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Palaeoenvironments of the Middle Stone Age at Sibudu Cave, KwaZulu-Natal, South Africa: An analysis of archaeological charcoal

Volume II

Lucy Fiona Allott

A thesis submitted to the Faculty of Science, University of the Witwatersrand, Johannesburg, in fulfillment of the requirements for the degree of Doctor of Philosophy

Johannesburg, 2005

DECLARATION

I declare that this thesis is my own unaided work. It is being submitted for the Degree of Doctor of Philosophy in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

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_____day of_____2005

ABSTRACT

Analysis of charcoal from Middle Stone Age layers at Sibudu Cave, KwaZulu-Natal, shows evidence of environmental change during the Last Glacial. Layers analysed encompass the end of the cold stadial, Oxygen Isotope Stage (OIS) 4, and the warmer interstadial, OIS 3. Layers are divided – on the basis of lithic industry associations and taxonomic content – into the Howiesons Poort (HP) (dated to ca. 61 000 years ago), and the early, middle and late post-HP assemblages (ca. 60-55 000, 55-50 000 and 50-33 000 years ago respectively). This project aims to identify evidence for environmental change, characterise this change using qualitative and quantitative analyses, and compare the results to evidence from other proxies at Sibudu Cave and elsewhere in South Africa.

HP layers (GS, GR, GR2) are dominated by evergreen forest taxa, including *Podocarpus* spp., *Buxus* sp., *Brachylaena* sp., *Sapium/Spirostachys* and *Ptaeroxylon obliquum*. *Kirkia* sp. suggests a warm, woodland savanna habitat grew beyond the forest vegetation. Early post-HP layers (Eb, SPCA, BSp) contain taxa from evergreen, riverine forest communities, including *Erica* spp., *Leucosidea sericea*, and *Rapanea melanophloeos*. Some of the taxa in these layers suggest a shift in vegetation, possibly related to the marine regression of the Last Glacial, bringing taxa currently found further inland towards the site. Fewer evergreen forest components, and more bushveld taxa, are present in the middle post-HP (RSp, OMOD, MOD) than in the previous layers. Some of the taxa are only found in northern South Africa in regions that are significantly drier than modern KwaZulu-Natal. These layers also contain more *Acacia* spp. and other Fabaceae taxa and fewer Erica spp. than the samples from the early post-HP. This may be a result of environmental change, a change in wood selection, charcoal fragmentation, or sampling bias. Layer Bu, within the late post-HP, contains evergreen and deciduous taxa many of which are found in KwaZulu-Natal today. *Kirkia* sp. again provides evidence for a dry habitat not

currently found in the region. Many Types were defined in Bu, which may indicate a vegetation community for which there is currently no reference material.

Temperature and moisture indices produced using the Factor Analysis suggest warm and moist conditions during the HP layers. During the early post-HP conditions became cooler with intermediate moisture levels. Subsequently, conditions were warm and dry (middle post-HP) and then warm with a little more moisture indicated (late post-HP).

Good fuelwoods were routinely collected during the post-HP. In contrast, the HP layers are dominated by *Podocarpus* spp. and many of the good fuelwoods, such as *Acacia* spp. and *Erica* spp., are absent. This pattern may be a result of changes in the environment, sample bias or a development of awareness of wood properties between the HP and post-HP occupations.

The charcoal results corroborate palaeoenvironmental interpretations provided by seeds and macrofauna from Sibudu Cave. When the Sibudu Cave data are combined with data from other sites it is apparent that, although conditions in the summer rainfall region during the Last Glacial were generally dry, there is evidence for localised variation in vegetation and climate.

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CONTENTS

Page

DECLARATION ii
ABSTRACT iii
ACKNOWLEDGEMENTS v
LIST OF FIGURES x
LIST OF TABLES xiv
LIST OF APPENDICES xvi

VOLUME 1

CHAPTER 1. INTRODUCTION
1.1. Introduction 1
1.2. Aims 1
1.3. Chapter Summary 6

CHAPTER 2. EVIDENCE FOR PALAEOENVIRONMENTS IN SOUTHERN AFRICA DURING THE LAST GLACIAL
2.1. Introduction 8
2.2. Global Environmental changes between the Last Interglacial and the Last Glacial Maximum 10
2.3. Local Palaeoenvironmental evidence 12
2.3.1. Local Sea Levels 13
2.3.2. River Geomorphology and Palaeochannels 16
2.3.3. Sediment and Pollen Records 17
2.3.4. Oxygen Isotope Records 23
2.4. Palaeoenvironmental Indicators from Archaeological Contexts 23
2.4.1. Winter Rainfall Region 24
2.4.2. Summer Rainfall Region 36
2.5. Summary 40
2.5.1. Winter Rainfall Region 40
2.5.2. Summer Rainfall Region 42

