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Stone Age Archaeology and Paleoecology of the Geelbek Dunes, West Coast National Park, South Africa Report on the 1998 Fieldwork

Introduction

The University's cooperative project at the Geelbek Dunes is conceived as a case study of Stone Age activity and past environments in the Western Cape. The hope is that the deflated surfaces within the dune system will provide sufficient datable exposures containing archaeological and non-archaeological materials to establish the history of Stone Age use of the dunes and to reconstruct the pattern of environmental change in the region. The two main sources of information are lithic artifacts and subfossil faunal remains. The Geelbek Dunes provide large surface areas of apparent Stone Age on which to conduct landscape archaeology. The study focuses on documenting a wide range of archaeological and natural accumulations in the dune system and is equally interested in low density ephemeral signatures as rich deposits. The comparatively low density of material in many of the dune bays could provide important information about the distribution of activities in areas that have traditionally been seen as "off site" and not worthy of systematic study. Systematic study of all archaeological signatures over large surfaces should allow a well balanced reconstruction of Stone Age subsistence and settlement in the region.

As reliable dates are not yet available for the dunes and calcrete deposits at Geelbek, several preliminary observations provide some indications about the age of the strata and their archaeological content. The complete absence of prehistoric ceramics suggests that the more recent phases of the LSA are not represented. A single U/Th date measured in Pretoria for the hard calcrete from one of the dune bays (Stella) yielded an age of ca. 40,000 yr. b.p. This age probably reflects the final stages of calcium carbonate migration. Thus, the finds in this deposit should predate 40kyr b.p. In addition to the hard calcrete, softer calcretes were observed in positions that appear to underlie and overlie the harder grey and gold colored calcretes. Above the various calcretes, find-bearing beds of fossilized root casts are present in many parts of the dune system. Finally, the majority of the system is covered by mobile white and yellow dune sands. At a minimum, several phases of Stone Age occupation are preserved in the dunes. Given that the visually similar calcrete and rhysolith deposits need not be the same age, the possibility exists that the geological strata could preserve finds from a wide range of ages. The dating of lithic and faunal assemblages, however, may very well be complicated by multiple phases of accumulation and deflation. Gaining a better appreciation for the chronological and geological complexity of the dune system is central to the current project.

The 1998 Field Season

Methods

The field season at Geelbek began February 12 and continued until March 13. Initially, between two and five people formed the crew, and from March 19 onwards six people were in the field or in the Geelbek cottages studying finds and their spatial distribution. All team members are from the department of Early Prehistory and Quaternary Ecology of the University of Tübingen. The crew consisted of an archaeological technician (Andrew Kandel), an archaeological technician in training (Jana Malina), three students (Bastian Asmus, Liane Giemseh, Tim Prindiville) and the project director (Nicholas Conard). Andrew Kandel was responsible for logistical matters and surveying, while

Prindiville coordinated all the incoming field data. Prindiville and Conard examined the faunal and lithic material while the remaining crew members assisted with all aspects of the outdoor and indoor work.

The research focused on two areas: 1) Creating a base map of the dune system with preliminary measurements of the deflation bays; 2) Documenting the archaeological and paleontological finds within the bays.

Upon the team's arrival, a hierarchical system was defined to describe the spatial relationships within the dune system. The individual bays were defined as localities, each of which could contain a number of sites. These sites could contain scatters of finds that appear to belong together. Scatters were to be considered isolated finds. Thus, typical finds would bear a designation including their locality, site, scatter and find number. Given the abundance of surface finds in the dune system and the need for fast piece-plotting of finds, a system of field recording based on a modified version of H. Dibble and S. Mc Pherson's computer program, EDM, was used. Typically, either Prindiville or Conard measured the location of the finds using a total station manufactured by Leica, while Conard selected the finds to be plotted and provided a field description of the objects. A scribe recorded the running find numbers, the geological contexts and preliminary descriptions on a tag which was placed with the find in a plastic bag. The operator of the total station used a Husky portable computer and the EDM program to record the information about the finds. In this manner as many as 3,000 measured finds could be located. Several finds that were deeply embedded in the dunes were plotted, but left in the field. All other finds and their field descriptions and subsequent laboratory descriptions are housed at the South African Museum. No finds have been taken out of the study for study.

The five bays were systematically studied: Bay 35, EDM, Bleached Bone, Alice and Stella. After a thorough surface collection, areas were chosen for excavation. Excavations generally consisted of a group of contiguous square meters in areas with high find densities or places that were interesting for other reasons. In each square meter, about 2cm of sediment were collected in a well-filled bucket and passed through 5mm and 2mm mesh. Excavators collected all lithic artifacts and a good sample of faunal remains contained in each bucket of sandy sediment. In all areas of excavation, at least one meter of sediment from lower levels was excavated to determine if finds were present in the sub-surface deposits. In areas where many finds were found *in situ*, such as the Stella, Site B, Scatter 1 and Scatter 2, excavation proceeded in quarter meter units for improved spatial resolution.

