SPATIAL ANALYSIS OF ARCHAEOLOGICAL SITES IN THE WESTERN CAPE USING AN INTEGRATED DIGITAL ARCHIVE

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Abstract

This thesis presents the digital amalgamation of eleven collections spanning six decades of archaeological research in the south-western Cape of South Africa. The oldest recordings were made in the 1950s by Hym Rabinowitz, Percy Sieff and 'Ginger' Townley Johnson while the most recent reports were contributed by members of the eastern Cederberg Rock Art Group (eCRAG). To date over 5100 sites have been captured. An archaeological database designed in 2005 at the University of Cape Town was modified to incorporate the fields required by the various collections before the data input and scanning of the collections took place. Each report was fully typed so that information could be indexed. Upon completion of the archiving work, a new table of rock art analyses was added to the database in order to produce layers suitable for interrogation on a Geographical Information System. Various applications of this database were explored in both the research and heritage management spheres. Given the high volume and broad nature of the data assembled in the archive only preliminary forays into potential research questions were possible. Despite these limitations, the integration of photographic, spatial and written recordings enabled the identification of distributional anomalies that are now being investigated in more detail. A number of other research projects have recently started using this database as a starting point. Undoubtedly the relevance of the information contained in this archive will continue to grow as other uses for the database are explored. Besides the spatial analyses completed in this thesis, over 300 new rock art sites have been added to the body of archaeological knowledge and work on papers related to these findings is ongoing.

Acknowledgements

This thesis is dedicated to Tony Manhire who managed the SARU collection for many years at UCT.

I would like to thank my supervisor, John Parkington, for his unfailing support and patience during this project. The idea to take the digital archive beyond the starting blocks in 2005 has long been in our sights and it is extremely satisfying to have finished this archive. At first we only envisaged digitisation and analysis of the records from the Spatial Archaeology Research Unit at the University of Cape Town but the project took on a life of its own when other contributors came to the fore. Hym and Jenny Rabinowitz, Judy Sealy and Tim Maggs arranged access to the Johnson, Rabinowitz and Sieff collection. Simon Hall provided access to his surveys in the Koue Bokkeveld with Aron Mazel and Siyakha Mguni contributed his records from Bushman's Kloof. Antonieta Jerardino made her West Coast slide collection available and John Lanham gave copies of images from UCT field schools from 2000-2004. Members of the UCT Archaeology Club assisted with surveys in the Koue Bokkeveld and the Witteberge. Many other UCT archaeology students over the years helped make this database possible. Connie Meister and Bastian Asmus contributed data from the Clanwilliam area. Heritage Western Cape and the South African Heritage Resources Agency facilitated access to site data from Archaeological Impact Assessments. Cuan Hahndiek and Louisa Hutten made copies of their De Hangen photographs for the archive. Dave Halkett and Royden Yates must also be thanked for their immense contribution to the SARU archive. Special thanks go to Janette Deacon for leading the eCRAG project, for providing slides, photos and reports and for her bottomless energy while working together at Heritage Western Cape.

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CHAPTER ONE

1.1 INTRODUCTION

The following thesis presents work carried out over the last four years to produce a digital archive that could serve as both a management and research tool for archaeological sites in the Western Cape province of South Africa. Subsequent to the digitisation and amalgamation of records from twelve collections and new fieldwork, the system facilitated a broad analysis of data pertaining to rock art motif distributions as compared to other elements of the archaeological record. This project also set out to overcome some of the shortcomings of previous attempts to digitise archaeological site data into an integrated system. In particular, such a system has been required by heritage management authorities to manage archaeological sites impacted by housing, mining and infrastructure projects (Jakavula 1999).

Generation & management of archaeological site data

Up until 1999, the National Monuments Act (Act 28 of 1969) was the relevant legislation protecting archaeological sites in South Africa but this was replaced by the National Heritage Resources Act (NHRA), Act 25 of 1999. The overhaul of heritage related legislation involved the closure of the National Monuments Council (NMC) and the creation of the South African Heritage Resources Agency (SAHRA) in its place. As part of the structure of the new Act, a three-tiered system was introduced for heritage resources management instead of the centralized model under the NMC. SAHRA would be responsible for managing sites of national status (grade I) and provincial heritage resources authorities (e.g. Heritage Western Cape (HWC) and Amafa in Kwa-Zulu Natal) would manage provincial heritage sites (grade II). Local heritage sites (grades IIIa-IIIc) are currently being managed at the provincial level of government in the Western Cape but the City of Cape Town has recently applied for competency to take over the management of local heritage sites. The Western Cape is therefore the first province where a completed chain of devolution of powers from national to local level has been initiated.

The NHRA was structured to integrate heritage management with planning processes following ten years of experience in handling impact assessments triggered by the Environmental Conservation Act (ECA), Act 73 of 1989. The desired effect of this legislation has been achieved by situating heritage authorities in the middle of development applications. Conversely and perhaps disappointingly, heritage authorities have not adapted to their new role as quickly and efficiently as many hoped for various reasons beyond the purview of this project. The lack of a national system,

after twelve years of applying the NHRA, to store and make sense of the information collected during impact assessments, is just one of many shortcomings that need immediate attention (J. Deacon et al in prep.). In terms of section 39 of the NHRA, SAHRA is responsible for creating and maintaining an inventory of the national estate of heritage resources. It is therefore imperative that local, provincial and national agencies collaborate to establish this archive with practical ways to manage it.

Prior to the promulgation of the ECA in 1989, archaeological site reports were primarily generated by researchers based in universities or museums. Very few of their paper-based archives had been fully digitised. Subsequently, the number of sites located during Archaeological Impact Assessments (AIAs) for development projects has rapidly overtaken the tally documented by research-based archaeological surveys (J. Deacon et al in prep.). As a national inventory system has not yet been made available by SAHRA, the volume of unconsolidated archaeological data continues to grow. Ironically, the results of the earliest archaeological surveys were kept in a paper-based national repository at the Archaeological Survey in Johannesburg until 1962 (J. Deacon 1993a). After the department was closed the records were handed over to the University of the Witwatersrand. Various South African universities have since been expected to handle the responsibilities of managing archaeological data (Willcox 1968).

A nationwide summary of known archaeological sites in the coastal zone was compiled by Kaplan (1993) as part of a report prepared for the Department of Environmental Affairs and Tourism (DEA&T). The report was written to guide national and provincial government departments in long-term planning of infrastructure development. In order to achieve this, Kaplan attempted to define archaeologically sensitive areas along the entire South African coastline within a five kilometre wide band. Due to the reluctance of archaeologists to make site location data available and the time constraints of the project, he was unable to realize all of the aims of the project. Despite the fact that about 3500 sites were plotted on 1:50 000 maps and handed over to DEA&T, the results and recommendations of the report were not incorporated into the planning process by the provincial government in the Western Cape (J. Deacon et al in prep.).

Jakavula (1999) attempted to remedy this situation. He expanded the range of archaeological site data to 20 kilometres from the coastline but only along the West Coast from Milnerton in Cape Town to the Orange River. Jakavula partially digitised about 2100 archaeological site locations and used the information to draw up a number of archaeological sensitivity models. This information was captured onto a Geographical Information System (GIS). Unfortunately this dataset also did not

become part of the assessment process for development applications. These issues are still plaguing the authorities involved in planning and development and will be discussed in a later chapter.

The rapid rate at which personal computing power has increased has been coupled with declining costs of storage and other hardware (Brock 2006). Tremendous opportunities have opened up to create free or relatively cheap database systems containing large data collections. The increasing use of the internet has also shifted the expectation levels of archaeologists for access to information and these needs have been partially satisfied in some other countries that have launched online archaeological site management systems (Hansen and Quine 1999). In Johannesburg, the South African Rock Art Digital Archive (SARADA) project at the University of the Witwatersrand has made great progress in scanning thousands of colour slides housed in institutional archives and private collections and their content has been made available to the public on the internet (RARI 2011).

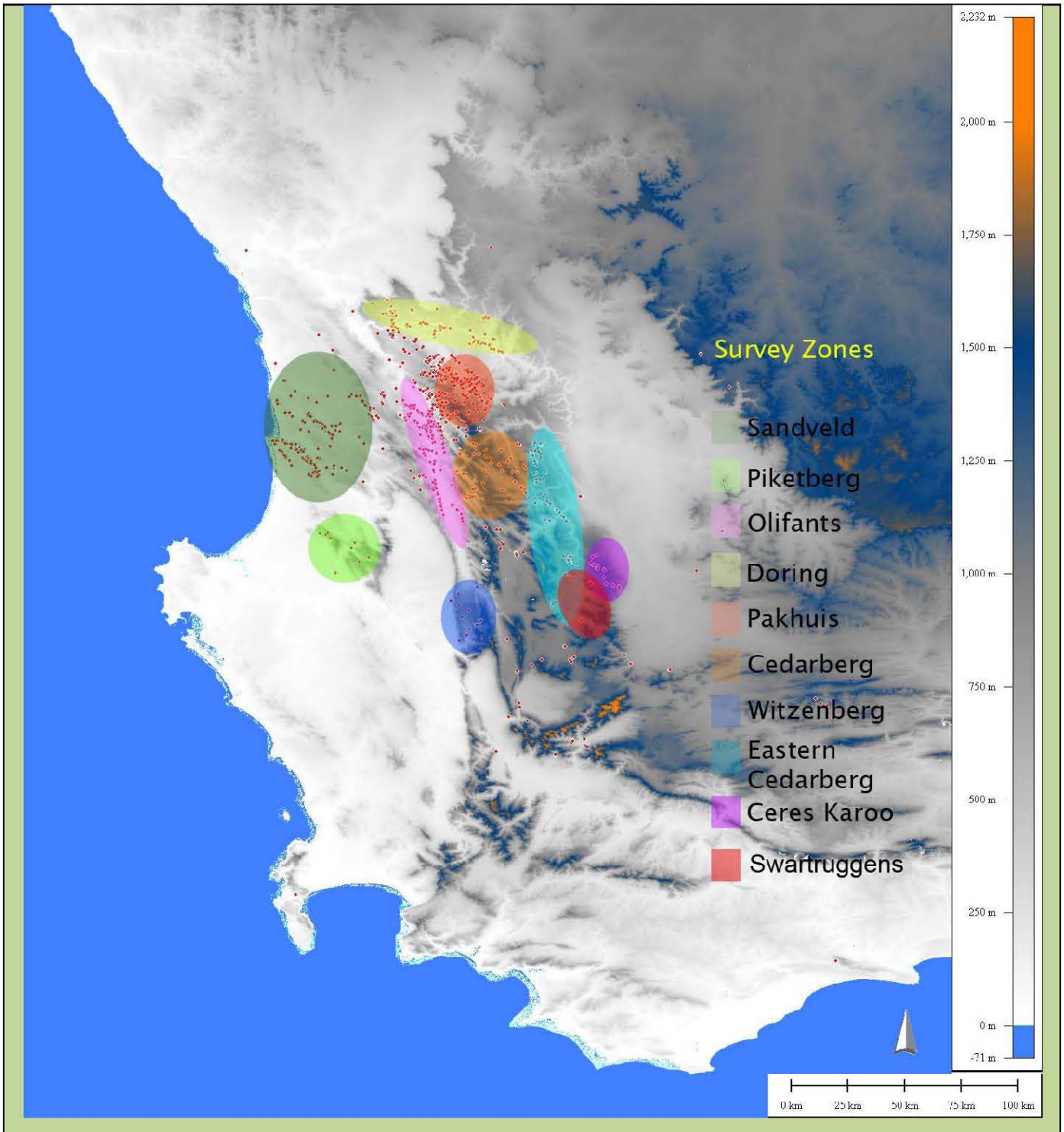
At the time of writing this thesis, over 5000 site reports were digitised during this project with a regional framework in mind. By using certain key data from archaeological records to build up a GIS database, research interests and heritage resources management have coalesced in a way that we are able to manage archaeological sites without compromising research programmes. Many of these issues were relevant to my work at Heritage Western Cape as a Heritage Officer where I explored various ways to use site inventories envisaged by J. Deacon (1999a).

The analysis

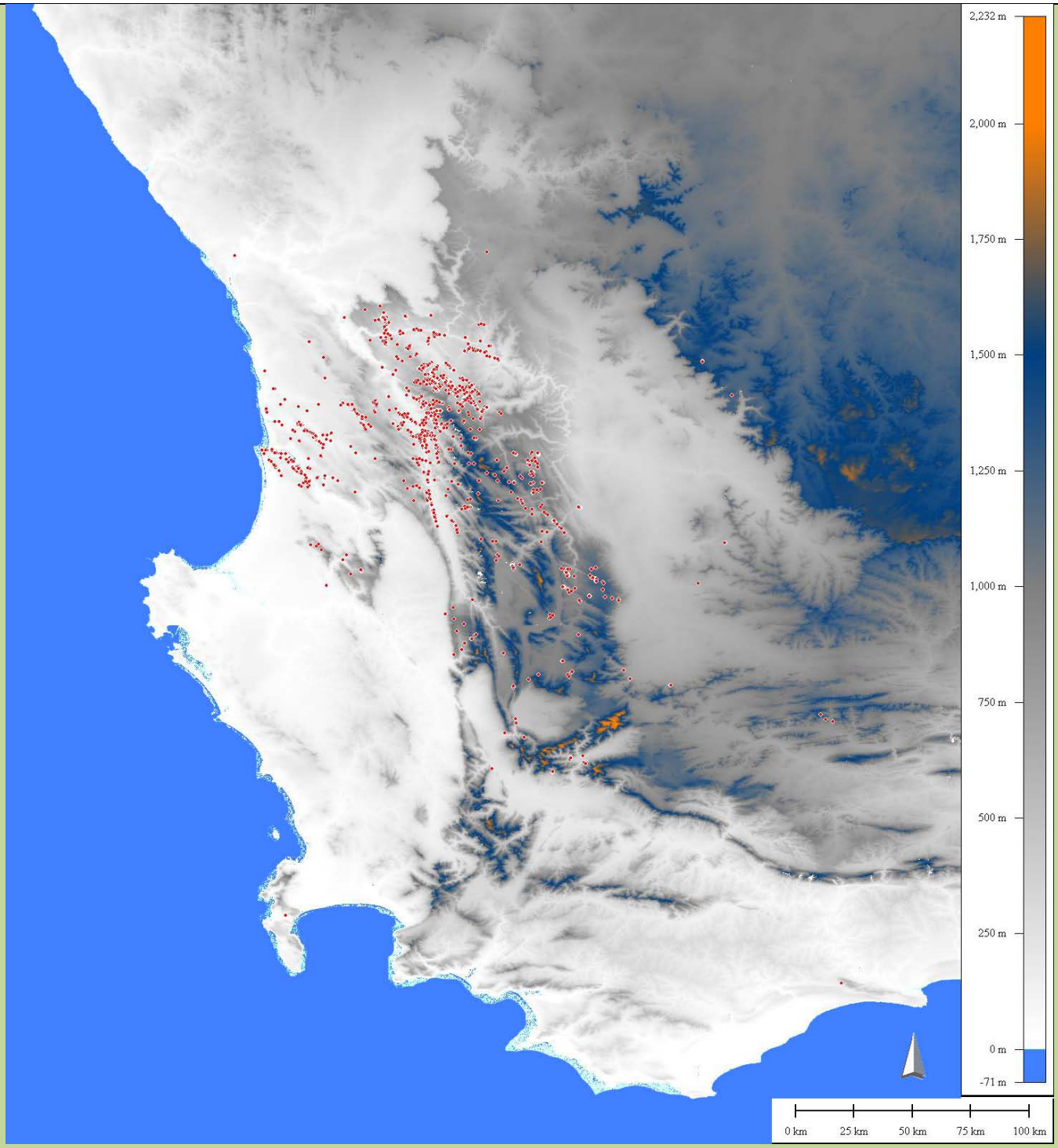
The main body of this thesis is spent on rock art research through the use of the system. A series of GIS layers were created to define the presence or absence of archaeological material. Another set of layers were derived from various rock art image categories. Distributions of the rock art were then compared to patterns in the material record in order to determine whether sub-regions or painting locales could be identified. The project also aimed to evaluate the meaning of the statistical set of data produced by the above approach against previous analyses concerned with counting individual images. This distribution set was then coupled to the spatial data to open a discussion on motif rarity in order to investigate whether image variability across space had implications for understanding the motivations of the painters.

Fortunately, a wide range of archaeological content had been documented in the site reports. It was possible to plot the distributions of raw materials used in the manufacture of stone tools to form a baseline map against which the 'geography' of rock art sites could be compared. By automating the task of mapping data collected out in the field and by condensing the various elements of the

recording process into a geocoded database, I was able to amplify some of the results obtained by Manhire et al (1983). This project also went beyond merely methodological and technological demonstrations of data collected in the past. I conducted a number of field trips throughout the



Map 1.2.1 Map of the Western Cape indicating the rock art sites (red dots) in the region chosen for this study.



Map 1.2.2 Map of the Western Cape indicating all the currently recorded rock art sites in the database. Sites in red dots.

region which will be described shortly. The majority of the 'new' sites were documented in collaboration with the eastern Cederberg Rock Art Group (eCRAG). The precision and spatial extent

of the rock art sites recorded in this archaeological database has been improved through these efforts.

1.2 THE REGION

The region referred to is indicated in the preceding map (Map 1.2.1).

The West Coast of South Africa forms the western edge of the study area while the most southerly sites included occur near Worcester in the Hex River Mountains. The most northerly sites analysed are found north of the Doring River which traverses the Cape Fold Belt. To the east, a few sites found in the Ceres-Karoo on the margins of the eastern Cederberg completed the zone of interest chosen for analysis. The distribution of sites occurring in this region is biased by the number of surveys which have been conducted in the area. One must therefore cautiously view the map in that gaps in the distribution do not represent real areas which are devoid of rock art sites. Within this region a number of specific locales have been thoroughly surveyed and these will be returned to in more detail later in the text. A map indicating all of the rock art sites currently captured in the database is shown in Map 1.2.2 but due to large unsurveyed areas some of the outliers were discarded from the analyses chosen for the study.

1.3 BRIEF HISTORY OF ARCHAEOLOGICAL SITE RECORDING IN THE SOUTH-WESTERN CAPE PRIOR TO 2000

The first systematic recording of rock paintings in the Cederberg and West Coast region of the Western Cape began in the late 1940s when 'Ginger' Townley Johnson and Hym Rabinowitz set out on camping trips to locate painted rock shelters (Johnson & Rabinowitz 1955). They were later joined by Percy Sieff and by the 1970s they had amassed over 500 sites in their collection. They were accompanied by friends, family members and professional archaeologists on many of the trips. These site reports were later typed by staff at the Archaeological Data Recording Centre (ADRC) at the South African Museum, now Iziko: South African Museum, in Cape Town. The paintings were photographed in black and white and sometimes traced in order to create water colour reproductions by Townley Johnson and selections of these paintings were published in two books (Johnson et al 1959; Johnson & Maggs 1979). Sadly, Hym and Percy passed away within two weeks of each other in February 2009, fifteen years after Ginger's death in 1994. I spent a number of cold wintry days in Hym's cottage in 2008 sipping tea and eating biscuits while he recounted many of his favourite stories of the Cederberg. It was a great privilege to be allowed access to scan and digitise their collection of records as part of this project. In the 1960s, Tim Maggs joined the group on their

excursions to the Cederberg and this led to the first detailed quantitative recording of handprints in the region (Maggs 1967a, 1967b). Interest in and popularisation of rock paintings grew tremendously as photography advanced and became more affordable (Lee & Woodhouse 1970). John Parkington joined the University of Cape Town in the 1960s and used many of the weekend trips with the rock art enthusiasts to find suitable sites for excavations which would later lay the basis for our current understanding of the Later Stone Age of the West Coast-Cederberg region. Notably, all of the major sites excavated included rock paintings on the walls of the shelters and it is hoped that we may be able to definitively relate the paintings to the excavated record in the not too distant future (Hahndiek 2007).

In the 1970s, the Spatial Archaeology Research Unit (SARU) was established by Parkington at the University of Cape Town with a special emphasis on landscape archaeology (Parkington 1987). By building on the work done by Johnson, Rabinowitz and Sieff they expanded the list of recorded rock art sites from 500 to over 2000. Van Rijssen surveyed the Olifants River Valley area for sites while Manhire focussed on the adjacent Sandveld area towards the coast (van Rijssen 1980; Manhire 1981). Other staff and students joined the unit or contributed to the database during field schools with more surveys in the 1980s and 1990s. Halkett investigated the Putslaagte sites to the northeast of the Pakhuis along the Doring River. Yates, Golson and Manhire collaborated in recording the paintings on the Sevilla and Boontjieskloof properties in great detail (Halkett 1982; Golson 1984; Yates et al 1985). The Eland's Bay, Clanwilliam and Pakhuis areas were saturated with field school surveys throughout this time and continue to receive attention. We owe a great deal to the efforts of many UCT archaeology students who assisted in fieldwork.

A series of sites displaying colonial period imagery in the finger painted tradition form a clustered distribution in the Swartruggens area on the eastern fringes of the Cederberg. These were first identified by Johnson, Rabinowitz and Sieff in the 1950s and a SARU study was conducted in the early 1990s (Yates et al 1993). Further surveys in this area were made by Anderson who added sites in the Kagga Kamma area (Anderson 1996).

A number of sites were also located by Bassett, Zimri and J. Deacon during the 'Management Guidelines for rock art sites in nature conservation areas and forestry reserves in the Western Cape' project which took place from 1991-1993 and was funded by the Department of Environmental Affairs and Tourism. The Cederberg and Groot Winterhoek Wilderness Areas were selected for intensive survey and the results led to the formulation of guidelines for site protection and

management of rock art sites managed by Cape Nature Conservation and Museums. Their sites have been merged into the database.

In addition to the work done by the aforementioned people that have contributed to the Western Cape archaeological database, Hollmann recorded over 50 sites in the Koebee River area in the early 1990s (Hollmann 1993). Unfortunately, due to time constraints, these sites have not been included in this study. However, Hollmann's records have been digitised and the images are accessible through the 'South African Rock Art Digital Archive (SARADA) based at the Rock Art Research Institute Rock Art Research Unit (RARI) at the University of the Witwatersrand.

1.4 MORE RECENT WORK SINCE 2000

Meister and Asmus compiled a comprehensive set of records from their surveys in 2001 – 2002 on the farms Keurbos, Rondegat and Warmhoek near Clanwilliam (Asmus 2003). Meister was particularly interested in photogrammetry and employed the most accurate methodology of measuring paintings of handprints to date (Meister 2003). Around the same time, Hall and Mazel conducted a colonial rock art project in the Ceres-Karoo and Swartruggens (Hall & Mazel 2006). Records from their surveys constitute the most easterly set of sites included in the analysis for this project.

The most detailed photographic archive of sites, accompanied by site condition reports was supplied by Mguni during his tenure as the resident archaeologist at Bushman's Kloof Wilderness Reserve. These reports have been integrated into the previous 'Boontjieskloof' records. A number of 'new' sites have been added to the collection during trips to the Cederberg, some of which were found with the UCT Archaeology Club or during 3rd year archaeology field schools. Hahndiek's rock art images from De Hangen were also added. Jerardino's West Coast slide collection consists mainly of images from various excavations near Eland's Bay and this was digitised and incorporated into the archive.

Moving further east, I participated in the surveys done by the eastern Cederberg Rock Art Group (eCRAG), affiliated with the South African Archaeological Society, and captured the site records into the system. We quickly realized how little archaeological information was known about the area and I thus decided to focus the bulk of my fieldwork contribution in this area. eCRAG is now in its fourth year at the time of writing and has thus far produced two management plans to assist the landowners in conservation of the sites located during the surveys.

A large number of sites were captured into the archaeological database from Archaeological Impact Assessments (AIAs) including a few rock art sites (e.g. Kaplan 2009). The number of archaeological recordings at the time of writing this thesis has swelled to around 5100 - ranging from shell middens, rock art sites and artefact scatters to graves, palaeontological occurrences and historical buildings.

Recorder/Unit	**Sub regions**	**Types of recordings**	**No of Site Recordings (as at 31/01/2011)**
eCRAG	eastern Cederberg, McGregor, Olifants	Mainly Rock Art & a few historical sites	236
Bassett, Zimri & J. Deacon	Cederberg Wilderness, Groot Winterhoek/Witzenberg	Rock Art Sites only	97
SARU (Parkington, Manhire, van Rijssen, Yates, Halkett)	south-western Cape	Rock Art, Open Sites	2284
Hall & Mazel	eastern Cederberg; Ceres-Karoo	Rock Art mainly, some open sites	36
Mguni	Bushman's Kloof (Pakhuis)	Rock Art only	116
Meister & Asmus	Warmhoek, Keurbos, Rondegat (Clanwilliam)	Rock Art only	51
Johnson, Rabinowitz, Sieff	south-western Cape	Rock Art only	454
Wiltshire 2008-2010	eastern Cederberg; Piketberg; Clanwilliam; Pakhuis; Doring; Koue Bokkeveld	Rock Art, Open sites	103
UCT field schools (2002, 2003, 2005, 2006, 2008)	Pakhuis & Clanwilliam	Rock Art, Open Sites	137
Heritage Western Cape AIAs (November 2008 – May 2010)	Western Cape	Rock Art, Open Sites, shell middens	1476
Jerardino	Sandveld	Rock Art, Open Sites, shell middens	93
	Total		**5083**

TABLE 1.4.1 Number of site recordings per recorder/unit.

1.5 THE ARCHIVES, DATABASES AND HERITAGE RESOURCES MANAGEMENT

This project began with the digitisation of paper-based records and the import of already digitised information from databases and collections stored at the Department of Archaeology at UCT. These included a FileMaker Pro database rock art database by Meister (2003) and Asmus (2003), the paper-based SARU records and slides, Hall and Mazel's rock art slides and written records and digital images from various UCT field schools. Rabinowitz's collection had been typed by the ADRC but the

original black and white photographs were kept at his home. The slides from J. Deacon and Bassett's project in the Cederberg and Groot Winterhoek Wilderness Areas had been digitised by RARI and copies of all the written site reports were made available by Dr J. Deacon in Stellenbosch. Mguni's database was stored at Bushman's Kloof and it consisted of digital images and Microsoft Word documents. All the site reports were typed, scanned and stored in folders for each site and the images were similarly saved into their respective site folders over the course of 18 months.

Other relevant records reside in the ADRC archives such as Trew's surveys in the Hex River Valley (Trew 1984). I decided to exclude the remaining sites in the ADRC lists as most of the rock art sites relevant to my area of choice were already contained within the Rabinowitz collection that already forms part of the ADRC archive. There are about 1700 archaeological sites listed at the ADRC (Petro Keene, pers. comm. 2010) which therefore leaves around 1200 (1700 – 500 sites from Rabinowitz's records) that should be investigated for possible merger with the other records in the future. Sadly, the ADRC is largely defunct and not much has been added to it since the 1980s (J. Deacon 1999a).

There have been a number of attempts to create a computerised archaeological recording system, and one of the earliest of these was made in the 1980s by Wackrill (1983). The database program was written in the Pascal coding language for the Department of Archaeology at UCT. The project was supervised by Parkington and his colleagues in SARU in order to devise a system whereby site reports could be captured, sorted, queried and archived electronically. Unfortunately the system was never implemented. The relative cost of personal computers at the time was much higher than today and it was difficult to find funding for the employment of non-research staff to run a management system which was formerly administered by the national government.

A great deal of research work is directed towards the publication of articles in peer-reviewed journals, books or student theses and rarely is much attention paid to leaving the raw data in a format and place which is easily accessible to other researchers. This is understandable as no database existed before that was made available to subsequent researchers accumulating new data. The benefits of starting a project from a detailed digital archive of information such as the one produced for this project have therefore previously not been made apparent. Even in the 'digital age', two new database systems were created for the department by Meister (2003) and Asmus (2003) and Wiltshire (2005) instead of implementing the Wackrill system. Each new system came with a number of recommendations praising the digital approach but due to the time constraints of creating a system and completing bouts of fieldwork in time for graduation, few students were willing to contemplate the task of typing up all the records and scanning the archived images.

Since 2002, RARI has made major progress to digitise collections containing thousands of colour slides. It therefore took almost 20 years to realize some of Ripp's recommendations about the advantages of scanning the slide collections for digital storage (Ripp 1983). The RARI project resulted in the creation of a digital archive known as the South African Rock Art Digital Archive (SARADA) and many of the UCT slides were scanned by Azizo da Fonseca and his team in 2008. The website does not provide site location data, but is structured around providing access to imagery organized by institution or contributor.

Similarly, Aluka provides an online resource of heritage sites in Africa and images of rock art are available where contributors have uploaded their material. Currently the bulk of the rock art dataset on Aluka derives from the sites submitted by Coulson from the Trust for African Rock Art (TARA) and SARADA. Ruther and his team at the UCT Department of Geomatics contributed very large amounts of data generated by 3D scans of historical monuments in Africa (Aluka 2011).

The advent of digital cameras in the 1990s and their rapid improvement to reach comparable quality to traditional film in the last decade (at a fraction of the cost per image), meant that the field was finally ready for a complete digital archiving system for archaeological records in the Western Cape. Handheld Global Positioning Systems were also improved and thus all the necessary components to replace the paper-based system – the site record, the slide/photograph and the manual plotting of dots on a 1:50 000 topographic map, were in place by 2005 within reasonable cost to researchers. It was therefore only a matter of time before someone integrated the old data with the new.

In some countries, national and statewide archaeological inventories have not only been digitised, but uploaded into web-based Content Management Systems. The U.S. National Archeological Database (NADB) is one such system run mainly by the National Parks Service. It has received government funding and widespread use precisely because of its application in town planning and conservation management by heritage administrators (Canouts 1999). In South Africa, SAHRA is tasked with creating a national inventory system which would probably be best accomplished via a web-based system (J. Deacon et al in prep.). The advantages of managing the system online include decentralization of data capturing and practical integration into the Archaeological Impact Assessment process. As yet, this has not been achieved but a draft system has been compiled for SAHRA (Mary Leslie, pers. comm. 2009).

1.6 BACKGROUND TO THIS PROJECT

My interest in these collections began in 2004 as a 3rd year student during the annual UCT Archaeology field school. My Honours Project in archaeology followed in 2005 in which I explored various digitisation options, Geographical Information Systems (GIS) and database packages available on the market at the time. I demonstrated how these could be strung together into an integrated system (Wiltshire 2005). Geographical coordinates and site numbers were extracted from the SARU maps and hand written site records to lay the groundwork for a full digitisation programme whereby slides, photographs and paper based records could be scanned, typed and cross-checked against previous and new recordings. In addition to the non-digital archive, various UCT field schools had taken place using digital cameras on excursions since 2001. John Lanham provided copies of these images for the archive.

As can be seen from Table 1.4.1, rock art recording has dominated most of the wide area surveys captured in this database during research projects. The high numbers of sites found in Archaeological Impact Assessments are conversely dominated by open site scatters of artefacts throughout the Western Cape and shell middens along the coast. These AIAs were requested by the provincial government to anticipate and mitigate the impact of developments and the scope of these assessments is variable. Comparatively few rock art sites have been located during AIAs.

At least 2500 of the sites in the database consist of standardized data conforming to the layout and variables determined by Manhire and his colleagues in SARU who drew up various archaeological site recording forms. My own recordings were adapted to and continued on from their format and thus the majority of sites in the database are consistent in taking in details of the rock art, the physical context of the site and the artefactual record. Rabinowitz's records mainly focused on rock art in descriptive paragraphs and on a few occasions his party noted the occurrence of artefacts. Other recorders focusing on rock art have categorically recorded the rock art in detail and J. Deacon's eCRAG recording form is a good example of this. In order to analyse the geographical distribution of rock art motifs and to overcome the disparities between various recorders' site reports, I created an entirely new table in the database at the end of the digitisation process. This will be dealt with in much more detail later, but it means that the database consists of the original records with a parallel set of data generated by my rock art analyses of the sites.

CHAPTER TWO

REVIEW OF APPROACHES TO REGIONAL STUDIES OF ARCHAEOLOGY IN THE WESTERN CAPE

2.1 DATA COLLECTION VIA OPEN-SITE SURVEYS & EXCAVATIONS

A number of open-air archaeological survey projects designed around regional scale studies in the Western Cape have been conducted (e.g. Rudner 1968; Parkington 1972; Sampson 1972; Smith & Ripp 1978; Mazel & Parkington 1981; Hart 1984; Manhire 1984; Kandel & Conard 2003; Sadr et al 2003). The bulk of the data captured in the Western Cape by researchers resides in the SARU unit at UCT and in the ADRC at the Iziko: South African Museum. As mentioned earlier, a large number of open-air sites have been documented over the last decade by contract archaeologists carrying out Archaeological Impact Assessments (J. Deacon et al in prep.). In addition to the recording of artefacts from open-air sites, there have been many rock art surveys (e.g. Johnson et al 1959; van Rijssen 1980; Manhire 1981; Yates et al 1985; J. Deacon 1993b; Hollmann 1993; Anderson 1996; Asmus 2003; Hall & Mazel 2006; Rust 2008).

These projects were run with different aims in mind and the recording sheets varied from survey to survey. In certain surveys the rock paintings were recorded without describing the artefacts at the sites. Other surveys did not deal with rock art at all (Rudner 1968; Kandel & Conard 2003). A degree of heterogeneity is therefore inherent in the assembled data collated in this database. Fortunately for this project, most of the records generated by SARU included both rock art and artefact scatters (Manhire 1981, 1984).

Between the 1970s and 1990s, SARU investigated an area of roughly 6500 square kilometres but the level of surveying can be described as patchy with a high level of coverage in certain locales. The reasons for gaps within the SARU area are mainly due to the emphasis on rock art site recording, the highly mountainous terrain and the extensive crop farming in the lowlands. Similarly, the ARAL surveys by Smits (1983) were very detailed along the river valleys surveyed in Lesotho as they were targeting rock art sites that tend to occur in the sandstone outcrops and boulders. The bulk of the open site scatters between the valleys were not recorded as they were not part of the aims of the ARAL surveys.

This contrasts markedly with Sampson's systematic surveys of the Seacow River Valley from 1979 to 1981 (Sampson 1985) during which about 16000 sites were located and recorded. Most of these sites consisted of open air scatters of stone tools dating from the Early to the Later Stone Age. 97 rock painting and 33 engraving sites were also found. As these sites were documented as part of a

single programme over 5000 square kilometres, the Seacow records are more standardised than the Western Cape database.

There have been many other regional archaeological surveys in South Africa (e.g. Mazel 1989) but much still has to be done due to the vast area within South Africa and the potential of finding archaeological sites across a great time depth ranging from the Early to Later Stone Age. Even the most thorough surveys in this region are by no means complete - we often find previously undocumented rock art sites when visiting well researched areas. More fieldwork is also necessary when methods are improved such as digital recording or when paradigms shift in our understanding of the material recorded.

The database compiled for this project does not have archaeological data from stratified contexts but only contains recordings of artefactual material on the surface of rock shelters or open sites. The recordings therefore derive from a palimpsest of occupations and this holds a number of limitations which will be discussed in more depth later (Parkington & Mazel 1981; Parkington 1987). Excavation programmes in the eastern and southern Cape (J. Deacon 1972; H.J. Deacon 1979; Volman 1981; Singer & Wymer 1982; Hall 1990; Sealy 2006) and the south-western Cape (Parkington & Poggenpoel 1968; Parkington 1972, 1976; Smith et al 1991; Jerardino 1996) have also led to databases from which various hypotheses have been formed and tested.

Even data from excavated contexts where direct dating methods have been employed are problematic in establishing regional syntheses (Blackham 1998). Besides the challenge of correctly relating stratigraphic episodes across sites, archaeological material has been subjected to differing post-depositional processes from site to site and this creates another kind of palimpsest when discussing the sites at a regional level. Archaeologists therefore rely on recordings from different scales (e.g. open-sites versus excavations) to intertwine the available information into a meaningful account of the past, however fragmentary or incomplete each trace of data may be (Wylie 1989).

