THE ARCHAEOLOGY OF A ROCK SHELTER AND A STONE CIRCLE AT KUIDAS SPRING, NORTH-WEST NAMIBIA

by

ANZEL VELDMAN

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Summary of the study

Stone circle open-air settlements occur in Namibia and South Africa. Stone circles were occupied during the past 2000 years. It is during this time that livestock and pottery reached southern Africa *via* a process of either migration/diffusion or both. In southern Africa people have different subsistence strategies such as hunting, gathering and/or herding. In an anthropological context it is sometimes possible to differentiate between people based on linguistics, settlement layouts and ideology. Prior to the introduction of domestic goats/sheep and pottery, people with hunter-gatherer practices inhabited southern Africa. However, to differentiate between the 'original' hunter-gatherer population, immigrant herders and hunter-gatherers that accepted livestock based on the archaeological record remains challenging. It has been proposed that hunter-gatherers abandoned rock shelters after acquiring caprines and built stone circle settlements to have more space for their flocks. Kuidas Spring is an archaeological site with rock shelters, stone circles, cairns and rock art. I excavated one rock shelter, a stone circle and a cairn, all features date within the last 2000 years. I conducted a typological and technological analyses of the lithics and ostrich eggshell beads. Based on the outcome there seems to be no differences between artefact assemblages. In addition no remains of caprines or cattle were found. The current evidence from Kuidas Spring suggest that it was a seasonal encampment that could have been utilised by both hunter-gatherers and herders, the latter probably reached Namibia through a process of migration and diffusion.

TABLE OF CONTENTS

List of tables

List of figures

List of abbreviations

KS1 -	Kuidas Spring site 1
KSISC -	Kuidas Spring site 1 surface collection
KRS1 -	Kuidas rock shelter 1
KRS2 -	Kuidas rock shelter 2
KSC14 -	Kuidas stone circle 14
KSC17 -	Kuidas stone circle 17
KSC19 -	Kuidas stone circle 19
KSS3 -	Kuidas cairn 3
OES -	Ostrich eggshell
OEB -	Ostrich eggshell bead
NISP -	Number of identified specimens
AMS -	Accelerator mass spectrometry
BC -	Before Christ
AD -	*Anno Domini* in the year of the Lord
BP -	Before present
H_o -	Null hypothesis

Chapter 1

Introduction

1.1 Research context and location

Namibia covers an area of 823,680 km^2. The country is 1320 km long and 1440 km wide. The Namibian coastline, located on the Atlantic Ocean, stretches some 1570 km. The country's environment has been arid for the past million years due to its location between two climate systems, namely the Intertropical Convergence Zone, which brings in moist air from the north and the Subtropical High Pressure Zone, which pushes the moist air back with dry air (Jacobson *et al.* 1995; Mendelsohn *et al.* 2002).

The Subtropical High Pressure Zone and consequent lack of water in the atmosphere makes Namibia arid. Dry air results in few clouds and the intense radiation from the sun, along with high daytime temperatures with rapid water evaporation contributes to the overall aridity. In addition, due to geological processes, deep soils are absent over much of the country, resulting in less water saturation and consequently, less rainfall. All the rivers in Namibia are ephemeral, and flash floods ensue after sporadic heavy rainfall. The only perennial rivers are the Kunene and Okavango in the north, creating a natural border with Angola and Zambia, as well as the Gariep River (formerly known as the Orange River) between Namibia and South Africa in the south (Jacobson *et al.* 1995; Mendelsohn *et al.* 2002; Suhling *et al.* 2006).

The Okavango River delta, with more moist and tropical areas in north-eastern Namibia has the greatest diversity of animal and plant species. However, most species endemic to Namibia occur in arid areas, situated around the escarpment and on isolated highlands. The main Namibian vegetation zones include tall woodlands in the north-east and vegetation becomes progressively sparse to the west and south. Gravel plains and sand dunes dominate the coastal areas from north to south. To cope with variable conditions, animals and consequently prehistoric societies moved over great distances to find food resources (Dentlinger 1977; Kinahan 1991; Jacobson *et al.* 1995; Mendelsohn *et al.* 2002; Wallace & Kinahan 2011).

