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Stone Age Archaeology and Paleoecology of the Geelbek Dunes, West Coast National Park, South Africa
Report on the 2001 Field Season

Introduction

The archaeological fieldwork of the University of Tübingen in the Geelbek Dunes began in 1998 with several goals. These include examining the spatial patterning of all classes of archaeological material over large surfaces of deflated ancient dunes and calcretes. Using the excellent visibility of finds at Geelbek and new methods for documenting large areas, the project studies the distribution of Stone Age finds across the landscape. Combining new chronostratigraphic information and abundant archaeological and paleoecological information, the project analyzes the diachronic patterns of human behavior, settlement and subsistence in the area of the West Coast National Park. Further information on goals and background to the project can be found in the reports to SAHRA and the NMC from the fieldwork in 1998, 1999 and 2000.

The 2001 Fieldwork

The three-week 2001 field season began with the arrival of the crew from Tübingen including Andrew Kandel, Maria Malina and Tim Prindiville in Geelbek on February 5. Nicholas Conard and one of the project geologists, Peter Felix-Henningsen, arrived for the third week of work beginning on February 19. The crew completed the fieldwork at Geelbek on February 23.

The team visited all of the 22 localities, which had been collected during the 1998-2000 seasons (Figure 1). Using a Leica total station and fixed points established in earlier seasons, the crew measured the borders of 15 of the 22 deflation bays (See Appendix 1 and Figure 1 for locations and names of the bays). These data document the migration of the deflation bays with the prevailing southwesterly summer winds. As demonstrated in previous seasons, the movement of bays within the Geelbek dune system is highly variable and averages 9 m annually. Figure 2 shows examples of the migration of the deflation bays in recent years.

The field crew used the total station to map north-south and east-west cross-sections through the dune system (Figure 3). These plots show that the mobile dunes often reach heights of 15m above the calcrete of the deflation bays and that the underlying calcrete forms a gently undulating surface with elevations varying up to 23 m within the extent of the dunes.

In favorable settings, the migration of the mobile dunes exposes freshly deflated finds in positions that can be associated with specific geological strata. In such settings, the wind can gently expose buried archaeological horizons without destroying the spatial integrity of the finds. This phenomenon is particularly useful when studying Ancient Dune 1 and 2, where occupied paleosurfaces are exposed and yield finds from well defined chronostatigraphic horizons. Assuming that archaeologists are present to monitor the deflation, the quality of data from such natural exposures is not significantly different than archaeological data from excavated contexts. Finds from less favorable settings such as the surfaces of calcretes provide less secure chronostratigraphic information and in some cases continue to provide interpretive problems.

bays included enough new finds to warrant collection (CR, HO, LO, NO, PO, RH, SH,). These collections yielded diverse Stone Age and historic finds that winds have exposed collections in 2000 (Table 1). Some of the highlights from the finds from these bays include and faunal remains from Ancient Dune 1 at Rhino; cutmarked eland bones from Ancient Snoek; and several burnt calcrete hearths, many pieces of pottery, lithics, ostrich eggshell diverse faunal material including fish vertebrae from Ancient Dune 2 at Toaster.

to the geological studies and collections of archaeological and paleontological materials, documented the position and condition of objects from the Geelbek Object Movement begun in 2000 in Loop. Here one sees that the nature of the substrate is a key variable in the nature of movement. Finds placed on the mobile dune sand moved the most, while on the firm brown fossil dune sand and calcrete moved much less. Objects left on the calcrete at moved moderate distances and came to rest in depressions that protected the objects from forces could redeposit them. Less important than the substrate were the materials used. Generally denser materials moved shorter distances than less dense materials, however, light materials as mussel shells and ostrich eggshells often quickly settled into stable flat-lying positions and stationary over the period of study. Bones appear to be both the most mobile and least stable materials tested. Figures 4-7 depict the *movements* of the objects used in the experiment. As one expect movement is either down slope or down wind depending on the specific *setting*. The experiment shows that the southwesterly summer winds and northeasterly winter winds can play a role the movement of lithic artifacts, bone, ostrich eggshell and marine shells. While the vertical movement of the deflated calcrete surface and the firm brown sand are of little consequence on the scale of individual years, over the course of a single year the loose sand surface has lost over a in elevation (Figure 5). The process of deflation on the loose sand quickly spreads finds and to cause a gradual down slope movement. In archaeological contexts, such as with many stone hearths at Geelbek, analogous movement has been documented.

With the 2001 season at Geelbek most of the goals of the Tübingen team have been met. In the coming years the project will continue with short periods in the field to continue studying the geology of the dune system. Further work will also be directed at collecting finds from a small number of localities with the intention of gaining a better understanding of the taphonomy of sites within dunes and calcretes. In the coming years the Tübingen team will also continue to monitor the object movement experiment. Several years will be needed to complete the study of the over 40,000 objects collected and to prepare publications on the results of the research at Geelbek.

