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Text of abstract

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Keywords: keyword 1; keyword 2; keyword 3

Highlights: These are the highlights.

# 1 Abstract

Flaked stone artefacts from Southeast Asia typically lack visually distinctive and strongly patterned forms, which can make them challenging to analyze and interpret. As a result, many of the cultural dynamics of Pleistocene hunter-gatherers of this region are poorly understood. We use 2D shape data to hypothesize a relationship between unretouched flake shape and assemblage reduction intensity at Mau A, an early Holocene archaeo- logical site in northern Vietnam. We apply a Principal Components Analysis to the flake outlines to investigate shape variation throughout the reduction sequence (measured by dorsal cortex coverage). We find that flake shape varies by reduction stage, primarily through differences in flake length and width. Our results suggest that flake shape is sensitive to assemblage reduction intensity, and may give useful comparative insights when other attributes show little variation. These results are important for understanding stone artefact assemblages from Southeast Asia which often yield little variation when analysed with traditional approaches.

## 1.1 Introduction

* Stone tools from South East Asia tend to lack distinctive typological categories (Mijares 2008; Borel et al. 2013; Borel et al. 2017)
* The purpose of this study was to examine the relationship between flake shape and reduction intensity
* Approach used in the paper is a response to the lack of traditional typological categories in South East Asia

Here is a citation (Marwick, 2017)

## 1.2 Background

* Mau A is an open air site located near the Red River in Yen Bai Province, Northern Vietnam.
* Excavation conducted in 2015 as a part of a UW field school
* A wide array of flakes and stone tools were recovered, n=1058
* Data for the paper comes from caliper measurements of flakes from the 2015 excavation <<<<<<< HEAD

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## 1.3 Methods

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The data used for our analysis came from a 2015 dig at Mau A, located in Northern Vietnam, conducted by a University of Washington field school in conjunction with local archaeologists. Raw flake dimension measurements, such as max dimension length and width at various points along the max dimension length, were converted into shape landmarks values using an R script (see X for supplementary material). The outlines formed by the shape landmarks were then normalized for size. Finally, the shape landmark values were passed through Primary Component Analysis. PCA biplots were created to visualize differences based upon secondary categorical variables, namely flake reduction categories, excavation unit, and mass cluster.

Reduction categories were based upon dorsal cortex percentage. Flakes with no dorsal cortex were categorized as tertiary flakes, those with up to a dorsal cortex percentage of 50% were considered secondary and those with a dorsal cortex value greater than 50% were considered primary (Bradbury & Carr 1995). Artefacts collected from Mau A were separated into 13 excavation units,

(Note, this is copied largely from the poster, and will require further editing -QH) -In order to gather the 1058 stone artefacts, excavations were conducted using hand tools and sieved 4 square meter plots of excavated sediment.