1.2 Summary of the archaeological sequence in Namibia

The archaeological sequence as it is presently known in Namibia, starts with the Early and Middle Stone Ages that range between 2 million years and 22 000 years ago. Evidence for Later Stone Age occupation first appears between 22 000 and 18 000 years ago. The Later Stone Age record also includes the first appearance of ceramics, metallurgy and herding within the last 2000 years (Mitchell 2002a; Eichhorn & Vogelsang 2011; Wallace & Kinahan 2011; Lombard *et al.* 2012).

Hominin remains are yet to be discovered in Namibia. However, an extinct primate and hominin ancestor, *Otavipithecus namibiensis* that lived 13 million years ago, have been found. Early Stone Age sites, Gemsbok and Namib IV date to between 800 000 and 500 000 years ago. The available evidence from the Namibian Middle Stone Age suggests that human encampments were located mainly near the few water sources. Population density appears to have been low and these groups may represent the limitations of human adaptation to desert conditions. Evidence for social organisation is limited. The earliest indication for symbolic expression is painted slabs excavated from Apollo II, which dates to *ca.* 25 000 years ago (Wendt 1972; Richter 1991; Mendelsohn *et al.* 2002; Wallace & Kinahan 2011).

Later Stone Age sites are concentrated in the mountainous areas of Namibia and sites become sporadic towards the south. The mountainous terrain in the desert and along the escarpment is associated with localised rainfall, which sustains reliable springs and seepages through groundwater recharge. Archaeological evidence shows that in the last 5000 years, the movement of people was bound to such places. By *ca.* 2200 years ago, evidence for pastoralism is present in Namibia and during the past 1000 and 500 years horticulturalists settled in southern Angola and northern Namibia (Eichhorn & Vogelsang 2011; Wallace & Kinahan 2011; Pleurdeau *et al.* 2012; Kinahan 2013).

By the time of European contact, Namibia hunter-gatherers, herders and horticulturalists populated Namibia. These groups include the Damara and San-speakers, who are considered the older inhabitants of Namibia. Oshiwambo, Otjiherero, Kavango and Caprivi communities are descendants of groups arriving in Namibia, from southern Angola during the past 500 years. The most recent arrivals are Nama communities and settlers from Europe and South Africa during the last 300 years (Fig. 1.1) (Schapera 1930; Malan 1980; Du Pisani 1985; Barnard 1992; Mendelsohn *et al.* 2002).

