remaining partially filled or unexplored (Osmanagich, 2026a) (**Figure 2**).

The documented dataset includes multiple excavation sectors across the Ravne tunnel system (Ravne 1-6), within which controlled excavation and stratigraphic recording have been conducted. Within these sectors, a total of 85 dry-stone walls have been recorded, providing a substantial empirical basis for analyzing patterns of structural sealing and spatial segmentation.

The underground network includes primary corridors, secondary passages, and chambers, many of which exhibit evidence of structural modification. Among the most prominent features documented during excavation are extensive deposits of infill material and numerous dry-stone walls constructed within the tunnel passages. These features occur repeatedly throughout the system and are often spatially associated, suggesting a structured relationship between deposition and architectural intervention.

### 3.2. Composition and Extent of Backfill Deposits

Excavation has demonstrated that large portions of the Ravne tunnel system were filled with material that is clearly distinct from the surrounding geological matrix (Figure 3). The natural conglomerate in which the tunnels are formed is compacted and cohesive, whereas the infill consists primarily of loosely compacted pebbles, sand, and finer sediments.

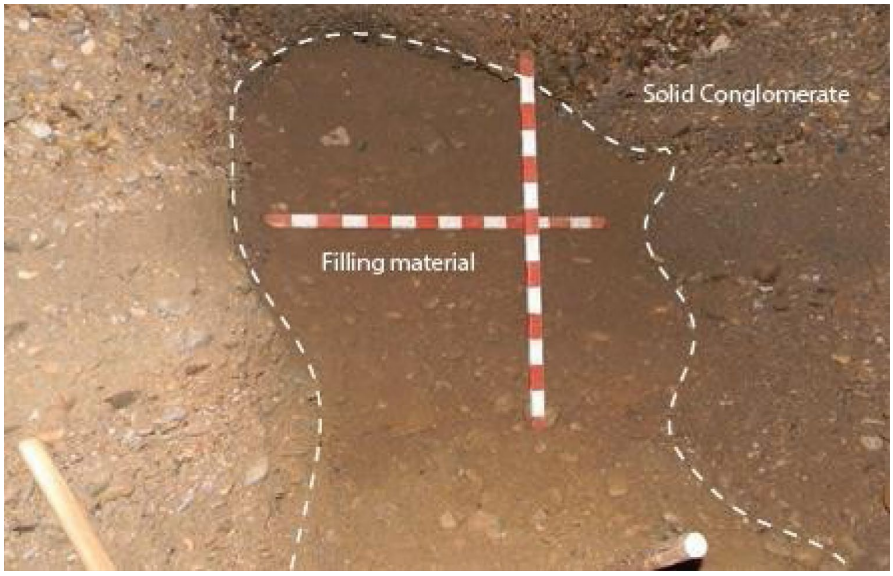


Figure 3. Section of tunnel fill shows clear distinction between natural conglomerate and anthropogenic infill material; the boundary between compact geological substrate and loose sediment demonstrates intentional deposition.

A defining characteristic of the Ravne backfill is its complete vertical extent. In multiple sections of the tunnel system, infill deposits extend continuously from the floor to the ceiling of the passages, demonstrating complete spatial infilling (Figure 4, Figure 5), with the full extent of vertical closure clearly visible in Figure 5. This pattern of complete filling within enclosed spaces is inconsistent with natural sedimentation processes, which typically produce partial or uneven accumulations. Instead, it indicates deliberate emplacement of material to entirely occupy the available space.

Alternative natural processes were considered in evaluating the origin of these deposits. However, the observed characteristics do not correspond to typical pat-

terns of natural sedimentation. Water transport would be expected to produce sorting, layering, or directional deposition, which are not consistently observed. Similarly, collapse processes would result in irregular voids, mixed angular material, and partial infilling rather than uniform, continuous deposits extending to the ceiling. The combination of complete spatial filling and material characteristics therefore supports an anthropogenic origin.