A base map of the dunes (Figure 1) was made using a Gravin, hand-held GPS instrument. The outline of the dunes and the position of local roads and buildings are in good agreement with published aerial photographs and topographic maps. 101 bays were documented. For these bays a position has been recorded, the dimensions approximated, the geological situation described and the abundance of faunal and lithic material recorded. A. Kandel estimates that approximately 10 larger bays have not yet been recorded.

The position of the five studied bays has been surveyed within our local Geelbek grid. Their approximate positions can be seen in Figure 1 and in the detailed maps of the localities (Figures 2-6). For each of the five bays a local topographic map has been produced using measurements from our total station and the graphics program, Surfer. The same program was used in combination with the database program, Microsoft Access, to produce the site maps.

At present only preliminary observations are possible. Nonetheless, clear differences between the bays are evident. While all bays have yielded lithic artifacts and faunal material, their relative abundances and densities are highly variable. The size of the bays and their geological setting also vary greatly.

Bleached Bone, for example, produced numerous faunal remains, including seven clear faunal scatters. The same bay, however, yielded very few lithic artifacts from only two of the scatters. This bay could be interpreted as a place where faunal material accumulated largely in the absence of human activities.

of these bones are white and not heavily mineralized. A high proportion of them come from small bays. EDM and Alice are bays where diverse faunal remains are present within a low density concentration of artifacts. At Alice, a relative abundance of hammerstones and probable grinding stones were found at Site B. As at Bleached Bone, one sees that the distribution of faunal and lithic remains are far from uniform.

Of all the bays, the richest lithic concentrations were documented at Stella. Particularly noteworthy is the *in situ* scatter of artifacts of beige silerete with red bands at Site B, Scatter 1. Remains of this material are dispersed over at least 100m². The find densities vary, with the richest areas reaching a density of more than 10 artifacts/m² when excavated and surface finds are counted.

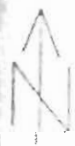
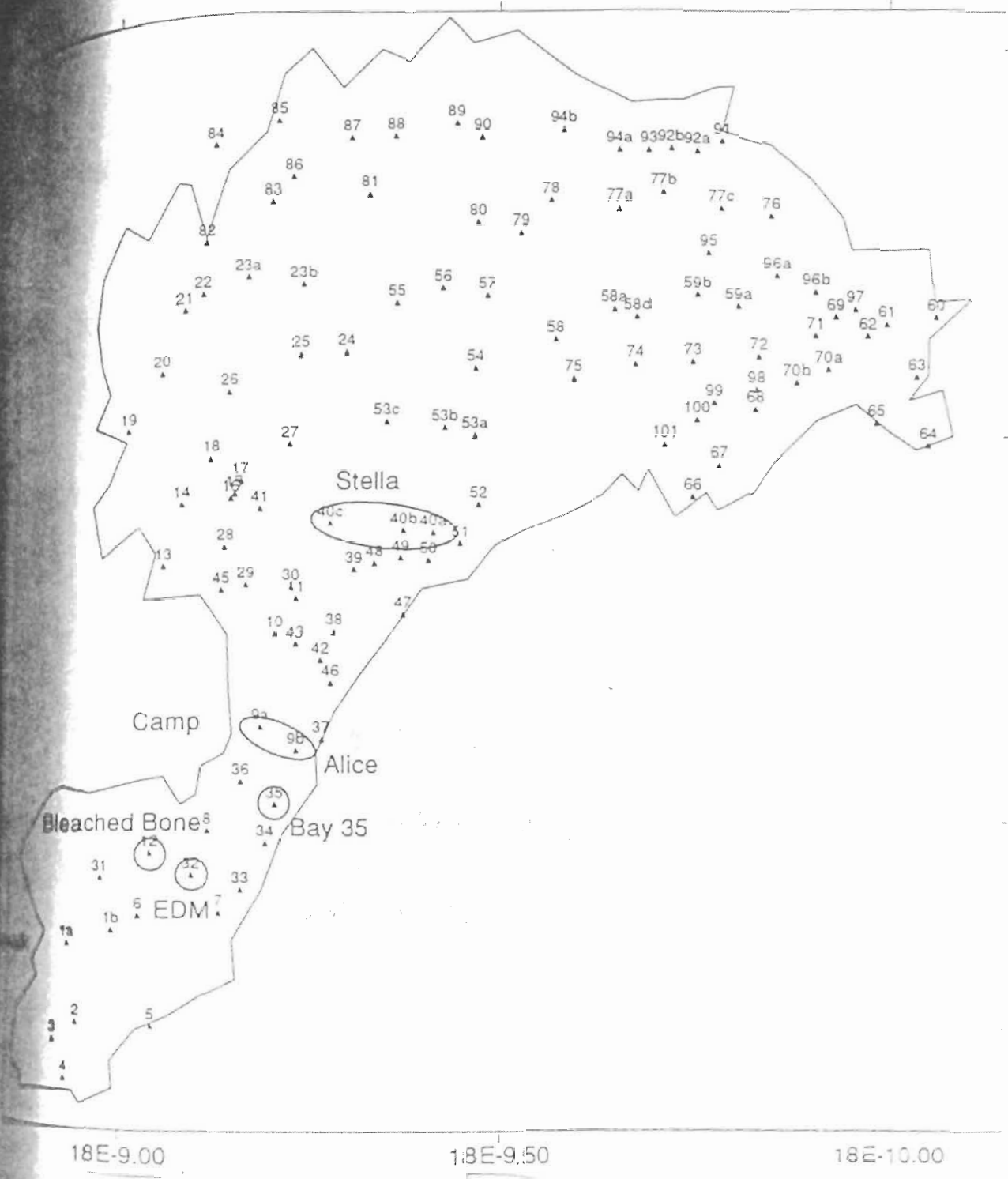
In other bays, Stella yielded several, clearly identifiable, faunal scatters, including many remains of Site A, Scatter 1. Here and elsewhere, faunal remains and lithic artifacts occur in the same area, however, the association between the two classes of finds cannot be demonstrated at present. Presumably, cases do occur where faunal and lithic material result from the same period of human occupation, but further work is needed to address this question in more detail. Such scatters will play a key role in reconstructing patterns of settlement and subsistence at Geelbek.

