

PUBLIC PERCEPTIONS OF LARGE STONES IN NORTH BALI: A SOCIOCULTURAL AND PALEO-DISASTER STUDY

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ABSTRACT

The presence of large stones measuring 0.5–5 meters in diameter in North Bali is a legacy of the 1815 multi-hazard event involving an earthquake, landslide, flash flood, and local tsunami. Scientifically, these stones can be explained as the result of geomorphological processes. However, for local communities, stones are not only seen as material remains of the disaster, but also as spiritual symbols, markers of village identity, and cultural archives of the disaster. This study aims to analyze community perceptions of large stones in North Bali through a qualitative approach based on interviews and field observations. The results show that community perceptions are multidimensional: historical (memory of the 1815 disaster), spiritual (sacred objects), social (spatial markers), and scientific (results of natural phenomena). This article confirms that large stones in North Bali function as a link between culture and nature, as well as a means of heritage-based disaster mitigation education. These findings contribute to paleo-disaster studies and disaster anthropology, particularly in examining how collective disaster memory is reproduced through physical artifacts and local traditions.

Keywords: Public Perception, Large Stones, North Bali, Socio-Culture, Paleo-Disaster

1.0 INTRODUCTION

Balinese people have a strong attachment to their natural landscape, where physical elements such as mountains, lakes, rivers, and large rocks are often positioned as meaningful entities within the cultural system. In North Bali, the presence of large rocks scattered from the hills to the coast is not simply a geological phenomenon, but part of the cultural identity. Scientifically, the presence of these rocks is linked to the volcanic flash flood following the 1815 earthquake that destroyed at least 15 villages in Buleleng (Faral et al., 2024; Griffin et al., 2019). This event was one of the deadliest disasters in Bali's history, leaving behind a material trail of boulders measuring up to 5 meters.

Previous studies have highlighted Bali as a tourism destination with rich Hindu culture and spirituality (Picard, 2011; Narottama et al., 2016; Wang, 2016). However, few have linked the cultural dimension to the legacy of geological disasters (paleo-disasters). In this context, the large stones of North Bali can be viewed as both physical artifacts and cultural symbols, representing the memory of a disaster across generations. The community interprets the stones syncretically: accepting scientific explanations but still tying them to religious, social, and mystical narratives.

However, from a socio-cultural perspective, stones are treated as sacred objects, places of worship, and even believed to possess supernatural powers. This phenomenon reflects a syncretism of knowledge: people accept scientific explanations but still tie the stones to spiritual and social narratives. Based on preliminary survey results, interviewed residents stated they were unaware of the origins of the stones in their homes. The family had made repeated attempts to remove the stones, which were located in their yards, but these attempts failed due to their large size and their being embedded too deeply. This was also linked to mystical events experienced by the homeowners. Researchers are interested in helping to explain the origins of these stones and how the community views them.

This article aims to analyze community perceptions of large stones in North Bali within the framework of socio-cultural and paleo-disaster studies. The research focuses on how stones are positioned as symbols of disaster memory, sacred objects, social markers, and scientific entities, thus understanding them as a link between culture and nature.

2.0 LITERATURE REVIEW

2.1 Public Perception, Cultural Landscape, and the Materiality of Stone

In environmental humanities studies, perception is understood as how people assign meaning to objects and spaces—not merely sensory responses, but rather the product of the interaction of local knowledge, religious practices, and historical experiences (Picard, 2011). In the Balinese context, natural objects are often drawn into the cultural landscape—a natural landscape “shaped” by culture (Sauer, 1925). Stone, as a massive material object, has the potential to become a symbolic “marker,” a territorial boundary, and a ritual medium, thus transcending geological categories to become a cultural material that produces and maintains identity (Picard, 2011; Untara & Gunawijaya, 2020).