CHAPTER 3. SIBUDU CAVE LOCATION, EXCAVATIONS AND ENVIRONMENTAL PROXIES
3.1. Site Location and Archaeology 45
3.2. Modern Vegetation and Local Climate 48
3.3. Local Geology and Lithic Raw Material Sources 49
3.4. Sibudu Cave Research 50
3.4.1. Fauna 51

3.4.2. Seeds 52
3.4.3. Phytoliths 54
3.4.4. Pollen 55
3.5. Summary 56

CHAPTER 4. SAMPLING STRATEGIES AND ANALYTICAL THEORY
4.1. Introduction 58
4.2. Multiple Stages of Sampling 58
4.2.1. Sampling Agencies for Archaeological Charcoal Assemblages 60
4.3. Analytical Theory 69
4.3.1. Qualitative versus Quantitative 69
4.4. Summary 72

CHAPTER 5. SAMPLING, CHARCOAL IDENTIFICATION AND ANALYTICAL METHODS
5.1. Introduction 74
5.2. Sibudu Charcoal Assemblage 74
5.2.1. Sampling Procedures 74
5.3. Identification 78
5.3.1. Southern African Comparative Collections 78
5.3.2. The University of the Witwatersrand Reference Collection and Database 81
5.4. Analysis of Sibudu Cave Charcoal 85
5.4.1. Sample Size Adequacy 85
5.4.2. Qualitative 87
5.4.3. Quantitative 89
5.5. Summary 92

CHAPTER 6. QUALITATIVE ANALYSIS RESULTS AND PRELIMINARY INTERPRETATIONS
6.1. Introduction 93
6.2. Qualitative Analysis 94
6.2.1. Howiesons Poort (HP) 94
6.2.2. Post–Howiesons Poort (post-HP) 100
6.3. Summary 123

CHAPTER 7. QUANTITATIVE ANALYSIS RESULTS AND PRELIMINARY INTERPRETATIONS
7.1. Introduction 127
7.2. Quantitative Analysis 127
7.2.1 Factor Analysis 127
7.2.2. Correspondence Analysis 138
7.3. Summary 140

CHAPTER 8. DISCUSSION

8.1. Introduction 144
8.2. Sibudu Cave Charcoal Assemblage 144
8.2.1. Howiesons Poort (HP) 147
8.2.2. Post - Howiesons Poort (post-HP) 152
8.3. Palaeoenvironmental Proxies from the Middle Stone Age at Sibudu Cave 160
8.3.1. Charcoal and Botanical Remains 160
8.3.2. Botanical Remains and Fauna 164
8.4. The Contribution of Sibudu Cave data to Understanding Palaeoenvironments in southern Africa during the Last Glacial 165
8.4.1. Oxygen Isotope Stage 4 (OIS 3) 165
8.4.2. Oxygen Isotope Stage 3 (OIS 4) 167
8.4.3. Correlations between Temperature and Moisture Records and the Sibudu Cave Summary Statistics Indices 169
8.5. Summary 170

CHAPTER 9. CONCLUSION & FUTURE RESEARCH
9.1. Introduction 172
9.2. Global climates during the Last Interglacial/Glacial cycle 172
9.3. Evidence for changes in climate during the Last Interglacial/Glacial cycle in South Africa 173
9.4. Evidence for climate change using palaeoenvironmental proxies from Sibudu Cave 177
9.4.1. Macrofauna, seeds, phytoliths and pollen 177
9.4.2. Charcoal 178
9.5. Summary 181
9.6. Directions for Future Research 183

REFERENCES 186

VOLUME 2

FIGURES 1
TABLES 42
APPENDICES 66

LIST OF FIGURES

Page

CHAPTER 2.