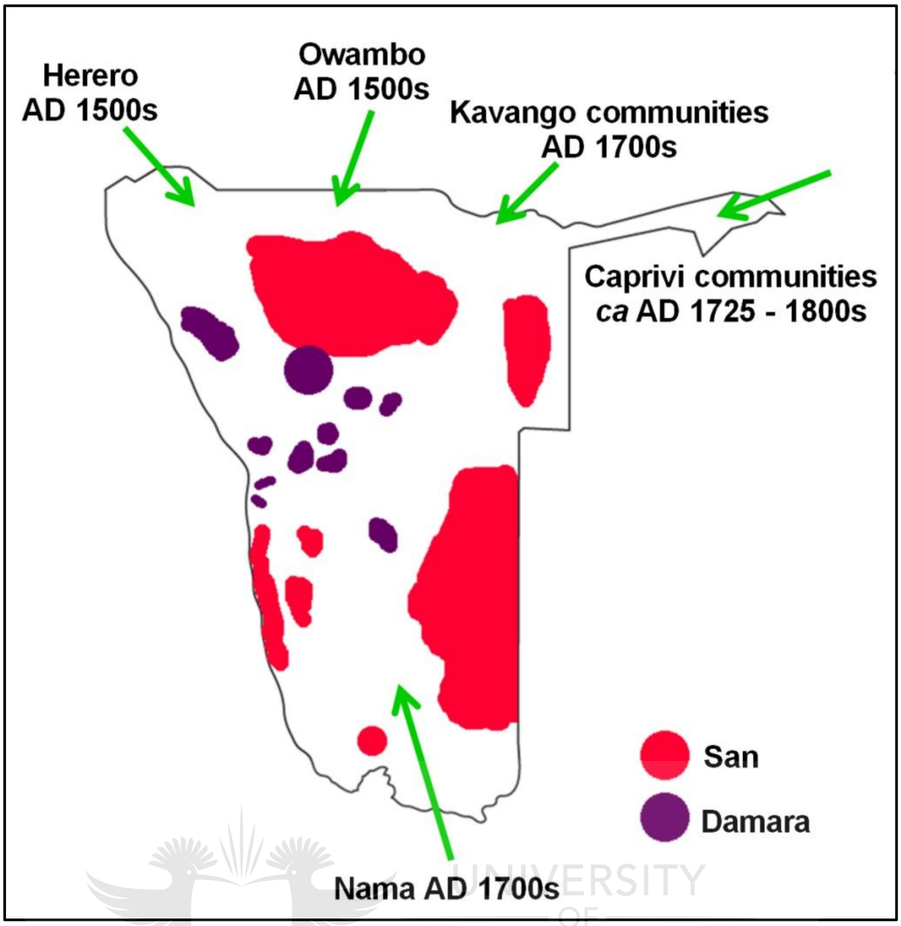

FIGURE 1.1. *A reconstruction of groups reaching Namibia based on oral histories (after Mendelsohn* et al. *2002).*

1.3 Kuidas Spring environmental and geological background

Kuidas Spring (hereafter KS1) is an archaeological site situated 5 km from the Huab River in the Namib Desert Biome of north-western Namibia in the Kunene Region. The site is adjacent to the Skeleton Coast Park and the Huab River that cuts through to the Atlantic Ocean (Fig. 1.2).