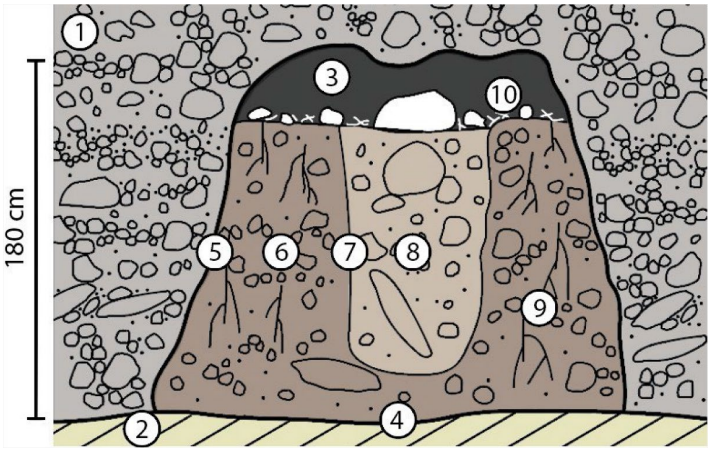


**Figure 4.** Schematic stratigraphic profile of a tunnel section illustrating the relationship between natural conglomerate layers and introduced backfill deposits, including internal organization and layering of infill material.


**Figure 5.** Tunnel passage completely filled with sediment from floor to ceiling, representing full spatial closure through deliberate backfilling.

Stratigraphic profiles further reinforce this interpretation. Clear and often abrupt boundaries are observed between natural geological formations and intro-

duced fill, with no gradual transition between the two (Figure 3, Figure 4). The composition of the infill—particularly the presence of rounded river pebbles within enclosed underground contexts—also supports its anthropogenic origin.

In addition, the internal organization of the backfill suggests controlled deposition. In some sections, layering and compaction patterns can be observed, with larger elements contributing to structural stability and finer material filling interstitial spaces. These characteristics are repeated across different areas of the tunnel system, indicating a consistent infilling method.

### 3.3. Dry-Stone Walls and Sequential Sealing

A distinctive feature of the Ravne tunnel system is the presence of numerous dry-stone walls constructed within the passages (Figure 6). These walls are built from locally available stone, primarily river pebbles, and are typically positioned across corridors or at junctions, effectively blocking access to the next section.

Figure 6. Dry-stone wall constructed within a tunnel passage, composed of river pebbles and used to block or stabilize a sealed section of the underground network.

A total of 85 dry-stone walls have been documented within the Ravne tunnel system and its associated branches. Of these, 64 walls are located within the primary Ravne tunnels, while 5 have been recorded in Ravne 3, 4 in Ravne 4, and 12 in Ravne 6 (identified to date during ongoing excavation). This distribution indicates that structural sealing is not localized but occurs across multiple segments of the underground network.

The relationship between these walls and the surrounding backfill provides critical insight into the closure process. In many cases, dry-stone walls are encountered only after the removal of overlying infill material. (Figure 7). This indicates that the walls were constructed in a sequential process rather than as isolated structural elements.

**Figure 7.** Dry-stone wall revealed after removal of overlying backfill material, demonstrating the sequential relationship between infilling and structural sealing within the tunnel system.

Such observations suggest that closure occurred in stages. Sections of the tunnel system were intentionally filled and subsequently sealed, or alternatively sealed and then reinforced through additional infilling. The repeated occurrence of this pattern across the network indicates that closure was not a single event but a series of deliberate, organized interventions (Osmanagich, 2026b).

The frequency and spatial repetition of these walls suggest that they are not isolated structural features but components of a systematic process of segmentation and closure. Their association with backfill deposits further indicates coordinated and repeated intervention rather than incidental modification.

### 3.4. Stratigraphic Evidence for Multi-Phase Closure

Stratigraphic analysis within the Ravne tunnels reveals a complex sequence of depositional events. Backfill deposits are not uniform but consist of multiple layers and discrete units that differ in composition and structure. (**Figure 4**). In several cases, distinct pockets of fill intrude into earlier deposits, indicating successive episodes of infilling.

These features point to multi-phase closure processes, in which the tunnel system underwent repeated cycles of use, modification, and sealing. The presence of discontinuities and stratigraphic complexity suggests that closure was not continuous but occurred in stages over an extended period.

Radiometric dating of associated materials further supports this interpretation. Analyses of organic remains and mineral formations indicate a long chronology of human activity within the broader landscape, consistent with multiple phases of intervention and modification.