In Balinese daily practices, prominent natural objects—ancient trees, springs, or large rocks—are often sacred and positioned within local cosmology. The installation of poleng cloth (black and white) represents Rwa Bhineda (cosmic duality) which marks the boundaries of sacred-profane, danger-protection, and so on (Untara & Gunawijaya, 2020). Thus, the community's perception of the large stone is shaped by a combination of: (a) aesthetic-ritual (installation of cloth, offerings), (b) spatial ethics (taboos, yard layout), and (c) collective memory (ancestral narratives about disasters)

The concept of collective memory explains how social groups store and negotiate memories of the past through symbols, rituals, and material objects (Halbwachs, 1992). Large stones can function as “cultural archives” that bind memories of disasters, both through oral stories and physical markers in the landscape. In the context of North Bali, memories of the events of 1815—a series of earthquakes, landslides, flash floods, and local waves—can be “anchored” by the presence of unusual stones at specific points (Faral et al., 2024). Due to their enduring nature, stones mediate the continuity of memory across generations—a form of memoryscape in which the landscape stores and transmits memories of the disaster.

Studies of materiality emphasize that objects are not merely passive “backdrops” but actors that influence human actions—for example, forcing houses to “conform” around stones, or establishing the route of ritual processions (Picard, 2011). In this context, stones become living

monuments—not made by humans, but “adopted” by culture as markers of memory that also guide social practices.

2.2 Paleo-Disaster: Rocks as Material Traces of Disaster

Paleo-disaster literature examines the physical traces of past disasters through sediments, boulders, and geomorphological anomalies (Sutikno et al., 2020). Historical reconstructions indicate that North Bali experienced a multi-hazard event in November 1815 that devastated large areas of Buleleng (Faral et al., 2024; Griffin et al., 2019). The distribution of large boulders (0.5–5 m) from upstream slopes to the coast indicates high-energy debris flow/flash flood processes. Analogously, studies of the Yigong landslide in Tibet demonstrate how giant boulders serve as evidence of extreme mass movement events and enter local narratives as meaningful objects (Xu et al., 2012).

Beyond mechanistic aspects (size-elevation, flow paths), hydrometeorological-disaster research highlights social impacts and vulnerability patterns that are reshaped post-disaster (Špitalar et al., 2014). In the Balinese context, the paleo-disaster reading that meets cultural memory produces a dual understanding: stones are both material traces and social traces of the disaster.

2.3 Balinese Hindu Religiosity, Stones as Social Infrastructure: Spatial Planning, Identity, and Symbolic Economy

Studies of Balinese culture demonstrate syncretism—the ability to combine “scientific” knowledge with local beliefs without sharp conflict (Picard, 2011). Large, geologically “clear” stones are simultaneously understood as sacred objects with “guardians,” taboos, and balancing rituals. This sacredness aligns with the cosmos-mandala view: harmony is achieved through managing sacred-profane boundaries, cardinal directions, and spatial hierarchies (Untara & Gunawijaya, 2020). Therefore, policies or technical interventions (e.g., stone removal) are often negotiated through ritual ethics to avoid violating the local cosmic order.

Several studies of cultural tourism and heritage demonstrate that meaningful objects—including sacred stones—can function as social infrastructure that organizes encounters, boundaries, and spatial orientation, while also supporting a symbolic economy (Christiawan, 2017; Picard, 2011). At the micro level, stones can serve as yard boundaries or gathering points; at the macro level, they can be developed into heritage sites with historical disaster narratives for public education. However, the literature also warns of the risk of excessive commodification, which could erode sacred meaning if not managed according to community-based heritage principles (Christiawan, 2017).

Based on the literature, there is a consensus that the large stones in North Bali originated from a historical catastrophic event (Faral et al., 2024; Griffin et al., 2019) and are sacred in local cosmology (Untara & Gunawijaya, 2020; Picard, 2011). However, research gaps remain in: (1) Quantification of the size-elevation relationship and boulder-flow path morphometry combined with in-depth ethnography; (2) Cross-generational analysis of sacred-scientific perceptions and shifting meanings in the digital era; (3) Models for integrating paleo-disaster literacy with local rituals for disaster mitigation curricula; and (4) Heritage policy frameworks that maintain sacredness while opening up educational space and equitable economic benefits for residents.

From this gap, the original contribution offered by this study is to weave two layers of evidence—geomorphology and ethnography—into a single model of “cultural archives of disaster”: stones as material objects that bind disaster memories, organize social spaces, and support religious practices, while also serving as a medium for risk education.