2.2 SAMPLING AT OPEN SITES & RAW MATERIAL SOURCING

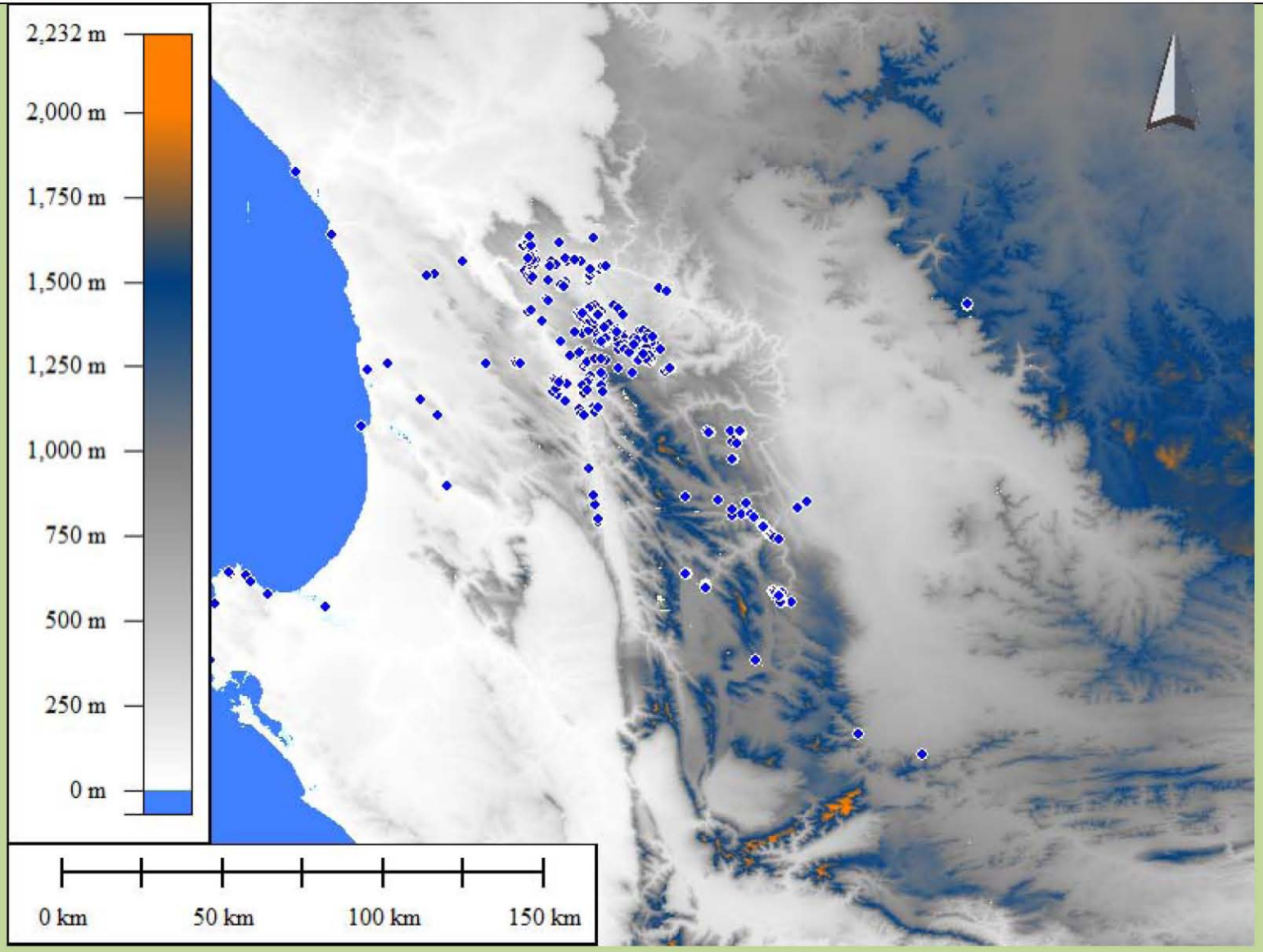
Following on from the work done by Mazel and Parkington in the 1970s (Mazel & Parkington 1981), Manhire's Sandveld survey in the early 1980s was by far the largest contribution of open site survey to the SARU collection of sites (Manhire 1984). These recordings were also combined with onsite sampling of artefacts. A total number of 832 sites were recorded including the rock art sites of the Sandveld identified previously (Manhire 1981). Manhire separated sites of stone scatters by focus or context into three categories, namely open sites in deflation hollows, scatters on talus slopes of rock

shelters and open sites on koppies. The stone tools from 21 open site assemblages were analysed in detail within the research area and the sampling was conducted in the field.

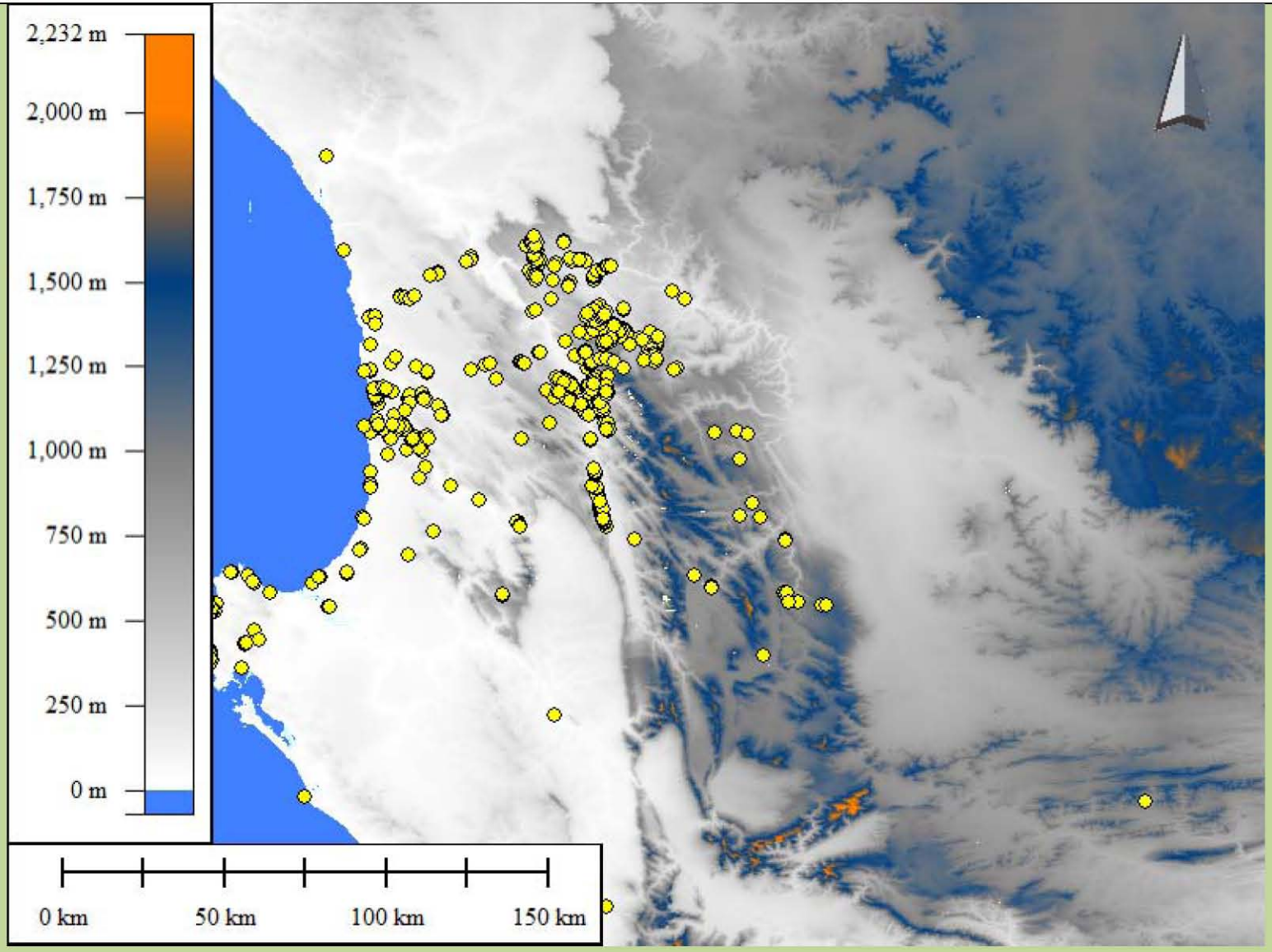
Notably, only a very small percentage of the raw materials found in the Sandveld sites consisted of indurated shale, commonly referred to as 'hornfels' by archaeologists (Sampson 1985). Some of these metamorphosed shales can be found in the contact area between the Malmesbury Shales and the Cape Granites to the south of the research area. Abundant sources of hornfels are found in areas east of the Olifants River along the Doring River or further east of the Cederberg in the Tanqua Karoo (Manhire 1984). In contrast to the hornfels dominated assemblages found at Aspoort near Die Mond (Smith & Ripp 1978), the Sandveld is dominated by silcrete as the main raw material used in the production of stone artefacts besides quartz and quartzite. For example, at Aspoort which is representative of the easternmost area in the region, hornfels represented 60.8% of the total assemblage as compared to silcrete which only contributed 3.4% (Smith & Ripp 1978). This differs significantly with the situation in the Sandveld, exemplified by the raw material percentages for chips, chunks and flakes at Grootberg 26 where silcrete contributed 37.0% as opposed to hornfels with only 1.6% (Manhire 1984). This variation is depicted in Maps 2.2.1 - 2.2.3 and will be returned to later in the discussion.

At the time of the study, Manhire and his colleagues were unable to determine a source of fine grained silcrete evident in the assemblages but they proposed that sources may be found in the lower reaches of the Olifants River (Manhire 1984). This has subsequently been verified by Archer and Porraz (Archer & Porraz, pers. comm. 2010) and a number of poorer quality silcrete sources have also been identified elsewhere in the Sandveld. A similar raw material sourcing survey was conducted around the Middle Stone Age sites at Pinnacle Point near Mossel Bay in the southern Cape. A local, poor quality source of silcrete was found nearby (Brown et al 2009). The same team went onto investigate the possible heat treatment of silcrete in order to offer an explanation for the high quality of silcrete found in the excavations. According to their findings, even poorer grades of silcrete could have been baked into better grades of silcrete by carefully applying heat over a fairly extended period of time to the raw material. This was also proposed by Mackay (2009) for certain sites in the Sandveld dating to the Middle Stone Age, but no studies have been done for heat treatment in the Later Stone Age of this area.

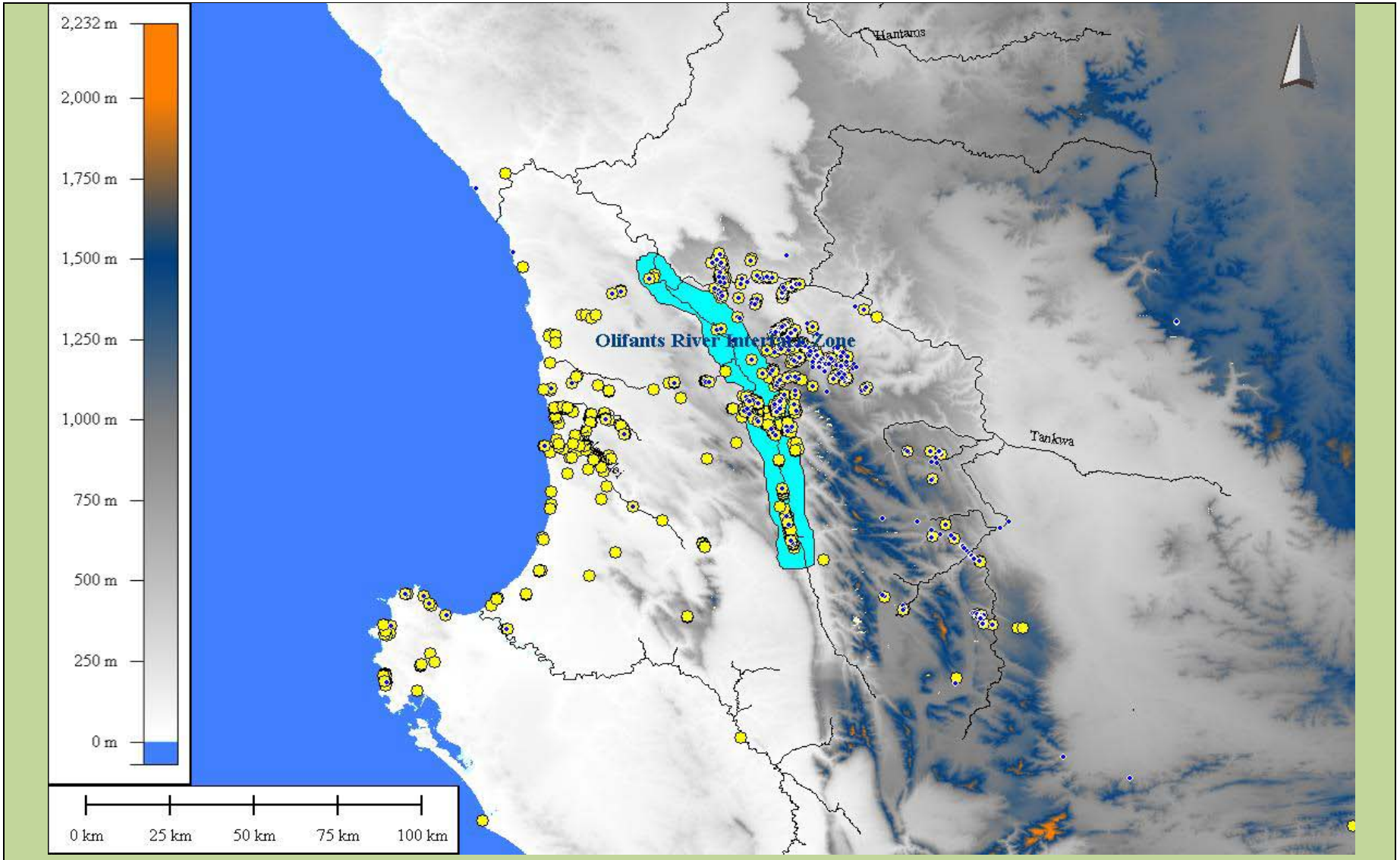
We have yet to digitise the information from intra-site specific studies at SARU and thus the data from those efforts have not been analysed anew for this project. I will henceforth only refer to



Map 2.2.1 Map showing the distribution of hornfels stone tools (blue dots) captured in the database.



Map 2.2.2 Map showing the distribution of silcrete stone tools (yellow dots) captured in the database.



Map 2.2.3 Map showing the distribution of silcrete versus hornfels stone tools and the interface area along the Olifants River (light blue zone). Yellow dots = silcrete, blue dots = hornfels. Note the silcrete layer in yellow dots has been enlarged to allow the overlay of the hornfels (blue dots) where they are both featured at the same sites.

broader conclusions drawn from previous researchers who dealt with excavated or sampled material.

2.3 SEASONAL MOBILITY AND ENVIRONMENTAL MODELS

Prior to the surveys conducted in the Sandveld, Parkington proposed that people were exploiting different resources on a seasonal basis between the Cape Fold Belt and the coast (Parkington 1972). The hypothesis for this model of prehistoric movement was developed during excavations at De Hangen and Eland's Bay Cave (Parkington & Poggenpoel 1968; Parkington 1972). The discovery of a pouch of mussel shells at De Hangen was clear proof of some form of contact with the coast. Once the faunal analyses were complete, it was evident that there were signals of selective spring – summer exploitation of dassies (rock hyrax) and tortoises at De Hangen and an apparent winter-spring signature for consumption of seals at Eland's Bay Cave on the coast. Based on this data and other lines of evidence, Parkington proposed that people were living at the coast mainly during the winter months and spending the summers in the mountains. A number of other sites have subsequently been found in the Cederberg area with traces of marine shell (Parkington 1987) and have been noted in the database.

During this period regional studies were also undertaken in the southern and eastern Cape in a comprehensive programme of excavations by the Deacons (H.J. Deacon 1976). Janette Deacon's reanalysis of the Wilton type site (J. Deacon 1972) precipitated the greater focus of analysis on intra-site variability rather than inter-site and regional differences. In order to explain the patterns of change within the Wilton period, Deacon described three ontogenetic phases. The birth, maturity and end of the Wilton industry was understood in part to represent the increase of populations up to their optimal level when groups were best adapted to their environment. Sites would therefore be most intensively occupied during the mature phase of the Wilton but changing climates, population or territorial pressure and/or the introduction of new technologies signaled the end of the Wilton cultural style. Importantly, Deacon analysed the Wilton assemblage by looking both for functional and cultural markers. Hilary Deacon went on to develop a model of 'homeostatic plateaux' (H.J. Deacon 1976) in order to characterize the Later Stone Age as a whole. He proposed that cultural industries in the LSA period are generally stable but that rapid changes occurred when people adapted to climate change. There were various differences and nuances in the arguments put forward by Parkington and the Deacons, but the idea of seasonal movement was largely accepted.

Following these regional syntheses, Parkington reviewed the data recorded in other areas of South Africa such as the southern Cape. He drew conclusions which were at odds with the cultural sequences established by Goodwin in the Later Stone Age period of South Africa (Parkington 1980). Parkington argued against the definition of rigid time periods classified by 'type' specimens of stone artefacts (e.g. Smithfield, Wilton, Albany and Robberg) because he believed that significant changes within these sequences had occurred. Instead, Parkington offered a view of the stone assemblages being strung together in a continuum of change where differences can be explained by adaptations to local circumstances, such as varying resources, the environment and climate. Environmental variables were clearly key indicators in these perspectives of the LSA and stone artefact changes were seen to either correlate with functional adaptations to these variables (Parkington 1980) or to cultural factors (J. Deacon 1972).

In pursuing this divergence of approach, Parkington and Mazel suggested that there was a break in the distribution of certain formal tools in the region between the Cape Fold Belt Mountains and the Sandveld (Mazel & Parkington 1981). While the distribution of scrapers remained fairly constant throughout the sites in the Sandveld and the mountains, the percentages of adzes dropped significantly in the Sandveld. An ecological explanation was offered to explain this phenomenon by proposing that adzes were used as wood working tools in the manufacture of digging sticks and that digging sticks were generally only used in the mountains where harder soils were more difficult to penetrate than in the Sandveld. Conversely, the Sandveld was dominated by backed pieces presumably used to make projectiles (Manhire 1984). The two zones were not segregated into different cultural territories, but were rather interpreted as representing evidence for differing behaviour of the same group on seasonal rounds between the coast and the mountains where exploitation of different resources was required.

2.4 BOUNDARIES, TERRITORIES & EXCHANGE

This interpretation is in contrast to an alternative explanation offered for the population movement of Later Stone Age people on the West Coast (Sealy and van der Merwe 1986, 1988). By analyzing the isotopic ratio of ^{13}C to ^{12}C from the bones and teeth of various Later Stone Age individuals, Sealy and van der Merwe argued that hunter-gatherers were confined to either the coast or the mountains for much of their lives, at least for certain millennia in the Holocene. For the region explored in this project their findings concluded that certain people were living on the coast, exploiting marine resources and terrestrial animals from the Sandveld, while others lived in a separate territory in the mountainous areas of the Cape Fold Belt. This analogue has been extended

to the southern Cape where contrasts between isotopic signatures of human remains found at Matjes River Rock Shelter and sites on the Robberg Peninsula have been cited as evidence for bands living in separate but contemporaneous territories (Sealy & Pfeiffer 2000; Sealy 2006; Kyriacou 2009).

Archaeologists working in the 1980s revisited and increasingly refined datasets from excavations and surveys mentioned earlier. Attempts were made to incorporate ideas emerging from ethnographic studies of the !Kung and other San groups in the Kalahari (Marshall 1976; R.B. Lee 1979; Silberbauer 1981; Wiessner 1982; Wilmsen 1989; Biesele 1993; Guenther 1999) and arguments lying between the seasonal mobility hypothesis and sedentarism were developed.

Wadley (1989) applied a model for aggregation and dispersal sites in her analyses of Jubilee Shelter and argued that the observed behaviour in the recent past relating to gift exchange (*hxaro*) and trade between hunter-gatherers could be identified in Later Stone Age assemblages. Hall (1990) applied this model in his study of Edgehill and Welgeluk shelters in the Eastern Cape and went on to discuss the changing roles of aggregation and dispersal episodes in the use of the sites through time. Evidence for increasingly sedentary behaviour such as food storage was interpreted to indicate higher population levels, decreasing mobility and more intense occupation of sites prior to the introduction of pastoralism in the area. In particular, Hall's insights on burial practices (Hall 2000) have highlighted this area of archaeological data as a useful marker against which the degree of social identity has been expressed - more markedly so in periods of stress with associated restriction of movement within areas demarcated by territorial boundaries.

The criteria for interpreting aggregation and dispersal sites were reviewed more closely in a regional synthesis for sites distributed in the Lesotho, eastern Free State, Kwa-Zulu Natal and north-eastern Cape areas (Mitchell 1996). Mitchell pointed out the problems in using exotic raw materials in stone artefacts as markers for these sites when the sources had not been robustly identified. Instead, he investigated the distribution of marine shell and ostrich eggshell as possible indicators for gift exchange. Evidence for gift exchange of these items was also found wanting and this negative result was thus used to support an argument for the delineation of various territories. In subsequent interpretations of the lithics and palaeoenvironmental changes of the Caledon Valley, Mitchell gravitated towards a marriage of the social and ecological explanations for hunter-gatherer behaviour (Mitchell et al 1998; Mitchell 2000). We will now turn to the main concepts relevant to studies of rock art in southern Africa as the spatial analyses conducted in this project assessed patterns in distributions of both the stone artefacts and the rock art motifs.

2.5 ROCK ART & RITUAL

The use of the ethnographic record has been vigorously adopted in rock art studies in southern Africa, especially since the 1970s. Lewis-Williams and Vinnicombe took the field in this direction by connecting behaviour and practices of the Kalahari San to images depicted in the rock paintings of south-eastern South Africa (Vinnicombe 1976; Lewis-Williams 1981). Furthermore, the wealth of information contained in the Bleek and Lloyd manuscripts recorded a century earlier was used to construct a model later dubbed the 'trance' or 'shamanistic' hypothesis. Lewis-Williams, in particular, advocated the use of theoretical models in the broader sense before approaching the rock art record which hitherto had been largely influenced by statistical approaches (Lewis-Williams 1984, 1990). The Great Dance of the !Kung was especially important to Lewis-Williams as he believed the rock art similarly represented experiences of diviners or shamans in trance. Later, neuropsychological research was added to augment the underpinning ideas supporting the model – painted dots, nets, decorated handprints and other images were described as entoptic phenomena as similar imagery had been observed when modern patients went into various states of altered consciousness (Maggs & Sealy 1983; Lewis-Williams & Dowson 1989; Yates & Manhire 1991).

Direct evidence for ritual behaviour in the creation of rock paintings was offered by Yates and Manhire (1991) in their interpretation of 'palette' like paint splotches prominent in the Western Cape rock paintings. Many of these paint patches appear to be smoothed or rubbed and thus the painters were perhaps connecting with the rock face as a gateway to the spirit-world (Lewis-Williams & Dowson 1990).

2.6 COMBINING ROCK ART WITH THE REST OF THE ARCHAEOLOGICAL RECORD

One of the most detailed attempts to accurately map out varying motif distributions of rock art in the south-western Cape region was done by comparing the rock art of the Sandveld to the Cape Fold Belt (Manhire et al 1983). By creating a series of 'dot plot maps' of motifs found at rock art sites in the area, they demonstrated that certain motifs were concentrated in the Cape Fold Belt (CFB) area and were absent in the Sandveld, while other motifs were found only in the Sandveld.

The paucity of decorated hand print sites in the CFB contrasted with the large numbers of hand print sites with shell middens and pottery in the Sandveld. This prompted the authors to ascribe the hand print tradition to less than 2000 years ago after Khoekhoen pastoralists had entered the area (Manhire et al 1983; Manhire 1998). In the fine line tradition, they selected crenulated designs described by Maggs and Sealy (1983) as entoptic images, 'group scenes' (Maggs 1967a, 1967b),

therianthropes and 'conflict scenes'. In the case of their selected fine line motifs, the images were not found in the Sandveld zone. The authors favoured the aggregation and dispersal model for hunter-gatherer behaviour ethnographically observed by anthropologists working with the Kalahari San (R.B. Lee 1979) and concluded that the differing distributions represented different localized choices by people occupying the same band territory.

2.7 ROCK ART AND CHRONOLOGY

Sorting out the chronology of a site or series of sites is an important consideration in archaeological studies. This was an important consideration in the aforementioned study on the distribution of rock art in the Western Cape. The occurrence of pottery and domesticated sheep appears in the archaeological record from about 2000 years BP onwards. Rock paintings of fat-tailed sheep in this area are therefore most likely to have been painted after 2000 years ago and thus provide an insight into the impacts which a herding economy would have had on the cultural landscape of hunter-gatherers occupying the region (Yates et al 1990; Jerardino 1998b). We would like to know more about possible sequences in older paintings to be able to understand the nature of change in belief systems prior to pastoralism in southern Africa (Mazel 2009).

Dating rock paintings and engravings remains an elusive task and successful results have generally relied on fortuitous circumstances (Morris 1988). Rock paintings at Steenbokfontein near Lambert's Bay were dated to at least 3600 years BP as the rock slab on which they were painted had fallen over and been buried in the deposit (Jerardino & Swanepoel 1999). Similarly, a rock painting at Apollo 11 in Namibia was dated to at about 25 500 years BP (Wendt 1976). In the southern Cape, deposits containing painted stones have been dated at Boomplaas, Klasies River Mouth, Matjes River and at caves on the Robberg Peninsula (H.J. Deacon et al 1976). The dates range from before the mid-Holocene (6500 years BP) to the introduction of herding in the southern Cape around 2000 years BP.

A much younger date for black finger paintings at Sonja's Cave Upper (BTJ30/BSK4) on Bushman's Kloof of 500 +-140 years BP was obtained by directly dating the radiocarbon in the pigment (van der Merwe et al 1987; Hedges et al 1987). Pigment samples have also been dated by Mazel and Watchman (1997, 2003) in the Kwa-Zulu Natal Drakensberg. A full range of direct dating attempts won't be discussed here in detail but various problems have to be overcome to obtain enough uncontaminated radiocarbon in pigment samples. The problem of environmental interference is also faced when using luminescent dating methods (Chippindale & Tacon 1998).

The technical challenges of rock art dating are further compounded by the fact that only very small samples can be taken as it is undesirable to damage the pigment used in the art. This contrasts with excavated material where a suitable amount can usually be sacrificed for dating purposes. As a result, extensive dating of rock paintings over a wide region has not been carried out and thus our understanding is still very limited in this respect.

The analysis of the superpositioning sequence of images is an alternative and relative dating method to order the chronology of rock paintings. There have been criticisms of the use of this method in determining relative chronologies of paintings (Lewis-Williams 1974; Pearce 2006, 2010) but there have been some promising attempts in organizing a general framework in the Western Cape (Yates et al 1990; Anderson 1996; Mguni 1997; Mguni in prep.). More site-specific studies employing Harris matrices in the Drakensberg (Russell 2000; Swart 2004, 2006) and the Free State (Loubser 1997) were also undertaken on paintings within the same (fine line) tradition.

For the Western Cape, the currently accepted chronology for rock paintings is as follows:

1. Fine Line tradition
2. Hand prints
3. Finger paintings
4. Colonial imagery

This chronology only addresses rock art in the region in a broad sense as fine line paintings do not necessarily end with handprints, nor are finger painted images confined to only colonial imagery. The date of 500 +-140 years BP for black finger paintings (Van der Merwe et al 1987) predates the finger painted colonial period paintings of wagons and horses at Stompiesfontein by possibly as much as 300 years (Hall & Mazel 2006). The latter was dated based on the subject matter and thus other finger painted images lacking clear colonial subject matter are difficult to place in the sequence unless directly sampled. Until many more pigment samples are dated directly, further contributions to the superpositioning database will be required.

2.8 ROCK ART AND TERRITORIALITY

A much wider regional programme than SARU of sampling archaeological sites and recording rock paintings has been ongoing in the Iberian Peninsula (Barton et al 2004). The sites have been mapped and plotted on GIS to assess the spatial variation of rock art motifs in the region and to set up the

relative chronology of the rock paintings through seriation and dating of portable media such as bone and pottery (Berrocal & Garcia 2007). Certain rock art motifs were found to be isolated to certain areas, whilst others are prevalent over the entire region. By inserting these motifs into their chronological framework, Berrocal and Garcia suggested that these motifs could be tracked in time and are attributable to particular processes that occurred in the area. One of these processes receiving a great deal of attention is the neolithisation or change in economy from hunting and gathering to farming. As the act of creating rock art evidently continued throughout this process, interesting parallels have been drawn between the location of painting activities and increasingly sedentary settlement systems.

In southern Africa, early researchers defined rock art territories based on style or subject matter (Bleek 1932; Willcox 1959, 1968; Rudner & Rudner 1970) but much of the emphasis in rock art studies shifted away from this due to the fruition of the ethnographic approach advocated by Vinnicombe (1976) and Lewis-Williams (1981). The overhaul of the Later Stone Age sequence as a result of the availability and use of radiocarbon dating was also another contributing factor to the abandonment of these 'territories' as archaeologists were able to obtain finer resolution and control of the excavated assemblages.

The idea of territoriality expressed in rock art paintings has been discussed for hunter-gatherer societies (Smith 1994). In contrast to the distributional approaches described previously, Smith considered the ideological conception of space expressed by different San groups in the Kalahari and how the production of rock paintings embodied these ideas. Beginning with the observation made by Sack (1980) that there was no ideological separation between space and society and that the use of space through production and modification of the environment led to a 'symbolic differentiation of space' (Thornton 1980), Smith showed that space was metaphorically inscribed in certain rock paintings.

A return to the study of territorial ranges may take place in the next phase of rock art research in southern Africa but it is unlikely that we will see the same methodologies applied over a half century ago. Instead, methods combining the chronological advances made in the last 30 years with the understanding of the ethnography and the superpositioning sequence will hopefully be developed in this sphere.

2.9 CONTACT ROCK ART

In the south-western Cape, two periods firmly identified in the archaeological record have been associated with rock paintings. Paintings of wagons, horses, guns, ships and people dressed in European style clothes were identified in the Koue Bokkeveld area north of Ceres (Johnson et al 1959). These paintings clearly post date the arrival of Europeans in South Africa. Further studies of these paintings were conducted by Yates et al (1993), Anderson (1996) and later by Hall & Mazel (2006). Hall & Mazel (2006) determined that at least some of the paintings of wagons were executed in the 1870s as specific types of wagons depicted in the paintings were only introduced around that time. Other sources of evidence such as historical accounts were essential in reaching these conclusions.

Another interesting set of paintings that has received attention in studies of contact between societies are the fine line paintings of fat-tailed sheep. As fat-tailed sheep were only introduced into the Western Cape about 2000 years ago, these images are also likely to have a maximum age. The authors of these paintings have been ascribed to San hunter-gatherers as they are consistent in style with other fine line paintings executed prior to 2000 years BP (van Rijssen 1984; Manhire et al 1986). We still do not have a fine enough resolution on the dating of these paintings to definitively place them in the first period of contact between hunter-gatherers and herders. This is an important period given that there is considerable debate around the nature of contact between hunter-gatherers and pastoralists and the definition of their subsequent identity as either ‘San’, ’Bushmen’, ‘Khoekhoen’ or ‘Khoisan’ in the south-western Cape (Schrire 1980; Smith 1986; Hall 1994; Sadr et al 2003).

2.10 GENDER AND ROCK ART

The last theoretical theme that will briefly be mentioned relates to the sex of the human figures depicted in the rock paintings. The project was not directly engaged with this topic but an interesting indicator worth pursuing in more detail came up during the analyses in this area. Gender roles and separations of males and females have been extensively discussed in ethnographic studies (Solomon 1989; Wadley 1989; Guenther 1999). Archaeological evidence for these gender roles has been offered in interpretations of the spatial patterning of living sites (Parkington 1987). In rock art research, Solomon (1989) applied gender models to rock art in terms of male and female dichotomies. She went on to contest the emphasis of rock art interpretation on the trance hypothesis and, instead, advocated the mythological approach to the meaning of paintings. Anderson (1996) conducted a superpositioning study and argued for female authorship of rock

paintings. His interpretations were based on sites from Kagga Kamma and unfortunately this is one of the areas missing from this database that must be included in the future.

CHAPTER THREE

NEEDS ASSESSMENT FOR THE ARCHAEOLOGICAL DATABASE AND PRESENTATION OF THE RESEARCH QUESTIONS

3.1 WESTERN CAPE ARCHAEOLOGICAL RECORD KEEPING

The need for baseline surveys of archaeological sites was realized many years ago (Goodwin & Van Riet Lowe 1929; Van Riet Lowe 1947) and various amateur and professional archaeologists contributed to the Archaeological Survey in Johannesburg until 1962 (J. Deacon 1993a). The Archaeological Data Recording Centre at the Iziko: South African Museum partly functioned to fill the gap caused by the termination of the Archaeological Survey but it, too, lost support and went out of date. Records are still accumulating at South African universities and museums and since the promulgation of the Environmental Conservation Act, sites located during Archaeological Impact Assessments have gradually begun to outweigh the numbers recorded by researchers (J. Deacon et al in prep.).

As mentioned earlier, there are a number of archaeological databases and collections in the Western Cape. The majority of these were set up by students and staff at the Department of Archaeology at the University of Cape Town and, in the past, other researchers submitted reports to the ADRC. There are also records in private collections and a rapidly growing number are building up in the archives at Heritage Western Cape and SAHRA. In the Western Cape, at least four digital database systems were set up as part of projects supervised by SARU at UCT (Wackrill 1983; Jakavula 1999; Asmus 2003; Wiltshire 2005). The Rock Art Research Institute in Johannesburg has another system and is providing access to rock art imagery online (RARI 2011). There are many other collections across the country in museums and in research projects but as yet there is no national repository.

SAHRA is mandated under section 8(2) of the NHRA to establish and manage a national inventory of heritage resources and archaeological sites are only one component of the records they are meant to keep. Thus far they have failed to do so and this has partly resulted in the great variety and array of databases across the country. Recently, SAHRA succeeded in producing the 'GIS Reporting Project' in November 2009 which realised certain requirements of this national archive but there is still a lot more that has to be done.

Despite the creation of the database systems at UCT, none of them were used by the Department of Archaeology after the students who built them had completed their projects. Jakavula's project (1999) differed from the rest as he had explicitly incorporated heritage management issues into his

thesis which are relevant to archaeologists working with the NHRA. The other projects were mainly based on rock art recordings and open site surveys - little attention was paid to their possible integration into the assessment of development and permit applications affecting archaeological sites. Jakavula had also managed to progress a fair way in partially digitising over 2000 sites whilst the other systems were set up either to demonstrate the capabilities of a digital archive approach (Wackrill 1983; Wiltshire 2005) or to capture the sites from a particular research area (Asmus 2003).

Jakavula's project demonstrated some of the applications made possible by using GIS and a digital database archive but the site reports were not typed up in full. Only key extracts were taken from the recordings to map out the sites and provide basic site content data to determine sensitive areas (Jakavula 1999). In Jakavula's system, researchers could therefore not obtain more detailed content from the original recordings and had to refer back to the physical site reports. At the beginning of 2008, access to archaeological data required direct contact with a number of different people who held the collections, with varying degrees of digitisation (or none at all). This led to many duplications and inconsistencies across the archives. Furthermore, heritage managers at HWC and at SAHRA were either unaware of Jakavula's project or did not have the GIS software or skills to adopt his work into their day-to-day processes.

It must be pointed out that at least the collections existed, albeit in paper form or partly digitised, and the public and researchers owe a great debt to the individuals who have maintained these resources over the years. The downside of this situation is that the absence of a consolidated system has made it very difficult to gauge the impact of construction projects on these resources during the planning process by heritage administrators (J. Deacon et al in prep.). The data from each proposal was not entered into a growing archive, nor was it feasible to do so without having digital access to the reports on GIS.

Heritage officers have particular requirements of archaeological information when assessing most applications for development. These are set out in section 38(3) of the NHRA:

'(3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:
(a) The identification and mapping of all heritage resources in the area affected;
(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;
(c) an assessment of the impact of the development on such heritage resources;
(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
(g) plans for mitigation of any adverse effects during and after the completion of the proposed development. '

Section 38(3)(a) clearly requires that we know WHERE things are before we can assess the significance of sites or the impacts of developments on heritage resources. A user-friendly database linked to a GIS system is one way of achieving this function. The evaluation of the significance of these identified heritage resources is a much more difficult process and often involves a loopback process between communities, researchers and administrators.

The problem of creating and maintaining an integrated record keeping system does not only confront national and provincial heritage resources authorities. At universities and other research institutions, the ability to interrogate a database system to identify unsurveyed areas for research or to identify gaps in research questions was ranked as the 5th highest requirement in a survey conducted by J. Deacon (1999a). Moreover, the maintenance of these archives required staffing and space to house the colour slides and files of site reports. The sharing of photos and information therefore meant that one either had to spend time in the same space as the physical archive, or you had to copy or loan slide collections at considerable risk and cost.

One of the advantages of these physical, undigitised archives was that the information they contained was fairly well protected as they were difficult to access. New researchers therefore had to obtain permission to access the archives and the information was not available to the general public besides work which had been published. In order to replicate this, a digital database must similarly be managed to address access issues and the need to protect site locations. Another advantage of electronic access management is that usage can be tracked on a digital system. Access codes and levels of authority can provide an array of choices not possible in handling physical archives.

Digital archives have distinct advantages over paper-based counterparts when considering backup solutions. Information can be electronically replicated at the fraction of the cost of copying physical collections. Electronic archiving is more immune to the threats of theft, fire or damage from other natural causes. The sheer speed of calling up digital imagery whilst flipping through electronic site reports eliminates the tedious task of mounting slides on a projector and trying to locate a site report physically stored in a file or notebook.

This project aimed to close the gaps that had been left between the various attempts to create digital archaeological databases in the Western Cape. This involved the complete digitisation of certain collections from scratch (Rabinowitz, Hall & Mazel, SARU, and Jerardino), digitisation of partly digitised collections (J. Deacon & Bassett), or absorption of digitised data (Mguni, Meister & Asmus, and Wiltshire). Certain software changes and additions were required to the system I created in 2005 and all of the information was linked to a GIS system. Sites found during AIAs from November 2008 to June 2010 were also integrated into the system during my time as a heritage officer at HWC to demonstrate the need for and practical application of such a system.

3.2 SPATIAL ARCHAEOLOGY IN ROCK ART RESEARCH

The role of spatial archaeology in rock art research is relevant to multiple areas summarised by J. Deacon (1999b):

1. Who made the rock art?
2. When was the rock art done?
3. How was the rock art done?
4. Where was San rock art done?
5. What does the rock art depict?
6. Why was the rock art done?

How & Where

'How' and 'Where' rock art images were made in question three and four have been relatively well addressed through baseline surveys, experimentation and archival research. Red iron oxide, commonly known as ochre, was used in the majority of paintings in this area. Yellow ochre also features prominently and the colouration of the ochre can vary from bright red to brown. White pigment was derived from kaolin and black pigment mainly from charcoal or manganese oxide. These in turn were mixed with water, blood, plant juices and oils to provide the right consistency (Johnson 1957; Rudner 1982; Deacon 1999b).