The identification of multiple depositional phases is based on observable stratigraphic relationships rather than direct dating of each individual infill event. Distinct layers, intrusions, and discontinuities within the deposits indicate successive episodes of material emplacement.

### 3.5. Scale and Organization of Closure Processes

The scale of backfilling and sealing within the Ravne tunnel system represents one of its most significant characteristics. The presence of anthropogenic infill across extensive lengths of tunnel—amounting to kilometers of passages—indicates that closure was not limited to localized interventions.

The volume of material required to fill these spaces suggests a coordinated and sustained effort. The repeated association of backfill with dry-stone walls further indicates that these activities were organized and methodical. Rather than resulting from abandonment or natural processes, the evidence points to intentional large-scale transformation of the subterranean environment.

The presence of both extensive backfill and a high number of structural sealing features (dry-stone walls) across multiple tunnel sectors indicates a level of organization that is not consistent with random or uncoordinated processes.

### 3.6. Summary

The archaeological evidence from the Ravne tunnel system demonstrates a consistent and well-defined pattern of deliberate closure through backfilling and structural sealing. Key characteristics include:

- complete filling of tunnel passages from floor to ceiling;
- clear stratigraphic distinction between natural formations and introduced material;
- repeated deposition of pebble- and sand-based infill;
- construction of dry-stone walls associated with blocked sections;
- stratigraphic complexity indicating multiple phases of closure;
- large-scale implementation of these processes across the tunnel network.

Taken together, these features provide strong evidence that closure within the Ravne tunnel system was intentional, organized, and repeated over time. This makes the site a particularly significant example of anthropogenic closure in a subterranean context and a suitable primary case for comparative analysis.

The combination of complete infill, stratigraphic structure, and the systematic presence of dry-stone walls across the network provides converging lines of evidence for intentional and organized closure processes.

## 4. Göbekli Tepe: Evidence of Deliberate Infilling

### 4.1. Site Overview

Göbekli Tepe, located in southeastern Türkiye, is a Pre-Pottery Neolithic site dated to the 10th–9th millennia BCE. Excavations led by Klaus Schmidt and subsequent research teams have revealed a series of monumental circular and oval

enclosures constructed from large T-shaped limestone pillars (Schmidt, 2010; Dietrich et al., 2012) (**Figure 8**). These structures are widely interpreted as non-domestic and are often associated with ritual or communal functions.

The interpretation of these enclosures as deliberately constructed spaces is well established in the archaeological literature, based on architectural consistency, spatial organization, and excavation data (Schmidt, 2010; Dietrich et al., 2012).

Each enclosure typically consists of a pair of central pillars surrounded by additional pillars set into circular stone walls. The repeated architectural pattern across multiple enclosures suggests a high degree of planning and continuity in construction practices over time.

**Figure 8.** General view of a monumental enclosure at Göbekli Tepe, showing circular layout and T-shaped limestone pillars prior to complete excavation.

## 4.2. Composition of Infilling Material

A defining characteristic of Göbekli Tepe is that many of its enclosures were discovered completely filled with sediment and debris. (**Figure 9**). Excavation has demonstrated that this fill is anthropogenic rather than the result of natural processes.

The infilling material is heterogeneous and includes:

- limestone fragments and rubble;
- flint tools and debitage;
- animal bones;
- soil and fine sediment.

The presence of cultural material within the fill indicates that deposition incorporated elements of human activity rather than representing purely structural infill. The mixture of materials suggests that the fill may have been sourced from surrounding areas or from activities taking place at the site itself (Schmidt, 2010; Dietrich et al., 2012).

The heterogeneous nature of the infill distinguishes it from natural sedimentary processes and indicates deliberate selection and deposition of material, as discussed in previous excavation reports (Schmidt, 2010; Dietrich et al., 2012).

**Figure 9.** Excavated enclosure at Göbekli Tepe showing architectural elements embedded within infill deposits, illustrating the process of deliberate burial.

### 4.3. Evidence for Intentional Infilling

Several lines of evidence support the interpretation that the infilling of Göbekli Tepe's enclosures was deliberate. First, the extent of the fill—often reaching the upper portions of the structures—indicates a systematic depositional process. Second, the internal structure of the fill does not correspond to patterns expected from natural collapse or gradual sedimentation.