3.0 RESEARCH METHODS

The research was conducted in Panji Village, North Bali, using a descriptive qualitative approach with a disaster anthropology perspective. Data were collected through semi-structured interviews with five informants (traditional leaders, landowners with large stones, temple caretakers, and local residents), as well as field observations of community practices regarding stones (e.g., the installation of poleng cloth, offerings, and religious rituals). Spatial observations were also conducted by recording the distribution and size of stones, supported by Geographic Information System analysis. Data analysis used a thematic approach within the framework of cultural geography (Sauer, 1925; Picard, 2011), collective memory theory (Halbwachs, 1992), and disaster anthropology (Špitalar et al., 2014). Triangulation was conducted by comparing community narratives, historical records, and geological findings.

4.0 RESULTS AND DISCUSSION

4.1 Stones as Disaster Memories

Most respondents associated the presence of stones with ancestral stories about villages lost to a major flood. For them, stones are "silent witnesses" to the 1815 disaster. Thus, stones serve as cultural archives that remind the community of the vulnerability of their environment. Interviews with the informant's parents revealed that: "This mother has passed down through generations that these stones came from a volcanic eruption scattered throughout the village." Stones function as disaster archives. They hold both material memory (evidence of the 1815 flash flood) and social memory (hereditary narratives). This aligns with the concept of collective memory (Halbwachs, 1992).

A 65-year-old resident of Panji stated, "These stones came down from the mountain with the flood." This narrative serves as evidence of collective memory of the 1815 disaster, although it is not recorded in official local archives. More than 300 boulders, measuring 53–500 cm, were recorded. The distribution shows a pattern of decreasing rock size with increasing elevation, indicating that the material was carried by flash floods from upstream to downstream.



Figure 1. Interview with the family of an informant whose residence contains a large rock.

4.2 Rocks as Sacred Objects

People often treat rocks like small temples: they are draped with poleng cloth, given offerings, and considered to have "guardians." Taboos apply, such as prohibitions against using harsh language or attempting to move the rock. This demonstrates how natural objects are positioned within the Balinese religious system as part of cosmic harmony (Untara & Gunawijaya, 2020). Interviews with informants at the location of the large rock revealed that many people come to "mepinunas" (ask the guardian of the rock for blessings). Those who come to ask for something have their wishes granted, such as wishes for children, good health, good fortune, and so on. Furthermore, offerings are always made to the large rock, as the community believes it harbors a guardian, thus considering it sacred (interview with R 1, August 22, 2025).



Figure 2. Stones as sacred places in Panji Village (Source: Document by I Gede Astra Wesnawa, 2025).

4.3 Stones in Social Spatial Planning

This phenomenon reinforces the concept of cultural landscape (Sauer, 1925; Picard, 2011), where natural elements are combined with cultural meaning. Stones are not simply inanimate objects, but symbols of collective identity.

Informants revealed that stones often influence village spatial planning. Some houses are built around stones because they are considered immovable. Stones also serve as markers of territory and social identity, for example, they are called "Batu Paras Belah".

Stones are treated like small temples. Cloth poleng and offerings are routinely placed. Taboos apply, such as the prohibition against moving stones because it is believed to bring misfortune. A 55-year-old informant in Panji Village stated: "When there is a ceremony, we give offerings to this stone."

5.0 DISCUSSION

Community perceptions of large stones in North Bali reflect the close relationship between disaster (paleo-disaster) and culture (socio-religious). Historical and geological data indicate that the stones are products of the events of 1815, while the community attaches spiritual

meaning to them that strengthens their cultural identity. Large stones are treated like small temples. Respondents reported frequently making offerings, hanging poleng cloth, and believing the stones to be inhabited by supernatural powers. Several taboos apply, such as prohibiting harsh language or damaging the stones. Mystical experiences, such as illness after attempting to move the stones, reinforce the belief that the stones possess "supernatural guardians." This aligns with Balinese culture, which views certain natural objects as spiritual manifestations.

Besides being viewed as physical objects, these stones also have a spiritual dimension. Some people treat them like large trees or small temples, making offerings and hanging poleng (black-and-white) cloth or white-red-and-black cloth as symbols of purity. Some informants also mentioned taboos, such as prohibitions against harsh language, littering, or attempting to damage the stones. Mystical experiences have also occurred, such as families who attempted to move the stones experiencing illness or misfortune. This view confirms the perception of stones as the abode of supernatural powers or as objects with a religious aura. The community also links the presence of the stones to the 1815 flash flood. Ancestral stories suggest that the stones were carried by a strong current from Lake Buyan-Tamblingan or from the mountains to the south. This aligns with scientific findings that the 1815 7.3 Mw earthquake triggered a massive landslide that developed into a debris flow, carrying giant boulders all the way to the Singaraja coast (Griffin et al., 2019; Faral et al., 2024).