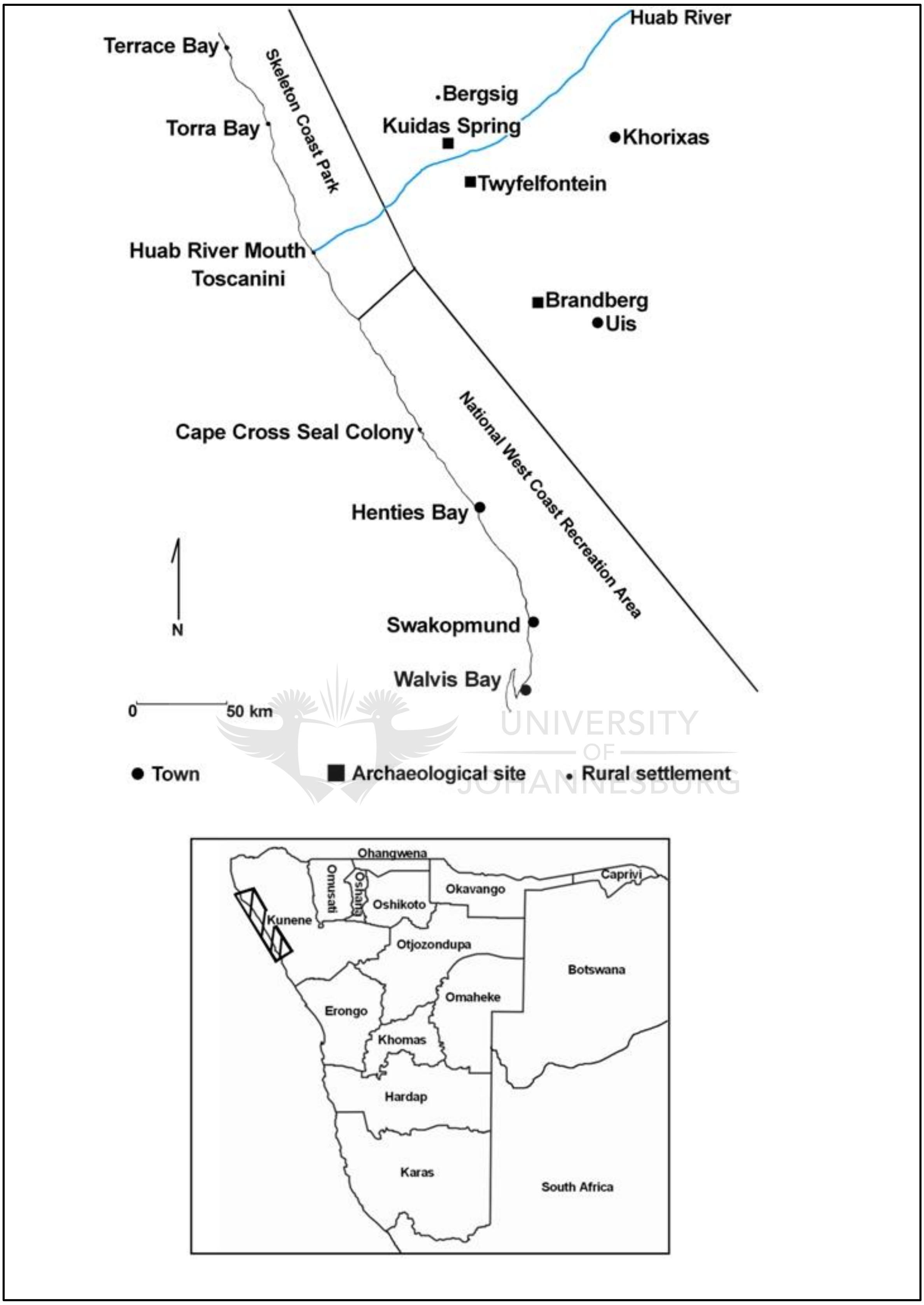

FIGURE 1.2. *Map of Namibia illustrating the study area within the Kunene Region and the location of Kuidas Spring (after Mendelsohn* et al. *2002).*

The Huab River Valley is part of two major geological divisions, the Karoo Supergroup and Damaraland Igneous Province. The rock type grouping includes the Etendeka plateau and Huab basin. The Etendeka plateau of north-western Namibia consists of volcanic rocks from the Cretaceous period. The Etendeka group consists of 59% dark-coloured rocks composed of minerals such as iron, magnesium, and basalt as well as 69% light-coloured rocks composed of minerals such as quartz and feldspar. Sandstone and shale are also present in the Huab River valley (Jacobson *et al.* 1995; Mendelsohn *et al.* 2002; Schneider 2004).

The soil of the Huab River valley consists of eutric leptosols, which typically forms in eroding landscapes. The coarse-textured soils are limited in depth caused by the presence of a continuous hard rock, visible as a highly calcareous or cemented layer within 30 cm of the surface. The eutric leptosols are the shallowest soils in Namibia and contain a lot of gravel. As a result, the leptosols' water-holding capacity is low and vegetation in this area is subject to drought. Rates of water run-off and erosion can be high when heavy rains fall and consequently, these soils can only support low densities of livestock and wildlife (Jacobson *et al.* 1995; Mendelsohn *et al.* 2002).

1.4 Theoretical context of the study

The Later Stone Age archaeology of southern Africa is well studied (e.g., Mitchell 2002a). Stone circle sites occur mainly in the Northern Cape and Namibia, the purpose of building and occupying these stone circles are not clear (e.g., Parsons 2000a, 2008; Veldman 2008; Sampson 2009; Sadr 2012). Most of these features are located in Namibia (Veldman 2008) and it is generally thought that stone circles were constructed and occupied by pastoralists and/or hunter-gatherers (e.g., Carr *et al.* 1978; Shackley 1985; Noli & Avery 1987; Kinahan 1991; Richter 1991; Speich 1999, 2002, 2010; Parsons 2007, 2008; Eichhorn & Vogelsang 2011). In this dissertation, I intend to contribute towards a better understanding of stone circles from Namibia.