Importantly, architectural elements, such as pillars, remain upright and well-preserved beneath the fill. This indicates that the enclosures were intentionally buried while still structurally intact, rather than being left to deteriorate over time. The preservation of these elements suggests a controlled process of closure that maintains the integrity of the structures.

In particular, the preservation of upright architectural elements within the filled enclosures suggests that the structures were intentionally buried while still structurally intact, rather than collapsing gradually over time. This pattern is widely interpreted as evidence of controlled infilling processes in the archaeological literature (Notroff et al., 2014).

In addition, the repetition of infilling across multiple enclosures demonstrates that this was not an isolated event. Archaeological evidence indicates that individual structures were filled following their use, and that new enclosures were subsequently constructed in proximity to or above earlier buried features. This pattern

reflects repeated cycles of construction, use, and closure (Dietrich et al., 2012; Notroff et al., 2014).

### 4.4. Interpretation of Closure Processes

The reasons for the deliberate infilling of Göbekli Tepe's enclosures remain debated within the archaeological literature. Proposed explanations include ritual closure, social transformation, and changes in the organization or function of the site (Schmidt, 2010; Hodder, 2010). While no single interpretation has been universally accepted, there is general agreement that the infilling represents a purposeful and meaningful act.

From an anthropological perspective, the burial of monumental structures can be understood as a transformation of space. Rather than abandoning the enclosures, the builders engaged in an active process that altered their accessibility and function. The deposition of material within the structures effectively removed them from use while preserving them within the landscape.

Current interpretations do not support the idea of rapid or unstructured burial. Instead, the available evidence suggests a controlled, possibly staged process carried out as part of broader site development. While the exact motivations remain debated, there is broad agreement that the infilling represents deliberate human action rather than incidental accumulation.

### 4.5. Relevance for Comparative Analysis

Göbekli Tepe provides a well-documented example of deliberate closure through infilling in a monumental architectural context. Key features relevant to the present study include:

- intentional deposition of heterogeneous material within constructed spaces;
- preservation of architectural elements beneath the fill;
- repetition of closure processes across multiple structures;
- integration of cultural material within infill deposits.

Although differing in form and environment from the Ravne tunnel system, these characteristics establish Göbekli Tepe as a suitable comparative case for examining broader patterns of anthropogenic closure.

These characteristics make Göbekli Tepe particularly suitable as a comparative case, as it provides a well-documented example of deliberate closure processes in a non-subterranean context, allowing analytical comparison with the Ravne tunnel system.

## 5. Comparative Analysis: Ravne Tunnel System and Göbekli Tepe

### 5.1. Shared Characteristics of Closure Processes

Despite substantial differences in chronology, architecture, and environmental setting, the Ravne tunnel system and Göbekli Tepe share several convergent features regarding the deliberate closure of constructed spaces.

Both sites demonstrate:

- intentional deposition of material within constructed environments;
- clear distinction between natural and introduced deposits;
- repetition of closure processes across multiple spatial units;
- association of infilling with phases of construction and use.

At both sites, infilling cannot be explained by natural processes. Instead, the composition, structure, and spatial organization of deposits indicate deliberate human action.

This conclusion is based on the observed characteristics of the deposits, including their composition, spatial extent, and stratigraphic relationships, rather than on assumptions about function or meaning. In both cases, the material evidence indicates structured deposition within constructed spaces.

### 5.2. Differences in Material and Method

While sharing key characteristics, the two sites differ significantly in the methods and materials used in closure.

At Göbekli Tepe:

- infill is heterogeneous and includes cultural debris;
- deposition occurs within surface monumental enclosures;
- structural sealing beyond infill is limited.

At Ravne:

- infill consists primarily of pebbles, sand, and rubble;
- deposition occurs within confined subterranean passages;
- closure includes both backfilling and structural sealing through dry-stone walls;
- infill frequently extends from floor to ceiling, completely occupying available space.

These differences reflect the distinct architectural and environmental contexts of the two sites. However, they also demonstrate that similar behavioral outcomes—closure of space—can be achieved through different material strategies.

These differences demonstrate that while the material strategies of closure vary according to environmental and architectural context, the underlying process of intentional spatial transformation can be identified through comparable archaeological indicators.