Thus, stones are not only geological artifacts but also cultural archives that preserve disaster memories. This concept aligns with paleo-disaster studies, which emphasize the importance of reconstructing past disasters through physical evidence and collective memory (Špitalar et al., 2014).

This phenomenon aligns with the theory of cultural memory, where natural objects serve as intergenerational reminders of disasters (Halbwachs, 1992). Stones serve not only as material evidence but also as religious symbols that maintain social order.

The case of North Bali is similar to examples in Tibet (Xu et al., 2012), where large landslide rocks are treated by the community as sacred markers. This demonstrates that across cultures, large stones recovered from disasters are often reassigned from a "natural" to a "cultural" status. Interviews revealed that the community considers these large stones to have been present since their ancestors' time. They are viewed as part of the village's historical heritage. This narrative demonstrates the existence of long-term cultural memory, where physical objects such as stones serve as links between generations (Christiawan, 2017).

Thus, the presence of stones in North Bali is not merely a geological phenomenon, but a marker of collective identity, which can be integrated into local culture-based disaster mitigation education programs.

6.0 CONCLUSION

The large stones in North Bali are perceived multidimensionally by the community: (1) as disaster memories that record the 1815 tragedy, (2) as sacred objects in the Balinese Hindu belief system, (3) as social markers that influence spatial planning and village identity, and (4) as scientific objects that remain entwined with mystical narratives.

This research emphasizes the importance of integrating sociocultural and paleo-disaster analysis to understand human-nature relationships in Bali. These stones serve as both cultural heritage and disaster archives that can be optimized as a means of heritage-based mitigation education. Further recommendations include the need for more detailed spatial documentation and exploration of the role of stones in the development of local wisdom-based tourism.

REFERENCES

- Christiawan, P. I. (2017). The role of local wisdom in controlling deforestation. *International Journal of Development and Sustainability*, 6(8), 876-888.
- Faral, A., Lavigne, F., Sastrawan, W. J., Suryana, I. G. P. E., Schrikker, A., et al. (2024). Deadliest natural disaster in Balinese history in November 1815 revealed by Western and Indonesian written sources. *Natural Hazards*. <https://doi.org/10.1007/s11069-024-06671-5>
- Faral, A., Suryana, I. G. P. E., & Lavigne, F. (2025). Field evidence of the greatest disaster in Balinese history: The 1815 Geger Bali multi-hazard event in Buleleng. *Geomorphology*. <https://doi.org/10.1016/j.geomorph.2025.109903>
- Griffin, J., Nguyen, N., Cummins, P., & Cipta, A. (2019). Historical earthquakes of the eastern Sunda arc: Source mechanisms and intensity-based testing of Indonesia's national seismic hazard assessment. *Bulletin of the Seismological Society of America*, 109, 43–65.
- Halbwachs, M. (1992). *On collective memory*. University of Chicago Press.
- Narottama, N., Abdillah, F., & Nirmalayani, I. A. (2016). Religion as the last fortress of Bali cultural tourism. *International Conference on Emerging Tourism Destinations*, 10
- Picard, M. (2011). Balinese religion in search of recognition: From Balinese Hindu Religion to Hindu Religion (1945–1965). *Bijdragen tot de Taal-, Land- en Volkenkunde*, 167(4), 482–510.
- Sauer, C. (1925). *The morphology of landscape*. University of California Publications in Geography, 2(2), 19–54.
- Špitalar, M., Gourley, J. J., Lutoff, C., Kirstetter, P. E., Brilly, M., & Carr, N. (2014). Analysis of flash flood parameters and human impacts in the US from 2006 to 2012. *Journal of Hydrology*, 519, 863–870.
- Untara, I. M. G. S., & Gunawijaya, I. W. T. (2020). The aesthetics and religious use of tattoos in Balinese society. *Jnanasiddhanta: Journal of Hindu Theology*, 2(1), 41–50.
- Wang, J. C. (2016). Beyond cultural tourism: Experiencing the arts in Bali. *Education About Asia*, 21(1).