Engravings are found to the north and east of the study area as they have mainly been executed on dolerite boulders found in the interior region of South Africa (Parkington et al 2008). The rock art referred to in this project deals almost entirely with painted sites on rock overhangs, shallow caves,

boulders and rock walls. Many sites are found close to streams but there are also a great number of sites on isolated overhangs and boulders. The only major restricting factor affecting the distribution of sites in this area is the availability of orthoquartzitic outcrops which are dispersed across the Sandveld in small koppies but are ubiquitous in the Cederberg (Manhire 1981).

What

Researchers recording paintings have also established the numerical distribution and range of images to provide answers to the fifth question (Maggs 1967b; Smits 1967; Vinnicombe 1967; Woodhouse 1969; Pager 1973; Lewis-Williams 1974). As rock art research matured by delving into the ethnographic work summarised in chapter two, the debates in this area became more heated and continue to be revisited from time to time (Blundell & Eastwood 2001).

Who

The identity of the painters has long been a source of contention because of difficulties in establishing 'when' and 'why' the paintings were made. In the south-western Cape, it is currently accepted that rock paintings were done by Khoesan hunter-gatherers and possibly by herders with sheep and cattle after 2000 years BP (van Rijssen 1984; Yates et al 1994). Other paintings falling into a tradition which has been dubbed 'Late White' have been attributed to agro-pastoralists in the northern parts of South Africa (Hall & Smith 2000). Interestingly, crude white paintings superimposed on much older paintings have been found in the south-western Cape but they have not been thoroughly investigated as yet.

Van Rijssen (1994) looked at the geographic distribution of domesticated animals and hand prints across southern Africa. He argued that since certain paintings such as hand prints and geometrics are confined to particular localities they must have been done by herders. This point has also been picked up elsewhere by others (Eastwood & Smith 2005). Contrastingly, the distribution of rock art done by hunter-gatherers is much more widespread and they occupied the region for a much greater period of time. In the Free State, sites with paintings of domesticated animals such as sheep, cattle and horses were mapped with rock paintings of 'shields' to unravel the authorship of paintings executed in the contact period between San and agro-pastoralists (Loubser & Laurens 1994).

Why

The sixth broad topic deals with 'Why' the paintings were made. Despite the fact that many of the paintings depict objects and animals encountered in everyday life (Manhire et al 1985), it has long

been known that the painters were very selective about what they chose to paint (Maggs 1967a; Vinnicombe 1976; Lewis-Williams 1981; Dowson 1989). The meaning and social significance of these images is best understood as representing the spiritual and religious beliefs of the painters and their societies. The literal interpretation of paintings is no longer entertained as there is a wealth of evidence that much of the rock painting activity was linked to ritual behaviour and the expression of trance experiences (Lewis-Williams 1981). In addition, the repetition of specific animals such as the eland (Vinnicombe 1976) and elephant (Manhire 1981) attests to the symbolic significance of certain animals over others (Deacon 1999b).

Diverse interpretations of the meaning of the paintings have been developed by combining spatial information with ethnographies or historical archives (Parkington 2002). One of the best examples of a study which combined spatial information with specific rock art motifs was carried out by Manhire (1998) to interpret the function and meaning of hand prints in the south-western Cape. Manhire measured the length of hand prints from the Pakhuis and Sandveld areas and used this information to reconstruct the body heights and likely ages of the individuals who painted the hand prints. The majority of the hand prints were found to be made by children aged 12-14 years and the spatial data was used to support the idea that they were executed during initiation rituals (Manhire 1998). Meister (2003) went on to prove that the hand prints were not made by the same individuals and this was further evidence for hand print production during group activities in sites with many hand prints.

Another study focused on a motif dubbed as the 'formling' (Mguni 2004). These paintings are mainly found in Zimbabwe and the northern parts of South Africa and have not been found in any great concentration outside of this area (Mguni 2004). Only one painting of a formling has been found in the Cederberg and therefore this motif is not characteristic of the rock art of the south-western Cape. Mguni went on to convincingly demonstrate that the 'formlings' are representations of termite mounds and beliefs around the spirit world (Mguni 2005, 2006). This was achieved by analyzing a wide variety of 'formlings' through their embellishments and associations with other images across a wide geographic area.

The distributional data was very useful and arguably played a key role in linking images with historical events (Hall & Smith 2000; Hall & Mazel 2006). These findings have set aside certain types of images from interpretation through the trance-hypothesis as the people who made them did not share the same worldview as San hunter-gatherers. Other ethnographies were deemed more

appropriate and in some cases historical archives were available as was the case with the 'colonial' paintings at Stompiesfontein (Hall & Mazel 2006).

Moving abroad, an ongoing GIS-based rock art project in the Iberian Peninsula was mentioned earlier (Berrocal & Garcia 2007). In one of the studies conducted from this dataset, four rock art styles were identified and used to discuss the process of neolithisation. In north-western Australia (McDonald & Veth 2009) and Papua New Guinea (Wilson 2004) rather exhaustive studies have been completed to establish the delineations of rock art regions.

These categories of research outlined by J.Deacon (1999b) are therefore permeable as findings made with one question in mind often percolate down to the others. Many interpretations, if not all, rely heavily on assumptions made in the other areas of research. Spatial archaeology in rock art studies therefore plays an integral part in the process of understanding the images and the painters.

3.3 NEW POSSIBILITIES FOR THE DISTRIBUTIONAL APPROACH TO ROCK ART

The research questions dealt with in this project are closely aligned with the inherited structure of the records captured in the database because a great deal of time was required to digitise and organize the collections. I have therefore attempted to make the most of the information gathered by others in addition to the new recordings of sites from 2008-2010. During the analysis phase of this project an interpretative layer of the images found at each site was added to the database. The framework for this layer was constructed by classifying subject matter based on the descriptions of the rock art.

Photographs of rock art images were digitally organized into a logical folder archive complementing the database system while the associated site location has been mapped on a GIS platform. These elements in turn are linked to the full site report describing the art and the associated archaeological record. There are many research possibilities which can be explored using this suite of tools but one of the goals of this project was to illustrate the range of applications enabled by this archive.

The studies conducted by Manhire and others (Manhire et al 1983; Manhire 1998) were mentioned as examples of the distributional approach to rock art sites. Their results were in turn informed by Maggs (1967b) who had mapped and recorded sites with plain and decorated hand prints and 'group scenes'. These analyses were very time consuming as they combined spatial information with images and required an excellent memory, physical reading and re-reading of site reports and the eventual manual plotting of sites matching their chosen themes on physical maps. It was therefore no coincidence that Wackrill (1983) was encouraged to produce an electronic system to automate this

task. Unfortunately, GIS systems were not commonly used at the time and were much more expensive than today (Foresman 1998). This created major hurdles to more nuanced applications of the distributional approach. The system developed for this project has removed many of these obstacles.

This study took advantage of the rapid reduction in cost and widespread adoption of GIS systems in archaeology. The results produced by Maggs (1967b) and Manhire et al (1983) can now be reproduced in a matter of minutes rather than months. The project also went beyond the replication of existing studies as it involved the consolidation of a number of collections which had never been assessed together until this study. In addition, almost thirty years have passed since the early 1980s and many new recordings have been made since then. In particular, the area I chose for further fieldwork and the areas covered by the eCRAG group were largely unsurveyed and distributions of images from these areas have therefore never been presented before.

By virtue of the digitised facility developed for this project, this study was liberated to explore a much wider range of motifs across the landscape. The distribution of hundreds of combinations of motifs can be selected and compared against one another. The rock art maps can also be compared against the artefactual record in a variety of ways. These in turn can be considered in the context of the models described previously that presented competing hypotheses about the range and nature of movement of pre-colonial peoples across the landscape in this area.

3.4 FOUNDATION SYSTEM FOR BROADER CHRONOLOGICAL SEQUENCE OF PAINTINGS

In the previous chapter regional scale discussions of archaeological studies were reviewed. Concomitantly, researchers sought patterns in the artefactual record to decipher the possible mechanisms behind 'cultural change' through time within their 'regions'. Various explanatory models were invoked such as adaptation to changing environments (Sampson 1972; J. Deacon 1976), differential use of ecological zones (Mazel & Parkington 1981), social stress between competing groups (Manhire et al 1983), division of labour and gender roles (Wadley 1989) and social identity markers (Hall 1990). For the most part, rock art studies fell outside of these debates as many archaeologists felt that the successful dating of rock art must first be accomplished.

The emphases of these approaches have been criticized by advocates of the universal themes underpinning certain aspects of rock art studies in archaeology (Lewis-Williams 1984, 1993) and at times certain researchers have chosen to avoid these debates (Blundell 2005). Despite the perceived problems of chronological control, other researchers have tried to address the concept of change in

San rock art (Dowson 1994; Blundell 2004; Swart 2004; Mazel 2009). Only a limited number of rock art samples have been tested with direct dating methods in South Africa (H.J. Deacon et al 1976; van der Merwe et al 1987; Jerardino & Swanepoel 1999; Mazel & Watchman 1997, 2003). Where long-term research projects have been conducted such as those by Mazel (1989), it is possible to combine the dated archaeological archive, relative superpositioning sequences (Russell 2000; Swart 2004) and the results of directly dated pigments to establish the chronological order of the paintings (Mazel 2009). In the south-western Cape, a detailed chronology of sites and artefacts has been established but for rock art only a broad chronology has been described based on the superpositioning of painting traditions outlined earlier (Yates et al 1994; Anderson 1996; Mguni 1997).

This regional chronological sequence was supported by two relative superpositioning studies during the 1990s (Anderson 1996; Mguni 1997) and two ages from radiocarbon dates have been obtained. For fine line images, a minimum age of 3600 years BP was determined at Steenbokfontein from the deposit around a fallen painted slab (Jerardino & Swanepoel 1999) and at Bushman's Kloof a finger painting was directly dated to around 500 years BP (van der Merwe et al 1987). A research programme targeting the superpositioning sequence within a painting tradition is much more difficult (Pearce 2006, 2010) but potentially groundbreaking insights may be stimulated.

At the time of writing there is currently one such a study (Mguni in prep.) assessing the superpositioning sequence in the south-western Cape using Harris matrices. So far three shelters have been analysed and a fourth may possibly be added. Hahndiek (in prep.) has recently embarked on extending his work at De Hangen (Hahndiek 2007) to include the excavated ochre at Diepkloof Rock Shelter and Andriesgrond to assess the relationship between the pigments in the deposits and those used in the paintings. We therefore have two promising projects which may refine our understanding of the chronological sequence of rock paintings in the south-western Cape.

Once their results are published, researchers will be able to use the database developed for this project to extend the scope of the painted sequence beyond the shelters analysed. There will of course be many ranges of paintings which did not appear in the shelters assessed by Mguni, but the digital archive has simplified the task of defining areas requiring further assessment. By combining future direct dating attempts with the rock art data contained in this archive, we can dissect the painting traditions and determine the length of time passed between painted phases. This will enable a better understanding of the nature of seemingly similar paintings across the landscape.

3.5 IMAGE RARITY

The final section of this project is spent on critically evaluating the use of the distributional approach to rock art in understanding the meaning of paintings. What does it mean when a particular motif, such as the 'formling' (Mguni 2005, 2006), is concentrated in an area and is relatively absent in others? Equally, what does the complete absence of a motif in an area mean and how do we establish motif 'idiosyncrasy' (Dowson 1989; Hampson et al 2002)? These questions lie at the heart of the formulation of the 'regional construct' applied to areas with rock art sites around the world (Rudner & Rudner 1970; Pager 1973; Manhire 1981; Manhire et al 1983; Hampson et al 2002; Blundell 2004; Wilson 2004; Berrocal & Garcia 2007).

The most common way of delineating rock art regions has been to describe the style and content of the paintings (Burkitt 1928; Vinnicombe 1967; Rudner & Rudner 1968, 1970; Pager 1971). For instance, the emphasis on paintings of kudu instead of eland has been proposed as one of the criteria separating the rock art regions of South Africa and Zimbabwe (Eastwood & Cnoops 1999). Similarly, paintings of elephants are common in the Western Cape but apparently less so in the Drakensberg (Maggs & Sealy 1983). In terms of style, the Rudners (1970) separated a 'Dynamic School' of paintings in the Drakensberg from a 'Formal School' in the Western Cape. Willcox (1955) was later corrected by Pager (1973) about the extent of the shaded polychrome technique used in many paintings of the Drakensberg as they were also found elsewhere but in lower numbers. Combinations of these factors making up 'style' were necessary in the superpositioning studies of the fine line tradition in the Drakensberg (Russell 2000; Swart 2004).

The early generalized statements were followed by quantitative studies in much more localized areas such as the Underberg (Vinnicombe 1967, 1976), Ndedema Gorge (Pager 1971), Kwa-Zulu Natal Drakensberg (Lewis-Williams 1972) and the Pakhuis (Maggs 1967a). Each individual painting was counted and the statistical results were shared with other researchers. As a result, besides paintings of humans, the numerically most prominent animal – the eland, was placed at the centre of rock art interpretations in the 1970s.

The methodology employed in the rock art survey of the Bongani Reserve bordering the Kruger Park in South Africa involved an attempt to define a region quite differently to other researchers (Hampson et al 2002). Hampson and his colleagues felt that previous attempts at classifying rock art regions were unsuccessful as they were based on stylistic criteria that had very little to do with later realizations about the meaning of the paintings. Instead, they offered a classification system based on their interpretations of the images through the trance-hypothesis. Three numerically derived

levels were defined, namely 'Widely distributed southern African', 'Regional' and 'Extremely rare and idiosyncratic or unique' before dividing each level into 'intelligible' or 'unintelligible' interpreted imagery.

A common challenge to all of the above mentioned studies is the continuously changing distribution of painted or engraved motifs as a result of further surveys. Until the 1990s, it was commonly believed that no shaded polychrome paintings were found in the Cederberg Mountains but this was refuted when Zimri's Shelter was found during the survey of the Cederberg Wilderness Area (J. Deacon 1993b; H.J. Deacon & J. Deacon 1999:173). Recently, another three sites with shaded polychrome eland have been located. Similarly, the 'formling' motif mentioned previously (Mguni 2006) has also been found in the Cederberg to the north of the Doring River. Clearly regional constructs based on style, statistics or interpretation are all failing to adequately explain the differences from region to region and require more attention.

Due to the fact that more paintings are being documented every year and that very few researchers have had access to all the collections in southern Africa, researchers have tended to focus on the relative density of common motifs published by others. Dowson's work in the late 1980s on the role of the individual was one of the exceptions to this trend when he proposed a much more complex definition of image rarity beyond the mere absence or presence of certain animals. Instead he classified various 'uncommon' poses in eland paintings and the 'defecation' motif (Dowson 1989). It was beyond the scope of this project to replicate his approach but the possibilities exist to investigate questions of this nature using this database.

For this project, quantitative analysis was possible but it was handled differently to counting individual images. A new table listing the range of identifiable and commonly accepted terms for paintings of animals, people and objects was created so that the absence or presence of any one of these could be flagged. Using this method, the former numerical prominence of certain images at intra-site levels (e.g. multiple human figures forming a procession) has been reshuffled to understand the conceptual prevalence of motifs at an inter-site level. A single elephant painting therefore rates equally with ten paintings of male human figures in a procession or ten eland if they all occur in the same site. In this array, complex motifs involving the combination of elements such as humans and equipment in 'group scenes' (Maggs 1967a) or 'processions' (Smuts 1999) were mapped but without much emphasis on the interpretation of these scenes.

CHAPTER FOUR

METHODS

4.1 METHOD AIMS

As discussed earlier, there are a number of advantages to using digital systems instead of paper-based databases. Digital archives feature miniaturized storage, rapid backup times and easy recovery of data. They also facilitate the automation of repetitive tasks such as mapping and digital archives can be indexed. This allows users to construct their own queries and to manipulate selections of data with ease. For heritage management, the ability to map site locations against potential developments is the most common requirement. In the absence of a digitised national archaeological system, contract archaeologists have submitted their findings in an ad hoc manner to the authorities and have often been unaware of previous archaeological work conducted by other practitioners in the vicinity of their assessments.

Similarly, the research aims of this project relied on the ability to query a digital archive compatible with GIS tools. The system had to allow the speedy creation of many queries and to link these results to digital maps. The Microsoft Access database designed in 2005 (Wiltshire 2005) lay at the core of this arrangement and GlobalMapper was chosen as the GIS system to present the geo-referenced data.

4.2 THE FILE STRUCTURE OF THE DIGITAL ARCHIVE

At the outset of the project, a logical file structure for storing the digital archive had to be determined. In the SARU collection, the 1:50 000 topographic map sheet code had been used consistently as the most general grouping category for the slide collection and written records. This happens to be similar to the structure adopted by SARADA (Da Fonseca, pers. comm. 2008) and therefore the following structure was adopted:

ROOT FOLDER – 1:50 000 MAP SHEET

SUB FOLDER LEVEL ONE - FARM/KLOOF or other naming sequence by which the sites were named

SUB FOLDER LEVEL TWO – SITE NUMBER

ALTERNATIVE FOLDER IN SUB FOLDER LEVEL TWO – GENERAL folder – used for general images of the area which are not site specific or unmatchable data, site reports or images

SUB FOLDER LEVEL THREE – RECORDER/CONTRIBUTOR NAME/PROJECT – folder into which images and reports are stored.

The following example demonstrates a typical archaeological site where multiple recorders have visited the site (Figure 4.3.1):

3218BB Clanwilliam – Andriesgrond - AG1 - Hym Rabinowitz – 28 – file: 28 - Andriesgrond.jpg

The AG1 root folder contains projects and contributors such as SARU, Janette Deacon, the UCT Field School of 2008 and Wits Scans 2008 to separate out the contributors from each other. One can browse the archive without the Microsoft Access database and navigate through folders. Older site numbers have been given to sub folder names (e.g. Rabinowitz site number 28). The separation of the projects or contributors means that the name of the photographer or recorder is embedded in the structure of the archive.

4.3 DIGITISATION

The SARU collection

The Microsoft Access database designed during my honours project was used to store the site records. Extracts of most of the SARU sites had already been geo-referenced and added to the database. These were either available as recorded GPS coordinates on site record forms or by matching up sites against their manually plotted dots on the 1:50 000 topographic maps in the SARU lab (Wiltshire 2005). The site record information had only been minimally entered (e.g. site number, recorder and type of site) in 2005 and I could therefore not create spatial queries of the rock art descriptions. This meant that each site record form had to be physically typed into the database system (Figure 4.3).

Many of the site reports were in the form of handwritten notes in field notebooks or as preprinted site recording forms used for various UCT Archaeology field schools. A number of records had been typed and printed on typewriters by the Archaeological Data Recording Centre (ADRC) in the 1970s and 1980s and copies of these were also retyped into the database when they were found at SARU.

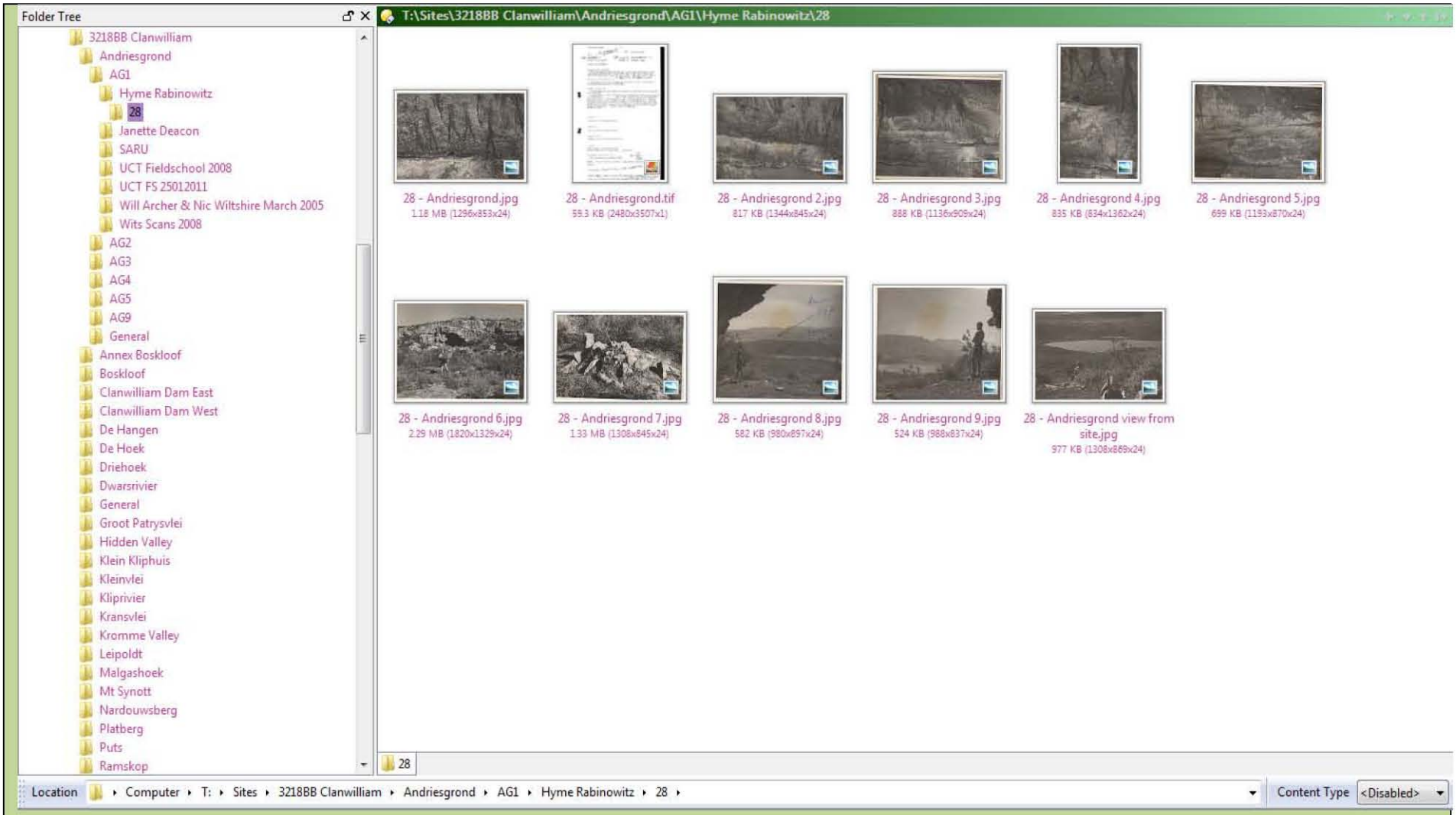


Figure 4.3.1 Screenshot of the Rabinowitz recording and folder structure for AG1 (Andriesgrond 1).

Each site report was scanned using a Canon flatbed scanner (model 'Canoscan 5200f') and saved as a Joint Photographic Experts Group (JPEG) file and archived into its respective site folder. In March 2008, Azizo da Fonseca from SARADA contacted UCT to arrange for the collection of the slide collection as per an agreement reached between UCT and RARI in 2006. This raised the possibility that the images would not be available for the rest of the year and possibly into 2009. I therefore decided on a quick and dirty method to digitise the images before they were taken to SARADA.

A plastic sheet was mounted against a larger Perspex sheet to create a sliding platform (Figure 4.3.2). A fluorescent light was placed behind the Perspex screen and a white sheet of A4 paper was used to diffuse the light. A Panasonic FZ30 digital camera was situated on the other side of the screen and set to manual focus about one to two centimetres away from the screen. The optimum focus was tested on a few slides at the beginning of each batch and once this was done the slides were photographed very quickly at around 400 slides per hour. The slide order was maintained in the slide protector sleeves as they were removed, photographed and replaced in the same sequence in which they had been stored. In total, about 10 000 slides were photographed in this manner.

Figure 4.3.2 Photographing the slides before sending them to RARI in 2008.

Once the slides had been photographed into digital images of about 4 megabytes per file, a processing script was devised in Adobe Photoshop to automatically open, crop out the frame, resave the resulting image to a new file and close the opened images before moving onto the next one in the batch. This saved an enormous amount of time as the computer could be left to run overnight to process a few thousand images at a time.

The images were then sorted by size to delete the smaller images created by the cropped frames. The light differences were not marked enough for the software to automatically differentiate

between the frame and the image where a grey frame had been used to hold the slide. This led to some file sizes in a mid range between a well cropped image and a frame and these were manually corrected in Adobe Photoshop from the original. The images were then sorted by filename to restore the relative order in which they had been taken so that the filenames could be converted into site numbers with brief descriptions where applicable. The date of the slide was captured with the rock art description where it had been written on the slide frame.

In December 2008, the SARU slide collection had been digitised in high resolution by SARADA. The slides were returned to UCT with digital copies on a series of DVDs. These images were filed into their respective site folders under 'Wits Scans 2008'. It turned out that some sites had been incorrectly arranged on the SARADA system as there was confusion over acronyms such as 'DH' which refers to 'Driehoek' and not 'De Hangen'. These mistakes are understandable given that the RARI data capturers are based outside of the south-western Cape. Fortunately, the photographing of the slides before their departure to Johannesburg made it possible to match up the scanned images to rectify the incorrectly filed sites and the errors were not carried through to this database.

Simon Hall & Aron Mazel's Ceres-Karoo/Koue Bokkeveld collection

Simon Hall approached me to digitise the rock art reports from his colonial rock art project with Aron Mazel. Their surveys took place in 2001 and they accumulated 36 sites. This collection was handled in exactly the same manner as the SARU records - each paper based site report was scanned, typed, mapped onto GIS and the colour slides were scanned.

Johnson, Rabinowitz & Sieff Collection

Later in 2008, I was introduced to Hym Rabinowitz by Judy Sealy at his home in Cape Town. Rabinowitz had kept eleven files of mainly black and white photographs covering the rock art recording trips he had participated in from the 1950s to the 1970s. Understandably, he was very worried about the collection and preferred that the records be digitised at his home. The rock art photographs took about four days to scan. One of these days was spent up at the pottery kiln scanning the ADRC copies of his site visits and any other notes he had kept in the files. Some of the notes and typed records were too faded to read and a few of the photographs ended up with a slight hazy effect along the top edges due to light reflecting off bent photographs.

Many of the photographs fell out of the files as soon as I opened them and it took a little extra time to stick them back using adhesive as I worked through the files. The scanner glass was filled with as

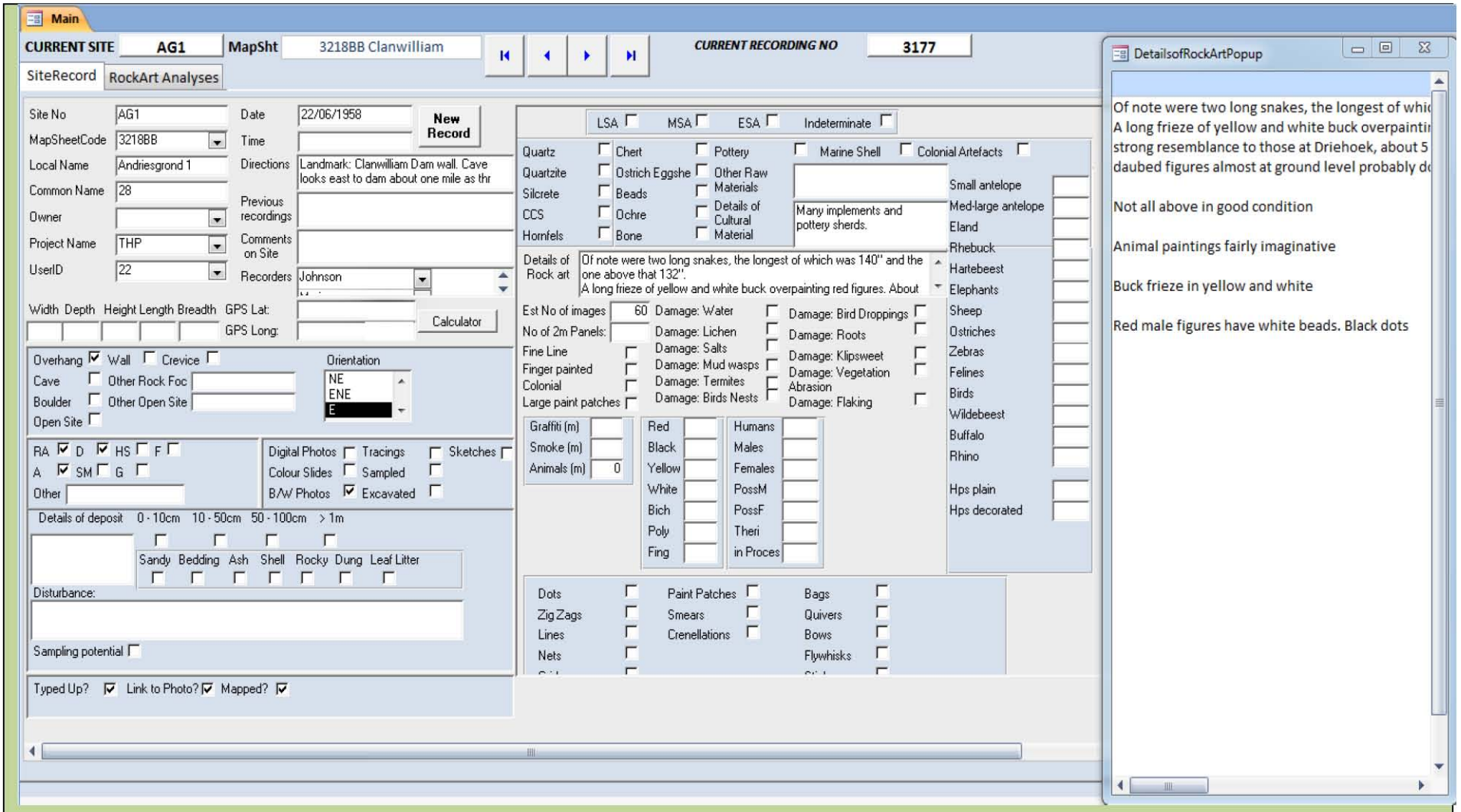


Figure 4.3.3 Screenshot of the Microsoft Access database showing the 1958 recording of AG1 (Andriesgrond 1).

many photographs as possible per scan at maximum resolution, producing images at 2480 x 3507 pixels in TIFF format (about 21 megabytes per file). This is comparable to the standard employed at SARADA for the digitisation of colour slides where each slide scanned results in a resolution of around 3404 x 2246 pixels and a file size approaching 22 megabytes per file.

After the initial job of scanning the collection, each TIFF file was separated into individual images in Adobe Photoshop, cropped, straightened and resaved as JPEG files. These files were temporarily stored in site folders corresponding to Rabinowitz's notes and site numbers which had been handwritten next to the images in the files. Rabinowitz had already flagged some sites with question marks in his files as he was unsure whether they matched up with the site number. Even today this is still a problematic issue when multiple people are involved in taking photographs as the images are often mixed up unless someone takes sole responsibility for the task.

The site reports were processed using Optical Character Recognition (OCR) software and then imported into the database from the resulting rich text files. None of the site reports processed into OCR text without at least some errors and these had to be manually corrected. A few reports did not translate into text at all and these were typed from scratch. Each of Rabinowitz's records was assigned to the 'THP' project (Townley, Hym, Percy) in the database and each person cited as present on the site report was added to the site record in the database under the 'recorder's sites' table. The recording of stone implements and pottery was added to the rock art descriptions from the 1960s but unfortunately the raw materials were not noted in most of the reports.

After many months of typing the site reports, Rabinowitz's image collection was finally ready to be merged into the rest of the archive. In the case of the Sandveld, Clanwilliam, Pakhuis and Doring sites, many of the reports could be matched against later re-recordings by SARU. This was mainly done by viewing the SARU colour slides or digital images and comparing them to the black and white photographs.

To the south and south-east of the intensively surveyed SARU areas, many of Rabinowitz's recordings were the only ones available. The mapping of these sites in areas such as the Witzenberg, Koue Bokkeveld and Ceres-Karoo involved a bit of educated guesswork by following the directions given on the site report against the 1:50 000 topographic maps. In areas where multiple sites were recorded in a particular outing, sites were plotted in relation to the last record. Subsequent follow-up trips to relocate these sites have verified their existence but often the actual site location is a few hundred metres away from that plotted in the desktop exercise.

The most time-consuming process was the matching of sites in areas overlapped by SARU surveys, especially in the Pakhuis area. The images in the Rabinowitz collection only spanned a selection of the total number of recorded sites due to the cost and aims of their recordings at the time. As a result, many sites had to be interrogated by the rock art description or the directions to site in the hope of finding a match with the rest of the records in the archive. A great deal of effort was made to prevent duplications but undoubtedly a few errors have been made which can only be rectified by revisiting certain areas. I added notes to the database record when there was a high likelihood of duplication or error so that subsequent recorders can identify areas requiring further verification. Janette Deacon's slide collection was especially helpful in eliminating errors or refining site locations in the Witzenberg area.

Janette Deacon & Stephen Townley Bassett's records from the Cederberg and Groot Winterhoek Wilderness Areas & Janette Deacon's digital collection

Janette Deacon allowed me to integrate her records from various rock art trips, graffiti removal and the surveys in the Cederberg and Groot Winterhoek Wilderness Areas in the early 1990s with the rest of the archive. The site record forms were scanned on the flatbed scanner, typed into the database and either added as new records or matched up against existing site recordings in the archive similarly to the other projects. Most of this rock art slide collection had already been digitised by SARADA and so it wasn't necessary to scan the original slide collection. In addition, she also contributed a large number of photographs taken with a digital camera during graffiti removal trips.

Siyakha Mguni – Bushman's Kloof

Siyakha Mguni contributed his collection of 120 site recordings to the archive. Around 20 of these sites were completely new recordings which had not been located during the SARU/Rabinowitz surveys. The updated recordings were matched against the existing archive. Mguni's collection was already in digitised form with digital photographs and Microsoft Word documents describing the sites. It was therefore a relatively simple task to draw this information into the system.

Connie Meister & Bastian Asmus 2000-2003

As stated earlier, the data from Connie Meister and Bastian Asmus's Filemaker Pro database was imported into the Microsoft Access database. I also decided to use their site numbers for the Keurbos dataset as they provided the most consistent and up to date version of these sites along with a number of completely new recordings. The SARU/ADRC/Rabinowitz site records were re-

arranged into Asmus's order and their digital photographs (which were complete for every site) were similarly stored in their respective folders.

Antonieta Jerardino West Coast slides

Antonieta Jerardino had a number of slides dating from the late 1980s through the 1990s covering various excavations of shelters and shell middens and surveys near Eland's Bay and Lambert's Bay along the West Coast (e.g. Jerardino 1998a). These colour slides were scanned at full resolution on the Canoscan 5200F flatbed scanner using the slide adapter. Each image generated a file similar to the SARADA files (around 21MB) and these have been archived into their respective site folders.

UCT Field schools > 2000

Various UCT Archaeology field schools were based in Clanwilliam over the years and digital cameras largely replaced the slides from about 2000 onwards. John Lanham at UCT had fortunately kept copies of these images and these were included in the archive. Site reports were missing in many cases but the Garmin handheld GPS waypoints and track paths (GPX files) had been downloaded to the computer at the Clanwilliam Living Landscapes Project for a few of the field schools to demonstrate the use of GIS and track paths. The time on the track path was matched against the digital image and stored in the archive where I could be completely certain that the site location was correct. Photographs which could not be matched have been archived to a separate temporary folder for possible matching in the future.

4.4 NEW FIELDWORK & THE EASTERN CEDERBERG ROCK ART GROUP (ECRAG)

Simon Hall introduced me to eCRAG in January 2008 as they needed someone to coordinate the mapping and archiving of their surveys in the eastern Cederberg. Apart from one trip to Die Mond, the majority of the weekend trips with eCRAG have been spent on farms west of the Doring River and east of the Matjiesrivier-Wupperthal road. The overall aim of these surveys has been to record as many of the archaeological sites as possible and to draw up Conservation Management Plans for the owners. At the time of writing two management plans for Bakkrans and Voelvlei have been written. We have also spent considerable time on the following properties: the Matjiesrivier area owned by CapeNature, Cedar Rock, Nuwerus, Zuurvlakte, Rietvlei, and Hartnekskloof. Portions of some of these properties will be joined to create the 'Rooi Cederberg' reserve.

My involvement with eCRAG has been extremely rewarding and the timing of my introduction to the group coincided well with this project. We have over 300 recordings from eCRAG trips with

thousands of images, accurate site locations and reliable notes on artefact scatters and site sketches. I attended almost all of the trips in 2008, 2009 and 2010. These surveys were augmented by further fieldwork with the UCT Archaeology Club, the UCT Archaeology field schools in 2006 & 2008 and many other trips taken in 2004 – 2010. A number of sites were also found in this area for the CapeNature Cederberg Wilderness Corridor project in 2006 with Tony Manhire and William Archer.

Coincidentally, two accidental 're-recordings' of Rabinowitz's sites occurred and this was only realized once the digitisation of the collections was complete. At the beginning of 2009, a series of sites were surveyed on the way back to Cape Town on the Bo-Piketberg. The local children who joined us for the day called the rocky outcrop 'Stawelklip' and it turned out to be the same site Rabinowitz had noted under 'Bushman's Hollow' in 1954. During the UCT field school in 2008, we also recorded a site called 'De Plaaie' by the local residents of the Heuningvlei Mission Station. Again, this site had been visited in 1959 by Townley Johnson, Hym Rabinowitz, Percy Sieff and Wyatt Sampson.

4.5 EXTENSIONS AND MODIFICATIONS TO THE MICROSOFT ACCESS DATABASE

There is a certain degree of variability amongst the site reports submitted for digitisation due to the fact that various researchers had different methods, approaches and questions. Conversely, the bulk of the dataset derived from the SARU records was standardized due to the administration of Manhire and Yates. Subsequent to the SARU surveys, the various UCT field schools adopted the same recording forms used by SARU. The eCRAG rock art recording forms designed by Janette Deacon overlapped for the most part with the SARU format and the additional fields were merged into the system by extending the Microsoft Access database.