Acknowledgements

Although the 2001 field season was brief it could not have been conducted without the support of many people. As in previous years, Andrew Kandel, Maria Malina and Tim Prindiville made important contributions to the project. Tim Prindiville in particular has been responsible for managing the data produced by the team and for producing the graphics in this report. Graham Avery of the South African Museum kindly supported the research team in many ways including coordinating the use of a field vehicle and laboratory space in the Museum. Peter Felix-Henningsen of the University of Gießen spent a week in the field with the Tübingen team and provided much insight into the chronostratigraphy and pedology of Geelbek and the surrounding region. Thanks are due Paul Sieben, Kevin Moore and the staff of the West Coast National Park and Mary Leslie of the South African Heritage Resources Agency for their continued interest and support of the project. Finally, the Tübingen team thanks John Parkington of UCT, Dave Roberts of the Council of Geoscience and Stephan Woodborne of the Quaternary Research Dating Unit in Pretoria for helpful discussions and ongoing support. The research at Geelbek is funded by the Deutsche Forschungsgemeinschaft and the University of Tübingen.

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Langebaanweg, February 27, 2001

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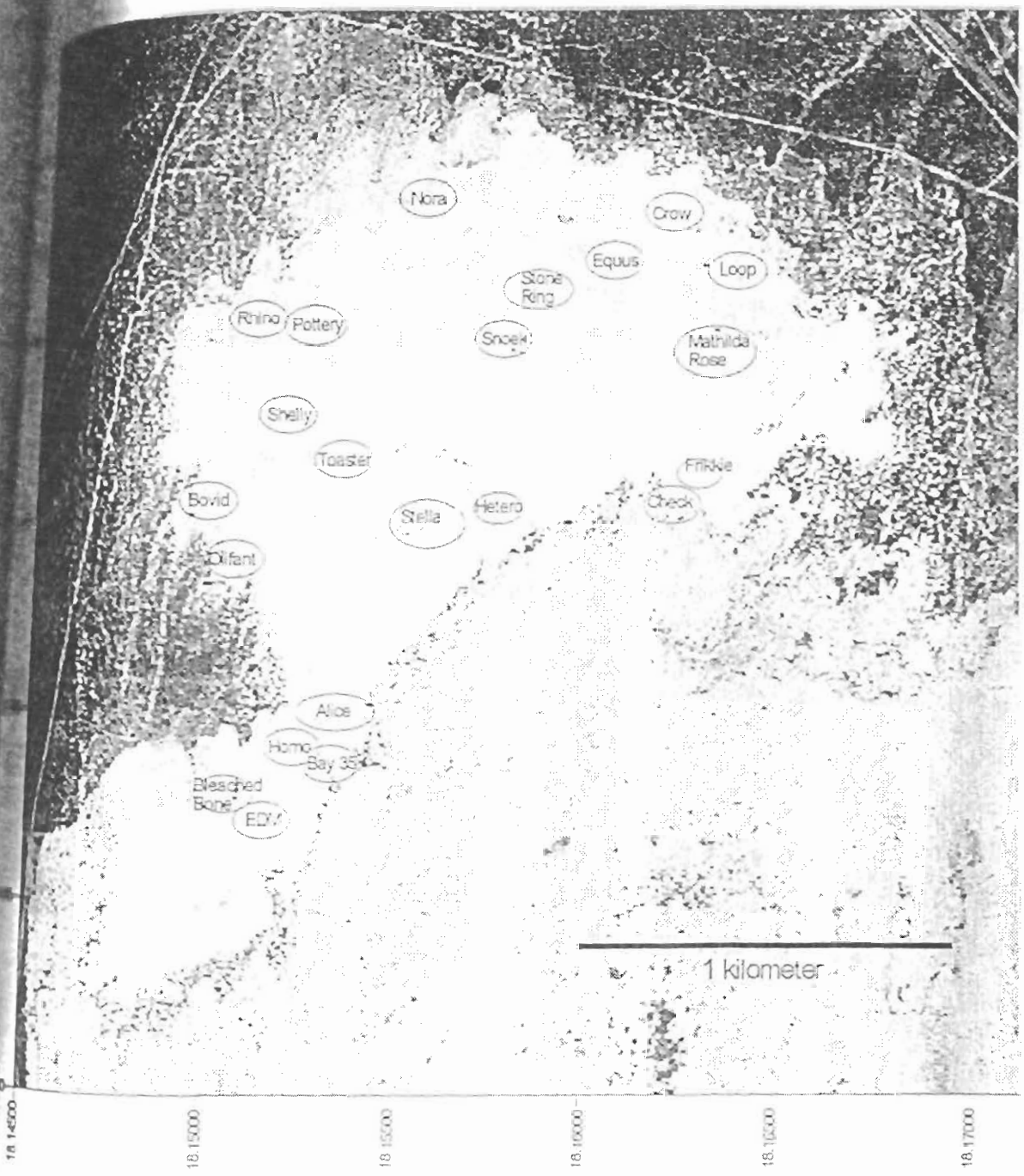

Geelbek 2001
Location of Investigated Localities

Figure 1

Geelbek Profiles
4x vertical exaggeration
(local grid coordinates)