Figure 2.1. Bathymetric Map of Tugela Canyon (after Zhiv 1975) with projected sea-level at 120 m below mean sea level **1**

Figure 2.2. Offshore Palaeoshorelines 1-4 (after Ramsay 1996) **2**

Figure 2.3. Plot of sea-level curve (after Williams *et al.* 1981) and the inferred age and depth relationships of Palaeocoastlines 1-4, on the Sodwana Bay shelf (after Ramsay 1996) **3**

Figure 2.4. Current interpretation of the Kosi Bay and Port Durford Formations (adapted from Maud & Botha 2000) **4**

Figure 2.5. Map showing locations of sites with palaeoenvironmental data **5**

Figure 2.6. Tswaing Crater (Partridge *et al.* 1997) proxy rainfall record aligned with Voordrag colluvium and palaeosol formations (adapted from Clarke *et al.* 2003) **6**

Figure 2.7. "Tentative" correlation between pollen zones at Tswaing Crater and Wonderkrater (redrawn from Scott 1999) **7**

Figure 2.8. Correlation of Boomplaas stratigraphic units to Klein's (1978), Earlier Upper Pleistocene Units **8**

CHAPTER 3.

Figure 3.1. Location of Sibudu Cave (redrawn from Wadley & Jacobs 2004) **9**

Figure 3.2. Plan of Sibudu Cave and excavation (after Wadley & Jacobs 2004) **10**

Figure 3.3. a) B5 and B6 North wall Stratigraphy **11**

Figure 3.3. b) B5 East wall Stratigraphy **12**

Figure 3.4. Stratigraphy of East Section wall showing layer Bu (after Wadley 2001) **13**

Figure 3.5. Map from Acocks (1988) showing Veld Types in Savanna Biome (after Wadley 2004) **14**

Figure 3.6. Map of Local Geology (supplied by G. Cochrane) **15**

Figure 3.7. Dolerite Dyke formation dipping into Tongati River (supplied by G. Cochrane) **16**

CHAPTER 4.

Figure 4.1. Flow chart showing stages of sampling **17**

CHAPTER 5.

Figure 5.1. Photograph of Sibudu Cave Excavation (supplied by C. Scott) **18**

Figure 5.2. View of Tongati River and vegetation from Sibudu Cave (supplied by L. Wadley **19**

Figure 5.3. Cumulative curve Howiesons Poort layers **20**

Figure 5.4. Cumulative Curve Layer Eb **20**

Figure 5.5. Cumulative Curve Layer SPCA **21**

Figure 5.6. Cumulative Curve Layer BSp **21**

Figure 5.7. Cumulative Curve Layer RSp **22**

Figure 5.8. Cumulative Curve Layer OMOD **22**

Figure 5.9. Cumulative Curve Layer MOD **23**

Figure 5.10. Cumulative Curve Layer Bu **23**

Figure 5.11. Diagram showing a hypothetical correlation between SSRF1 (temperature) and SSRF2 (moisture) **24**

CHAPTER 6.

Figure 6.1. Distribution maps for taxa identified in the Howiesons Poort layers (GS, GR2 and GR) **25**

Figure 6.2. Distribution maps for taxa identified in layer Eb **26**

Figure 6.3. Distribution maps for taxa identified in the layer SPCA **27**

Figure 6.4. Distribution maps for taxa identified in the layer BSp **28**

Figure 6.5. Distribution maps for taxa identified in the layer RSp **29**

Figure 6.6. Distribution maps for taxa identified in the layer OMOD **30**

Figure 6.7. Distribution maps for taxa identified in the layer MOD **31**

Figure 6.8. Distribution maps for taxa identified in the layer Bu **32**

Figure 6.9. Location of PRECIS grid squares, 2931 AC and 2931 CA, and their proximity to Sibudu Cave **33**

Figure 6.10. Graph showing identified taxa and fragment frequencies **34**

CHAPTER 7.

Figure 7.1. SSRF1 temperature (warmer-cooler conditions). The indices could also be interpreted as an indication of moisture availability **35**

Figure 7.2. SSRF2 moisture availability (wetter conditions-drier conditions). The graph could also be interpreted as showing the presence of frost resistant plants to more non-frost resistant taxa being present **36**

Figure 7.3. SSRF3 habitat niches - forest vegetation to less forested (or different forest) and more open vegetation **37**

Figure 7.4. Correspondence Analysis graph Axis 1 and 2 **38**

CHAPTER 8.