Once all the site records had been typed up and the photographs scanned and filed, I had to figure out a way to query the rock art descriptions. The rock art description in Rabinowitz's records and most of SARU's collection had been typed into a memo field named 'Rock Art Description'. The amount of information could run into many pages at times and the database was not initially set up to flag or categorise particular motifs. Text within these memo fields can be filtered but the results are often inconsistent due to spelling errors or abbreviations. It also meant that differences in naming conventions had to be taken at face value and the photographs had not yet been checked against the written descriptions.

To tackle these issues, I created an entirely new form and table attached to the main site form in the database. 'True' or 'false' checkbox fields (Yes/No) were created for the rock art analyses. Flags for

Tradition, Density & Colours were grouped together, followed by *Animals and Indeterminate Animals, Humans and Indeterminate Humans* (with respect to sex), *Abstract Images, Equipment and Compound Motifs*. The entire archive of rock art sites was analysed. Each site's rock art description had to be read to flag the identified imagery. All the images available for every site were viewed to confirm the details of the site report or to augment information which was missing in the record.

During the digitisation process, I realised that an audit of the collections was necessary to determine the number of sites missing photographs, or where photographs were available without site reports. In a few cases we simply have a site number and a coordinate without any further information. I therefore decided to conduct the audit and the analyses simultaneously. The audit took the form of an Excel spreadsheet to note which sites had no images at all, no information (besides a GPS location), or sites without a site record recorded with images and a GPS location.

4.6 GENERATION OF GIS LAYERS

Manhire had highlighted various 1:50 000 topographic maps in the SARU lab to indicate the areas surveyed by SARU and UCT field schools since the 1970s. I have redrawn these surveyed areas onto a separate GIS layer and, where possible, have included attribute information for the date and context of the survey. The latest polygons on the layer were drawn for my own fieldtrips and the eCRAG surveys. The following collections have not been adequately mapped into the 'areas searched' layer as I did not have the track paths or sufficient information:

1. Rabinowitz's collection
2. Hall & Mazel's surveys
3. Mguni (although much of this area has been saturated with surveys)
4. J. Deacon and Bassett

Another shapefile which relates obliquely to the areas searched is a GIS layer covering the AIAs in the Western Cape. SAHRA initiated a project in 2006 to create a digital library of all the AIAs which had been done in South Africa. A few were completed prior to 1989 when the ECA was passed. Since then, and especially after the ECA was replaced by the National Environmental Management Act (NEMA), Act 107 of 1998, the total number of AIAs conducted per year has grown exponentially (J. Deacon et al in prep.).

Thanks largely to the efforts of SAHRA, with Steven Walker and Mary Leslie being the main drivers behind the project, cultural resource management practitioners have access to a GIS friendly set of maps and overlays denoting almost all of the reports submitted to Heritage Western Cape or SAHRA. Each polygon indicates that a report has been compiled but not the actual areas searched. These layers are linked to scanned digital copies residing at SAHRA. The Western Cape files are housed both at SAHRA and at Heritage Western Cape. The formal release of a DVD containing the shapefiles and maps of the reports was released on 26 November 2009.

Quite soon after my involvement with HWC in November 2008, I contributed to the Western Cape component of the GIS Report Mapping Project by mapping and scanning reports before sending copies on to SAHRA. This is continuing for new reports which are received at HWC and their shapefiles are regularly merged with the master file. In addition to mapping reporting areas, the sites documented in the AIAs have been inputted into the sites database between November 2008 and June 2010. As a few practitioners were failing to report on the GPS locations of their finds from time to time, a workshop was arranged in July 2009 to recap on the minimum standards and to demonstrate the use of site inventories generated from AIAs.

Work has begun to create two other geo-referenced layer types. The first one is a map of the extent of Provincial Heritage Sites (PHSs), and the other is a map indicating the extent of archaeological sites. The latter is useful when dealing with shell middens as the normal 'dot plot' location approach is insufficient for large middens that extend over a wide area. Both of these layers are embryonic as much of the archived documents have yet to captured into the system. The mapping of PHSs also hinges on digitisation of the former National Monuments files. This is an area holding much potential for heritage resources management.

GlobalMapper was used as the software package to create the shapefiles mentioned:

1. Distribution of sites (multiple layers by site type or content)
2. Areas Searched (Research surveys only)
3. SAHRA/HWC AIA Reports (CRM Archaeology and some research surveys)
4. Provincial Heritage Sites
5. Extent of sites (only certain shell middens have thus far been mapped)

The task of creating a polygon is a relatively simple one. Where track paths were available the paths were loaded first and the subsequent research layer was drawn as closely around the paths as possible to minimize the size of polygons contributing to the 'areas searched' layer. In the case of the 'AIA Reports' layer, the polygon simply represents the farm or erven on which the development is planned and does not relate directly to an area surveyed. The shapefiles are compatible with ArcGIS and many other formats can be exported from GlobalMapper such as Google Earth or Mapinfo files.

The mapping of the older SARU sites was done by re-plotting dots on 1:50 000 maps in GlobalMapper. In other cases, the GPS latitude and longitude coordinates were entered directly into the database as they had been recorded on the site record forms (and checked subsequently to eliminate errors). Rabinowitz's sites were mapped by deciding on the closest point which matched the 'directions to site' given in the site report. Once the GPS coordinates had been entered on the database, various layers were generated by exporting the table data to comma separated value files (CSV).

As stated earlier, not all the sites were recorded consistently as I was dealing with multiple collections over a sixty year period. Luckily, the size and dominance of the SARU dataset meant that spatial data for cultural material as well as rock art motifs was available in most places. The breakdown of the raw material types was extracted for the majority of the sites and observations of these data types were carried through into the more recent surveys described previously. Site specific artefact counts were produced in Manhire's Sandveld project but the site record forms digitised in this project only referred to the absence or presence of raw materials. An additional layer could be added to the database showing the stone tool counts recorded at open sites in areas where this has been done (Mazel 1978; Manhire 1984). The original reports currently reside at SARU and it would definitely be beneficial to digitise them in the future.

A CSV file was filtered for each of the major raw material types, namely quartz, quartzite, silcrete, hornfels and cryptocrystalline silicate (CCS). Other categories of material culture such as pottery, ochre, ostrich eggshell and bone were also selected to produce distribution maps. After the analysis of the rock art sites was complete, each flag produced a corresponding distribution map in the same vein. The physical character of each site can also be mapped such as the breakdown of rock art on overhangs and boulders, or the distribution of open sites versus shelters. Many more possibilities are generated when these data flags are overlayed against one another in various combinations (e.g.

pottery and handprints). The results of these queries are presented in the next chapter and a few selected examples have been included in the appendices.

CHAPTER FIVE

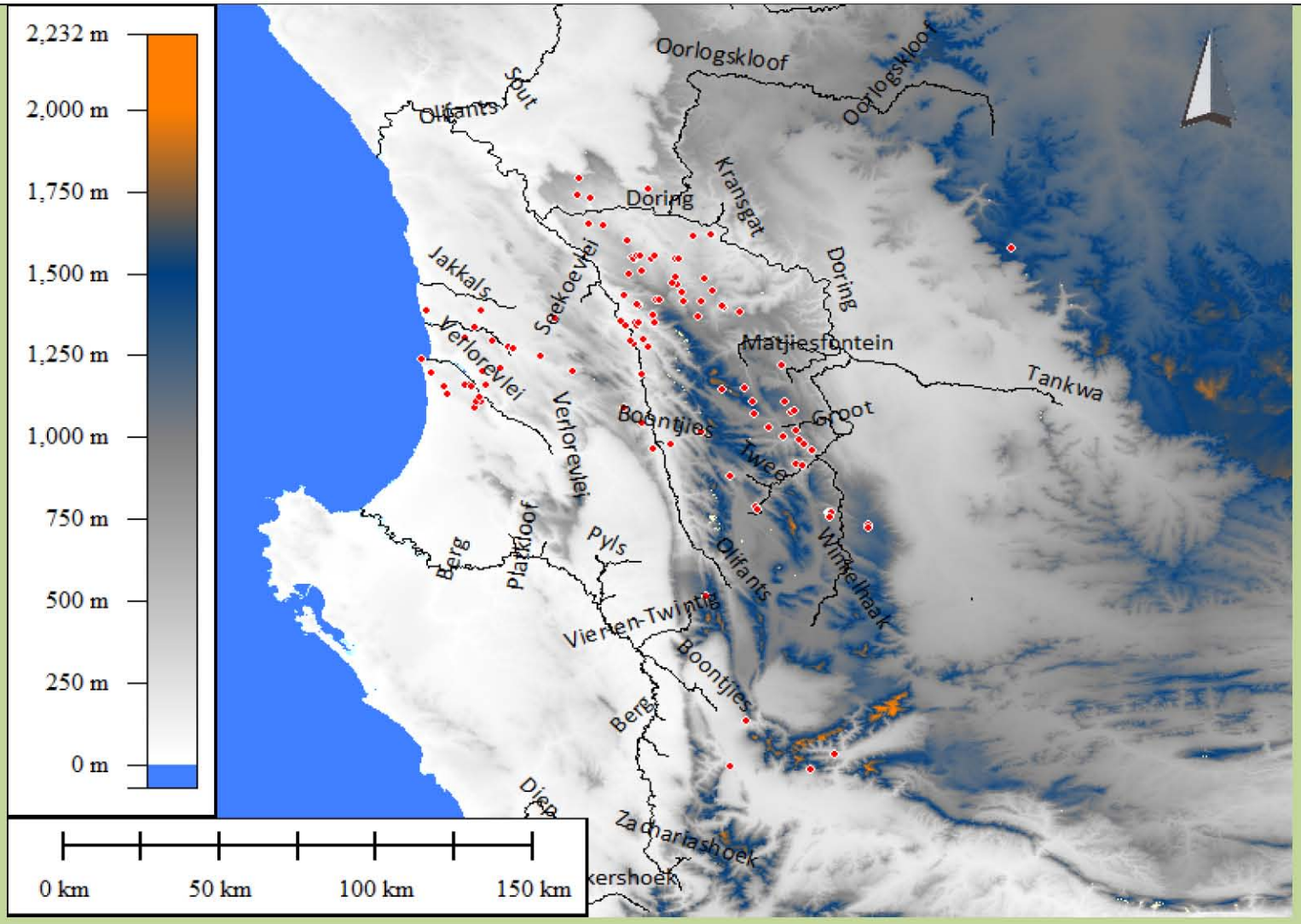
ANALYSES & DISCUSSION

5.1 GRAFFITI AUDIT

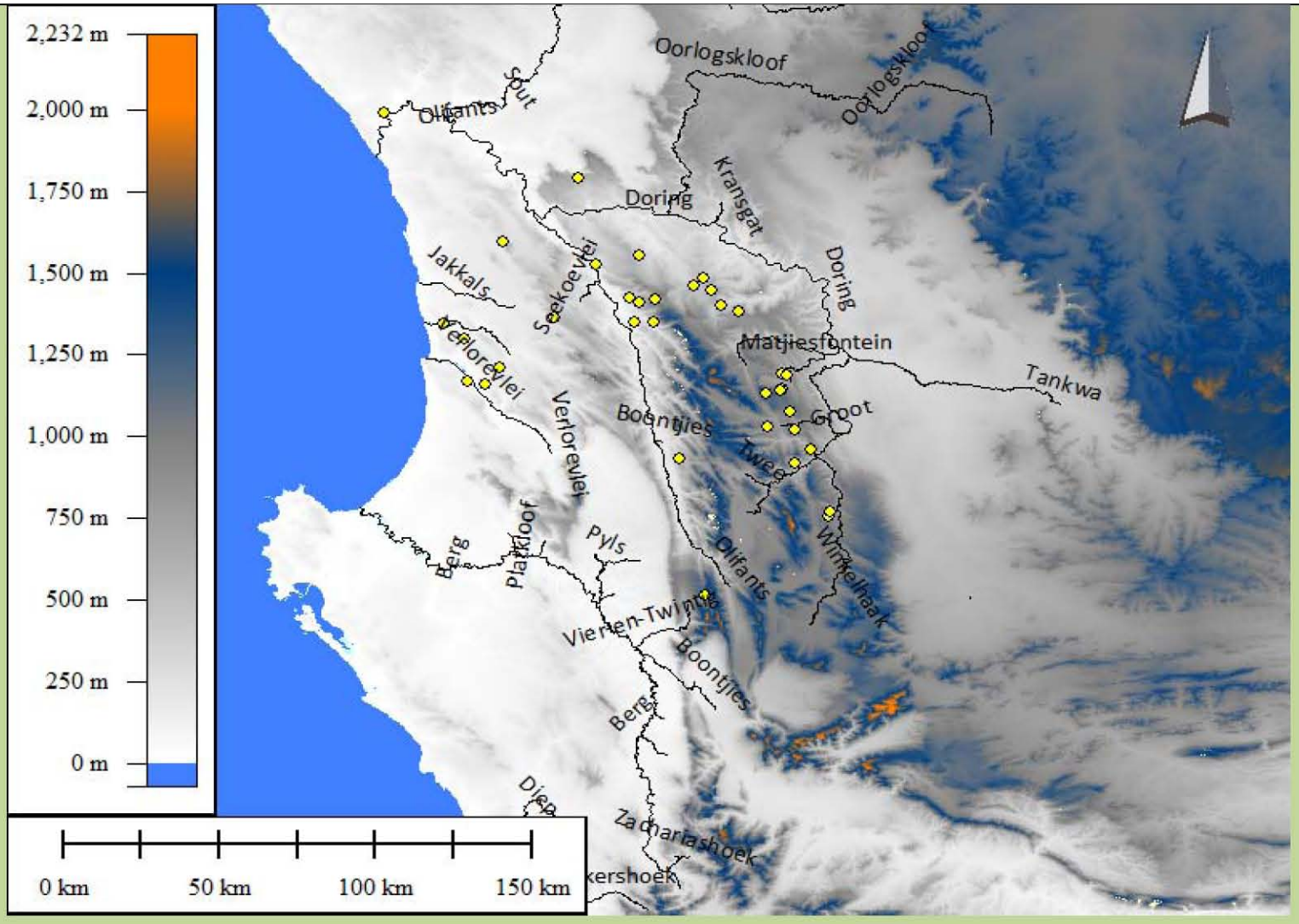
The first part of this chapter will briefly be spent on reviewing the audit of the graffiti found at rock art sites in the study region – just one of many possible examples of the heritage management capabilities of the database derived from the analyses carried out. Another layer dealing with actual development applications assessed at Heritage Western Cape has been included in the appendix. In the next section, a selected sample of queries is presented to prepare the context for the main discussion on rock art and raw material distributions. The statistical implications of the spatial-flagging approach to rock art motifs are presented at the end with a discussion on image rarity.

The prevalence of two categories of graffiti, 'historical' and 'recent', was flagged during the analyses (Figure 5.3.2). Historical graffiti was marked where a date older than 100 years had been written on the rock surface (Heritage Western Cape 2009). However, some of the graffiti falling into the 'recent graffiti' category is undated and may actually be older than 100 years. A number of efforts have been directed towards addressing vandalism of archaeological sites (Mazel 1982; J.Deacon 1993b, 2006; Parkington 2006). The definition of graffiti worth removing is a subject of debate (Loubser 2001; Bednarik 2007). Dr Janette Deacon has been especially active in the Western Cape in removing certain kinds of graffiti from rock art sites under permits from Heritage Western Cape or the National Monuments Council prior to 1999 (J. Deacon 2006, 2009).

Besides the permit reports there is a paucity of published information on graffiti at rock art sites in South Africa. The full extent of the problem could only be roughly estimated as no database existed on this issue. The GIS database has finally addressed this problem and the results of the audit are shown in Maps 5.1.1 & 5.1.2. A number of sites have escaped vandalism as they are well hidden and require concerted efforts to locate them. In addition to this, the number of rock art sites is high and it is unusual to see graffiti extending beyond the most obvious and easily accessible sites. The sites nearest tarred roads tend to be extremely vulnerable and we have noted a number of instances where generations of farmers and farm workers have added their names to large overhangs on their properties.



Map 5.1.1 Recent graffiti found at sites in red dots.



Map 5.1.2 Historical graffiti found at sites in yellow dots.

Notably 11.90% of all the sites analysed had graffiti. This is larger than the percentage of vandalised sites in the survey of the Cederberg and Groot Winterhoek Wilderness Areas (J. Deacon 1993b) where 8 out of 90 sites (8.9%) had soot and/or graffiti damage. This is not surprising as sites in the Wilderness area are generally more isolated than those on working farms documented in this system. The distributions for historical graffiti are also different to recent graffiti. In the past, the practice appears to have been concentrated on particular farms while in more recent times the improved network of roads and densification of people living in or visiting the area has resulted in a far more widespread problem. The actual number of sites in either category is very similar (136 historical versus 132 recent) but the range of the distribution presents serious management challenges as the issue is not isolated to a small area. Importantly, sites impacted by graffiti attract more graffiti as people have a tendency to add their names to the rock face when others have already done so (Heritage Western Cape 2009).

Despite the fact that the production of a graffiti layer was not one of the primary aims of this project, it was relatively simple to produce the mapping information from the database. A more thorough approach to the topic and the social causes of graffiti at local levels should be explored in the near future to prevent additional acts of graffiti. This database can also be used to track this problem through time to detect whether deterrent and educational strategies are reducing the prevalence of the problem.

5.2 SURVEY BIAS AND APPRAISAL OF DATA CONSISTENCY

Differing recording goals

Before we move into the spatial analyses of the archive, a few important points need to be made about the nature of the data contained in the system. As outlined in the opening chapter, the database consists of a wide array of datasets which were recorded with differing goals in mind. The description of the artefacts at each site was not a priority during the surveys of the Cederberg and Groot Winterhoek Wilderness Areas or much of the data recorded by Rabinowitz and his associates as they were primarily engaged with rock art sites. In contrast, the SARU records are replete with details of the raw materials used in stone tool manufacture and other cultural items. Each site record therefore had to be carefully understood in terms of its particular history and functions.

The intensive Sandveld recording programme conducted by Manhire (1984) and the subsequent UCT field schools in the Pakhuis, Doring and Clanwilliam areas, compensated for most of the gaps in the reporting of artefacts. The latest surveys in the eastern Cederberg have widened the geographical

range of the artefactual recording to the east but more work still needs to be done to bolster the recordings in the Ceres-Karoo and Swartruggens areas. In terms of rock art, the documentation within each contributor's set of records was relatively consistent. Other potential analysts in future must be aware of the layering of archaeological recordings in the system in order to develop a sense of the places described and the relative accuracy of the information across collections. This is best done by combining desktop studies with fieldwork at sites which have multiple recordings.

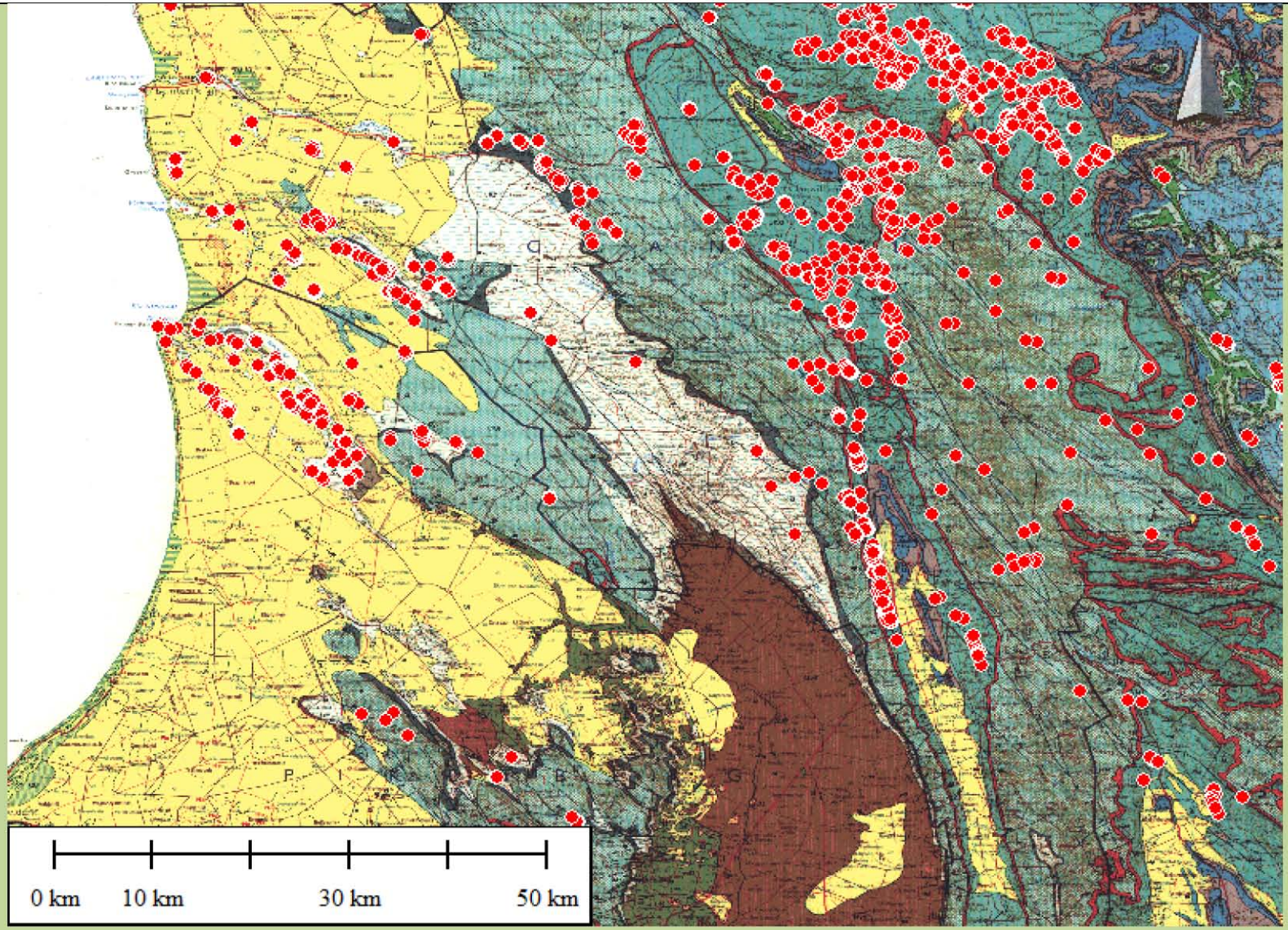
Geology & Environment

The geology of the study region, depicted in Map 5.2.1, has a major influence on the distribution of rock art sites (Manhire 1981). Areas lacking suitable boulders or overhangs tend not to have rock art sites and paintings are generally executed on orthoquartzitic surfaces. Interestingly, no rock art sites have ever been documented in the granite outcrops of the Vredenburg Peninsula to the south of the study area but finger painted images have been documented further south at Peers Cave (Goodwin & Peers 1953) and De Hoop Nature Reserve (own recording in May 2009). Artefact scatters are far more widespread than rock art sites and are not as strictly constrained by geological limitations. This is illustrated in Map 5.2.1 where many open sites occur in deflation hollows north of the Verlorenvlei.

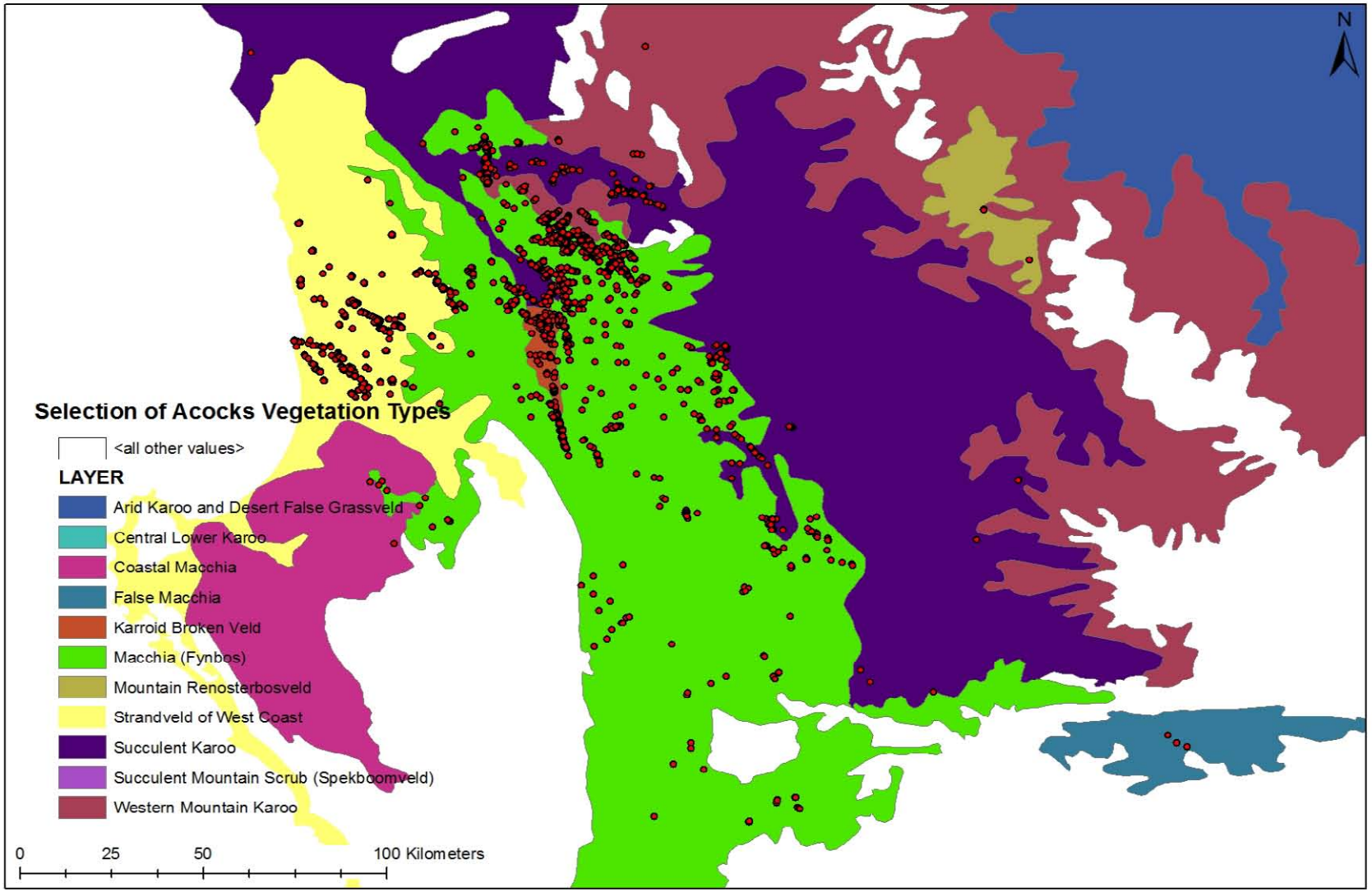
Map 5.2.2 shows the distribution of rock art sites overlaid on the Acocks (1988) vegetation map layer. Other researchers are investigating the possibilities of mapping the environment against changing rock art motifs (Ndlovu, pers. comm. 2010) and this map has been included to demonstrate the availability of data required for these sorts of studies.

Survey Bias

The distributions of sites in Maps 5.2.1 & 5.2.2 show large areas across the region which appear to have no rock art or other archaeological sites. The true situation on the ground is very different as many areas have not been archaeologically surveyed. The general rule when viewing the maps is to treat isolated 'pockets' of archaeological sites cautiously as they closely correspond to extent of the surveys carried out by recorders (see Maps 5.2.3 & 5.2.4). The resulting absence of evidence in the unsurveyed areas is therefore not due to a real lack of archaeological sites. Elsewhere in thoroughly searched portions, we have yet to find a substantial area in the Cederberg region lacking rock art sites where the geological conditions are suitable for painting. Artefact scatters are commonly found even in ploughed fields where their spatial integrity has been disturbed. Ironically the visibility of



Map 5.2.1 Map of rock art sites overlaid on the geology of the Clanwilliam area. Sites in red dots.



Map 5.2.2 Map of rock art sites overlaid on a selected portion of Acocks (1988) vegetation map. Sites in red dots.

buried flakes can improve when they are brought to the surface during agricultural activities as this has been demonstrated in various AIAs conducted in the Western Cape (Nilssen 2004).

Many people who set out on rock art surveys for the first time tend to search only for 'caves'. Whilst it is generally the case that many large, obvious overhangs contain archaeological material and/or rock art, about 10% of the collection of rock art sites has been painted on boulders (228 sites). In resurveying sites located in the past, we have found that these sites were often overlooked. The resultant site distribution is therefore only a sample of the total numbers of sites, even in areas which have been saturated with surveys. In the last three years, over 20 previously unrecorded rock art sites were located in the thoroughly recorded properties encompassed by Bushman's Kloof Wilderness Reserve (Mguni, pers. comm. 2009). By far, the vast majority of rock art sites have been found within easy reach from the valley floor or along the top of kloofs and plateaus. The most heavily painted sites are mainly in the larger overhangs but the number of sites with deep archaeological deposits is low.

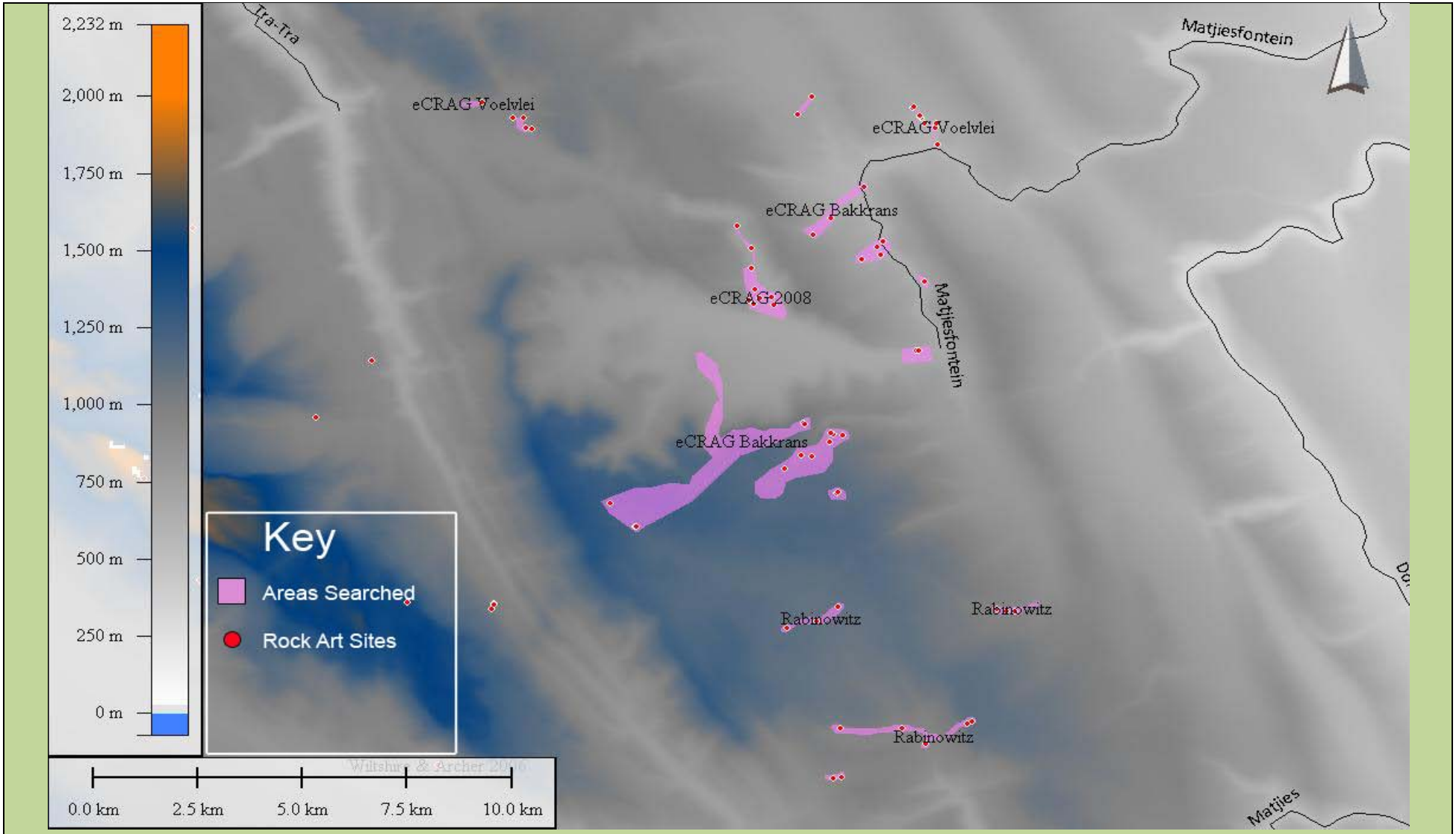
Gaps in the database

I conducted an audit of the database collection at the end of August 2009 after the digitisation was complete. Since then new records have not required further auditing since they are accompanied by site record forms and photographs. The following table summarizes the state of the records in January 2010 when the final export of data to build the GIS layers was done:

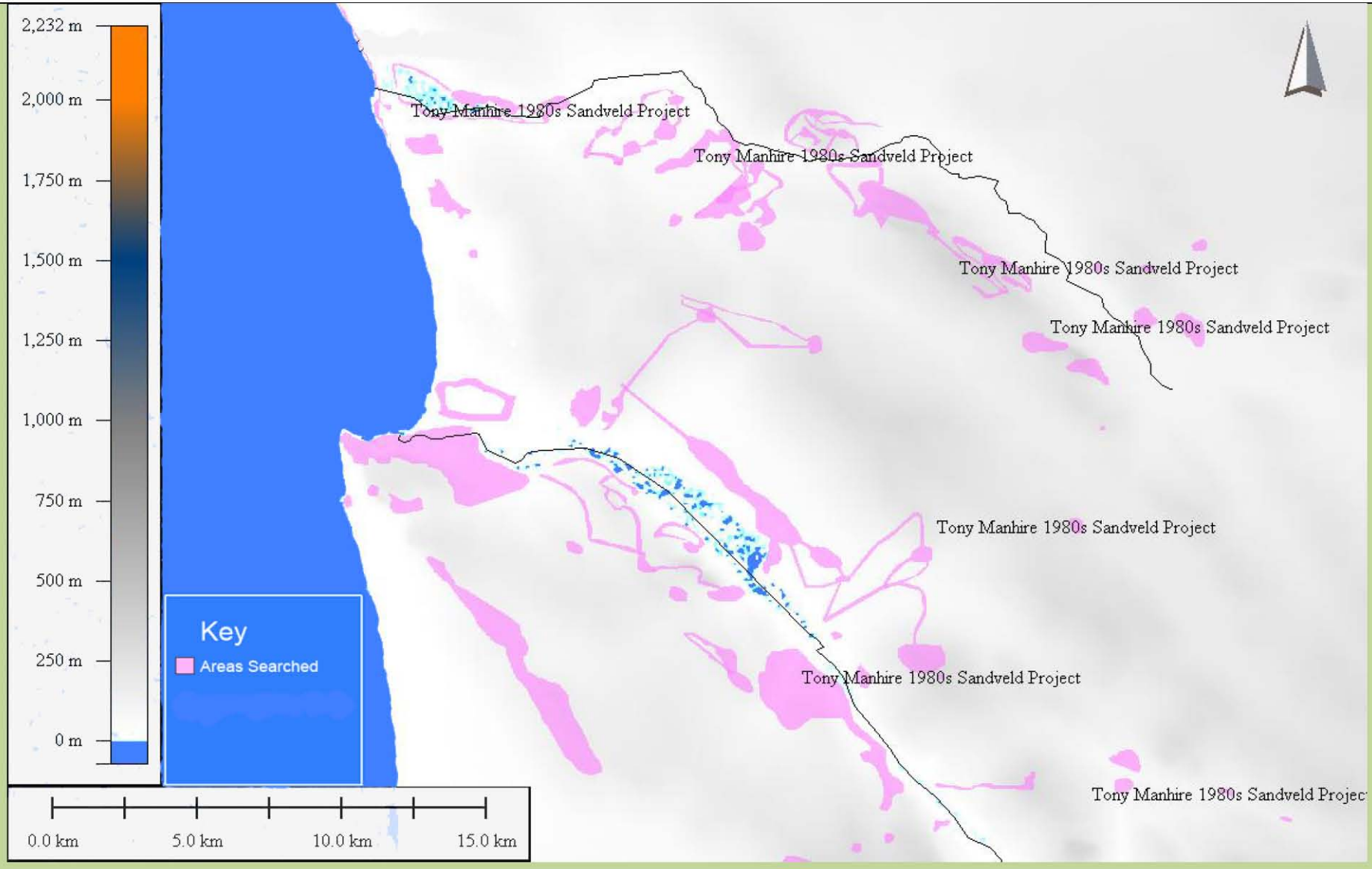
1	Missing photographs & forms	108
2	No photographs available	982
3	Complete records	1335
	Total No of Rock Art Recordings	**2814**
	Total No of re-recordings	**389**
	Total No of Rock Art Sites (2814-389)	**2425**
	Total Rock Art Sites analysed (2425-108)	**2317**
	Total Rock Art Sites flagged (2317-65)	**2252**

Table 5.2.1 Results from the audit of the records.

The only information available for the 108 sites missing forms and photographs is a site location extracted from the 1:50 000 topographic maps held at SARU. These sites require re-recording and it was not possible to analyse them for the motif distribution analyses. A great deal of time and effort was spent to eliminate possible duplications amongst the collections and often information from one collection provided the missing content residing in another. The second set of 982 sites was



Map 5.2.3 Map of areas searched in the eastern Cederberg. Areas searched in pink polygons. Rock art sites in red dots (Conservation Management Plans completed for displayed properties).