## 1.4 Results

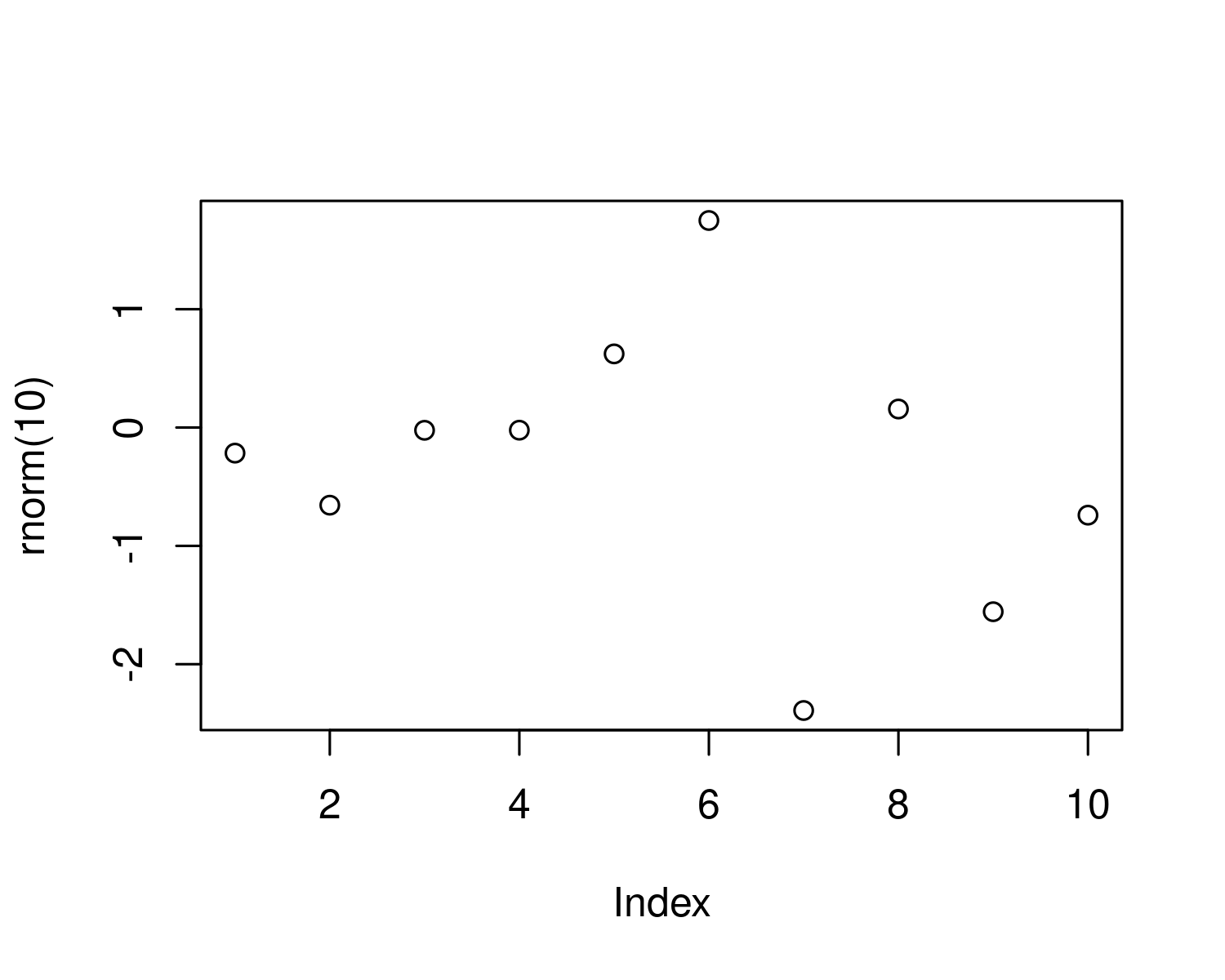


Figure 1.1: A plot of random numbers

Figure 1.1 shows how we can have a caption and cross-reference for a plot

Here is an example of inline code 3.14 in the middle of a sentence.

# 2 Discussion

# 3 Conclusion

# 4 Acknowledgements

## 4.1 References

Borel, Antony, Richard Cornette, and Michel Baylac. 2017. “Stone Tool Forms and Functions: A Morphometric Analysis of Modern Humans’ Stone Tools From Song Terus Cave (Java, Indonesia).” Archaeometry 59 (3): 455–71. <https://doi.org/10.1111/arcm.12264>.

Borel, Antony, Claire Gaillard, Marie-Hélène Moncel, Robert Sala, Emmanuelle Pouydebat, Truman Simanjuntak, and François Sémah. 2013. “How to Interpret Informal Flakes Assemblages? Integrating Morphological Description, Usewear and Morphometric Analysis Gave Better Understanding of the Behaviors of Anatomically Modern Human from Song Terus (Indonesia).” Journal of Anthropological Archaeology 32 (4): 630–46. <https://doi.org/10.1016/j.jaa.2013.03.002>.

Bradbury, Andrew P., and Philip J. Carr. “Flake Typologies and Alternative Approaches: An Experimental Assessment.” Lithic Technology 20, no. 2 (1995): 100-15. Accessed June 11, 2021. <http://www.jstor.org/stable/23273168>.

Mijares, A. 2008. “The late pleistocene to early holocene foragers of northern Luzon.” Bulletin of the Indo-Pacific Prehistory Association 28: 99-107.

Marwick, B., 2017. Computational reproducibility in archaeological research: Basic principles and a case study of their implementation. Journal of Archaeological Method and Theory 24, 424–450. <https://doi.org/10.1007/s10816-015-9272-9>

### 4.1.1 Colophon

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