Figure 8.1. Vegetation Map (after van Wyk & van Wyk 1997) showing the modern vegetation around Sibudu Cave and the proximity of the Afromontane and inland forest vegetation to the site **39**

Figure 8.2. Deuterium isotope ratios for the Vostok Ice Core (Jouzel *et al.* 1997) (adapted from Thackeray 1992) and Summary Statistics index on Rotated Factor 1 (SSRF1), based on archaeological charcoal samples, showing the placement of the Sibudu Cave sequence **40**

Figure 8.3. Tswaing Crater, Voordrag colluvium accumulations (Clarke *et al.* 2003) and Summary Statistics index on Rotated Factor 2 (SSRF2) showing discrepancies between the Sibudu Cave record for available moisture and the proxy rainfall record **41**

LIST OF TABLES

Page

CHAPTER 2.

Table 2.1. ^{14}C dates and relative sea levels (below mean sea level) for estuarine sediments (Maud 2000) **42**

Table 2.2. Correlation of Klasies River Middle Stone Age Archaeological sequences with Avery's (1987) microfauna sample numbers, and Feathers's (2002) Luminescence dates **42**

Table 2.3. Correlations between old and revised ESR dates by Grün *et al.* (1990) and Grün & Beaumont (2001), respectively, and Butzer's (1984) unit numbers used by Avery (1982) (Correlation based on Avery's updated interpretation of micromammal data (Avery 1992) **43**

CHAPTER 3.

Table 3.1. OSL dates and C^{14} dates (Wadley & Jacobs 2004), and provisional OSL dates Z. Jacobs (pers. comm.) for the Middle Stone Age deposits at Sibudu Cave **44**

Table 3.2. Data from palaeoenvironmental proxies, including seeds, phytoliths and macrofauna (Wadley 2004, Schiegl *et al*. 2004, and Plug 2004), respectively **45**

CHAPTER 6.

Table 6.1. Environmental requirements and preferred habitats of taxa identified through charcoal and seed analyses from Sibudu Cave **48**

Table 6.2. Fragment counts for Howiesons Poort (HP) charcoal identifications (from combined layers, GS, GR2 and GR) **54**

Table 6.3. Fragment counts for Eb charcoal identifications **55**

Table 6.4. Fragment counts for SPCA charcoal identifications **56**

Table 6.5. Fragment counts for BSp charcoal identifications **57**

Table 6.6. Fragment counts for RSp charcoal identifications **58**

Table 6.7. Fragment counts for OMOD charcoal identifications **59**

Table 6.8. Fragment counts for MOD charcoal identifications **60**

Table 6.9. Fragment counts for Bu charcoal identifications **61**

CHAPTER 7.

Table 7.1. Eigenvalues of the Correlation Matrix. Column 5 shows the cumulative percentage contribution of each factor to the data **62**

Table 7.2. Factor Pattern with values less than 0.3 and greater than – 0.3 blanked out. Negative Values highlighted **62**

Table 7.3. Factor Loadings for Factor 1 (**F1**) before varimax rotation was applied. (Taxa ordered from highest to lowest Factor Loadings) **63**

Table 7.4. Factor Loadings for Factor 2 (**F2**) before varimax rotation was applied. (Taxa ordered from highest to lowest Factor Loadings) **63**

Table 7.5. Factor Loadings for Factor 3 (**F3**) before varimax rotation was applied. (Taxa ordered from highest to lowest Factor Loadings) **64**

Table 7.6. Factor Loadings for Rotated Factor 1 (**RF1**) (after varimax rotation was applied). (Taxa ordered from highest to lowest Factor Loadings) **64**

Table 7.7. Factor Loadings for Rotated Factor 2 (**RF2**) (after varimax rotation was applied). (Taxa ordered from highest to lowest Factor Loadings) **65**

Table 7.8. Factor Loadings for Rotated Factor 3 (**RF2**) (after varimax rotation was applied). (Taxa ordered from highest to lowest Factor Loadings) **65**

LIST OF APPENDICES

Page

APPENDIX A

Reference Collection Database with no graphics **66**

APPENDIX B

Reference Database Images **92**

APPENDIX C

Wood anatomical characters used for charcoal identification **93**

APPENDIX D

Type Identification Database **103**

APPENDIX E

Summary Statistics Equations **124**

APPENDIX F

List of genera and species included in the factor analysis **130**