Map 5.2.4 Map of areas searched near Eland's Bay. Areas searched in pink polygons.

analysed as the written descriptions from their site recording forms had been captured. However, since no photographs were available I could not verify the images against the written records to maintain the same level of consistency in flagging the motifs as I had when both site reports and photographs were on hand.

This is one of the main reasons why the range of definition of the motifs had to remain on a fairly simple level. Since consistency existed within collections, I was relatively certain in being able to flag motifs correctly for the sites lacking any photographs. For example, 'eland' could be analysed across the whole database but more complex questions focusing on variations in eland images could not be attempted (Dowson 1989). While there may be limited value in only having the point location indicating the presence of rock art for research studies, it is still invaluable in the management aspects of the archive when evaluating impact assessments. Also worth noting is that 389 rock art sites had been recorded more than once in the database by January 2010 and thus the total number of rock art site recordings at the time was 2814.

5.3 UNDERSTANDING THE RELATIONSHIP OF SPACE AND TIME TO ROCK ART TRADITIONS

We can now turn to the spatial analyses of the rock art in the study region. A total of 90 classification flags were chosen before the rock art analyses began. The criteria fell into six broad groups, namely 'Tradition, Density & Colours', 'Animals', 'Humans', 'Equipment', 'Compound Motifs' and 'Abstract Images' (Figure 5.3.1). In addition to these categories, the base site reports were also filtered (Figure 4.3.3) to produce queries for the artefacts and the physical nature of the sites (e.g. boulders versus overhangs). These queries in turn could also be amalgamated into combination questions (e.g. pottery + hand prints). During the rock art analyses an additional 65 sites could not be flagged as their site records and/or photographs yielded no information pertaining to the description of rock art. The total number of sites represented in the sample is therefore 2252. Many distribution maps of interest were generated and a few of those not included in this chapter have been added to the appendix for illustrative purposes.

The classifications outlined in Figure 5.3.1 were derived from the names and definitions used by the contributors to the database. As mentioned earlier, this project was not directed towards an interpretation of rock art imagery per se, and for this reason I have omitted a deeper discussion on the debates related to these categories. This is especially relevant to the 'Compound Motifs' section where I attempted to inherit and extend the analysis of motifs involving 'scenes' as defined by

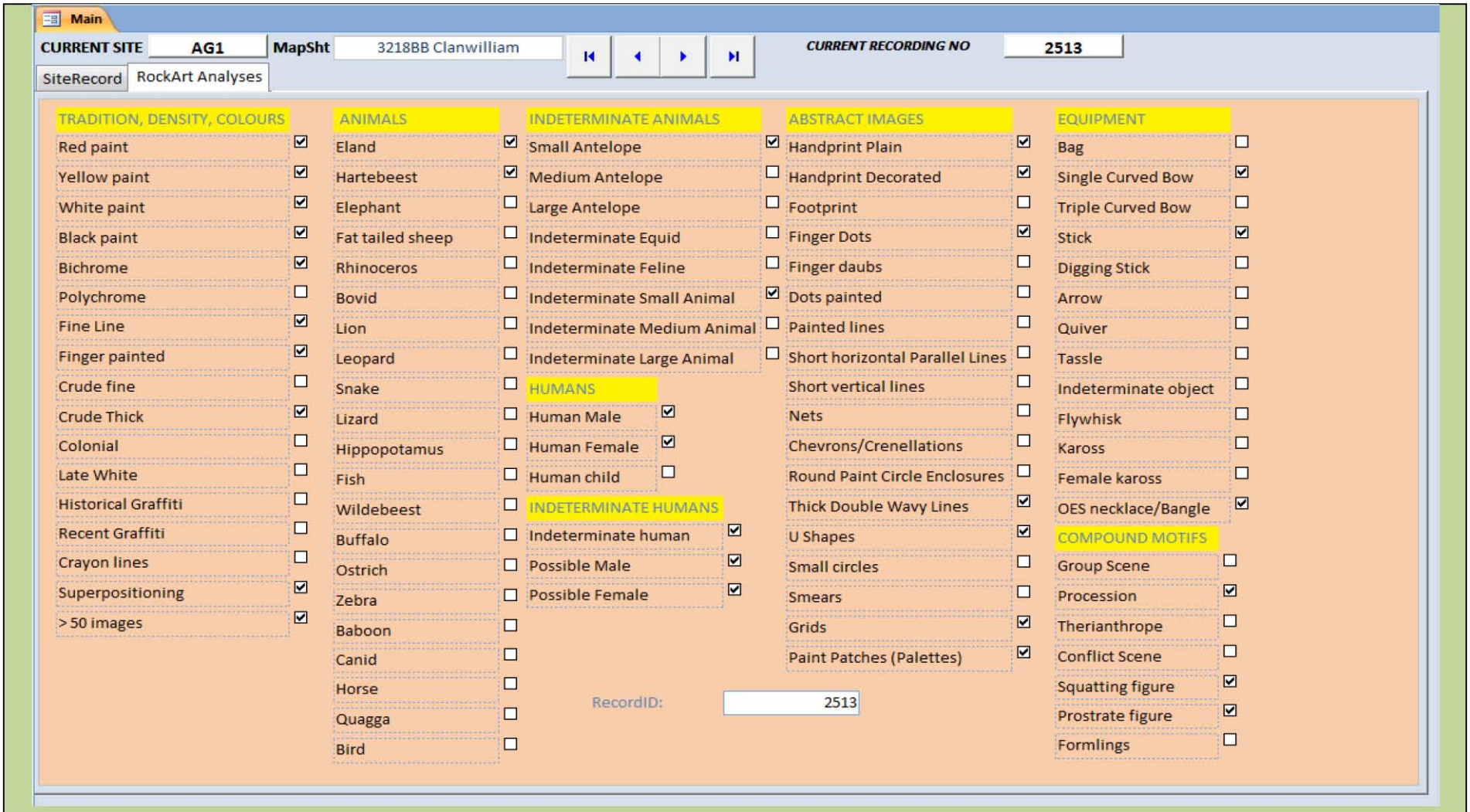


Figure 5.3.1 Screenshot of the Rock Art Analysis screen designed for this project.

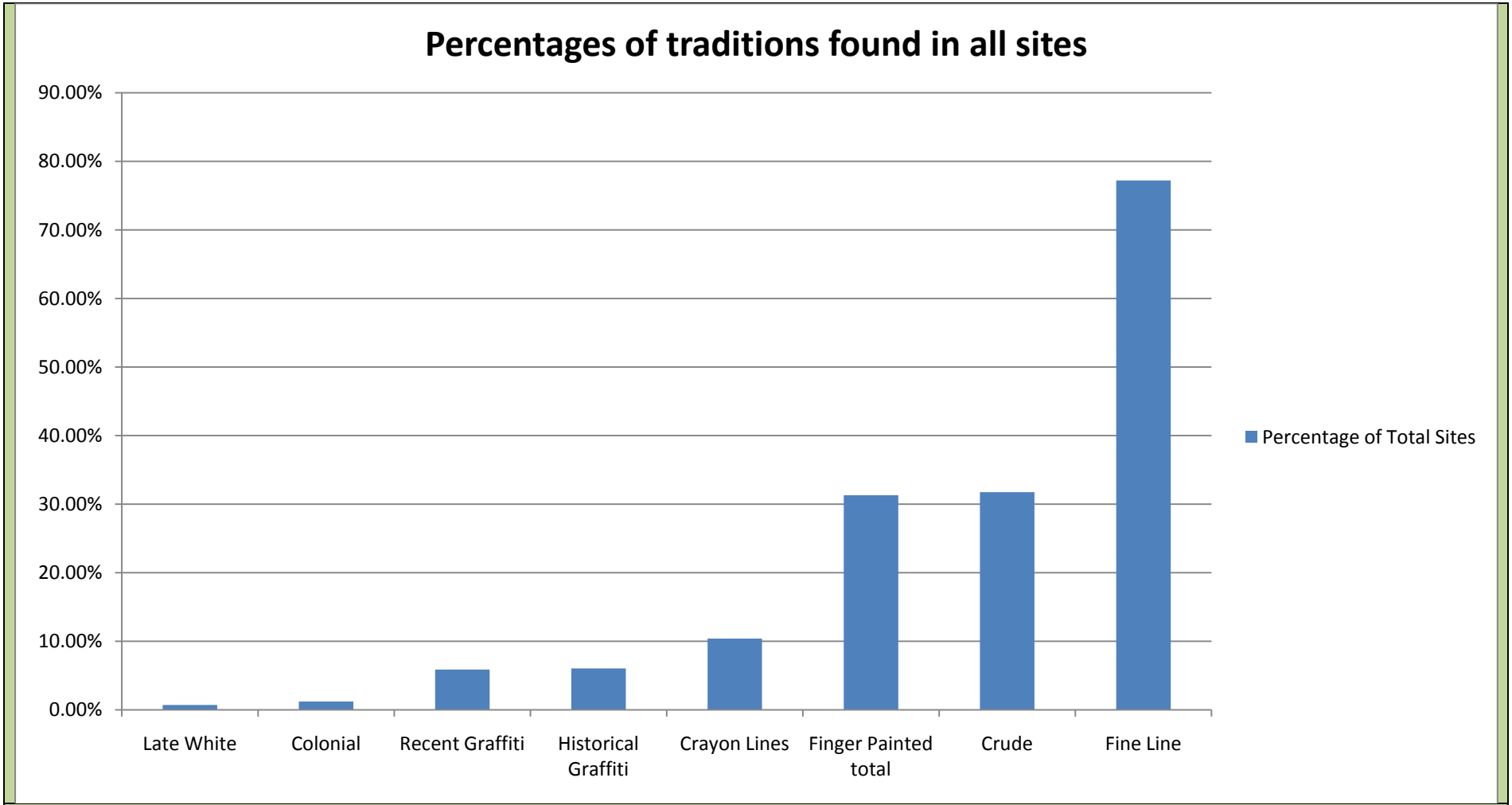


Figure 5.3.2 Graph showing the dominance of the fine line tradition over other painted forms across all sites. Note the percentages do not reflect counts of the individual paintings.

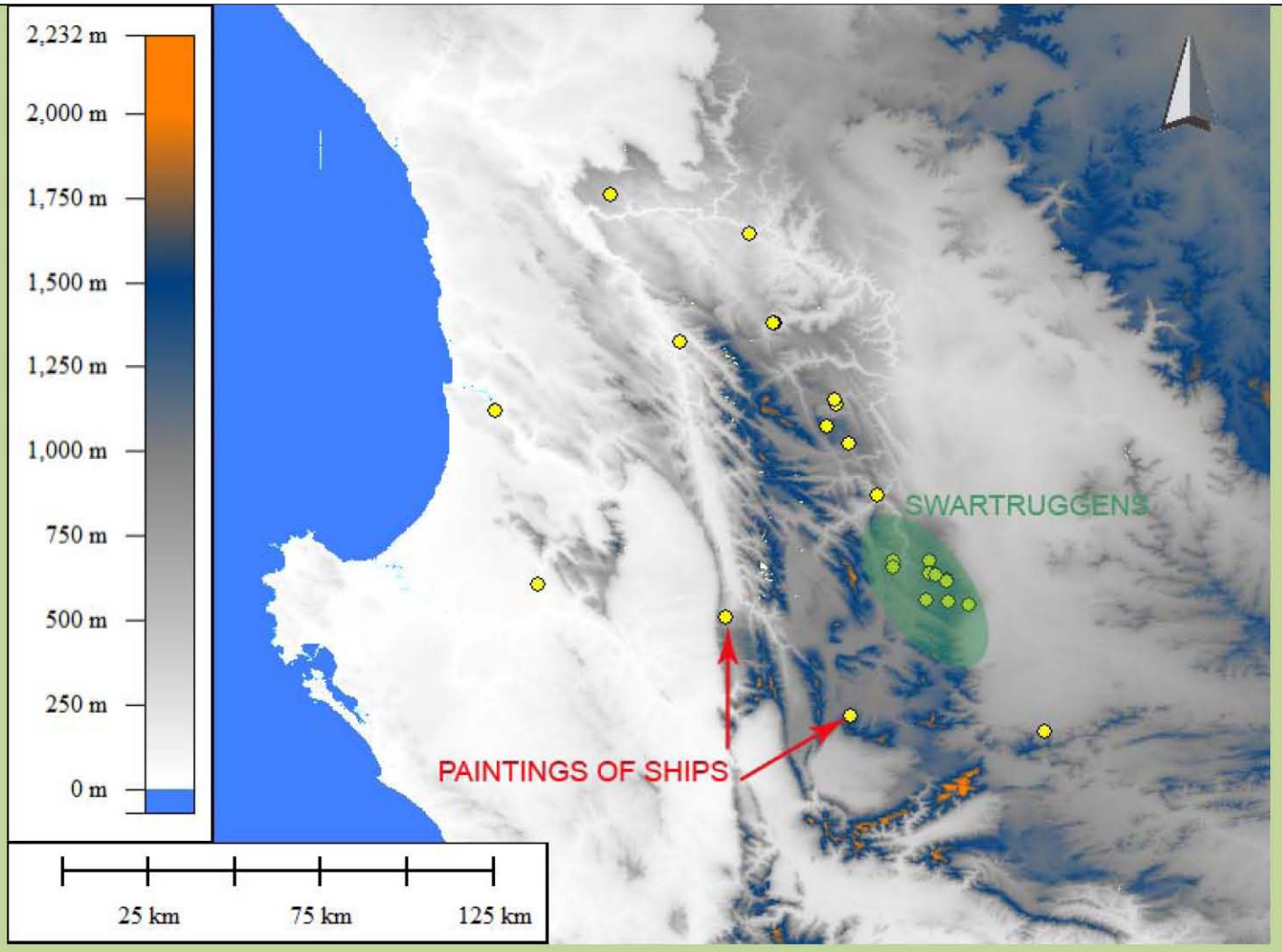
others such as the 'group scene' (Maggs 1967a), 'processions' (Smuts 1999) or 'squatting figure' (Solomon 1989). The meanings of these motifs have therefore not been reinterpreted in this project. The analyses of the patterning found in the rock art and artefactual distributions took cognisance of the fact that the economy of this landscape has gone through three distinct phases. Hunter-gatherers occupied the area for the greatest length of time, followed by hunter-gatherers and pastoralists in the last 2000 years and colonial farmers and their labourers entered the area around 300 years ago. 'Rock art' has been produced in each of these phases. Two traditions exemplifying opposite ends of the scale were chosen to show how time and space are related to the paintings (Asmus 2003).

Colonial Paintings

For the first example, I chose the colonial period rock art tradition. 28 sites featuring colonial rock art have been documented, accounting for only 1.24% of the total number of sites (Figure 5.3.2). Images depicting people in European dress, wagons and other items have been ascribed to the colonial period (Yates et al 1993; Hall & Mazel 2006). Non-finger painted images have also been defined as colonial paintings when the subject matter can be determined. For example, paintings of two possible ships have been found (Johnson et al 1959: plate 6; Rudner & Rudner 1970). These two sites are isolated occurrences of colonial imagery in the Groot Winterhoek and Koue Bokkeveld (Map 5.3.1) and are not typical of the finger painted sites mainly found in the Swartruggens area. The Sandveld has a well documented site (Manhire 1981; Yates et al 1993; Mguni 1997) and perhaps another in the same vicinity (Parkington, pers. comm. 2011). An isolated site was found by Rabinowitz and others near the Piketberg.

The distribution map of colonial imagery therefore portrays a rather disconnected painting tradition with high levels of activity in specific locations such as the Swartruggens. For the most part, the range of colonial imagery does not feature in all locations. Paintings of wagons, for instance, have only been found in the Swartruggens and not in the Sandveld. Hall and Mazel (2006) found that these paintings of wagons date to the 1870s at Stompiesfontein and were painted in the context of an historic event, namely the diamond rush in South Africa. The paintings of the possible ships are difficult to date but their isolation, subject matter, rarity and geographic separation from each other are intriguing.

The generation of the colonial map demonstrated the possibilities for interrogating the data through GIS as well as presenting an update of the results of fieldwork and digitization conducted over the last few years. A set of newly documented occurrences of colonial type paintings was found in 2008



Map 5.3.1 Colonial rock art sites in yellow dots.

Figure 5.3.3 Painting of a possible wagon near the Doring River (SARU collection).

in the Biedouw area and five more sites were found during eCRAG surveys in the eastern Cederberg to the south of these sites. This shifted (albeit not dramatically) the observations made in the early 1990s that the colonial paintings were largely limited to the Swartruggens in the eastern part of the region (Yates et al 1993). Two additional sites were mapped and incorporated into the colonial layer of the database once the Rabinowitz collection had been digitised.

Another site lying in the north-east area of the colonial distribution was labeled as a colonial site in 1981 by SARU when they described a possible 'Voortrekker wagon' (Figure 5.3.3). Interestingly this site was ignored in their publication in the early 1990s (Yates et al 1993). This image may have intentionally been set aside as too ambiguous given the fact that previous paintings of wagons were all found clustered in the Swartruggens. It is also possible that it was simply missed when drawing up the distribution map from memory in the absence of a computerised archive.

Setting aside the ever present possibility of finding more colonial paintings, the current database indicates three occurrences to the west of the Olifants River. These sites are all relatively isolated instances of colonial rock art and are surrounded by many other rock art sites without colonial imagery. It is possible that some of the other finger painted images were executed contemporaneously (Anderson 1996) but this is more difficult to determine when the subject matter is 'abstract'. Given the very late date ascribed to the Stompiesfontein paintings (Hall & Mazel 2006),

colonial paintings are right at the very edge of what one may call a 'tradition' but common themes such as human figures with hands on their hips, hats, elongated penises and crinoline dresses occur throughout the various locales (Yates et al 1993).

Importantly, the amalgamation of data from six collections with the latest fieldwork has failed to reveal more colonial sites in areas where the densest surveys have taken place such as the Pakhuis, Clanwilliam, Citrusdal and Sandveld areas. Their regionally sparse but locally dense distributions in certain areas substantiate the evidence that these paintings are very young compared to the other painting traditions. Further understanding of these findings would warrant a more detailed project dealing with the actual paintings and an historical study into the events and circumstances behind their production.

Paintings of humans - sex bias

Humans are by far the most common subject matter in rock paintings of this region (Maggs 1967a; Manhire 1981). This is also the case from site to site summarised in Table 5.3.1 where indeterminate humans are found in almost 70% of all painted shelters. This figure includes finger paintings, but humans painted in the fine line tradition are the most common. The high proportion of indeterminate sex in human imagery has been a subject of much debate (Parkington 1989; Lenssen-Erz 1998, 2007; Asmus 2003). The inter-site data is another avenue to explore this issue. The two opposing viewpoints either contend that indeterminacy is intentional (Lenssen-Erz 1998) or that ambiguity in human images results from poor preservation and our lack of understanding of implied meaning (Asmus 2003). Kaross-clad figures are a good example where breasts or penises are covered but associated hunting equipment such as bows and arrows may imply such figures are male (Smuts 1999; Parkington 2002, 2003).

Paintings of children are difficult to define as most instances are ambiguous. Small human figures in processions or group scenes could be children based on their relative size to other human figures comprising the same 'scene'. The stated number here is most likely an under representation of the true count. A clear example of a small child or baby 'hookhead' was recorded in the Koue Bokkeveld during my surveys. Its face was painted in yellow infill just over the right hand shoulder of a female figure which was similarly painted as a hookhead with yellow infill. Other recorders have mentioned possible babies on the backs of their mothers but the corresponding photographs were not convincing.

Motif	Site Count	Percentage of Total Sites
Indeterminate Human	1551	68.87%
Human Males	536	23.80%
Possible Males	119	5.28%
Human Females	239	10.61%
Possible Females	102	4.53%
Possible Children	30	1.33%

Table 5.3.1 Percentages of all rock art sites containing humans by sex.

Paintings of Humans	No of sites	Percentage of all sites with human paintings
I	975	56.75%
I & M	259	15.08%
I, M & F	90	5.24%
M	76	4.42%
I & F	56	3.26%
I & pM	44	2.56%
C & any other	30	1.75%
I & pF	27	1.57%
F	23	1.34%
M & F	21	1.22%
I, M & pM	14	0.81%
pM	12	0.70%
M & pM	8	0.47%
pF	8	0.47%
I, F & pF	3	0.17%
pM & pF	1	0.06%
F & pF	1	0.06%
Other combinations	70	4.07%
Totals	1718	100.00%

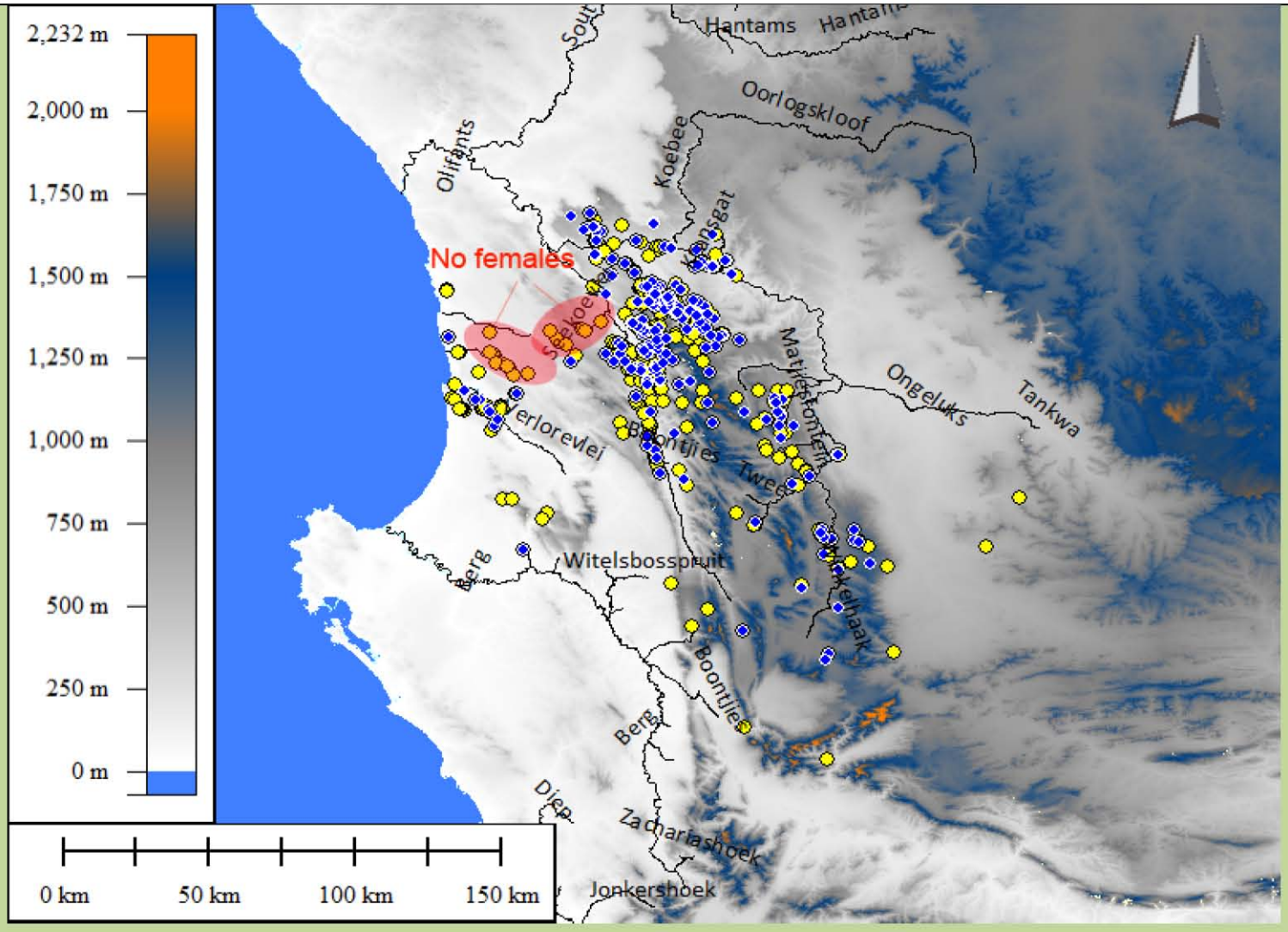
Table 5.3.2 Number of sites by sex, indeterminacy or combinations of these. I = indeterminate, M = male, F = female, pM = possible male, pF= possible female, C=children. Figures represent exact matches and exclude other categories unless specified.

Besides dominating the individual number of images (Maggs 1967a), paintings of humans are also the most widely distributed. There are no areas in the study region lacking human imagery where rock art has been found (Map 5.3.2). Furthermore, Table 5.3.1 shows that sites with identifiable paintings of males far outweigh those of females. This may indirectly support the observation that San ideology tends to favour the role of males (Solomon 1989:79).

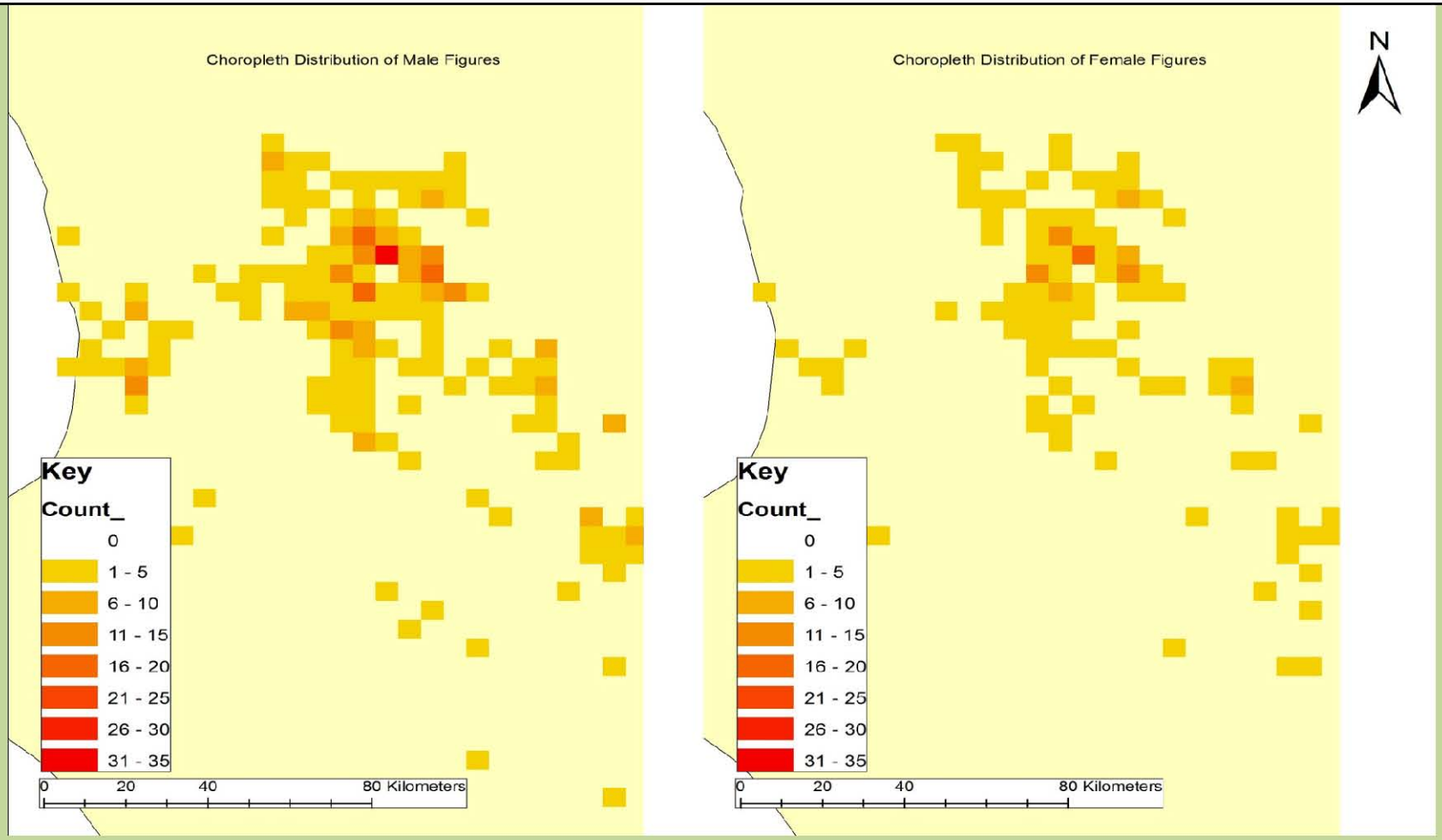
The numerical prominence and bias towards male imagery in the area is further underlined when looking at Map 5.3.2. The general distribution of humans in all locales is supported despite the exclusion of the indeterminate human layer. Contrastingly, female paintings are not only numerically fewer than male images (Maggs 1967a), but are completely absent in certain areas. There is no break east-west or south-north for female images but pockets of males without female sites were identified in the Sandveld, eastern Cederberg and the Piketberg. Unfortunately the shortcomings arising from the missing or incomplete records combined with inconsistencies in defining sex in humans across and within collections hinder the extent to which we can take these findings at this stage.

Turning to Map 5.3.3, the same data has been converted into a choropleth map using the 1:10 000 mapsheet indices to act as the reference grid. These two snapshots of the concentration of images per cell also show the presence of male only imagery in various places but importantly they also show an interesting overlap between the densest male and densest female clusters of sites. The densest cell in the male set lies in the Pakhuis and corresponds exactly with the female set. The choropleth density distribution of all rock art sites (Map 5.3.4) shows that this cell also possesses the densest concentration of all paintings – the higher the number of sites, the higher the density of female and male sites. Surprisingly, this pattern does not hold in the Sandveld. Once one moves westwards from the Pakhuis, sites with female paintings drop off significantly and are almost exclusively clustered in the Verlorenvlei core area. Sites with male paintings continue to follow the general distribution of all rock art sites.

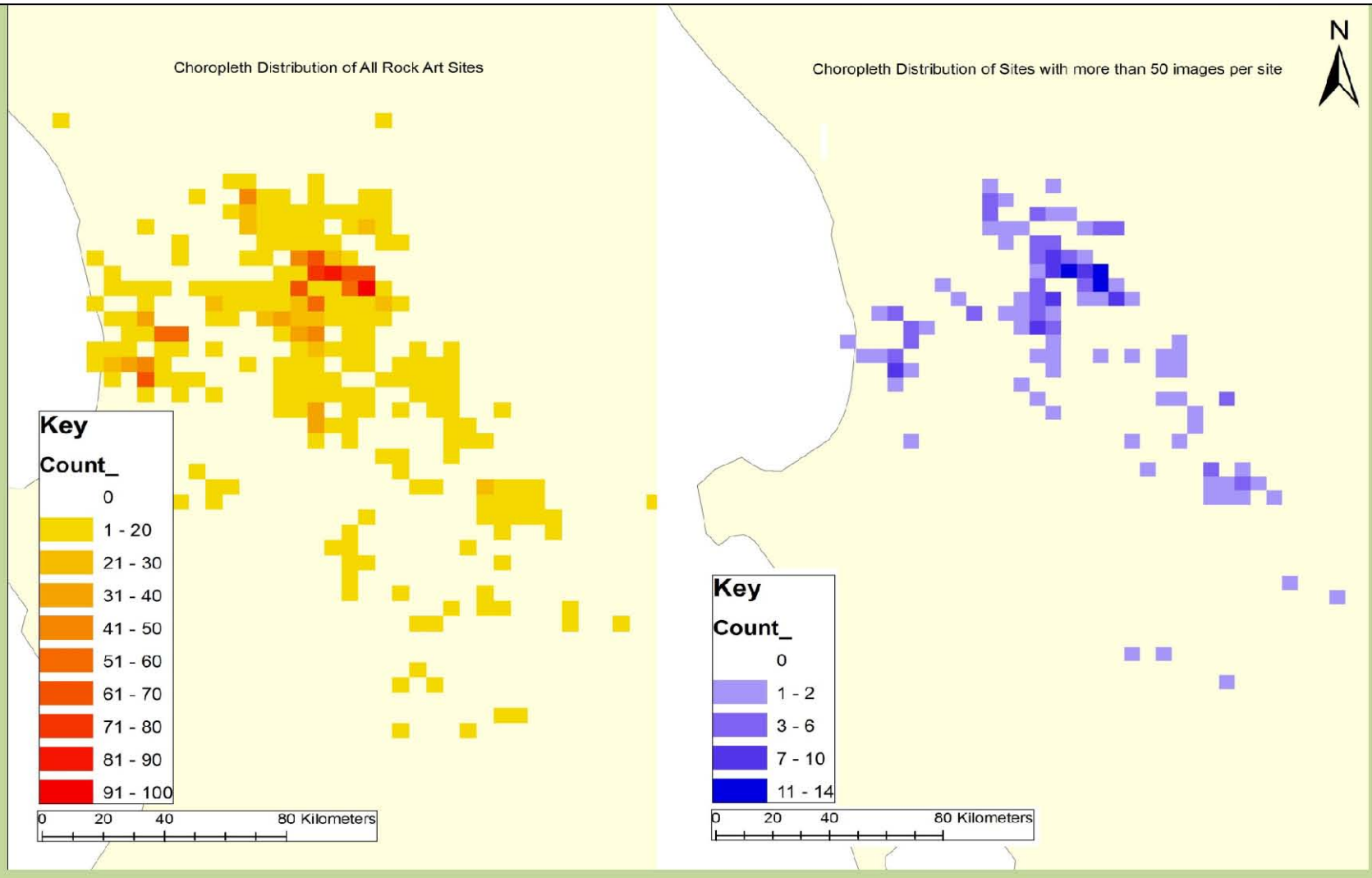
These statistics were further broken down to show the detailed separation of sites containing human imagery in Table 5.3.2. The high indeterminacy percentage is again prominent, but third on the list is the combination of indeterminate humans, males and females. This excludes possible females, possible males or children. These 90 sites were mapped and all of the 4 Sandveld sites in this category fell into the Verlorenvlei core area and the CFB contained the rest (Map 5.3.5). The preservation of imagery and ambiguity in the minds of the recorders in determining the sex of the human figures does not appear to skew the overall pattern because the number of possible males versus possible females is almost the same (Table 5.3.1). If preservation was playing a major role at the macro level one would expect this number to correlate instead with the totals for the number of identifiable figures. Recorders were therefore almost equally unsure about whether to classify the figures as male or female when confronted with an ambiguous painting.



Map 5.3.2 Painting distribution of male figures (yellow dots) against female figures (blue dots).



Map 5.3.3 Choropleth maps indicating the distribution and concentration of male figures (left) against female figures (right).



Map 5.3.4 Choropleth maps indicating the density of all rock art sites per cell (left) versus the density of sites with more than 50 images per site (right).