The artifacts from Geelbek show characteristics of both the MSA and LSA, and the presence of both would not be surprising in this geological setting. No handaxes or other indicators of occupations dating to the ESA have been documented.

As a whole, the lithic assemblage at Geelbek is unusually rich in cores (Table 1). Most of these are single or multiple platform cores. Well made blade cores are present, as are a range of informal cores and occasional centripetal cores. Notched and denticulate forms are the most abundant tools. Scrapers are rare. Two relatively small crescents and the tip of a small backed point were found at Stella B1, and a fragment of a backed bladelet was recovered at Bleached Bone B1. The latter forms can be seen as indicative of LSA occupations. With few exceptions beige and gray sileretes are the most abundant materials, while quartz and metamorphosed shale are the next most abundant chipped artifacts. Granite is also abundant and appears to have been used primarily for hammer and grinding stones.

The geological settings of the bays range from positions with numerous *in situ* root casts, like Bleached Bone, to bays including EDM, Alice and Stella, where larger areas of hard calcrete are exposed. With the exception of Bleached Bone, all the other localities include highly deflated areas of calcrete and less deflated areas with *in situ* root casts. Some bays, particularly Stella, preserve more than one kind of calcrete and presumably document multiple phases of calcrete formation. Discussions in the field with van Compton (Cape Town), John Parkington (Cape Town), Dave Roberts (Cape Town) and Stephan Woodborne (Pretoria) helped to clarify some of the complexity related to the formation and dating of calcrete and rhyoliths. Clearly, these features need to be studied in more detail at Geelbek and in other sites.

In March 11, Stephan Woodborne collected six samples from Stella for dating using 14C, TL and OSL. Results from these samples should be available by the end of this year. These dates should play a helpful role in establishing a reliable chronology for the dunes and the archaeological and micromorphological sites they contain.



Geelbek 1998

GPS Base Map
14 March 1998

Figure 1

Future Research

If appropriate funding, further fieldwork is planned for 1999. The goals and methods will be defined, but the analysis scheduled over the coming year and new dates from Pretoria should be defined. Given the good results from the methods used in 1998, no major changes are anticipated. If adequate funding can be secured, a long-term cooperative arrangement between the University of Tübingen, the National Parks Board, the National Monuments Council, the South African Museum, the University of Cape Town and the CSIR Quaternary Research Centre in Pretoria promises to yield important new results.

Map of the Geelbek Dunes with the location of 101 deflated bays and the five bays at which plotting and excavation has been conducted.

Topographic position of the Bay 35 Locality and the distribution of lithic finds, faunal materials and excavation areas.

Topographic position of the EDM Locality and the distribution of lithic finds, faunal materials and excavation areas.

Topographic position of the Bleached Bone Locality and the distribution of lithic finds, faunal materials and excavation areas.

Topographic position of the Alice Locality and the distribution of lithic finds, faunal materials and excavation areas.

Topographic position of the Stella Locality and the distribution of lithic finds, faunal materials and excavation areas.

Tables

Summary of the lithic finds, faunal material and excavation units from each of the bays visited in the 1998 field season

Acknowledgments

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