My main research aim is to explore the occupational history of Kuidas Spring through lithic analysis that may highlight potential changes in subsistence, and risk management strategies (e.g., Lombard & Parsons 2008; Parsons 2011). Thus, the research question is whether stone tool kits of people who lived at Kuidas Spring reflect changes or differences in subsistence and risk management strategies through time.

The theoretical context of this study articulates with current debate regarding the introduction of domesticated livestock to southern Africa and its impact on hunter-gatherer risk management strategies (Lombard & Parsons 2008; Parsons 2011). According to the archaeological record, livestock was introduced into southern Africa *ca.* 2270 years ago (Robbins *et al.* 2005; Pleurdeau *et al.* 2012). The topic facilitates a debate regarding possible changes in hunter-gatherer ideology (Smith 1990, 1992, 1998a,b, 2008a,b; Barnard 2008), the role of artefacts in signalling subsistence changes and the possibilities of detecting the ephemeral herder encampments in the archaeological record (Robertshaw 1978; Robertshaw & Collet 1983; Kinahan 1991; Sadr 1998, 2003, 2005, 2008a; Smith 1998a,b, 2005, 2008a,b; Smith & Jacobson 1995; Smith *et al.* 1991, 2001; Sadr & Plug 2001; Parsons 2004, 2008; Arthur 2008; Fauvelle-Aymar 2008; Fauvelle-Aymar & Sadr 2008).

Caprines are present in southern Africa from *ca*. 2270-2000 years ago, marking the beginning of pastoralism in southern Africa (Sadr 2003, 2005, 2008a; Smith 1983, 2005, 2008a,b; Robbins *et al.* 2008; Pleurdeau *et al.* 2012). Although contentious, artefacts that are interpreted to designate hunter-gatherer occupation includes a high percentage of formal stone tools made from fine-grained rock types, <5 mm ostrich eggshell beads, no or few pottery and no or few faunal remains of caprines (Jacobson 1987a; Smith 1990, 2005; Sadr 2003). On the other hand, herders are recognised by the presence of thin-walled pottery, >5 mm ostrich eggshell beads, an informal stone tool assemblage made from coarse-grained rock types, metal beads and faunal remains of livestock (Kinahan 1984; Jacobson 1987a; Smith *et al.* 1991; Schrire 1992; Sadr 2003, 2008a; Smith 1990; 2005, 2008a,b; Parsons 2007, 2008).

In addition, the use of risk management strategies might also indicate whether people were more dependent on hunting or not (Lombard & Parsons 2008). Risk management, in the context of subsistence, can be defined as strategies developed to promote subsistence security and prevent food shortages. In lithic technology, risk management strategies are expected to be reflected in terms of the typology and possible function of the stone tools (Bleed 1986; Bousman 1993, 2005). Therefore, should a group of people occupy an area where there is the minimum amount of plant food available and they do not practice pastoralism and/or physical food storage, they must have hunting success and this is expected to result in curated as opposed to expedient stone tool manufacture (Bleed 1986; Bousman 1993, 2005; Lombard & Parsons 2008).