### 5.3. Sequential and Multi-Phase Closure

A particularly significant point of comparison lies in the evidence for repeated and staged closure processes.

At Göbekli Tepe, archaeological data indicate cycles of construction, use, and infilling, with new structures built above or adjacent to earlier buried enclosures. This reflects a patterned sequence of architectural transformation over time.

At Ravne, stratigraphic evidence and the spatial relationship between backfill and dry-stone walls indicate **sequential closure of tunnel segments**. The discov-

ery of walls beneath infill deposits suggests that closure occurred in stages, with sections of the tunnel system being filled and sealed progressively. In both cases, the identification of multi-phase closure is derived from stratigraphic relationships and spatial organization of deposits rather than direct chronological sequencing of each event.

This pattern of multi-phase intervention is evident at both sites, although expressed differently in relation to their respective architectural forms.

### 5.4. Scale and Organization

Both sites exhibit closure processes at a scale that implies coordinated effort.

At Göbekli Tepe, the complete infilling of large enclosures required the transport and deposition of substantial volumes of material. The repetition of this process across multiple structures indicates organized activity. The scale of material deposition and the repetition of closure features across multiple spatial units provide measurable indicators of coordinated intervention.

At Ravne, the scale is expressed in linear rather than enclosed space. The presence of anthropogenic infill across kilometers of tunnel passages suggests sustained and systematic intervention. The combination of backfilling and wall construction further indicates planning and coordination in the closure process.

### 5.5. Anthropological Interpretation

The following interpretations are based on material patterns observed in the archaeological record and should be understood as analytical possibilities rather than definitive explanations.

From an anthropological perspective, the comparison of these two sites highlights closure as an active and structured form of human behavior. In both cases, constructed spaces were not simply abandoned, but deliberately transformed through the introduction of material and, in the case of Ravne, additional architectural elements.

Possible interpretations of such behavior include:

- **ritual closure**, involving the symbolic termination of space;
- **functional decommissioning**, removing spaces from us;e
- **reorganization of the built environment**, reflecting changing spatial needs;
- **preservation through burial**, maintaining structures within the landscape.

Rather than selecting a single explanation, the evidence suggests that closure processes may serve multiple functions, depending on context.

### 5.6. Summary of Comparative Findings

The comparison between the Ravne tunnel system and Göbekli Tepe demonstrates that:

- deliberate closure of constructed spaces occurs in both surface and subterranean contexts;
- infilling is a central mechanism of closure in both cases;

- closure processes are repeated and structured rather than incidental;
- material strategies differ, but underlying behavioral patterns show convergence.

These findings support the interpretation of closure as a broader anthropological phenomenon, extending beyond individual sites and cultural contexts, as shown in Table 1.

Table 1. Comparative characteristics of closure processes at the Ravne Tunnel System and Göbekli Tepe.

| Parameter | Ravne Tunnel System (Bosnia and Herzegovina) | Göbekli Tepe (Türkiye) |
|---|---|---|
| Context | Subterranean tunnel network | Surface monumental enclosures |
| Chronology | Multi-period (investigated 2006-2025) | Pre-Pottery Neolithic (10th-9th millennium BCE) |
| Type of closure | Backfilling + structural sealing | Backfilling |
| Fill composition | Pebbles, sand, rubble | Stone fragments, soil, cultural debris |
| Fill extent | Complete (floor to ceiling) | Complete enclosure infill |
| Structural elements | Dry-stone walls blocking passages | Limited structural sealing |
| Stratigraphy | Multi-layered, discontinuous, multi-phase | Repeated enclosure infilling phases |
| Closure pattern | Sequential (section-by-section) | Cyclical (construction–use–burial) |
| Scale | Kilometers of tunnels | Multiple large enclosures |
| Interpretation | Controlled closure of underground space | Monumental closure/transformation of space |

Taken together, these observations support the identification of closure as a recurring pattern of human behavior, expressed through different material strategies but recognizable through consistent archaeological indicators.

## 6. Discussion

### 6.1. Closure as a Deliberate Human Action

The evidence from the Ravne tunnel system and Göbekli Tepe demonstrates that the closure of constructed spaces can take the form of a deliberate, organized process rather than a passive consequence of abandonment. In both cases, the introduction of material into built environments, whether subterranean passages or monumental enclosures, represents intentional human intervention that transforms their spatial and functional properties.