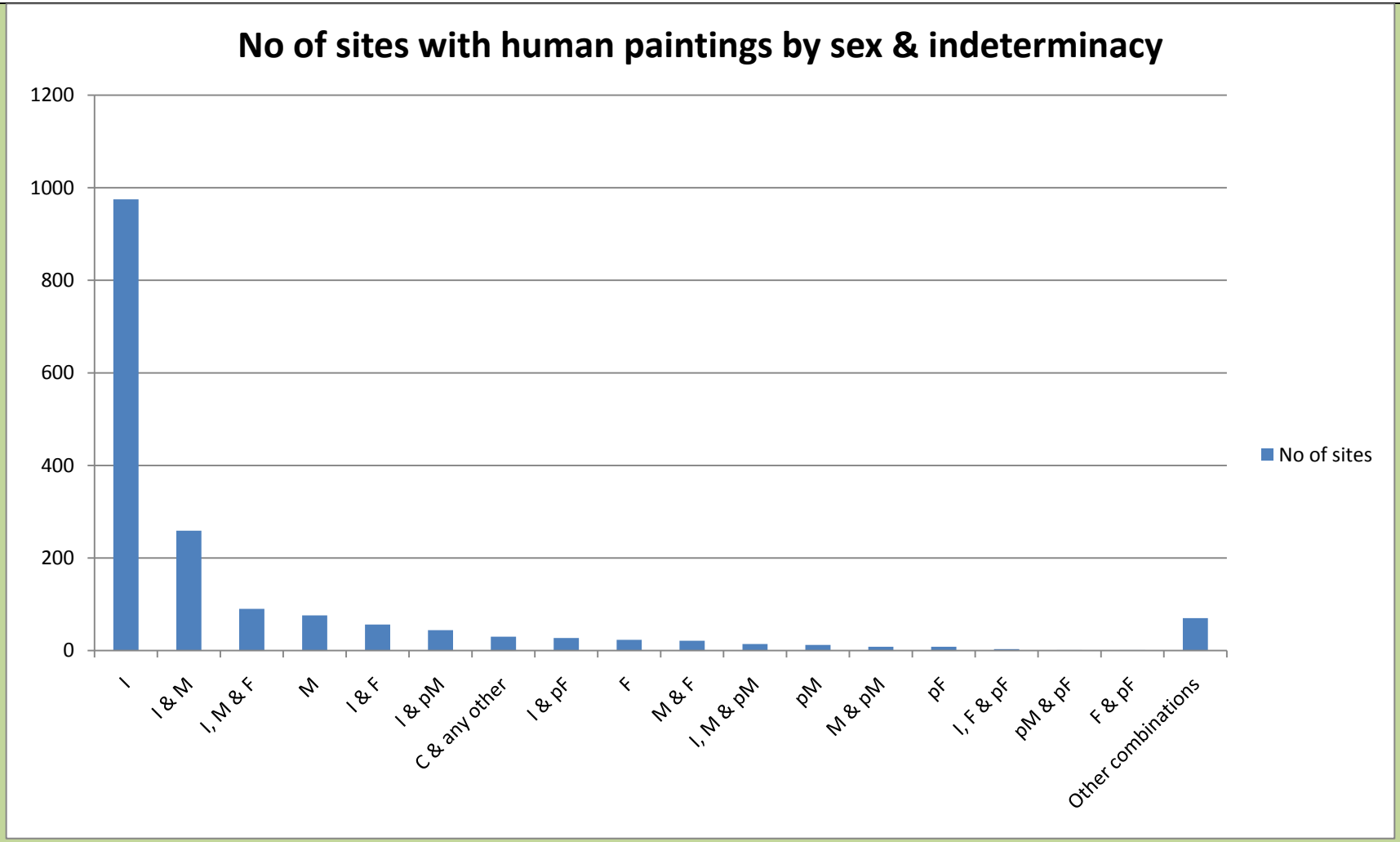
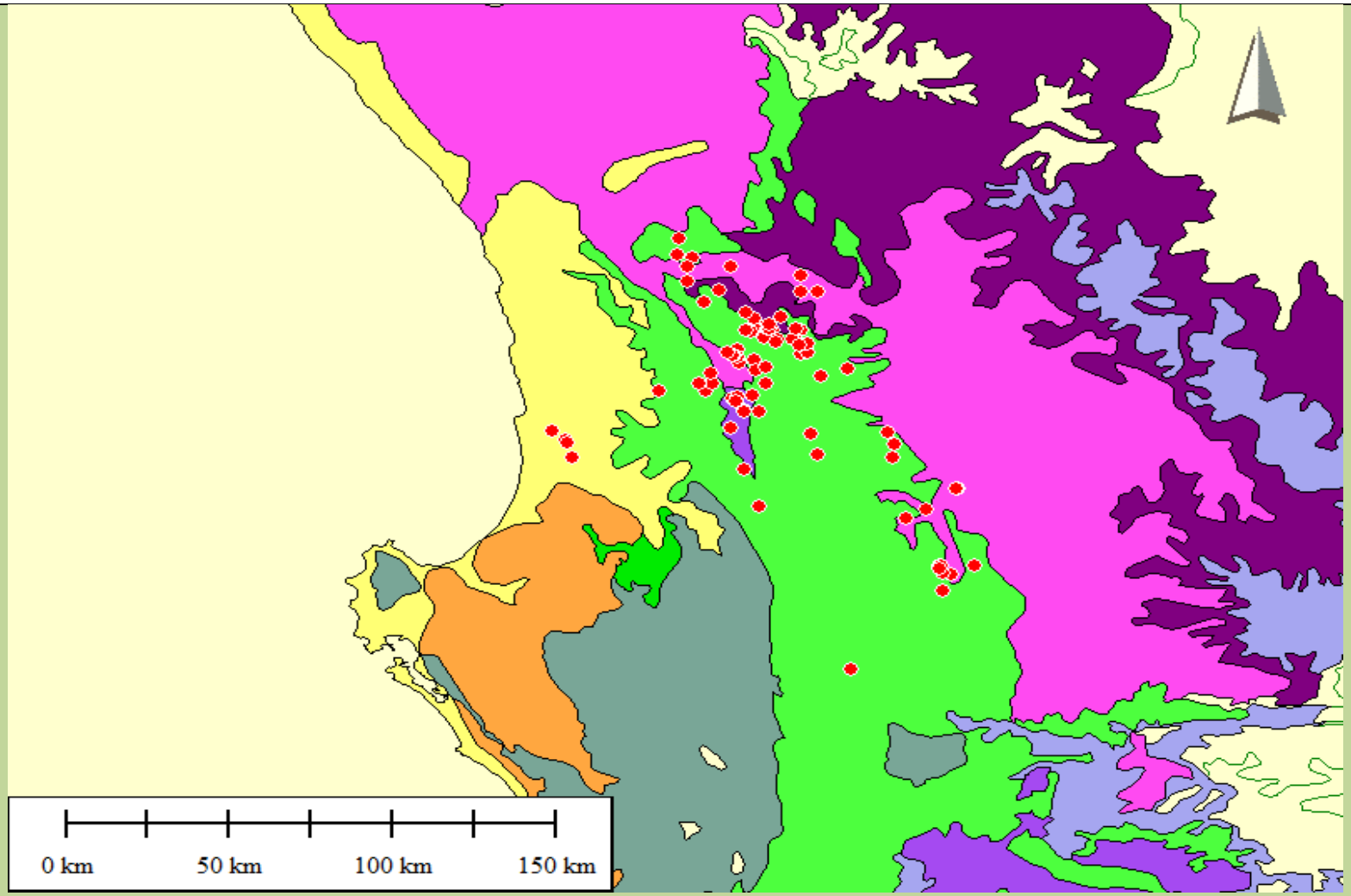


Figure 5.3.4 Number of sites by sex, indeterminacy or combinations of these. I = indeterminate, M = male, F = female, pM = possible male, pF= possible female, C=children. Figures represent exact matches and exclude other categories unless specified.



Map 5.3.5 Painting distribution showing males, females and indeterminate figures (red dots) on Acocks (1998). Note only 4 sites found in the Sandveld, all within the Verlorenvlei core area.

The intensive recording programme by Manhire (1984) and the limited availability of orthoquartzitic outcrops in the Sandveld have resulted in the recording of a high proportion of all possible rock art sites in this area. The absence of female paintings in certain areas therefore appears to be real and not stemming from a lack of surveys. This strongly supports the idea that hunter-gatherers did not perform the same activities across the landscape and that there is a link between rock paintings and these activities (Manhire et al 1983).

The colonial tradition query neatly depicted the influence of historical events at a very specific local scale on the distribution of rock paintings. Mapping this tradition highlights the disconnected motivations and norms found in these paintings that were produced very late and over a relatively short time in the region when compared to the fine line tradition. Contrastingly, the wide distribution of sexed and indeterminate human figures in the fine line paintings illustrates the much deeper time over which these paintings were made (Asmus 2003).

One cannot overlook the possibility that many of the animal paintings and inanimate objects such as bags could also have associations with males or females (Parkington 2003). This would have to be considered under a more sophisticated umbrella query were one to argue for exclusively 'male' or 'female' sites. Similarly, the impression that female and male processions rarely include individuals from both sexes (Smuts 1999) could be tested at a much broader level in this study region.

5.4 DISTRIBUTION OF ARTEFACTS & ROCK ART

The raw material 'boundary'

In Chapter Two, Maps 2.1-2.3 introduced the varying west-east distributions of silcrete and hornfels raw materials used in stone tool manufacture. This pattern is complemented by data analysed from excavated sites (Smith & Ripp 1978; Mazel & Parkington 1981; van Rijssen & Avery 1992) in a graph showing the changing raw material percentages at excavated sites from the coast to the Tanqua Karoo (Figure 5.4.1).

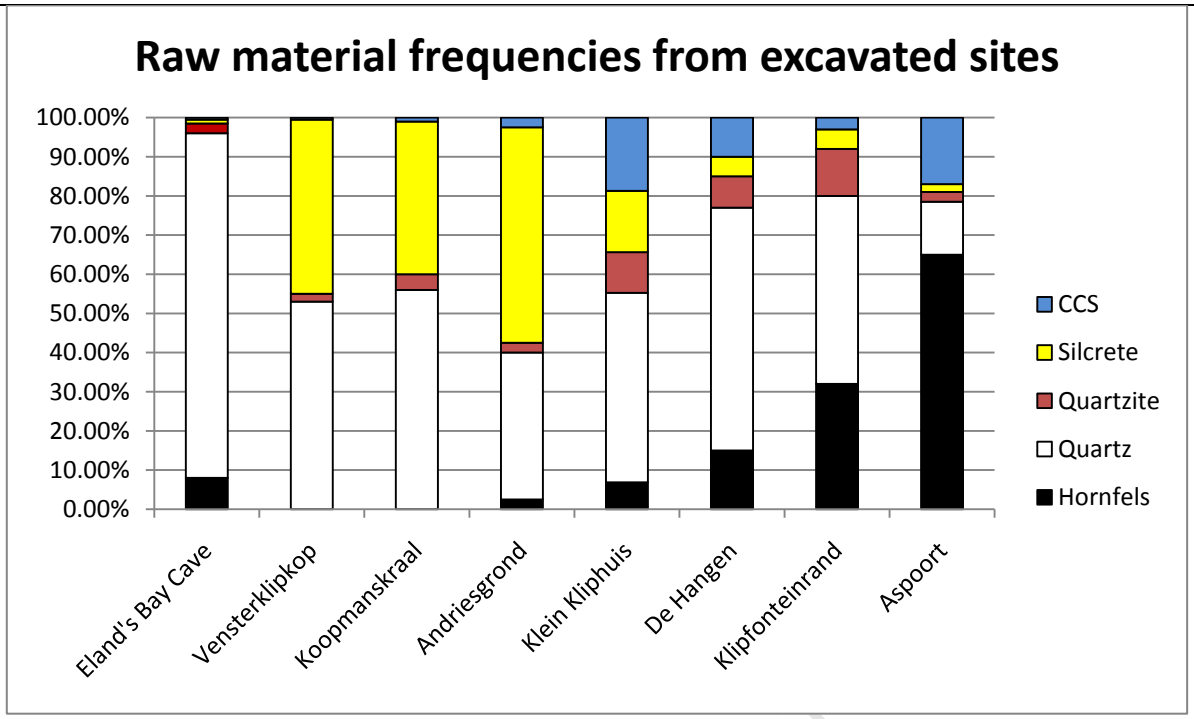


Figure 5.4.1 Raw material frequencies of total stone collected at sites ranging from the coast to the Tanqua/Doorn Karoo (Smith & Ripp 1978; van Rijssen & Avery 1992).

The prevalence of silcrete and quartz is shown throughout all the sites. This trend has also been observed during open site survey where a few silcrete flakes were found in scatters in the eastern Cederberg otherwise dominated by hornfels (shale) and chert. Most interestingly, the reverse situation for hornfels traveling west to the coast is *not* true. There is a surprising absence of hornfels in open site scatters of the Sandveld. Hornfels has been found at only a few open sites in the Sandveld and is also found in the Middle Stone Age layers at Diepkloof (Mackay 2008) but the source of this hornfels could be from the Malmesbury shales to the south instead of the Doring or Karoo.

Both silcrete and hornfels are fairly homogeneous materials and are more predictably flaked during knapping than quartzite. Their sources are also less ubiquitous compared to quartzite and quartz (milky, vein quartz) which are distributed throughout the greater area. As a result of these differences, studies focusing on mobility patterns as reflected in the stone artefact record have tended to focus on hornfels and silcrete (Manhire 1984; Mackay 2009). The dominance of silcrete, hornfels and quartz over quartzite and the wide swing from hornfels to silcrete between the Cape Fold Belt and the Sandveld is proof of the preference for these raw materials over quartzite, at least for certain tools, despite quartzite's consistent contribution to the assemblages across space.

Quartz is highly represented in certain assemblages on the coast and is a major component of the assemblages from west to east. However, its spatial ubiquity and hardness probably account for the wide distribution and it is unlikely there was any great need to curate quartz cores when moving across the landscape. The other category of raw materials, commonly lumped together as crypto-crystalline silicates (CCS), is dominated by a light blue/grey chert in the eastern Cederberg and various other grades of CCS are found in decreasing percentages to the west. CCS discard patterns correlate with hornfels and not silcrete and this is probably because these raw materials are mainly derived from volcanically altered rocks in the same areas sourced for hornfels (Manhire 1984).

Eland's Bay Cave is situated in the immediate coastal zone and the high percentages of quartz featuring in other similarly situated assemblages have been documented elsewhere along the West Coast (Orton 2004; Dewar 2008). Once one moves away from the immediate coastal band, silcrete and quartz are divided almost equally and share just about all of the stone up to the Olifants River Valley. From the east, hornfels follows a more regular pattern with very high percentages at Aspoort in the Tanqua Karoo and lower and lower percentages further west towards the Olifants River Valley. Studies focusing on tool types (Mazel & Parkington 1981) have demonstrated that hornfels is replaced with silcrete or vice versa depending on whether one is looking at assemblages in the Sandveld or the Karoo as similar tools such as adzes have been made using these stones.

Later Stone Age silcrete assemblages from De Hangen, Klein Kliphuis and Andriesgrond, located relatively near one another in the hypothetical interface zone between the hornfels and silcrete zones (Map 2.2.3), do not gradually step down in prominence west to east in the same way that hornfels percentages drop from east to west. Instead, Andriesgrond has the highest percent of silcrete and De Hangen has one of the lowest. Andriesgrond does not appear to be radically different from the Sandveld sites to the west, but De Hangen quartz is proportionately high with a very low silcrete component. Klein Kliphuis, which lies roughly along the same longitude as De Hangen (van Rijssen & Avery 1992; Mackay 2008), is very similar to De Hangen as the silcrete percentage dips to a low level relative to other raw materials. This site also lies on the east side of the Olifants River but is even closer to Andriesgrond than De Hangen.

Let's consider these phenomena against the models summarized in Chapter Two. An interface zone between the Sandveld and the Karoo appears to run through the Olifants River Valley based on the mapping of the open site stone tool record (Maps 2.2.1-2.2.3). As silcrete is found in sites fairly substantial distances to the east in small amounts, there is evidence that silcrete was preferentially curated or traded, or it could mean there are as yet undiscovered silcrete sources further east of the

Olifants River. Hornfels, despite its similar qualities to silcrete, was not taken back to the Sandveld in any great quantities but CCS items were curated in very small amounts. Despite the fact that the data from open sites collected in this database do not provide controlled contexts and thus more insight into changing behaviour through time, a few observations can still be made.

All of the major raw materials, CCS, quartzite, hornfels, quartz and silcrete are found in the Olifants River Valley zone but not in the Sandveld or the Karoo margin at the very eastern end of this study region. The aggregation and dispersal model explored by Parkington (1976), Wadley (1989) and Hall (1990) therefore seems to explain some of the patterning in the stone tool record found in the Olifants River area. The seasonal mobility hypothesis (Parkington 1972) also offers an explanation for the high amount of quartz and low amount of silcrete at De Hangen in that it predicts lower mobility during the dry summer months of the year when this site was apparently occupied. This scenario would see aggregation events taking place in the summer at sites close to permanent water such as the Olifants River, and dispersal during the wetter winter months to more marginal areas (Parkington 1976).

A territorial explanation offering less expansive use of the landscape by hunter-gatherers between the Sandveld and the Cape Fold Belt is also possible (Sealy and van der Merwe 1986, 1988). The sharp drop in silcrete between the Pakhuis and the Olifants River Valley (Figure 5.4.1) is not what one would expect given the high percentage of silcrete at Andriesgrond immediately to the west of the Pakhuis. The open site record downplays this contrast as even very small amounts of silcrete found in the Pakhuis are treated equally to other raw materials in Maps 2.2.1-2.2.3. The absence of Karoo/Doring hornfels in the Sandveld could be evidence that people collecting hornfels were living in a separate territory from people in the Sandveld and that limited or no trade of this stone took place.

Unfortunately the recordings of artefacts at all the sites in the database did not involve detailed analyses of cores and core types (a mammoth task) and this is just one reason why conclusions drawn from the artefact distribution should be treated with caution. The Sandveld and Olifants River Valley zone contain multiple sources of silcrete but all of the sources have not been located or sampled. It is therefore possible that many of the stone artefacts have not been transported very far away from their sources. Alternatively, we could be looking at the palimpsest of occupations resulting from different territorial bands. These are very intricate issues that are difficult to tease out given the nature of the data in this archive.

The seasonal mobility hypothesis offers valid explanations for some of the more peculiar patterns found at sites such as De Hangen, but the raw material patterns at Andriesgrond do not adhere to the predicted lower mobility in summer unless a silcrete source is lying in the very immediate vicinity of this site. The absence of hornfels in the Sandveld might support a territorial explanation but it *weakens* the hypothesis that the Olifants River Valley was an aggregation and dispersal area since we would expect exchanged items to disperse east and west away from this zone. De Hangen and Klein Kliphuis, located about 7.5km from each other, featured very similar assemblages, but Andriesgrond, scarcely 8.5km away from Klein Kliphuis on the west side of the Olifants River, differs markedly from these sites and is aligned with the Sandveld sites further west.

Past territorial bands are even more difficult to detect when considering social reasons for settlement choices and exploitation of localized resource caches. Multiple permanent water sources are found in the study region (e.g. the Grootrivier, Doorn River, Verlorenvlei) and other potential resources such as freshwater fish (Parkington 1976) and herds of antelope played a significant role in attracting hunter-gatherers. Furthermore, the landscape was not used homogeneously by hunter-gatherers and therefore different uses from site to site must be taken into account when assessing the variations in archaeological material (Mazel & Parkington 1981). Functional choices related to survival included marriage and reproduction and therefore aggregation must have taken place, perhaps not only in areas predicted when viewing the region on an east-west axis.

So far we have seen how useful this stone tool archive has been in generating generalized distribution patterns in the study region. This approach tends to suppress variation resulting from differential use amongst sites. This has been shown to either be useful or problematic depending on the scale of inquiry one is after. Arguably, the excavated record cannot be understood without the broader open site survey data as demonstrated by the unexpectedly large drop in silcrete percentages on the east side of the Olifants River at excavated sites.

Rock art distributions

Archaeologists have regarded rock art as a possible key to uncovering the settlement choices made by hunter-gatherers as rock paintings are much more expressive and variable from site to site than stone tools. However, complex motifs such as group scenes (Maggs 1967a) are circumscribed in subject matter and the general placement of objects – substantiating the prevalence of deeper norms and conventions adhered to by multiple painters. With this in mind, the spatial analysis by Manhire et al (1983) was aimed at explaining paintings of group scenes in terms of the aggregation and dispersal model.

We've already seen the clustering of male without female paintings in the Sandveld and the high density of rock art sites in the Pakhuis compared to the Sandveld (Maps 5.3.2-5.3.4). Superficially this seems to indicate that there are differences between the rock art sites of the Pakhuis and the Sandveld. On a localized scale, the Verlorenvlei rock art area mentioned above appears to constitute another core locality. The lack of a break in the tradition of painting combined with contemporaneity of sites dated between these two areas is evidence for a level of unity or common hunter-gatherer culture between the Cape Fold Belt and the Sandveld zones.

Mapping exercises conducted by Maggs (1967a, 1967b) and others (Manhire 1981; Manhire et al 1983) were introduced in the second chapter and an argument was made that certain motifs found in the Cape Fold Belt (CFB) were completely absent in the Sandveld and vice versa. These included a higher concentration of decorated hand prints in the Sandveld than the CFB, while group scenes typical of the Pakhuis were completely absent in the Sandveld (Manhire et al 1983). The issue of time and authorship was integral to these and later analyses as the hand prints were ascribed to a post 2000 period (Manhire 1998) with the conclusion that the hand prints were executed by pastoralists or at least hunter-gatherers heavily affected by pastoralism.

Almost all of the group scenes are executed in the fine line tradition and may be useful in determining possible pre-pastoralist territories. Subsequent fieldwork carried out as part of the eCRAG surveys has revealed that the distribution of these sites continues towards the north and east but no group scenes have been located in the Sandveld to date (Map 5.4.1). It is more than likely that systematic surveys of the Cederberg Wilderness Area will yield many more locations of this motif. We therefore have to either re-assess the validity of associating this motif with aggregation and dispersal events, or it could mean that the Olifants River Valley was not the centre for aggregation of hunter-gatherers (Manhire et al 1983).

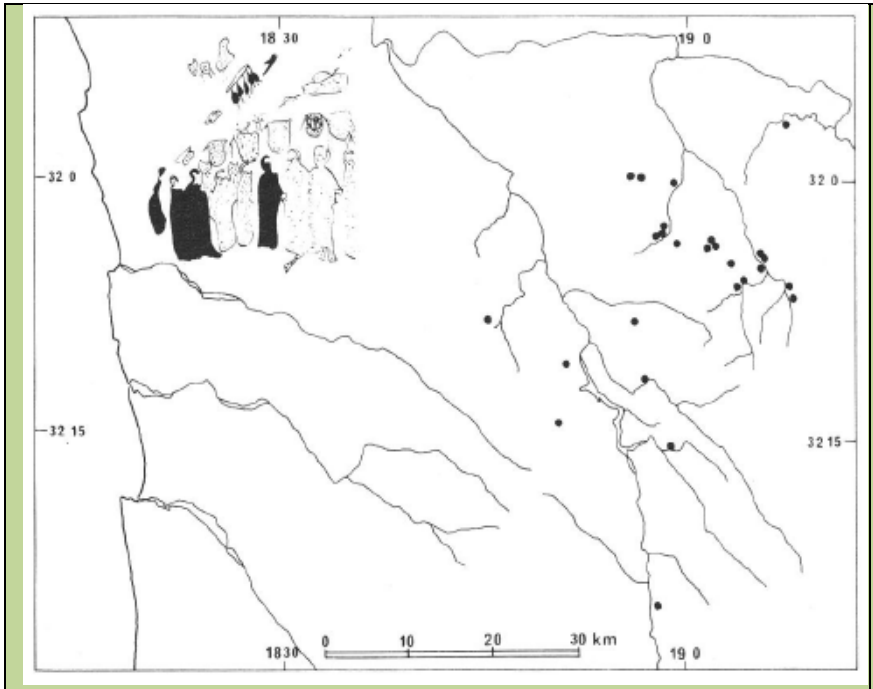
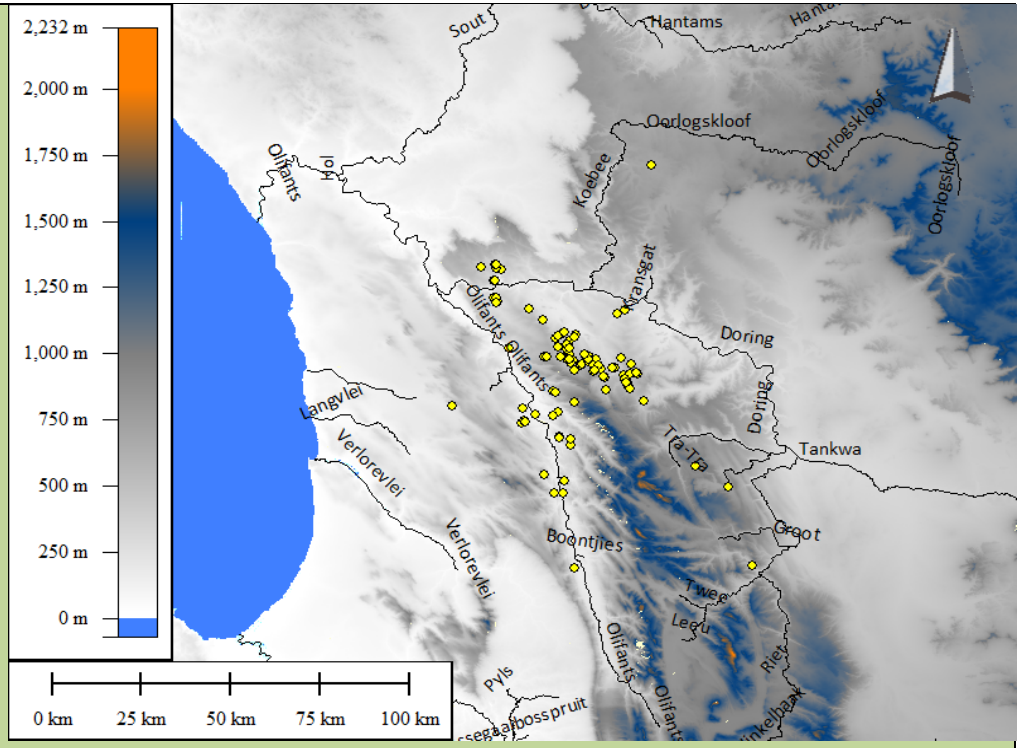


Figure 5.4.2 Distribution of group scenes as per Manhire et al (1983:32).



Map 5.4.1 Distribution of group scenes.

The only consistently available quantitative data pertaining to rock art from the site reports were estimations of the total number of images per site in three categories, namely 1-10, 20-50 and 50 or more images. These ranges are arbitrary but I decided to map the sites containing 50 or more images as they corresponded well with sites with superpositioning.

Category	No of Sites	As a percentage of total sites
>50 Images	275	12.21%
Superpositioning	359	15.94%
Superpositioning & >50 images	187	8.30%
Table 5.4.1 Totals of sites with superpositioning and more than 50 images.		

Category	Percentages
% of all sites with >50 images (275) showing superpositioning (187)	68%
% of all sites with superpositioning (359) that also had >50 images (187)	52.09%
Table 5.4.2 Proportions of superpositioning and >50 images against one another.	

An analysis of superpositioning was not an explicit direction taken in this study and the results shown in Tables 5.4.1 & 5.4.2 should not be interpreted too broadly. Hand prints and finger dots account for a large amount of superpositioning and the conclusions reached by Lewis-Williams (1972) are not going to be debated here. The phenomenon of multiple and relatively clearly separated traditions involved in superpositioning in the Western Cape (Mguni 1997; Pearce 2010) was evident during the analyses whilst superpositioning within the same tradition occurred far less. The database has the potential to concretize the nature of superpositioning within the fine line tradition in this study region and it would certainly be worthwhile to include the finger painted traditions in such a study.

The right hand side of Map 5.3.4 shows that the most densely painted sites also fall into the Pakhuis core area, but the pattern of density is far more widespread than expected following the previous results on sexed humans and general rock art site density. Put another way, it means that sites in the Sandveld, albeit far fewer in number per square kilometre, have a higher proportion of heavily painted sites than the Pakhuis. The number of sites with 50 or more paintings is therefore not consistently correlated with the number of rock art sites in any given area.

Clearly the geological availability of suitable shelters is contributing in some measure to the distribution pattern in the Sandveld, but this is best understood if one accepts the strong

relationship between domestic spaces and rock art sites at least for a certain significant period in the past (Parkington & Manhire 2003). The suggestion that there was a shift in the pattern of occupation of Later Stone Age sites in the Sandveld around 2000 years ago by Manhire et al (1983) was largely based on data collected from these shelters. There is ample evidence for rock paintings with no artefactual material found in the immediate vicinity of the sites (within 50 metres) and therefore the presence of larger overhangs suitable for use as shelters is not a prerequisite for rock art. However, I would suggest that in the main, sites with no artefacts should be seen as satellite sites linked to a series of occupation areas as we have never discovered a rock art site that is more than a few hundred metres from an open site scatter or rock shelter with occupation debris. A much more detailed analysis of this type of patterning was done by Asmus (2003) on a more limited range of sites and very wide spatial analyses by Carter (1977) and Smits (1983) in Lesotho established that certain areas are similarly clustered.

The Verlorenvlei rock art core area is an exception to the rest of the Sandveld zone. The density of sites in this area is not merely mirroring the geological availability of paintable rock in the Sandveld as there are various other outcrops available. The abundance of permanent water in the Verlorenvlei was an obvious attraction for prehistoric settlement but that also doesn't explain the lack of lateral density of sites along the length of the Verlorenvlei, most noticeable at Uitkykberg and the northwestern end of Muishoekberg. These anomalies in the predicted environmental and geological distributions of rock art sites have yielded some fascinating questions which could be tackled by determining additional ecological and social factors underlying the choices made to paint in different areas along the Verlorenvlei. The mapping of the rock art motifs has already yielded some results in this direction and the following table listing the data for paintings of animals is of interest here.

Animals	Site Count	Percentage of Total Sites
Small Antelope	516	22.91%
Eland	477	21.18%
Indeterminate small animal	395	17.54%
Elephant	221	9.81%
Medium Antelope	113	5.02%
Indeterminate medium animal	100	4.44%
Hartebeest	79	3.51%
Large Antelope	49	2.18%
Indeterminate Equid	47	2.09%
Indeterminate large animal	47	2.09%
Indeterminate Feline	28	1.24%
Fat Tailed Sheep	27	1.20%

Canid	27	1.20%
Bovid	24	1.07%
Baboon	19	0.84%
Ostrich	19	0.84%
Zebra	15	0.67%
Rhinoceros	12	0.53%
Bird	9	0.40%
Snake	8	0.36%
Wildebeest	5	0.22%
Buffalo	4	0.18%
Leopards/Cheetahs	3	0.13%
Fish	3	0.13%
Hippopotamus	2	0.09%
Lions	2	0.09%
Table 5.4.3 Statistics of sites containing animal paintings.		

Various maps generated were consulted to ascertain whether the east-west boundary scenario held true for rock art motifs as they seemingly do for group scenes. Aside from indeterminate animals, sites tend to feature small antelope (22.91%), closely followed by eland (21.18%). On the next tier, elephants are very common at 9.81% and hartebeest are also found in a fair number of sites. The geographical distribution of small antelope, eland and elephant paintings was not isolated to any particular zone of the research area.

Only three sites had references to hartebeest paintings in the Sandveld. No photographs were available for two of these sites and the recorders were unsure whether they had in fact found any hartebeest painted there. Photographs taken at a site near Leipoldtville clearly depict a hartebeest making it the only site in the Sandveld with a definite match. The hartebeest motif therefore shows clustering in the CFB but other antelope including eland and small antelope do not. The chi-squared test was run to see whether this was significant and the Acocks (1998) vegetation map was used to define the boundaries of the Sandveld (Table 5.4.4 & Map 5.2.2). The result of 15.127 is much greater than *p* even at 0.001 probability (10.83) which shows that the null hypothesis is not true. The rarity of hartebeest paintings in the Sandveld is therefore statistically significant, and a study directed towards assessing the ecological boundary of the Sandveld in relation to these paintings would be worthwhile.

	Sandveld	CFB	Total
Total Rock Art Sites	515	1737	2252
Hartebeest paintings	3	76	79
Expected numbers	18.066	60.934	79
X^2 (adjusted by Yates correction) **16.182**			

Table 5.4.4 Chi-squared test for hartebeest paintings Sandveld vs Cape Fold Belt.

The results from the less commonly painted animals were significant in some unexpected ways. For instance, cheetah/leopard paintings were only found in the Swartruggens in a very confined geographical area. Admittedly other indeterminate paintings of felines could also have been leopards but they did not look anything like the Swartruggens sites that were painted in similar ways to each other. Zebras/quaggas and ostriches were absent in the Sandveld and their data supported the east-west discontinuity. Contrastingly, another uncommon motif, the fat-tailed sheep, was spread evenly over the research area despite its overall rarity (Jerardino 1998b). The patterning derived from these idiosyncratic animal motifs therefore displays a high degree of variability and there are too few of these paintings to test the territorial hypothesis. Instead, the mapping of multiple animal layers was carried out and this highlighted the Verlorenvlei core area once again.

In particular, the layer combining baboons and rhinoceroses showed matches in the CFB but these two uncommon motifs were only found in the Verlorenvlei core area of the Sandveld (Map 5.4.3). The painting of a rhinoceros in the Sandveld is rather different to the one in the Pakhuis (CFB) (Figures 5.4.3 & 5.4.4). This demonstrates the need to carefully consider the results of mapping idiosyncratic motifs from the database when the spatial analyses are turning up matches based on broad criteria. Conceptually there appears to be a similarity between hubs in the Sandveld and the CFB, but the differences in style and possible age of these paintings is significant (Swart 2004) and must be explained before one can link these areas into a single territory.

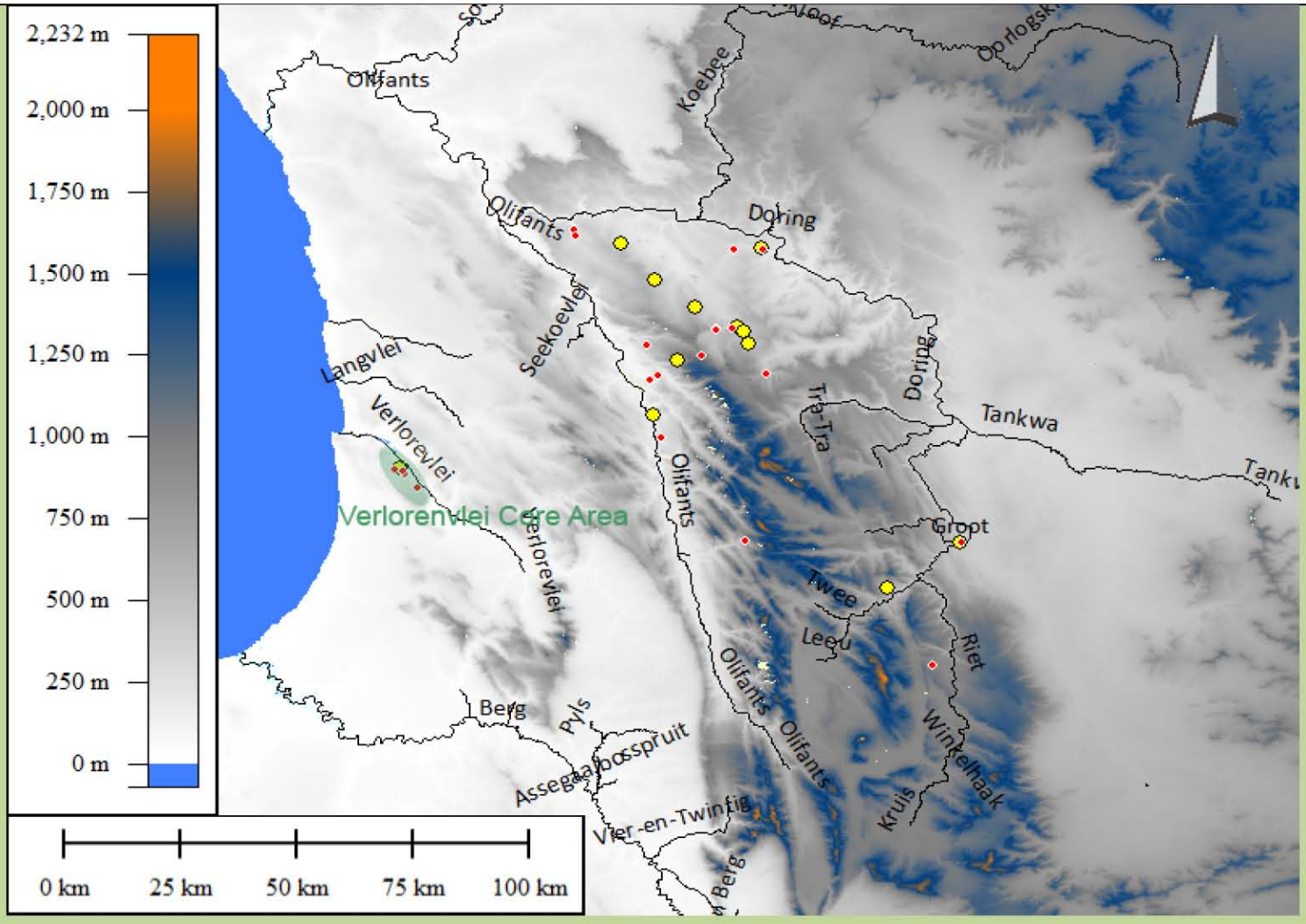
Figure 5.4.3 Sandveld Rhinoceros.

Figure 5.4.4 Pakhuis Rhinoceros.

Animal paintings therefore both contradict and support the notion of territories. The wide distribution of eland across the area attests to the similarities between groups living in the study area more than the differences. However, as has been argued elsewhere (Vinnicombe 1976; Lewis-Williams 1981), eland are very common throughout South Africa south of the Limpopo River (Eastwood & Cnoops 1999) and underpin the notion of a broad pan-San cognitive system across southern Africa. It is therefore not surprising that there isn't a clear break in the distribution of these paintings here.

For this reason, paintings of elephants, common in the Western Cape and in engravings of the Karoo (Morris 1988; Parkington et al 2008) but far less so in the Drakensberg, were initially more fruitful to investigate potential territories. Surprisingly, it was found that they too are not only numerically common (Maggs & Sealy 1983) but are geographically widespread in the study region. Elephants were therefore commonly chosen for paintings by groups in this landscape. Elephants also happen to be the only motif along with eland where extra large renditions have been made (often in yellow or white paint). Hand prints have been printed on or around these fine line images at certain sites (Parkington 2003). The enigmatic 'elephants in boxes' motif (Maggs & Sealy 1983; Manhire et al 1983) is also worth mentioning as we found 'eland in boxes' for the first time near Ceres, yet again linking these two animals in some special way.

In the case of hartebeest the sample size (3.51%) was better than the rest of the animal species further down the list and the geographical distribution was largely biased towards the CFB. This may be explained away in some part by the indeterminate categorization of medium to large antelope that obfuscates the true distribution of this species. The eland is much easier to identify due to the standardization and constant repetition of the torso in red ochre, but the hartebeest is generally only determined by the rectangular shape of the muzzle and the single, monochromatic head and torso. The result supporting the absence of Sandveld hartebeest should therefore be treated with caution. Before we turn to other classes of imagery, it is already apparent that there are no motifs isolated only to the Sandveld.



Map 5.4.3 Distribution of baboon paintings (red dots) and rhinoceroses (yellow dots) with the highlighted Verlorenvlei core area.

Two abstract categories of paintings, namely hand prints and corrugated motifs, were also discussed by Manhire et al (1983). The updated mapping of these paintings revealed much the same distribution patterns for these motifs. Certain gaps were filled in by the amalgamation of other recordings and further fieldwork. Two sites situated on the eastern fringe of the Sandveld containing corrugated motifs were tagged (Figures 5.4.5 & 5.4.6). Both sites had 'saw tooth' representations of this motif and the rest of the Sandveld including the Verlorenvlei core area returned no results. 33 sites in total contain these images or 1.47% of all the painted sites. While this sample size may not seem particularly significant, only 10 sites were mapped during the study in the early 1980s (Manhire et al 1983).

Figure 5.4.5 Corrugated motif, Piketberg area.