Stone circle settlements occur in South Africa and Namibia, and are associated with both hunter-gatherers and herders (Kinahan 1991; Parsons 2000a, 2004, 2008; Sampson 2009; Sadr 2012). Stone circles are often interpreted as hunting blinds, aggregation sites, permanent herder settlements, some as temporary encampments while travelling to the Atlantic coast and others are associated with copper smelting activities (Sandelowsky 1974; Carr *et al.* 1978; Shackley 1983, 1985; Jacobson & Noli 1987; Noli & Avery 1987; Kinahan 1991; Miller & Sandelowsky 1999; Parsons 2000a, 2004; Sampson 2009; Eichhorn & Vogelsang 2011). Based on archaeological evidence that relates to the social and religious contexts of hunter-gatherer communities, Kinahan (1991) proposed that due to the adoption of livestock stone circle settlements arose and rock shelters were abandoned by hunter-gatherers that accepted livestock. Therefore, if the archaeological distinctions of hunter-gatherers and herders are prominent, the rock shelter should signify hunter-gatherers, and the stone circle should have evidence of herders (Smith 1990; Kinahan 1991).

Due to the various interpretations of stone circle settlements, I propose three interrelated hypotheses regarding the occupation and purpose of Kuidas Spring 1 (KS1):

- The rock shelter (KRS2) is indicative of a hunter-gatherer occupation, while the stone circle (KSC14) is that of herders.
- Both hunter-gatherers and herders occupied KSC14 and that stone circles are not exclusive to herder communities.
- KS1 was a seasonal encampment.

1.5 Chapter summary

KS1 is an archaeological site situated in the Namib Desert biome of north-west Namibia. Archaeological research aimed to contribute to current issues within the hunter-gatherer and herder debate. The main aims of my study include potential visibility of changes in subsistence strategies *via* stone tool analyses, risk management strategies and the possibility to discern between hunter-gatherers and herders at KS1.

Chapters 2 and 3 explore the background to the hunter-gatherer herder debate and a summary of archaeological sites pertaining to the debate. Chapter 4 are the methods I used for this study, Chapter 5 include the results of the archaeological excavations, Chapter 6 is the discussion and Chapter 7 is the conclusion.

Chapter 2

Current debates about the introduction of herding to southern Africa

2.1 The spread of early herding communities

The supposed arrival and spread of early herding communities in southern Africa and their impact on local hunter-gatherer populations are currently debated. Topics include possible changes in hunter-gatherer ideology (Smith 1990; Barnard 2008), the role of artefacts in signalling subsistence changes and the detection of herder encampments in the archaeological record (Robertshaw 1978; Kinahan 1991; Smith *et al.* 1991; Smith & Jacobson 1995; Sadr 1998, 2003, 2005, 2008a; Smith 1998a,b, 2005, 2008a,b; Parsons 2004, 2008; Arthur 2008; Barnard 2008). According to archaeological evidence, caprines (sheep and goats combined) are present from *ca.* 2270-2000 years ago, marking pastoralism as a cultural shift in southern Africa (Sadr 2003, 2005, 2008a; Smith 2005, 2008a,b; Robbins *et al.* 2005, 2008; Pleurdeau *et al.* 2012).

There are no wild progenitors for caprines in southern Africa during the Holocene (Klein 1986; Smith 1992; Sealy & Yates 1994; Sadr 1998). Caprines first appeared on the African continent between 8000 and 7700 years ago (Smith 1992, 2005; Fagan 2004; Gifford-Gonzalez 2005). Both cattle and caprines are present in eastern Africa more than 4000 years ago amongst Stone Age groups (Bower 1991), reaching southern Africa *ca.* 2270-2000 years ago (Webley 1992; Robbins *et al.* 2008; Pleurdeau *et al.* 2012).

Assuming that the introduction of livestock did not take place *via* a process of diffusion, there are two hypothesised routes by which early herder communities travelled to reached southern Africa from north-eastern Africa. Stow (1905) and Cooke (1965) proposed a route based on rock art (human figures and sheep) and oral traditions. Supposedly, the journey took place through modern-day central Zimbabwe towards northern Botswana, thereafter leading west to northern Namibia and then south along the Atlantic coastal region, to the western and southern Cape in South Africa (Fig. 2.1) (Stow 1905; Cooke 1965). Elphick (1977) proposes a different route based on Westphal's (1963) model of Khoe-languages. According to this model, herders obtained sheep in northern Botswana and some migrated to the former Transvaal (area between the Vaal and Limpopo Rivers in South Africa) and some south to the Gariep River (formerly known as the Orange River), from where the route divides in two streams. Some groups moved west along the Gariep River towards Namibia and southwards to the Northern and Western Cape Provinces of South Africa (Elphick 1977).

