High resolution spatial analysis of Middle Stone Age assemblages from Sibudu Cave, South Africa

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INTRODUCTION

The archaeological site of Sibudu is a large rock shelter situated above the Tongati River in KwaZulu Natal approximately 40 km north of Durban, South Africa (Figure 1). The locality provides one of the longest Middle Stone Age (MSA) records in sub-Saharan Africa, with deposits dating between roughly 80,000 and 30,000 years ago. Researchers from the University of Tübingen began excavations at Sibudu in 2011 and have added to the important results achieved by Lyn Wadley’s long-term excavations at the site. Sibudu preserves an exceptionally thick, rich and high-resolution archaeological sequence that dates to ~58 ka (Figure 2), which has recently been proposed as type assemblage for the “Sibudan”. Here we focus on three sequential layers of these deposits: Brown Speckled (BSp), Spotty Camel (SPCA) and Chestnut (CHE) from the Eastern Excavation.

RESULTS AND DISCUSSION

Layer BSp yields a DI value of 280. As a DI value > 1 signifies a non-random distribution pattern, the find distribution for BSp is highly non-random with clusters. This is also supported by the χ² Test (t=6340; df=24; p<0.01). Micromorphological analysis found only little post-depositional disturbances of the occupation horizons, suggesting that the non-random dispersion resulted from anthropogenic activity.

The results for the single finds of BSp show two main concentrations of artefacts in the south-west and the north-east of the excavation area (Figure 3a). The available data for the small debitage (Figure 3b) provides a similar picture, but with higher find densities in the north-western corner. There is an absence of artefacts especially in square D3a, throughout the three layers. It has to be investigated, whether this area served for a special purpose.

The position of features is often associated with particularly high density of artefacts >3 cm, predominantly in the south-west area of the excavation. This is unusual, as one might expect features as hearths, to be activity-zones with only small debitage in the adjacent drop zones. But for BSP-CHE, many large artefacts occur in the direct surrounding of combustion features. In conclusion, there are clear non-random patterns in the find distribution and find densities at Sibudu. The next step will be to interpret these patterns in terms of activity areas, site function as well as social and economic organization of early modern humans at Sibudu. Future investigations will also include more layers and separate classes of archaeological finds.

METHODS

We conducted an intra-site, spatial analysis of BSp-CHE to study patterns of lithic and organic artefact dispersions within and between layers which can provide insights into spatial behavior and site use of early modern humans. These deposits were excavated on 6 m² (see Figure 2) following the natural stratigraphy of the site.

In a first step, we calculated the Dispersion Index (DI) for identifying statistically whether the distributions within the layers are random, in clusters or homogenous.

In a second step, we plotted all the single finds >3 cm that were measured in the field with a total station (Figure 4). We created kernel-density-estimations (KDE) to compare artefact distributions and examine changes in the find densities of the different occupation horizons that cover only a few centimetres each.

For layer BSP, we also calculated KDE for the amount of small debitage in each quadrant. Additionally, GIS was used to create maps for dispersions of measured single finds.

Figure 4 shows the distribution map of single finds for BSp, also providing the location of features like hearths and ash lenses.

REFERENCES AND ACKNOWLEDGEMENTS


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Fig. 1: Geographic map of Sibudu and other MSA sites in KwaZulu Natal (from Wadley & Jacobs 2008)

Fig. 2: Photograph of North profile of Eastern Excavation (left) and excavation plan (right) of Sibudu (by M. Will)

Fig. 3: Kernel-density-estimations (radius=0.1 m). a: BSp with artefacts >3 cm. b: BSp < 3 cm. c: SPCA > 3 cm. d: CHE > 3 cm. (Charts made with Past by B. Brenner)

Fig. 4: Left: Map of artefact distribution in layer BSp with position of features. (Made with GIS by B. Brenner.)

Fig. 5: Right: View on the excavations during 2014 (photograph by J. Pearen)