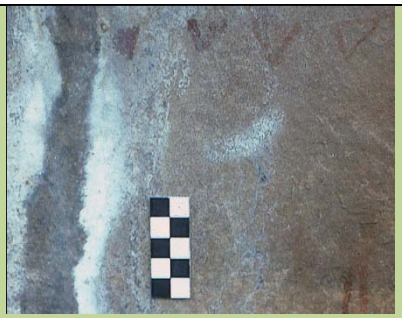


Figure 5.4.6 Possible corrugated motif, Sandveld area.

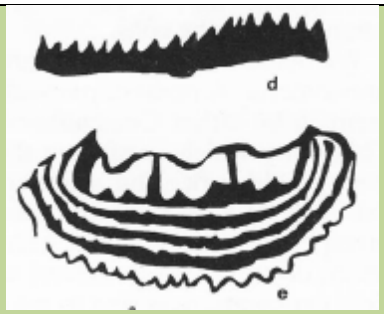


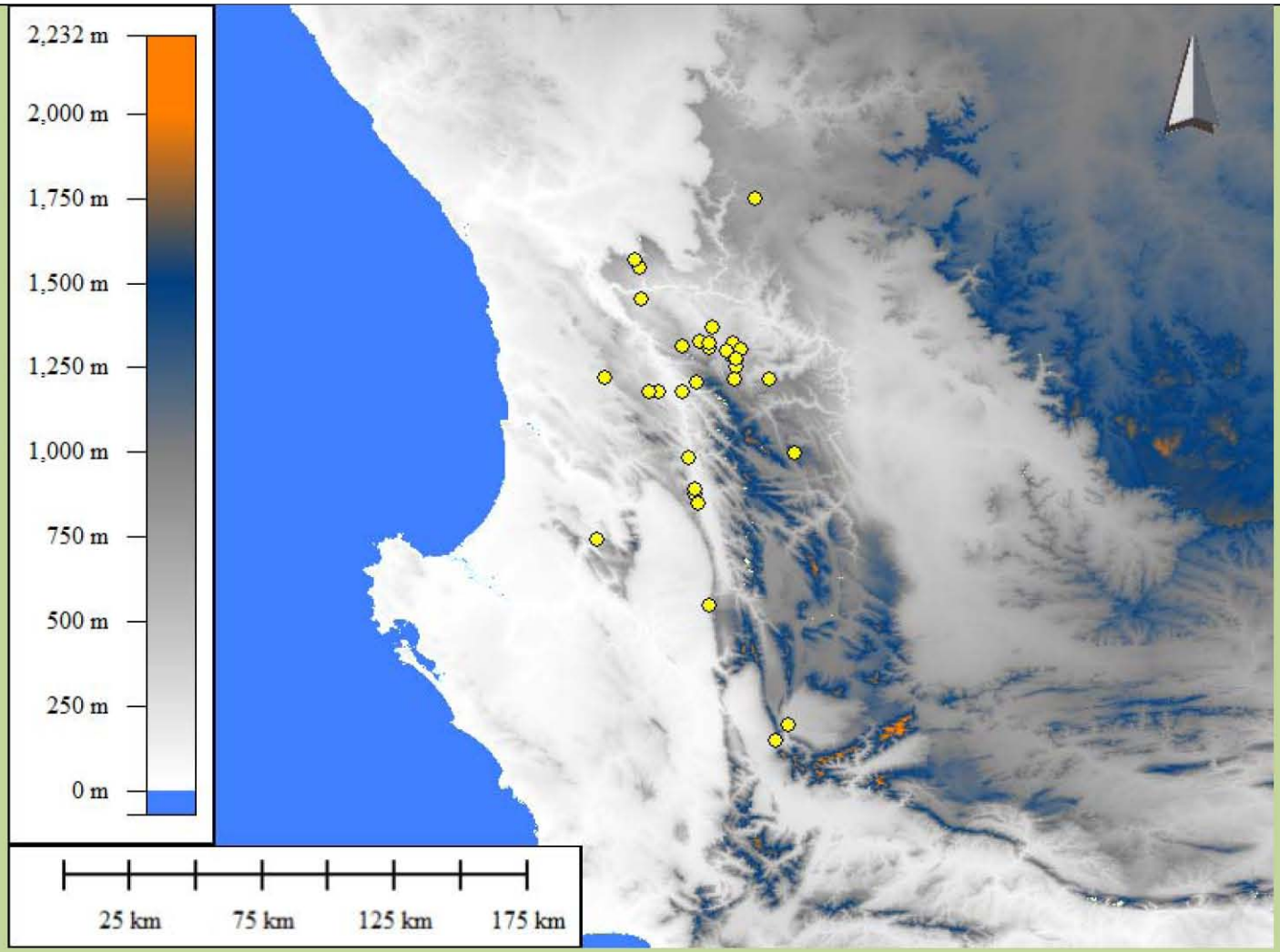
Figure 5.4.7 Corrugated motifs from Manhire et al (1983).

The possibly related motif of 'elephants in boxes' was included in the same flagging category during the analyses and the resultant map is displayed in Map 5.4.4. The presence of a corrugated motif in the Piketberg area tends to weaken the the idea that the rock art is aligned with the open site stone tool record as this zone falls very much within the silcrete dominated raw material zone. Another site in the Piketberg was reported recently with a rhinoceros and possible corrugated motif amongst other paintings (Parkington, pers. comm. 2011). Alternatively, it may mean we need to consider rock art distributions in terms of 'mountain' versus 'plain' instead of the Sandveld versus the Cape Fold Belt. The possible differing social choices of physical locations for rock art sites in contexts such as high, medium and low has been explored by others (Asmus 2003; McCall 2010) but these studies were limited to a series of sites within a kloof or gorge and have thus far proved to have limited predictive applications. A broader landscape study such as the one by Smits (1983) could pick up from some of the preliminary conclusions found here to test the idea that the choice of place played a significant role before paintings were made.

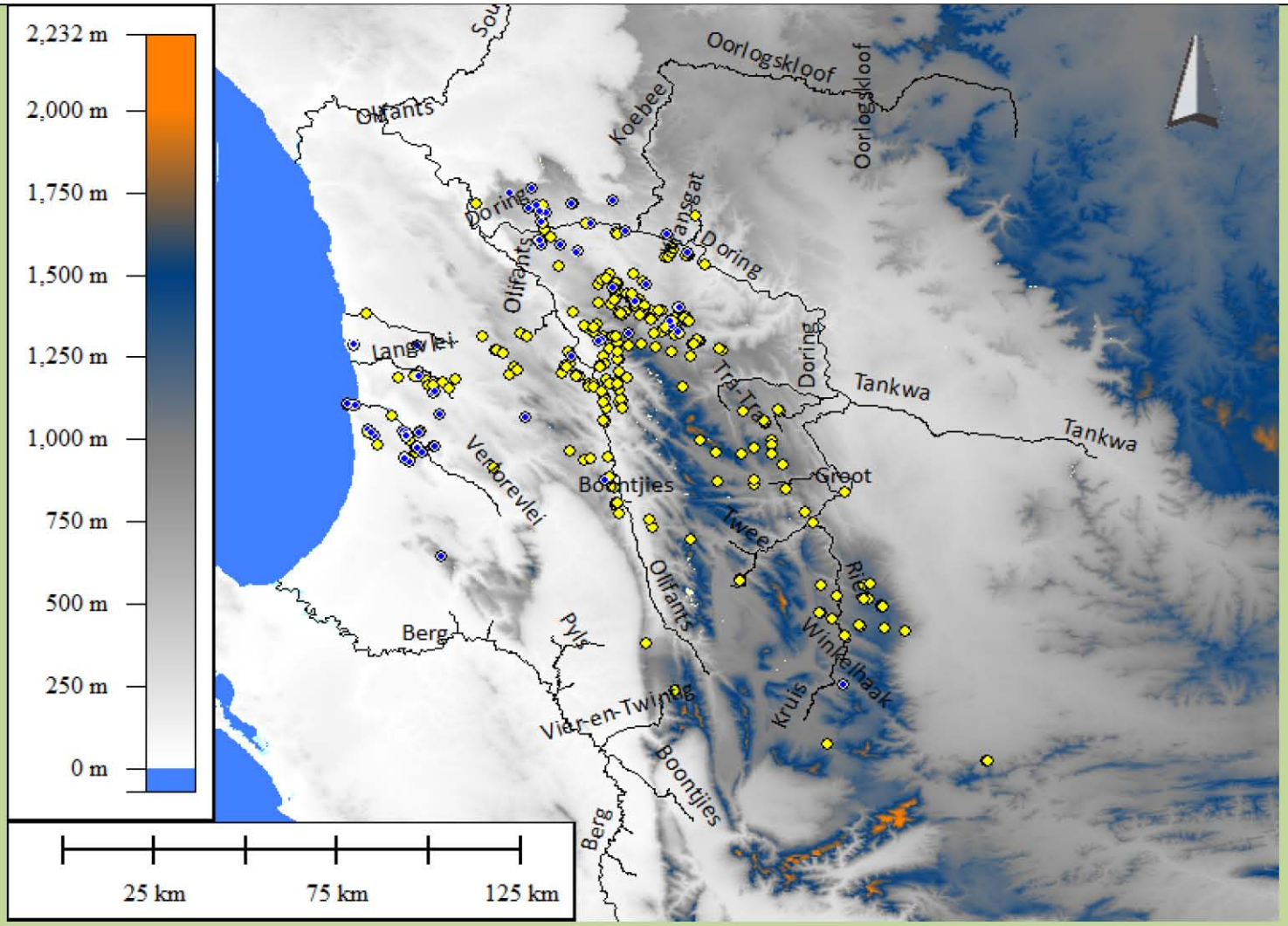
The other abstract category that received a number of spatial assessments in the past is hand prints. These consist of either plain or decorated hand prints with the latter being made by removing paint from the hand to create a series of lines, often in 'u-shapes', before being printed on the rock surface (Manhire 1998). The hand print tradition has been interpreted as the work of sub adults and currently many researchers believe that this painting tradition started after the advent of pastoralism 2000 years ago in the south-western Cape (van Rijssen 1984, 1994; Manhire 1998; Meister 2003). If this is true, then the wide range of handprints distributed across the study region occurred in a much shorter period of time than the fine line tradition. Meister (2003) concluded that large numbers of hand prints at shelters such as those found in the Sandveld were executed by multiple individuals. Hand prints, in certain shelters, are therefore most likely associated with aggregation events such as initiation, involving mainly sub adults but also older and younger individuals. Hand prints may require separate treatment from other rock art to assess territories as they were probably the cultural product of a society with a different relationship to the landscape than the hunter-gatherers before them.

The mapping of the hand print tradition is worth reviewing briefly to update the situation since the last published maps more than 12 years ago (Map 5.4.5 & Figures 5.4.8-11). The new fieldwork has greatly increased the sample to the east and south-east of the Pakhuis. In addition to new recordings, the consolidation of records revealed a few sites such as the most south-westerly point recorded by Rabinowitz and his associates in 1961. Overall, the GIS exercise has neatly confirmed many of Manhire's mapping positions in 1998 with a decorated hand print 'outlier' in the south eastern area of the study region (Figure 5.4.12). Between 1983 and 1998, the Doring River was surveyed and this significantly shifted our understanding of the decorated hand print distribution. Remarks made in the early 1980s about the absence of decorated handprints in the CFB were overturned as they were found to occur in a number of places to the north and south of the Doring River.

After extensive surveys by eCRAG and others since 2005, we have failed to extend this distribution of decorated handprints to the south-east of the Pakhuis. The Cederberg Wilderness zone is currently



Map 5.4.4 Distribution of corrugated motifs and 'animals in boxes' in yellow dots.



Map 5.4.5 Distribution of plain hand prints in yellow dots and decorated hand prints in blue dots.

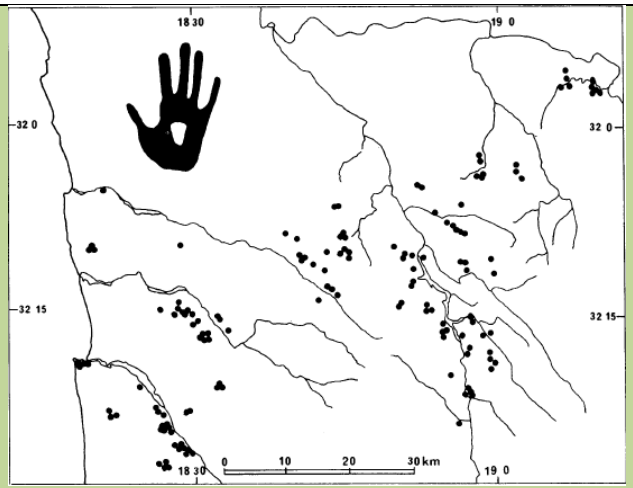


Figure 5.4.8 Distribution of plain hand prints as per Manhire et al (1983).

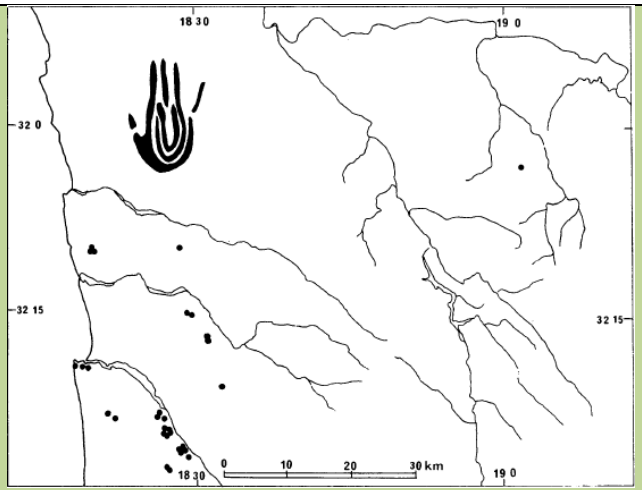


Figure 5.4.9 Distribution of decorated hand prints as per Manhire et al (1983).

Figure 5.4.10 Distribution of plain hand prints as per Manhire (1998).

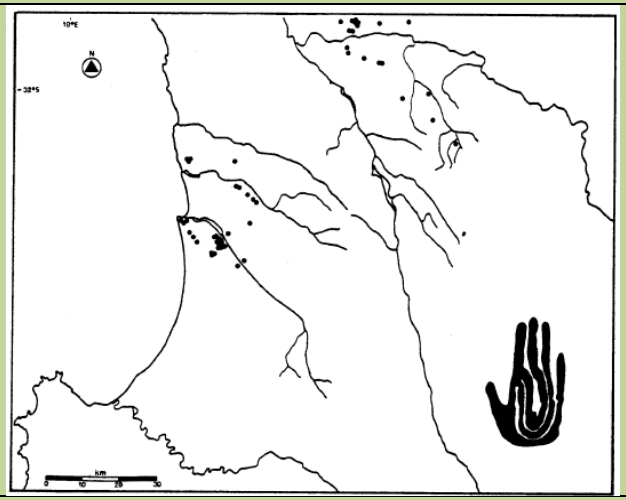
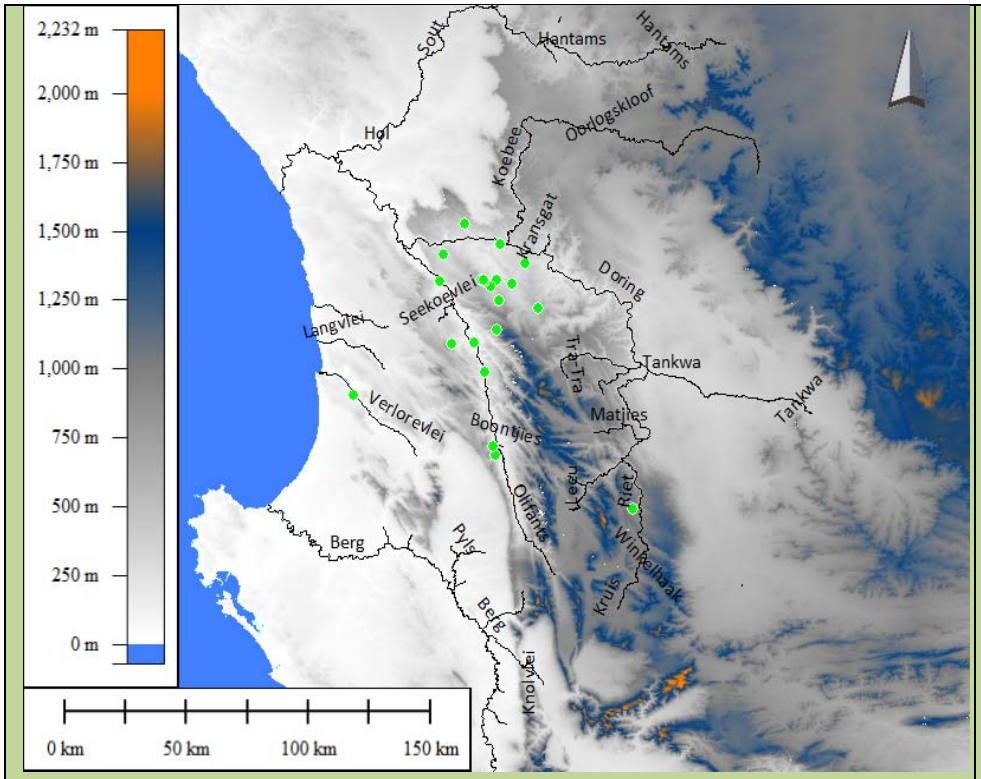


Figure 5.4.11 Distribution of decorated hand prints as per Manhire (1998).

Figure 5.4.12 Decorated hand prints to the south-east of the study area in the Swartruggens.

only fractionally surveyed but the data gathered thus far suggests that the more mountainous centre of the Cederberg was not an area where people made decorated hand prints. Conversely, plain hand prints were found throughout the area which could mean that they were painted for a longer period than decorated hand prints. The high number and concentrated distributions of decorated hand prints in the Doring River and Sandveld Zones suggest a strong connection between the coast and the CFB after the advent of pastoralism in the study area.

The final class of images analysed dealt with humans and their associated clothing and equipment. Manhire et al (1983) already mapped paintings which they classified as 'conflict scenes' that show only males or indeterminate humans with upheld weapons facing each other (Figure 5.4.13). In many cases arrows have been painted flying through the air and the images are almost always executed in a rather crude fine line technique. It is very common for these figures to be painted in highly active forms, on top of one another and holding objects which look like heavy clubs. These 'clubs' are almost exclusively found in this painting subset (Hunter's Cave is a notable exception to this). Other interpretations for these scenes could be valid other than the idea that they literally portray hostilities between people but this is not the focus of this discussion. The results of fieldwork since the 1980s have taken the sample from 4 sites to 21 or 0.93% of all sites (Map 5.4.6). Conflict scenes can no longer be seen as confined to the CFB, are widely dispersed and therefore do not suggest that aggregation activities exclusively occurred in the Olifants River Valley zone.



Map 5.4.6 Distribution of conflict scenes in green dots.

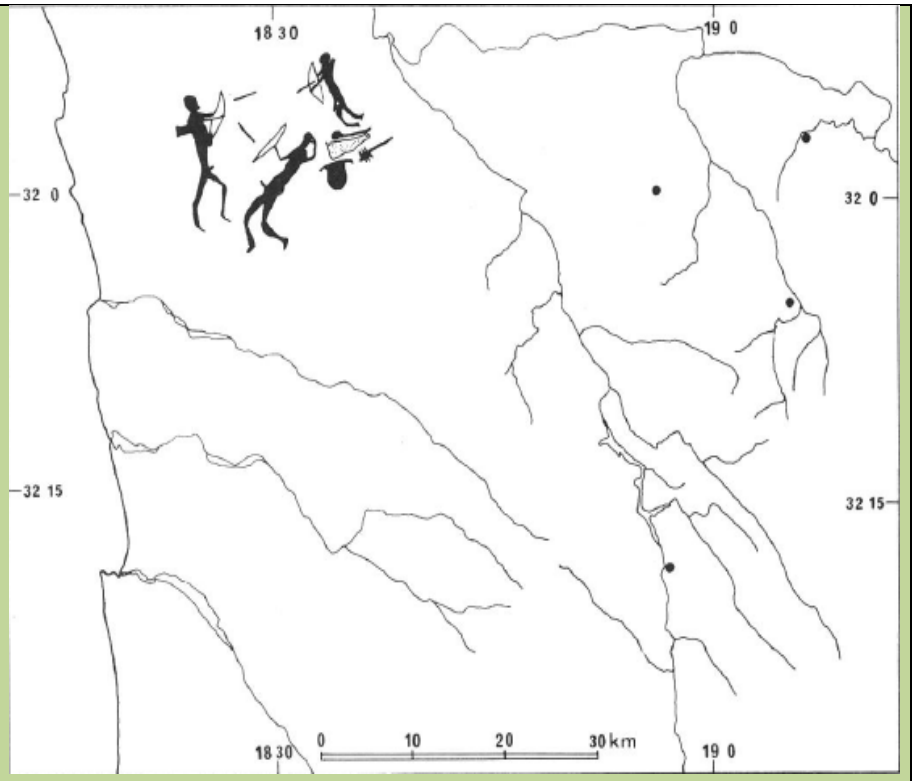
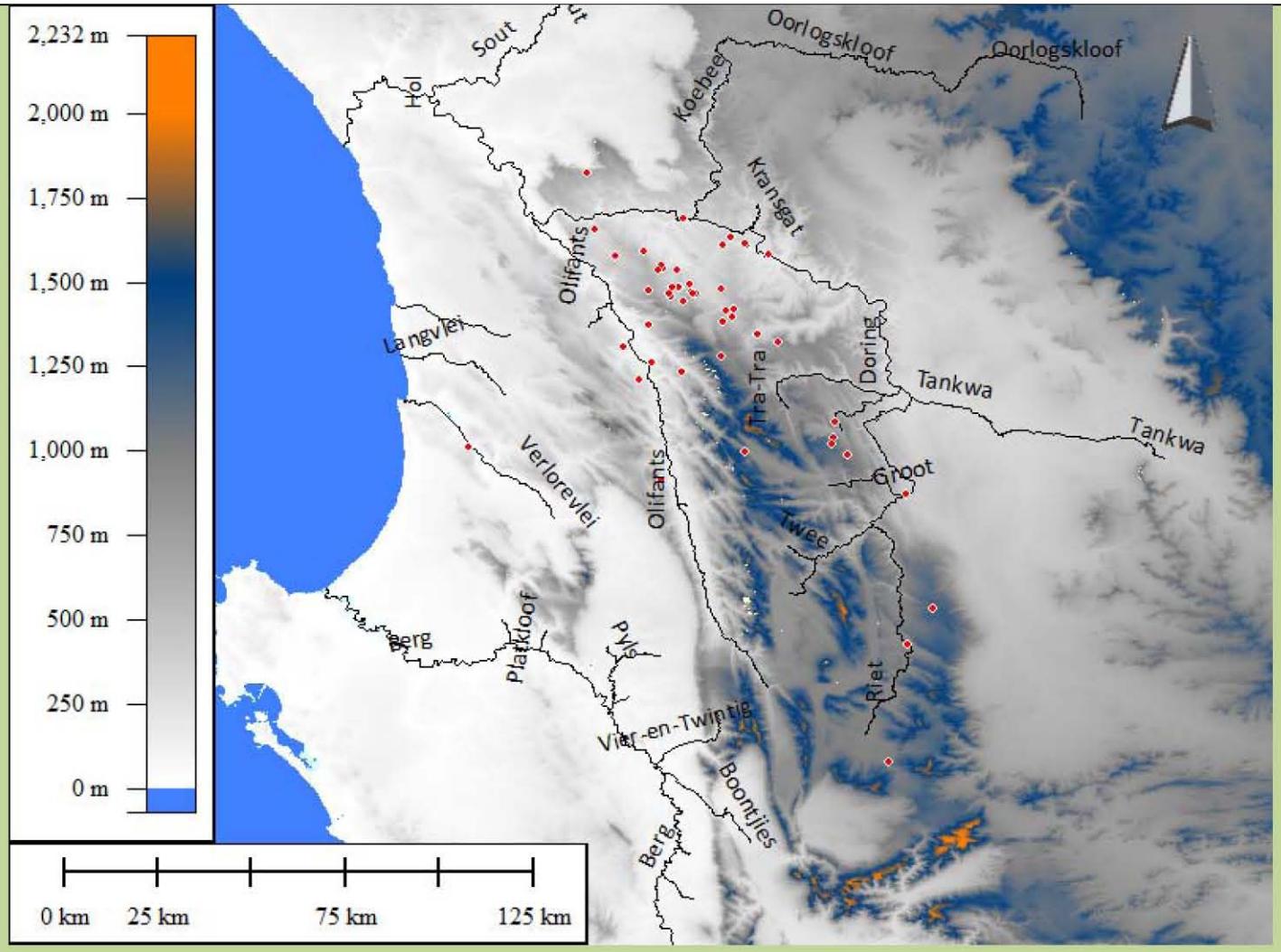


Figure 5.4.13 Distribution of conflict scenes as per Manhire et al (1983).

As already presented, paintings of humans cover the entire region and interesting hints at differences in the pattern of sexed humans were discussed. Most of the associated types of equipment namely bags, quivers, arrows, bows (including single curved and triple curved), sticks and digging sticks (showing the weighted bored stone) were found throughout the study region and no obvious clusters were identified. With the exception of a written site record with no photographs, the Sandveld did not contain any sites showing people painted with a skin cloak/kaross or apron shown in the side profile (Figures 5.4.15 & 5.4.16). This 'kaross' may of course be some other object but I classified it as a 'female kaross' as I did not find a single male with this item of possible clothing. Conversely the standard kaross (Figure 5.4.14) covering the entire upper torso down to the knees has been painted throughout the Sandveld and the CFB and it is likely many of these are males (Smuts 1999; Parkington 2003). A total of 53 sites were flagged with the female kaross (2.35% of sites) and the distribution map shows clustering in the Pakhuis, Doring and eastern Cederberg zones (Map 5.4.7).

These female karosses are generally painted on females in processions and this has been interpreted as women participating in the trance dance (Lewis-Williams 1981). The close correlation in the patterning of these sites with group scenes (Map 5.4.1) is therefore unsurprising since both sets of motifs are believed to be visual representations of ritual behaviour involving both sexes. The explanation offered by Manhire et al (1983) for the absence of these kinds of paintings in the Sandveld was that families and relatives did not aggregate in the Sandveld. The Sandveld was not viewed as a separate territory, but part of one system where the absence of certain paintings could be explained by the difference in landscape use during dispersal rather than aggregation episodes. As already mentioned, the data from this project have largely dismissed the idea of the Olifants River Valley as *the* aggregation area. Instead, a much more complex network of landscape use is evident (Parkington 1987) or we have to re-evaluate the validity of painted elements used to identify aggregation zones.

Overall the various layers produced in the analyses of the rock art did not support the changing east-west pattern mapped in the raw material record. The palimpsests created by multiple occupation episodes over a very long period of time obscure a range of different clustering patterns possible in the artefactual record. Rock art is not immune to this issue as many sites have been superimposed to such a degree that the details of the oldest paintings are impossible to make out. However, 84% of sites did not involve superpositioning and thus it is arguably more justifiable to tease out and compare motifs between rock art sites as opposed to undated open scatters of artefacts.



Map 5.4.7 Distribution of 'female kaross' paintings in red dots.

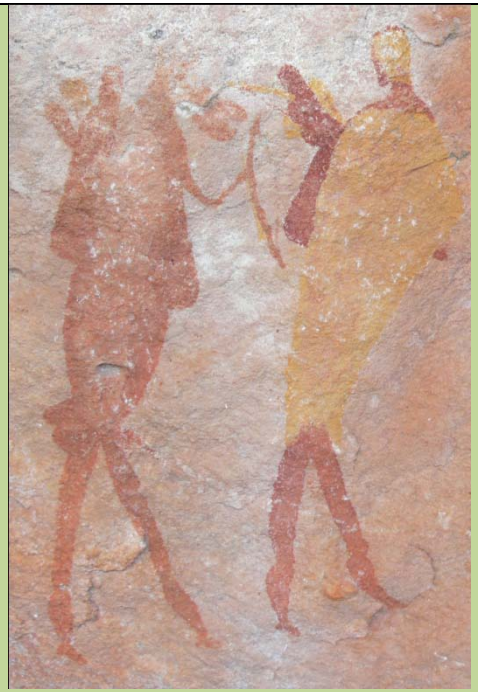


Figure 5.4.14 Probable male in yellow kaross near Clanwilliam.

Figure 5.4.15 Female karosses near the Doring River.

Figure 5.4.16 Female karosses in the eastern Cederberg.

A great deal of progress has been made in understanding the motives and context of rock art production since the 1970s. This has concomitant implications for research steered at landscape scale patterns (Hampson et al 2002). The distributional approach coupled to the interpretative models has extended our knowledge of inter-site relationships. Mechanisms for this have been successfully initiated elsewhere by others dealing with style, tradition, superpositioning sequence and absolute dates (e.g. Hampson et al 2002; Swart 2004; Mazel 2009). The construction of 'complex' motifs such as conflict scenes or group scenes was also shown to be more helpful in creating geographical clusters, but the definitions underpinning these and other combinations of imagery must first be preceded by robust theoretical clarifications.

Despite the grounding of some of the analyses presented here in the spatial aspects of the rock art motifs, certain implications for interpretation of paintings in the study area have emerged. These will now be discussed along with some of the shortcomings of the methods employed in using these categories to map the rock art motifs.

5.5 IMPLICATIONS OF THE RE-ANALYSIS, COMMENTS ON MEANING & RARITY

The system of analysis chosen for this project was largely shaped by the format in which data could be displayed using a GIS system. This meant that categorical data was required before spatial layers could be generated. The site reports, in their raw format, ranged from long descriptive accounts of the rock art (e.g. Rabinowitz) to others where categories and numerical data were part of the site report (e.g. eCRAG forms designed by J. Deacon and SARU forms designed by Manhire). Only limited filtering of the results of descriptive fields was initially possible. Consistency was limited between the collections as they were compiled by different people over a long period of time with different aims. Changing interpretations of rock art and conventionalisation on the part of the recorders have also impacted on the terms used to describe images within collections. For instance, prior to the 1960s, group scenes were not described as such.

The true/false tags featured in Figure 5.3.1 were created to harmonize the collections for this project and to produce the spatial layers without changing the content of the site reports. An audit was conducted alongside the analysis to list sites missing photographs or reports. The sites with only written records were less reliable in allocating matches to the categories. The many layers generated by this approach, while using the same data in some cases to Manhire et al (1983, 1985), Yates et al (1993) or Manhire (1998), are significantly different to previous work. They can be electronically arrayed in combinations with one another or with other characteristics related to the cultural material and physical properties of the sites.

The analysis also resulted in an alternative statistical summary of the rock art imagery as compared to the statistical data collected in the 1960s and 1970s (Maggs 1967a, 1967b; Vinnicombe 1967; Pager 1971; Lewis-Williams 1974). It was impossible to replicate the same statistical approaches taken by Maggs (1967a) and others to count the individual images within sites as the collections are fragmentary and the reports did not necessarily provide this information. The analysis of motifs from site to site was found to be feasible by choosing only generalized categories.

Here is an example illustrating the statistical differences between the analyses carried out in this project versus those by Maggs (1967a). Paintings of elephants or small antelope, often painted with few or single individuals per site, were given equivalence in my analyses to highly repetitive intra-site categories such as eland or people. The statistical results in this project therefore relate to the number of sites where any of the motif classifications were found rather than a reflection of the number of actual paintings made (unless otherwise specified).

Motif	Site Count	Percentage of Total Sites
Humans	1718	76.29%
Animals	1205	53.51%
Table 5.5.1 Humans vs Animals at an inter-site level.		

In Table 5.5.1, the total number of sites containing any human figure is listed along with sites containing any kind of animal. These have been chosen to compare the re-analysis to the intra-site results summarised by Lewis-Williams (1972) across multiple collections. The general dominance of humans over animals is apparent once again but a few unexpected trends emerged from this approach. Firstly, Maggs (1967a), who recorded paintings in a sector within the same study region as this project, determined that humans represented 75% of the rock art images in his sample of sites. The total of 76.29% for humans depicted across 2252 sites happens to be very close to his tally of humans at an intra-site level. Humans therefore comprise three quarters of all painted panels (at least in a sample area) and are found at three quarters of all recorded rock art sites in the south-western Cape.

53.51% of the sites contained at least one image of an animal, more than double the corresponding percentage (25%) when these images are individually counted (Maggs 1967a). This percentage increases if we set aside 6.31% of the total number of sites consisting only of hand prints (100 sites) or finger dots (42 sites). If one considers these motifs as part of an entirely separate tradition of painting (Yates et al 1994; Eastwood & Smith 2005) then animal paintings are found in 57% and humans in 81% of all fine line tradition sites. Almost as many sites containing human paintings

contain animal paintings and this attests to the strong symbolic connection between people and animals, especially antelope (Vinnicombe 1976) and elephants in the south-western Cape (Johnson et al 1959). When rock paintings are interpreted through the eyes of the last painters (Lewis-Williams 1972), this conclusion is fairly uncontentious as previous painting episodes were at their disposal in determining the placement and arrangement of their compositions. However, the high numbers of human processions (364 sites) and group scenes (95 sites) are provisional evidence warranting deeper assessment of this relationship between painted humans and animals. Not a single group scene analysed portrayed an animal within the confines of the 'scene'. Likewise, processions typically involve the repetition of either naked or kaross clad figures (Smuts 1999) and animals are rarely painted in-between the human figures. It would be very interesting to assess the superpositioning sequence in relation to these particular motifs to determine whether they were in fact painted as discrete scenes or whether animal paintings were executed simultaneously as part of broader 'scenes'.

Rules and conventions to painting were very important (Yates et al 1990). The fact that almost all of the paintings could be summarised in the categories listed in Figure 5.3.1 is indicative of the limited range of subject matter chosen for the rock paintings. This does not negate the realm of individual creativity. Here the perspective of analysis is different from a compositional approach to rock art. Arguably much of what we have learnt using the Bleek and Lloyd collection and the ethnographies would not have been possible had strong social conventions not existed. These general distribution percentages do not apply homogeneously to the entire study region but rather represent the end product when all sites are summarised. Local differences do exist (e.g. where animals outnumber humans (Trew 1984)) and these deviations may prove enlightening if pursued in more detail.

The following table (Table 5.5.2) summarizes many of the motif classes discussed above and shows the variability across the research area when 'zones' such as the Sandveld are constructed. Hand prints and finger dots are normally distributed. The contrast found in the decorated hand print category highlights possible changes which occurred within this tradition or emerging differential landscape use during the time of the hand print tradition. Trew's (1984) data was not digitised during this project but his published work includes tracings of decorated hand prints in the Hex River Valley area. This is probably what we would have expected given the Rabinowitz record to the south of the Swartruggens. Further surveys around Ceres and Worcester are likely to yield more decorated hand prints.

	Sandveld	CFB	Chi-squared	Reject null hypothesis Y/N
Total Sites	515	1737		
As % of all sites	22.87%	77.13%		
Humans	322	1396		
% of region	62.52%	80.37%		
Expected	392.8818828	1325.118117	16.34663352	Y
Animals	201	1004		
% of region	39.03%	57.80%		
Expected	275.5661634	929.4338366	25.8096655	Y
Hps & fdots	108	416		
% of region	20.97%	23.95%		N
Expected	119.8312611	404.1687389	1.389168515	
Decorated Hps	34	40		
% of region	6.60%	2.30%		
Expected	16.92273535	57.07726465	21.05347297	Y
Males	57	479		
% of region	11.07%	27.58%		
Expected	122.5754885	413.4245115	44.79193336	Y
Females	11	228		
% of region	2.14%	13.13%		
Expected	54.65586146	184.3441385	44.17854458	Y

Table 5.5.2 Chi-squared tests applied to certain motifs found in the Sandveld and the Cape Fold Belt.