Archaeologists agree that either route is possible (Deacon *et al.* 1978; Smith 1983, 1990, 2008a,b; Klein 1986; Webley 1986, 1992, 2007; Sealy & Yates 1994; Sadr 1998, 2003). The possibility of finding archaeological evidence of herders along the proposed routes and the socio-economic interaction with indigenous hunter-gatherers groups are currently debated (Sadr 1998, 2003, 2005, 2008a; Smith 1998a,b, 2005, 2008a,b; Parsons 2004, 2008; Barnard 2008). I will first summarise the so-called Kalahari debate, because current disputes concerning the differentiation of hunter-gatherers and herders originate from themes in the Kalahari debate.

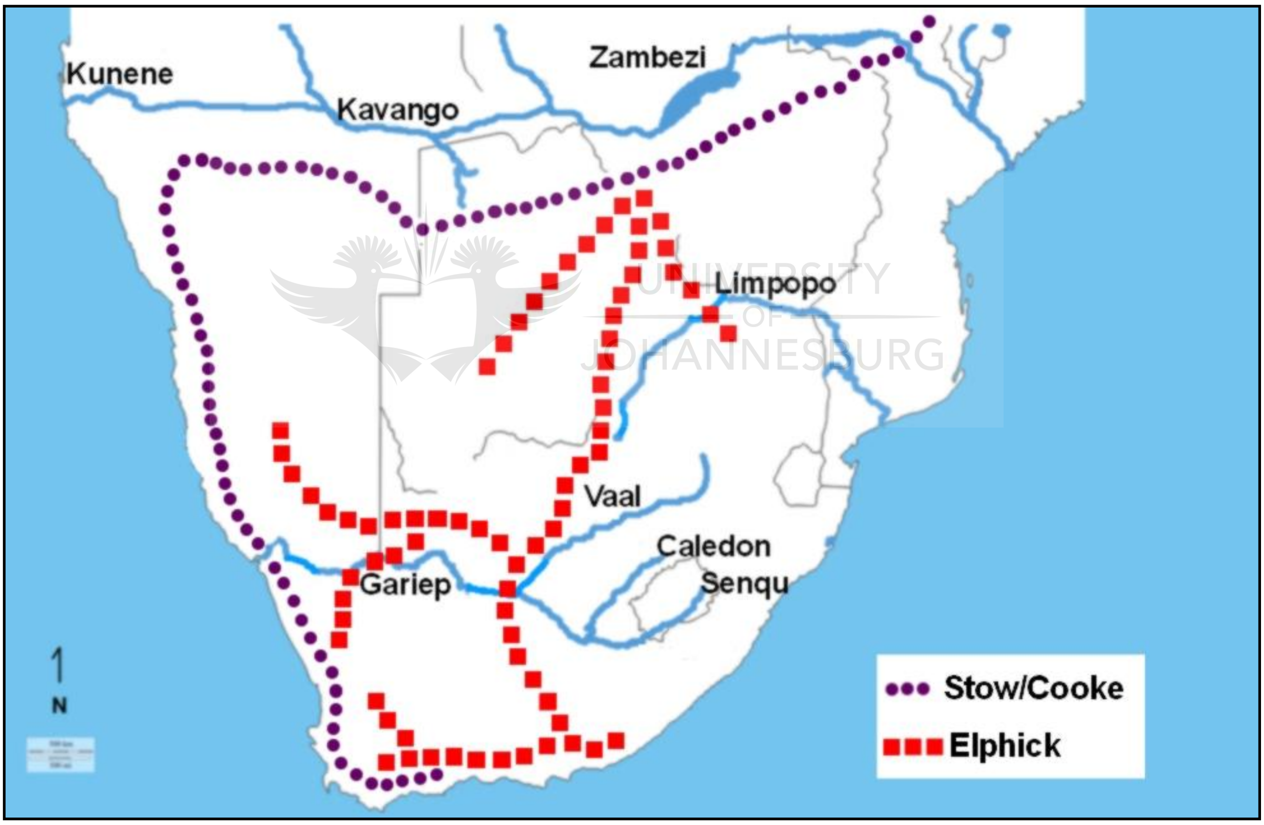

FIGURE 2.1. *The routes by which migrating herders came to southern Africa, proposed by Stow (1905), Cooke (1965) and Elphick (1977).*

2.2 The Kalahari debate

Ethnographic research on the Khoe-San began in the late 17th century. The accounts of early travellers, colonial officials and explorers such as Sparrman (1785), Campbell (1816), Alexander (1838), as well as research by Bleek and Lloyd (1911) enabled scholars such as Schapera (1930) to produce comprehensive studies on these communities. Additional anthropological research began during the 1950s when Marshall (1976) studied !Kung-speaking communities in the Nyae-Nyae area of Namibia. Lee (1979) followed and worked among the Ju/'hoansi in the Dobe area of Botswana. These research endeavours contributed to the concept among archaeologists that hunter-gatherers are a pristine example of how people lived in the past (Schrire 1984, 1992; Kent 1996; Barnard 2007).

However, some archaeologists began questioning the validity of Kalahari ethnography when they found Later Stone Age artefacts at Iron Age sites and *vice versa*, indicating interaction between hunter-gatherer and Bantu-speaking groups in the past (Denbow 1984, 1986; Schrire 1984, 1992). The presence of livestock, pottery and metal implies that the notion of an unchanged, egalitarian hunter-gatherer society is unfeasible. The archaeological record rather reflects Bantu-speaking horticulturalists oppressing and marginalising hunter-gatherers (Denbow 1986; Wilmsen & Denbow 1990).

