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

Volume I

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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