This interpretation is grounded in the material characteristics of the deposits and structures, including complete spatial infilling, stratigraphic discontinuities, and the repeated presence of architectural sealing elements such as dry-stone walls.

At Ravne, this process is particularly evident in the systematic deposition of backfill reaching from floor to ceiling, combined with the construction of dry-stone walls that segment and block passages. At Göbekli Tepe, the complete infilling of enclosures while architectural elements remained intact similarly reflects a controlled process of closure. These patterns indicate that closure is not simply an

endpoint, but an active phase within the life cycle of constructed space.

### 6.2. Material Strategies of Closure

The comparison between the two sites highlights that closure is achieved through different material strategies adapted to specific environmental and architectural conditions. At Göbekli Tepe, infilling involves heterogeneous material incorporating both natural and cultural elements, suggesting a process that integrates deposition with ongoing site activity. At Ravne, infilling relies primarily on pebble- and sand-based material, often placed in a structured manner within confined passages.

The absence of sedimentary features associated with natural processes, such as graded bedding or irregular collapse patterns, further supports the interpretation of controlled deposition within the Ravne tunnel system.

In addition to infilling, the Ravne tunnel system demonstrates the use of architectural features—specifically dry-stone walls—as an integral component of closure. These walls serve not only as barriers but also as structural elements that organize and reinforce the sealing process. The combination of backfilling and wall construction indicates a multi-layered approach to closure that extends beyond simple deposition.

These differences underline the adaptability of closure practices, while reinforcing the shared underlying behavior of intentional spatial transformation.

### 6.3. Sequential Closure and Spatial Control

One of the most significant observations from the Ravne tunnel system is the evidence for sequential closure. The stratigraphic relationship between backfill deposits and dry-stone walls indicates that closure occurred in stages, with individual segments of the tunnel system being progressively filled and sealed. This pattern suggests a high degree of spatial control and planning.

This interpretation is supported by the stratigraphic relationship between backfill deposits and structural elements, particularly the occurrence of walls beneath overlying infill layers, indicating repeated and staged intervention.

At Göbekli Tepe, sequential processes are expressed in different ways through repeated cycles of enclosure construction, use, and burial. Although the architectural contexts differ, both sites demonstrate that closure is not a single event but a structured sequence of actions that may extend over considerable periods.

The presence of such multi-phase processes suggests that closure is integrated into broader patterns of site use and transformation. It reflects decisions about when and how to terminate the use of space, and how to manage its physical and symbolic presence within the landscape.

### 6.4. Scale and Organization of Closure Activities

The scale of closure in both contexts indicates coordinated and sustained human activity. At Göbekli Tepe, the complete infilling of large enclosures required the

movement and deposition of substantial quantities of material. At Ravne, the presence of backfill across kilometers of tunnel passages represents an even more extensive application of similar processes in a linear, subterranean environment.

Such large-scale interventions require organization and planning. At Ravne, the scale of intervention is further reflected in the number and distribution of structural sealing features, with 85 documented dry-stone walls indicating repeated and coordinated modification across the tunnel network. The repetition of closure across multiple spatial units further suggests that these processes were not incidental but formed part of established practices. The scale of activity also reinforces the interpretation of closure as a meaningful and deliberate act, rather than a by-product of abandonment.

### 6.5. Anthropological Implications

The following interpretive frameworks are proposed as analytical models based on observed material patterns and should not be understood as mutually exclusive or definitive explanations.

From an anthropological perspective, the deliberate closure of constructed spaces can be understood as a form of interaction between human groups and their built environments. Rather than simply ceasing to use a space, communities may actively transform it, altering its accessibility, visibility, and function.

Several interpretive frameworks may be considered:

- Ritual closure, in which spaces are intentionally "terminated" as part of symbolic or ceremonial practices;
- Functional decommissioning, involving the systematic removal of spaces from use;
- Spatial reorganization, reflecting changes in settlement patterns or social organization;
- Preservation through burial, whereby structures are intentionally maintained in a concealed state.

The available evidence does not allow for a single definitive interpretation in either case. However, the consistency of closure practices across different contexts suggests that such actions are not arbitrary. Instead, they reflect structured behaviors that respond to cultural, environmental, and functional considerations.