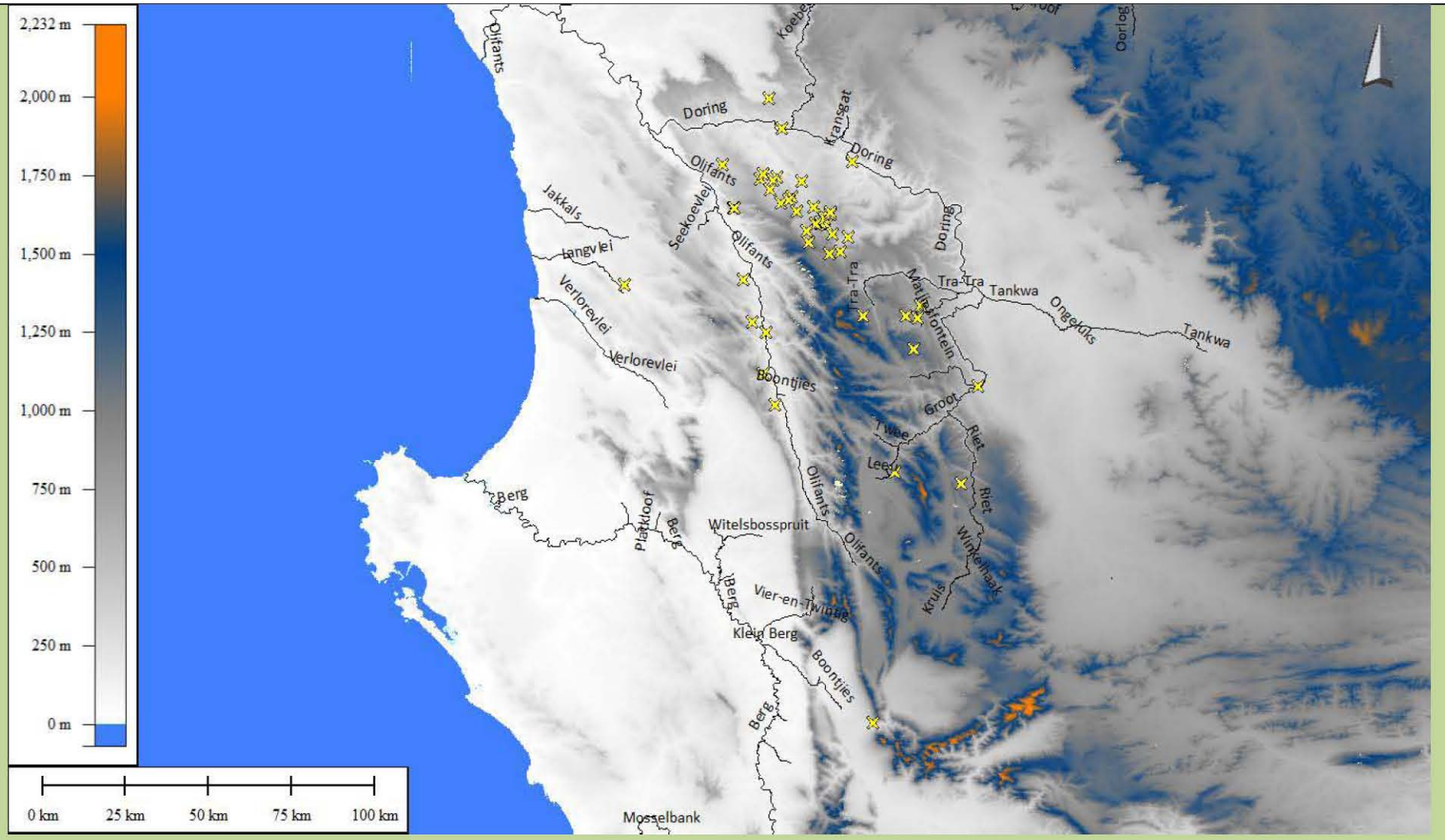
The re-analysis of the rock art in its spatial context supports previous findings on the numerical prominence of eland (477, 21.18%) listed in Table 5.4.1. Notably, small antelope, a generic category applied to rhebuck, grysbuck, duiker, klipspringer, steenbuck and others, also featured prominently (516, 22.91%). This result was unexpected and warrants a closer study of the small antelope category which hitherto has been relatively ignored in the study region. So-called 'net scenes' (Yates et al 1985) are particularly good examples which feature small antelope. 48 sites contained paintings of 'nets', up from 5 sites discussed in 1985. The distribution of these paintings extends to other areas of the CFB besides the Pakhuis, notably to the north, south and east, but only one doubtful match was found in the Sandveld (Map 5.5.1). The subject matter for these paintings is highly restricted

and only consists of nets, small antelope and in only a few instances, people. There are a handful of sites in this sample where only 'nets' were painted in a rather crude and thickly applied paint, often labeled as 'grids' by the recorders. These may in fact be examples of entoptic phenomena listed by Lewis-Williams and Dowson (1989) and not true net scenes.

There isn't a single site where eland, hartebeest or elephants have been painted in obvious interaction with a net despite the fact that these animals are highly representative of the region. The argument that they literally portray real nets used for hunting small game has convincingly been made (Manhire et al 1985) but the authors did not deny that metaphorical importance should be ascribed to these images - trance metaphors building on the everyday things people used have been shown to exist in many paintings (Yates & Manhire 1991). What is important here is that net scenes are highly conventional and often do not involve portrayals of humans. There may very well be a therianthropic element as yet undetermined in the animals shown in these paintings, but two sites illustrate the validity of treating nets as separate entities or true complex motifs in the fine line tradition.

A site commonly known as 'Nirdev's Net' features a lone small antelope and a highly detailed single net with supporting pegs featured on either end (Figure 5.5.1). This is the only 'scene' on the panel. The other site in Figure 5.5.2 was found in the eastern Cederberg and features all sorts of motifs, from hand prints to eland and even a group scene. However, the net scene has been tucked away on a sloping surface in a central overhang annex in the middle of the site away from all the other paintings (Figure 5.5.2). It is highly plausible that this scene was intentionally isolated from the other paintings and it features a net and a series of small antelope in association with the net.

The variations which exist in this motif largely revolve around the placement of the small antelope relative to the net as well as the number of small antelope the painter wished to portray. The adherence to this norm is striking across such a large area, and arguably so in other paintings of elephants, people and eland. Paintings of net scenes therefore offer us a sliver of insight into a particular painting event even where other images are present. They can thus be justifiably treated as coherent scenes when asking questions of the rock art that do not deal with the meaning of the entire panel as seen through the eyes of the last painter.



Map 5.5.1 Distribution of net paintings in yellow crosshairs.

Figure 5.5.1 'Nirdev's Net' net scene.

Figure 5.5.2 eastern Cederberg net scene.

There is a degree of variation in the style and tradition of net scenes – they have been painted in a thickly applied crude painted technique, some possibly finger painted, a crude fine line or stick figure technique, and others are done in the fine line tradition with detailed, well-proportioned images of small antelope and nets. It is therefore highly unlikely that the net scenes were painted by a single individual in the study region and they seem to transcend stylistic barriers not found in many other motif classes. The assumed linkages between style and cultural phases have been criticized (Lewis-Williams 1984) but some promising insights have been offered in the Drakensberg in returning to this aspect of rock art (Swart 2004; Mazel 2009). More work should be taken up on this topic in the Western Cape. For example, do the stick figures found in 'conflict scenes' belong to the fine line tradition at all?

Rarity

Patterns of idiosyncratic and geographically isolated motifs rarely turned up in the analysis, but a cluster of feline paintings cropped up in the Swartruggens area. These images could provide a convincing platform on which to identify an individual painter or at least a close-knit group of painters at work in the past. These three sites were all found within 4km of each other (Figures 5.5.3-5.5.5). 28 indeterminate felines were found in other areas of the study region but there wasn't a single example which looked anything like the felines found in the Swartruggens. Interestingly, the position of the tail is different in all three paintings, but the heads of two are similar. The spatial mapping and the identification of these motifs as 'rare' across 2252 sites have opened up some interesting questions.

Firstly, are these paintings of leopards or cheetahs or perhaps both species? Cape leopards are still found in this area today and their movements are being tracked by the Cape Leopard Trust (Martins 2011). However, the Swartruggens is also on the margin of the Ceres-Karoo and the Koue Bokkeveld where large numbers of springbok (Skinner 1993) and other ungulates were found historically. These animals would have been within the ecological niche of cheetahs now extinct in the area. Cheetahs are diurnal as they hunt during the day, and therefore they were more easily seen by humans than leopards. This ecological explanation does not explain the meaning of these paintings, but rather offers a possible clue as to which cat species was painted and why these paintings are found only in this sector.

Secondly, if these paintings weren't painted by the same artist or group of artists, then we have an example of a motif painted at one site that has probably influenced the creation of another similar subject at a different site. Alternatively, we may be dealing with a phase spanning more than one generation of painters where the cheetah or leopard motif gained and held entry into the selectable range of paintable subjects but only when painters were present in this sector – thus linking the landscape setting and subsequent subject choices to this motif.

Figure 5.5.3 Swartruggens feline.

Figure 5.5.4 Swartruggens feline.

Figure 5.5.5 Swartruggens feline.

These scenarios do not explain the rarity of these motifs, limited to a specific area. It is much more likely that these idiosyncratic paintings were painted in a short period of time referencing certain

Figure 5.5.6 Eland paintings, Olifants River area.

Figure 5.5.7 Eland painting, Olifants River area.

Figure 5.5.8 Eland painting, Pakhuis area.

Figure 5.5.9 Eland painting, Olifants River area.

events. These felines are not like eland which have been repeated over and over in much the same fashion by many painters across a very wide area.

Four sites containing shaded polychrome eland paintings were flagged during the course of this study. Shaded polychrome images are extremely rare in the south-western Cape (Pager 1973). The most interesting thing about the sample of sites with shaded polychrome paintings in this archive is that they all occur within 9 kilometres from one another. The technique applied is very uncommon in the region and the geographic isolation of these paintings strongly suggests that these eland were painted by the same person. The appearance and anomaly of this technique in the south-western Cape deserves its own study. However, the presence of shaded images is not limited to these sites and fieldwork in the eastern Cederberg has revealed more images (mainly shaded humans) or bichromatic shading of animals such as eland.

Touched on earlier, the set of baboon paintings documented thus far (Map 5.4.3 & Table 5.4.1) are widely dispersed in the study region and comprise 0.84% of the sites (19 sites). They differ markedly from the felines mentioned above in that they are not isolated to a small area. Baboon paintings are rare and appear to be paintings executed in once off events at sites rather than having patterns of accumulation found in eland or humans. Two separate patterns are evident in the distribution – the degree of dispersal of the sites points to the fact that it is highly unlikely that all the baboons were painted by an individual painter. Secondly, a cluster of sites, almost a quarter of the sample, occurs in the Verlorenvlei core area. I've already shown that something different to the rest of the Sandveld occurred in this particular locale, and baboon paintings may have been the work of an individual or group of individuals here. One of the paintings is shown in Figure 5.5.10.

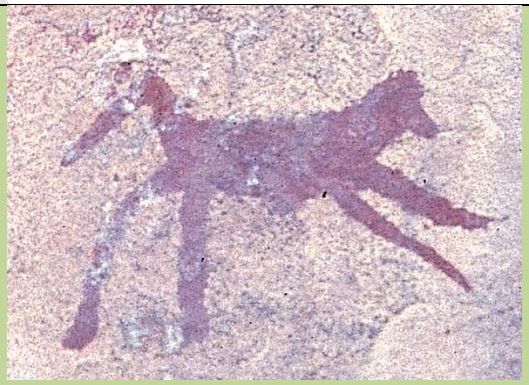


Figure 5.5.10 Sandveld baboon.

Two site reports listed 1 baboon each and another listed 2 baboons. Despite the fact that some of the paintings at these sites were photographed, no photographs were taken of the baboon images at these sites. The instance of only one or two baboons per panel is consistent with most of the other sites in the CFB, and only four sites exceeded two per site. 50% of the sites had 1 single baboon (10 sites), 26% had 2 baboons (5 sites), and 21% had more than 2 baboons per site (4 sites). Once the analysis was taken a little deeper, it was revealed that one baboon was finger painted, others were rather crude and similar to the stick figures, while some were clearly painted in the fine line tradition. Therefore there are consistencies in placement and number (1 or 2 baboons per site in general) but also a great deal of variation in technique and geographical patterns.

We know that people and baboons shared the landscape for a great period of time and hunter-gatherers were certainly not strangers to baboons. However, baboons played only a small role in the painted expression of their cosmological system. The clustering in locales most probably points to the work of individuals who chose to paint baboons during a limited time period and the great deal of variation in technique further supports the highly individualistic choices made to execute these images.

No of baboon paintings	Zone
1	Sandveld
1	Sandveld
2	Sandveld
1	Sandveld
1	CFB
2	CFB
1	CFB
1	CFB
1	CFB
4	CFB
2	CFB
1	CFB
1	CFB
2	CFB
2	CFB
?>2	CFB
6	CFB
3	CFB
1	CFB

Table 5.5.3 Detailed list of sites with baboon paintings.

Rare images or 'rarity' in rock art per se is a product of the quantitative and distributional approaches. These categories can easily be shifted or redefined depending on the questions of the researcher (Lewis-Williams 1984) – for instance by focusing on some characteristics such as the position of the tail in the feline paintings reviewed or the posture of a figure (Dowson 1989). For this reason, subject matter is only an entry agent to discuss rarity as more complex motifs can be constructed from a range of arbitrary definitions. Group scenes, for instance, do vary from site to site and the definition of these motifs has to be qualified in more detail than an eland. As one moves from the level of a subject to a whole scene, the potential for statistical splitting increases dramatically. Firstly, it is very difficult to define a scene unless one takes the perspective of the last painter (Lewis-Williams 1972). Secondly, besides the hand prints and possibly finger dots that were painted during group activities (Manhire 1998; Meister 2003), the majority of the rock art was probably painted by individuals expressing their own interpretation of a trance or other experience. Despite this individuality, the distributional approach has shown that the *subject matter* invoked by these individuals was highly regulated and conventional.

The method of analysis chosen for this project proved to be very useful in ring fencing rarity. For instance, a procession of ten kaross-clad figures at one site may be the only one in the study area with that exact number of figures if other sites had 1-9 figures or greater than 11 figures. Statistically such a site would be flagged as 'rare' under that definition. Instead, the site based method created equivalence between sites holding any number of kaross-clad figures and it was this motif 'kaross-clad' which proved to be widespread. This narrowed the range in which variation could be mapped but at the other end of the scale we would simply be mapping individual variation between panels. The mapping of idiosyncratic motifs such as the felines in the Swartruggens or the baboons has isolated potential sites where the work of an individual has been found at more than one site – a much more difficult task when comparing inter-site imagery selected from highly conventional motifs such as the eland. This interplay between convention and idiosyncrasy can be used to assist interpretation of meaning by allowing the viewer to identify and move through imagery which is deeply embedded and organized at the level of society through to highly individualistic and rare subject matter.

CHAPTER SIX

CONCLUSIONS & RECOMMENDATIONS

6.1 ROCK ART MOTIF DISTRIBUTIONS AND THE RAW MATERIAL 'BOUNDARY'

The primary research concern of this project was the interpretation of patterning in archaeological site distribution data in the greater Cederberg area with rock art as the primary layer. Ideas stemming from the seasonal mobility hypothesis (Parkington 1972, 1976, 2001), aggregation and dispersal model (R.B. Lee 1979; Silberbauer 1981; Manhire et al 1983; Wadley 1989; Hall 1990) and territoriality (Sealy and van der Merwe 1986, 1988) were assessed to situate the analyses within a broader framework of practice. A number of challenges were inevitably faced when dealing with disparate collections spanning over 50 years of archaeological recording and the adopted approach is by no means sufficient to reach a robust conclusion on these complex issues. Given the aims and time available to the project, some promising directions have been stimulated on the platform created by this database system.

The bulk of the analyses presented in the previous chapter were carried out in order to compare the distributions of rock paintings to those of the raw materials used in the manufacture of stone tools. Categorical data had to be created for the painted motifs but existing categories for stone tools were already available from the site reports. Once the data had been mapped on a GIS system, a raw material boundary or interface zone appeared to exist between silcrete and hornfels tools around the Olifants River area. This change from silcrete to hornfels has also been well documented by others from excavated sites in the region (Smith & Ripp 1978; Parkington 1980; Mazel & Parkington 1981; Manhire 1984; Mackay 2009). In other areas such as the Northern Cape, preferences for different raw materials by neighbouring Flat and Grass Bushmen groups were identified (J. Deacon 1996) and therefore this research may lead to similar interpretations in the Cederberg area.

Members of the Spatial Archaeology Unit (SARU) synthesized the results of an extensive open and excavated site recording programme in the Sandveld and the Cape Fold Belt to suggest that the Olifants River Valley was an aggregation and dispersal zone (Parkington 1976; Mazel 1978; Mazel & Parkington 1981; Manhire et al 1983; Parkington 1987). The idea was largely grounded in the interpretation of seasonal signatures apparent in faunal and botanical material from excavated sites (Parkington 1972, 1976, 2001) and a pattern of summer occupation of the Olifants River Valley was suggested by the evidence. Rock art was combined with this model to test whether people were painting different themes in different places. Motifs depicting figures in groups of fifteen or more

individuals, ‘conflict scenes’ and ‘group scenes’ were understood as markers of aggregation events as they apparently showed behaviour recorded in the ethnographic accounts on those kinds of occasions (R.B. Lee 1979; Silberbauer 1981). The sites containing these motifs were manually mapped and the Sandveld showed a clear absence of these motifs.

The distribution of these motifs was updated during the course of this project and their relative absence in the Sandveld was confirmed. Significant clustering of these images appeared in the Agter-Pakhuis and other patterns which may support aggregation or concentrated painting activity were found in a limited area along the Verlorenvlei. The analyses therefore do not support the idea that the Olifants River Valley was an aggregation area when replicating the same argument made by Manhire et al (1983). Other explanations are now required to understand this patterning and the aggregation area may in fact lie further to the east in the Agter-Pakhuis. The problem with using rock art to debate these topics is the lack of a detailed chronology of the paintings and this still poses challenges to future work organized along the lines of this project. It may also be incorrect to define these aggregation areas by the presence of these rock art motifs and the complete absence of hornfels in hundreds of open sites in the Sandveld is indicative of a very complex picture of settlement systems that does not necessarily support the expectations of these models.

Promising initiatives in dating rock art have been attempted here and elsewhere (Van der Merwe et al 1987; Mazel 2009; Hoerle et al 2010) but attempts at building up a rock art sequence are still a long way from the progress made with the lithic sequence. Work on the order of image superpositioning (Mguni 1997, Mguni in prep.) in the south-western Cape holds great potential when read in combination with the mapping completed for this project. Methodological issues will arise when attempting to interpret the paintings through the lens of ‘change’ (Pearce 2006, 2010) but this has to be done for rock art as we have already observed tremendous changes in the choices of occupation sites, lithics and diet by hunter-gatherers during the Holocene (J. Deacon 1972; Parkington 1980; Manhire 1984; Parkington 1987; Mazel 1989; Hall 1990; Jerardino 1996; Mitchell et al 1998).

In addition to the distributional mapping of previously analysed motifs, almost fifty new categories were created. The ease with which these could be arrayed on a GIS system was demonstrated and some intriguing results were produced. The absence of female figures in some areas of the Sandveld was presented and a project aimed at verification of this issue is required to eliminate bias from incomplete records. We have preliminary evidence for marked contrasts in painting behaviour across the region and these patterns appear to lie at a deeper level than the variation resulting from

choices made by individual painters. The hypothesis that the Sandveld koppies were only heavily painted during times of increased stress *after* the advent of pastoralism 2000 years ago (Manhire et al 1983; Manhire 1984) must be tested against these records.

The importance of time and place (Parkington 1980, 1987; Manhire et al 1983; Asmus 2003) was also shown to extend to other areas of inquiry. For instance, the connection between the hand print tradition and pastoralism (Manhire 1998) is essential in understanding the statistical distribution of plain hand prints which does not differ significantly between the Sandveld and the CFB. This very wide distribution over a supposedly shorter period of time than the fine line tradition is perhaps what one would expect from a highly mobile pastoralist economy (Parkington 1987) but the determination of the authorship of plain hand prints remains elusive (Manhire 1998). The location of decorated hand prints differs significantly between the Sandveld and the CFB. Manhire (1998) therefore tentatively ascribed decorated hand prints to pastoralists and not a single decorated hand print has been found in the eastern Cederberg despite hundreds of recordings. A future assessment dealing with decorated hand prints and the total number of hand prints per site will produce a spatial layer of 'mega hand print sites' and could potentially pick up on the debate around the movements and belief systems of hunter-gatherers influenced by pastoralism versus people engaged in permanent herding.

The site-based approach to flagging rock art motifs resulted in a statistical dataset that highlighted the range of subject matter. For instance, the convention of painting multiple human figures in a procession scene was given equivalence to a single baboon painting. Interestingly, the sample of all human images counted by Maggs (1967a) happened to correspond closely with the total number of sites featuring human paintings, but notable differences emerged as soon as animal paintings or more specific classes were selected. Zebra, ostrich and cheetah paintings appear to feature more prominently in the eastern Cederberg and Swartuggens than to the west of the Olifants River. This approach combined fairly seamlessly with the GIS layering of distributions and the disparate collections limited further statistical possibilities one could explore. Detailed recordings of the number of individual images would still be required in order to unpack the patterning behind differential site use such as the imagery in the decorated hand print class.

Mechanisms for interpreting idiosyncratic imagery emerging from the archive were also suggested in the previous chapter. The identification of individual artists was proposed in the discussions of localized patterns of cheetah, baboon and shaded polychrome paintings and these results could be taken up further to elucidate their relationship to the ethnography. Finally, social choices for

painting in particular landscapes such as 'mountain' versus 'plain' are on offer using this large spatial database to overcome the limitations of previous efforts that were confined to particular valleys (Asmus 2003). The Verlorenvlei core area and the Piketberg are two sub locales in particular that warrant a closer look.

6.2 CONTRIBUTIONS MADE BY THIS PROJECT

The complete digitisation of the photographs, slides and site reports has facilitated research to take place such as the investigation of the distribution of rock art motifs in the region. Other researchers can now pose a multitude of questions on this archive in easier ways than before. Eleven sources of archaeological data of varying sizes and levels of digitisation requirements were incorporated into one system and every effort was made to eliminate duplications in the records using the combination of GIS and the digital database tools.

The resulting archive provides users with the ability to draw on all the information available in one digital space. The SARADA archive administered by the Rock Art Research Institute similarly consists of a large database of digital rock art imagery. The SARADA archive allows internet access to users to view images of rock art and details pertaining to the name of the site, project and source of the imagery. The database compiled during my project contains all the information gathered including the complete site reports but is currently only in a standalone format which is not networked or available on the internet.

In addition to the site report and photographic archive, the areas searched by previous contributors were digitised on the GIS system to enable future researchers to better identify gaps requiring further surveys. This feature translates across to heritage management as sites located during research work are also relevant to contract archaeologists assessing the impact of development projects on archaeological material. I was able to demonstrate its use at Heritage Western Cape and the mapping of graffiti presented in chapter five is especially relevant to practitioners involved in prevention and cleaning of graffiti from rock art sites. The additional digitisation of sites recorded in Archaeological Impact Assessments largely augments the work done by Jakavula (1999) and Kaplan (1993) and much greater use of this digital system has been offered as a way forward in archaeological site management in the Western Cape (J. Deacon et al in prep.).

In addition to the digitisation, archiving and analysis of previously recorded archaeological sites, more than 300 new recordings have been made since the beginning of 2008, especially in collaboration with the eastern Cederberg Rock Art Group (eCRAG). These surveys have opened up

areas that received less attention in the past than the Olifants River, Pakhuis, Doring and Sandveld zones and more sites are being added annually as the eCRAG project continues. A number of observations such as the unexpected absence of decorated hand prints in the eastern Cederberg have been made and better linkages between the Swartruggens, the Koue Bokkeveld and the rest of the Cederberg are being established. The first sites in the study region with symbolic engravings or rock markings were also recorded during these surveys (Wiltshire in prep.).

6.3 THE FUTURE OF THE DATABASE

Pursuit of more detailed research into the preliminary findings outlined in this project is already underway but the database is currently in standalone form and is not ideally formatted to provide access to other researchers. As there is already a demand for access to the tools and information contained in this archive it will be imperative to convert the database into a secure system which can allow sharing of information, ideally using web-based software such as the SARADA archive. The protection of site location information (J. Deacon 1999a) will be the main security requirement in this system.

The failure to adopt previous databases in the past has already been discussed, but a window of opportunity lies before us now that the digitisation of such a large volume of sites is already behind us. The conversion of this database to an online system will only be successful if it provides a service that archaeologists or other potential users need. Furthermore, intellectual copyright and the cost of hosting such a system are major concerns. Thankfully there are already thousands of examples of successful online archives where these factors have been addressed.

The ongoing eCRAG programme of recording archaeological sites will add many more records to the archive in the coming years and older recordings falling within the eCRAG survey areas have been systematically corrected. Re-recordings will have to be carried out in the Sandveld as digital photography and GPS devices were not available in the 1980s. Other collections of sites recorded by Anderson (1996) at Kagga Kamma and Hollmann (1993) in the Koebee should also be merged into the database as they are geographically located in the same area as the rest of this archive. The records at the Iziko: South African Museum will also yield additional sites currently missing after this project such as the many shell middens recorded along the coastline. The database itself must also be updated to include other layers of archaeological site recording such as open site sampling (Manhire 1984) and excavations in the region so that the GIS system can be used to generate archaeological distribution layers currently not available using this archive.

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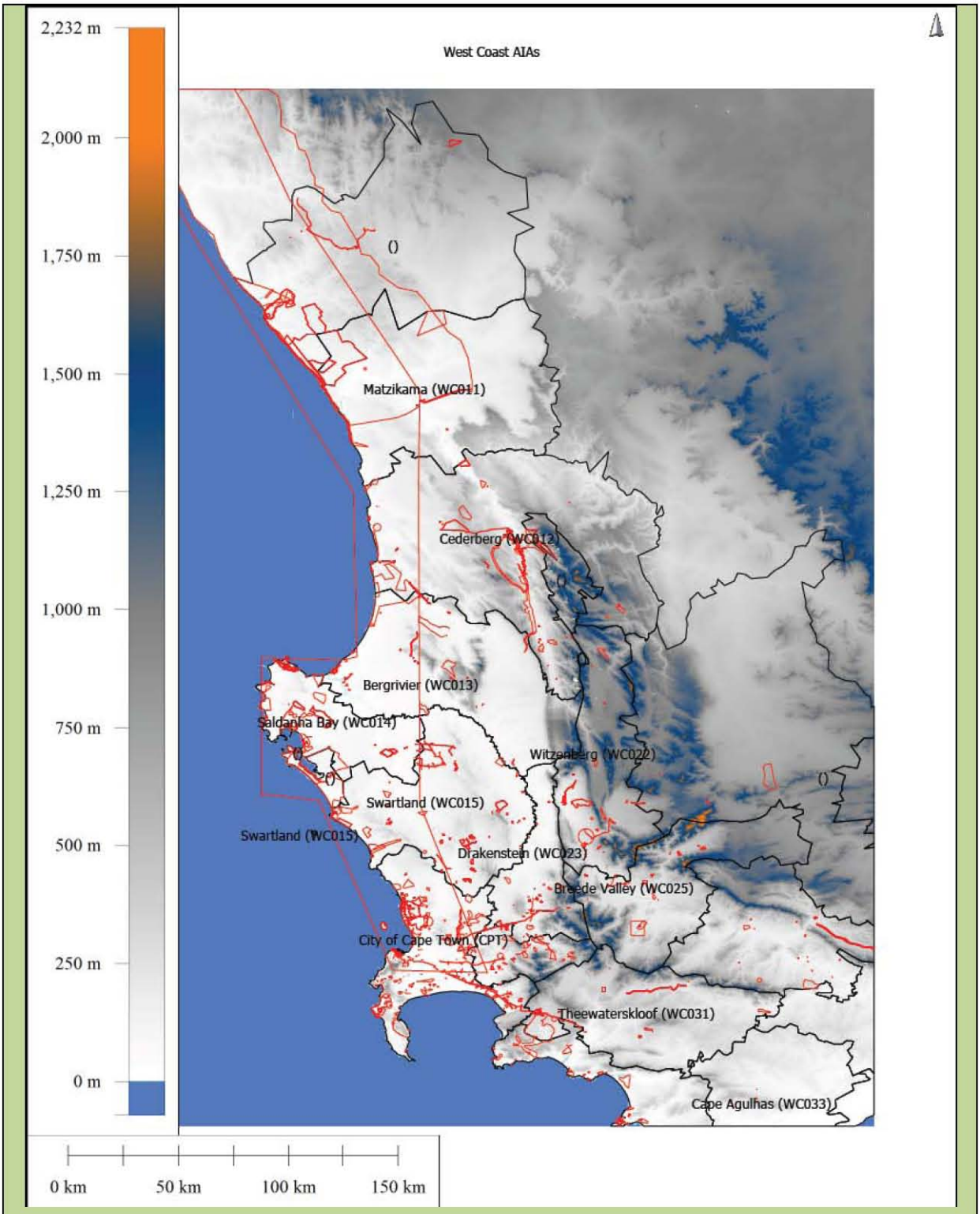
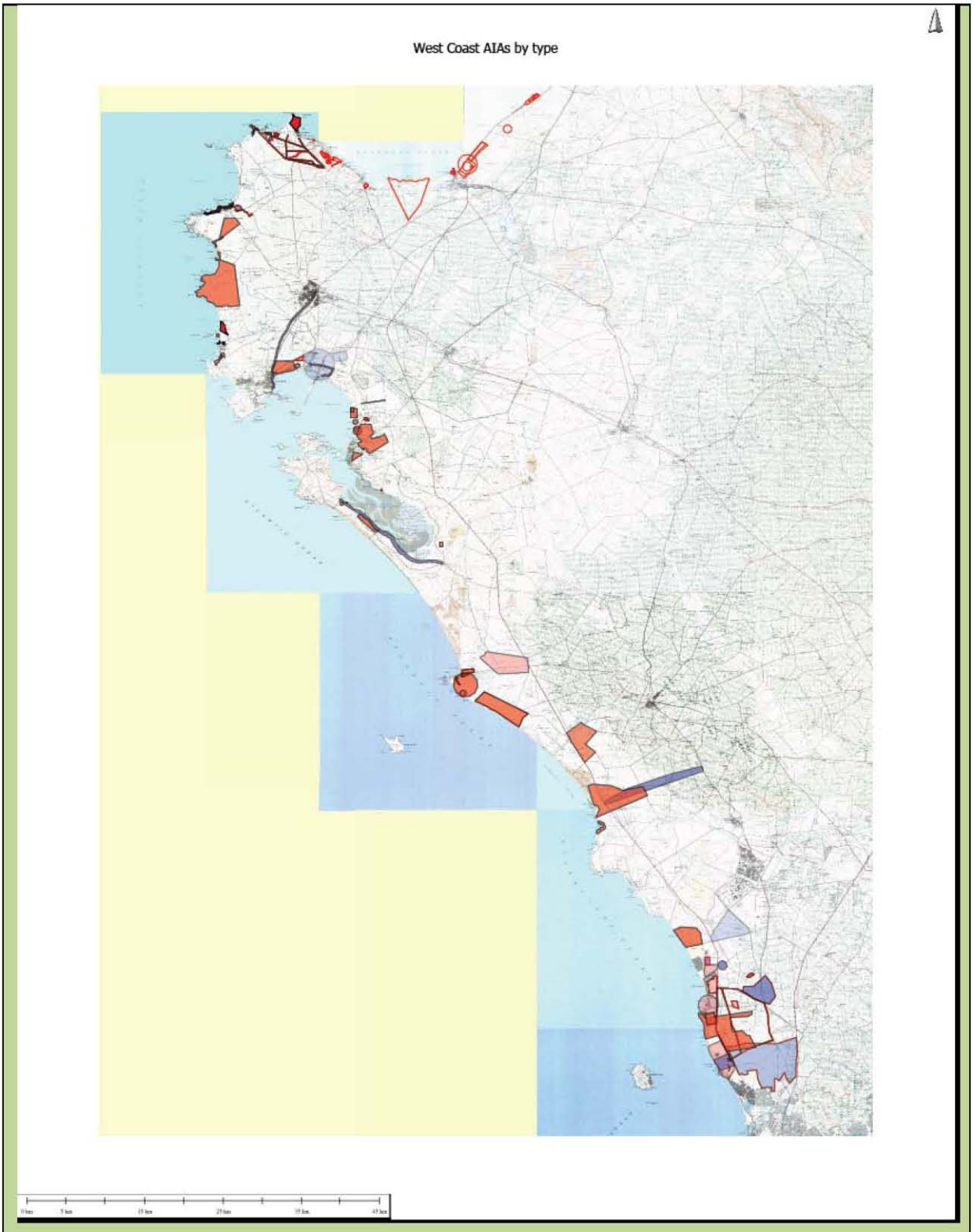
APPENDICES

APPENDIX A – MAP OF WEST COAST AIAS



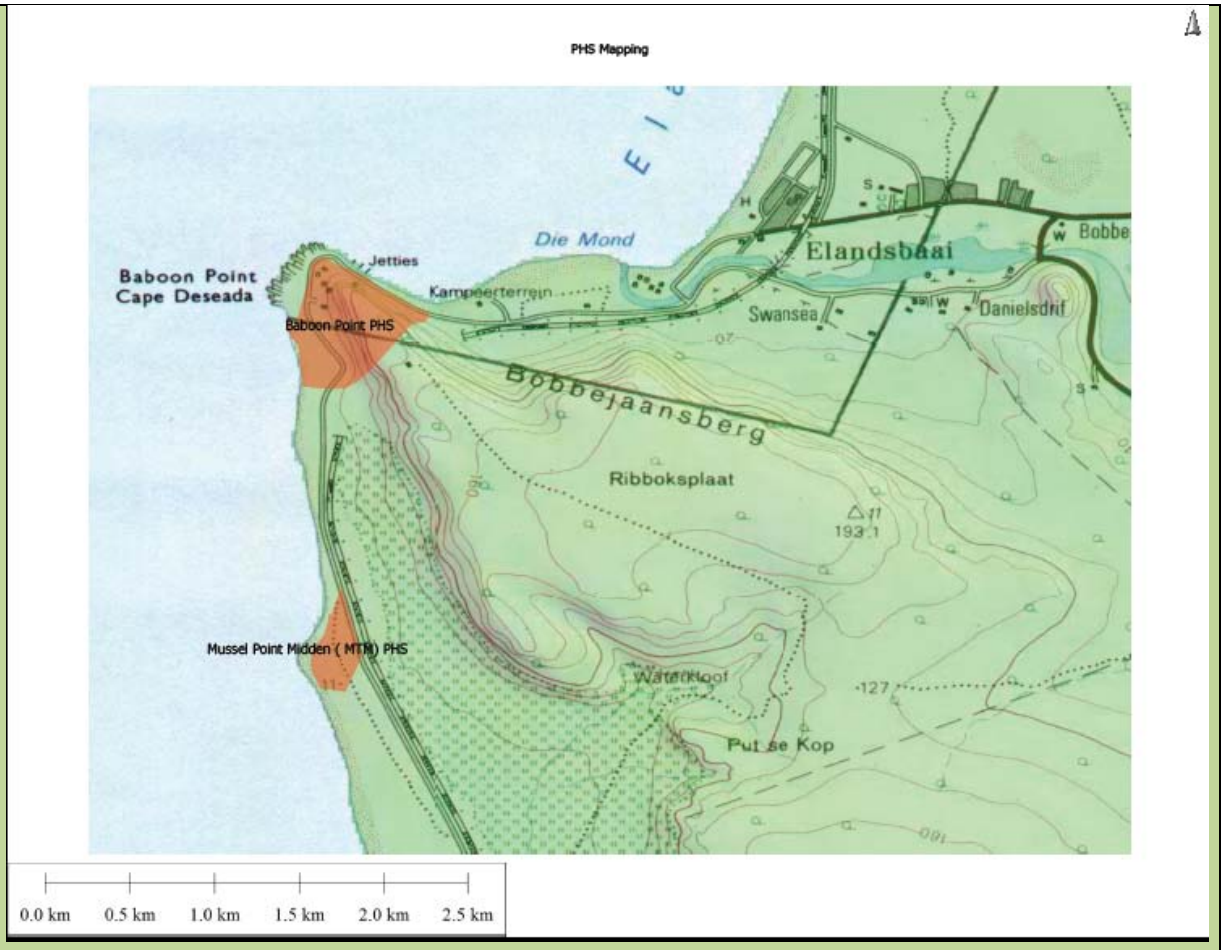
Appendix Map 1. Mapping done at HWC and SAHRA showing properties surveyed for archaeological sites during Archaeological Impact Assessments (AIAs) along the West Coast of South Africa.

APPENDIX B – MAP OF WEST COAST AIAS BY TYPE OF DEVELOPMENT



Appendix Map 2. Map showing AIAs by type of development application. Property development in shades of red, mining and infrastructure in shades of blue.

APPENDIX C – MAP OF PROVINCIAL HERITAGE SITES NEAR ELAND'S BAY, WESTERN CAPE



Appendix Map 3. Map showing the boundaries of two archaeological Provincial Heritage Sites declared by Heritage Western Cape in 2009.

APPENDIX D – EXAMPLE OF A SITE RECORD REPORT PRODUCED FROM THE DATABASE SYSTEM

Archaeological Site Report		Site No	MELK10
Project	eCRAG - Voelvlei	Recording No	2931
		Date	21/03/2009

General Information							
Full Site Name	Common Name		Owner				Map Sheet
Melkboom 10	Eland		Louis Melis				3219AD
Physical Site Type	Size (metres)	Width	Depth	Height	Length	Breadth	Likely Age
Overhang		15	5	10			
Featuring							
Rock Art, Artefacts							

Directions to Site
Comments on Site
Large obvious site higher up on west side of kloof above waterfall
Other Notes

Artefactual Content
Stone Artefact Types
Non-Stone Artefacts
Other Artefact Info
Notes on artefacts

Details of Deposit	
Depth	Contains
Deposit Comments	
Disturbance	

Rock Art Summary
Tradition(s)
Fine Line, Finger Painted
Damage
Equipment
Bags, Quivers
Abstract Imagery
Dots, Lines, Smears

Archaeological Site Report

Site No	MELK10
Recording No	2931
Date	21/03/2009
Project	eCRAG - Voelvlei

Rock Art Image Counts

Estimated No of images	No of 2m Panels	Red	Black	White	Yellow	Hand prints plain	Hand prints decorated
27	5	24			3	5	

No of finger painted	No of Bichrome	No of Polychrome
	2	

Indeterm Humans	Males	Possible Males	Females	Possible Females	Therianthropes	in Processions
7						

Small antelope	Eland	Hartebeest	Elephants	Med-large antelope	Sheep	Zebras	Felines	Ostriches
	2			1				

Rhino

Verbatim Rock Art Description

At least 5 plain hps
5 'm' shaped images on left - tails?
Series of finger daubs
yellow eland torso
red animal in close association with eland torso
Very clear eland with white head and tuft FR
just above FL animal in red - hippo? Or eland?
Indet animal FR
indet animal FR with upright Platberg tail
another indet animal FR with similar tail
2 large (at least 50cm) yellow kaross red bag figs FF
indet animal
2 humans fl, both with equipment
2 faint humans leaning left
human fig dark maroon
red finger daubs/dots below on right of shelter

End of Report