### 6.6. Limits of Interpretation

While the material evidence clearly supports the interpretation of deliberate closure, the motivations underlying these processes remain difficult to determine with certainty. The absence of direct textual or ethnographic evidence limits the ability to assign specific meanings to these actions.

In addition, differences between the two sites—particularly in terms of chronology, architectural form, and environmental setting—must be considered. The comparison presented here is based on observable patterns of behavior rather than assumptions of cultural connection or shared origin.

As such, the interpretations offered in this study should be understood as analytical frameworks rather than definitive explanations. Further research, including more detailed analysis of material composition and depositional processes, may help refine these interpretations.

In particular, the interpretation of Ravne as a context of deliberate closure is based on converging lines of material evidence rather than on a single diagnostic feature.

### 6.7. Closure as a Broader Pattern of Human Behavior

Despite these limitations, the comparison between the Ravne tunnel system and Göbekli Tepe supports the identification of deliberate closure as a broader anthropological pattern. Across contexts, human groups have intentionally transformed constructed spaces through backfilling, sealing, and architectural modification.

These processes demonstrate that the end of a structure's functional life does not necessarily correspond to its abandonment. Instead, closure may represent an active and meaningful stage in the relationship between people and their built environment.

The Ravne tunnel system, with its combination of large-scale backfilling, structural sealing, and evidence of sequential closure, provides a particularly clear example of this phenomenon in a subterranean context. When considered alongside the well-documented case of Göbekli Tepe, it contributes to a broader understanding of how human societies manage, transform, and ultimately terminate the use of constructed space.

The consistency of these patterns across distinct contexts supports the identification of closure as a recurring and structured form of human interaction with constructed environments.

## 7. Conclusion

The analysis presented in this study demonstrates that the deliberate closure of constructed spaces constitutes a recognizable and structured form of human activity. This interpretation is supported by consistent stratigraphic and material evidence observed across multiple excavation contexts. Evidence from the Ravne tunnel system in Bosnia and Herzegovina, supported by comparative data from Göbekli Tepe, indicates that backfilling and sealing are not incidental outcomes of abandonment, but intentional processes integrated into the life cycle of built environments.

At Ravne, the archaeological record reveals a combination of features that collectively support this interpretation: extensive anthropogenic backfill composed of pebbles and sand, complete filling of tunnel passages from floor to ceiling, the repeated construction of dry-stone walls blocking access to sections of the system, and stratigraphic evidence for multi-phase infilling. These characteristics demonstrate a systematic, staged closure process carried out over extended spatial and temporal scales. In particular, the complete filling of tunnel passages from floor

to ceiling, the clear distinction between natural and introduced material, and the documented presence of 85 dry-stone walls across multiple sectors of the system provide converging lines of evidence for intentional and repeated closure.

At Göbekli Tepe, a comparable pattern is observed in the deliberate infilling of monumental enclosures. Although differing in architectural form and context, both sites exhibit key similarities, including the intentional deposition of material, the preservation of structural elements beneath fill, and the repetition of closure processes across multiple units. These similarities are based on observable material patterns, including the extent and composition of infill and the preservation of structural elements beneath deposited material. These shared features suggest that closure is not site-specific but reflects a broader pattern of human behavior.

The comparison highlights that different material strategies—heterogeneous cultural fill at Göbekli Tepe and structured pebble-based infill combined with architectural sealing at Ravne—can serve similar purposes in transforming and terminating the use of constructed spaces. In both cases, closure appears as an active process involving planning, organization, and coordinated effort.

From an anthropological perspective, these findings support the interpretation of closure as a meaningful stage in the interaction between human groups and their built environment. Whether motivated by functional, social, or symbolic considerations, the deliberate transformation of space through backfilling and sealing reflects intentional decisions about how structures are taken out of use and integrated into the landscape. While the specific motivations underlying these processes remain open to interpretation, the material record provides a consistent basis for identifying closure as a deliberate and organized practice.

While the precise motivations underlying these processes remain open to interpretation, the material evidence provides a clear basis for identifying closure as a distinct and recurring phenomenon.

The Ravne tunnel system, due to the scale, clarity, and repetition of its archaeological features, represents a particularly significant example of deliberate closure in a subterranean context. When considered alongside well-documented sites such as Göbekli Tepe, it contributes to a broader analytical framework for understanding how human societies actively transform and terminate the use of constructed spaces.

## Acknowledgements

The author expresses sincere appreciation to all archaeologists, researchers, and field teams who participated in the long-term investigations of the Ravne tunnel system between 2006 and 2025. Their work in excavation, documentation, and analysis made the dataset presented in this study possible.

Special thanks are extended to the international and local collaborators, as well as to the volunteers and technical staff who contributed to excavation campaigns and field operations. Their sustained effort over multiple field seasons enabled the systematic recovery and recording of stratigraphic and architectural data.

The author also acknowledges the institutional support of the Archaeological Park: Bosnian Pyramid of the Sun Foundation, which coordinated and funded the archaeological research program in the Visoko region.

## Funding

This research was supported by the Archaeological Park: Bosnian Pyramid of the Sun Foundation. No external funding was received.

## Data Availability

The data supporting the findings of this study are derived from archaeological investigations conducted between 2006 and 2025 in the Visoko region. Field documentation, excavation records, and associated materials are maintained by the Archaeological Park: Bosnian Pyramid of the Sun Foundation and are available from the author upon reasonable request.

## Ethical Approval

All archaeological investigations were conducted in accordance with applicable local regulations and accepted professional standards for archaeological research.

## Author Contributions

The author was responsible for the conception of the study, direction of fieldwork, analysis of archaeological data, and preparation of the manuscript.

## Permissions

All necessary permissions for archaeological research and excavation were obtained from the relevant authorities.

## Conflicts of Interest

The author declares no conflict of interest.

## References

Cameron, C. M., & Tomka, S. A. (1993). *The Abandonment of Settlements and Regions*. Cambridge University Press. https://doi.org/10.1017/cbo9780511735240

Dietrich, O., Heun, M., Notroff, J., Schmidt, K., & Zarnkow, M. (2012). The Role of Cult and Feasting in the Emergence of Neolithic Communities. New Evidence from Göbekli Tepe, South-Eastern Turkey. *Antiquity, 86,* 674-695. https://doi.org/10.1017/s0003598x00047840

Harris, E. C. (1989). *Principles of Archaeological Stratigraphy* (2nd ed.). Academic Press.

Hodder, I. (1999). *The Archaeological Process: An Introduction*. Blackwell.

Hodder, I. (2010). *Religion in the Emergence of Civilization*. Cambridge University Press. https://doi.org/10.1017/CBO9780511761416

Ingold, T. (2000). *The Perception of the Environment: Essays on Livelihood, Dwelling And skill*. Routledge.

Notroff, J., Dietrich, O., & Schmidt, K. (2014). Building Monuments, Creating Communities: Early Monumental Architecture at Pre-Pottery Neolithic Göbekli Tepe. In C. Renfrew, M. Boyd, & I. Morley (Eds.), *Death Rituals, Social Order and the Archaeology of Immortality in the Ancient World* (pp. 65-77). Cambridge University Press.

Osmanagich, S. (2026a). Systematic Archaeological Investigation of the Ravne Underground Complex in Bosnia and Herzegovina. *Archaeological Discovery, 14,* 125-151. https://doi.org/10.4236/ad.2026.142007

Osmanagich, S. (2026b). A New Class of Subterranean Drystone Structures: River-pebble Walls in the Ravne Tunnel Complex, Bosnia-Herzegovina. *Journal of Environment and Biological Science, 1,* 1-14. https://doi.org/10.21203/rs.3.rs-6564956/v1

Osmanagich, S. (2026c). An Anthropological Interpretation of the Subterranean Ravne Tunnel System (Central Bosnia). *Advances in Anthropology, 16,* 23-50. https://doi.org/10.4236/aa.2026.161002

Schiffer, M. B. (1987). *Formation Processes of the Archaeological Record*. University of New Mexico Press.

Schmidt, K. (2010). Göbekli Tepe—The Stone Age Sanctuaries. New Results of Ongoing Excavations with a Special Focus on Sculptures and High Reliefs. *Documenta Praehistorica, 37,* 239-256. https://doi.org/10.4312/dp.37.21