This view of Denbow and Wilmsen (1986, 1990) led to a debate between scholars, known as the Kalahari debate. Essentially, the Kalahari debate revolved around the extent of Iron Age horticulturalist economy influencing local hunter-gatherers. Some researchers, such as Solway and Lee (1990), regarded some San-speaking groups studied in the 1950s and 1960s as independent hunter-gatherers, who sustained their original cultural identity. They acknowledged contact with horticulturalists by some hunter-gatherers, while other San-groups became economically dependent on their Bantu-speaking neighbours. Wilmsen and Denbow (1990) argued that Solway and Lee (1990) ignored that San-speakers were influenced by neighbouring Bantu-speaking societies and that San communities were oppressed and marginalised, resulting from trade with Bantu-speakers and European capitalists (Solway & Lee 1990; Wilmsen & Denbow 1990; Sadr 1997; Smith & Lee 1997).

Wilmsen and Denbow (1990) based their model on archaeological evidence and rock art from Tsodilo Hills in Botswana. Sadr (1997) suggested that rock art is not direct evidence of marginalised hunter-gatherers as being client-herders for Iron Age peoples. In addition, the archaeological evidence of hunter-gatherer artefacts in Iron Age contexts are insignificant in the formulation of an interpretive model. Metal, ceramics, cattle and sheep remains may provide the basis for the concept of an oppressed hunter-gatherer society. However, metal and ceramics could also indicate that hunter-gatherers were merely participating in the Early Iron Age economy, while the cattle remains suggested payment for managing outposts of Bantu-speaking farmers. Therefore, the mere presence of ceramics, metal and cattle remains is not necessarily reflective of an oppressed and marginalised hunter-gatherer society (Sadr 1997).

2.3 Migration *versus* diffusion

During the last two decades, a debate emerged on the spread of pastoralism in southern Africa. Smith (1983, 1990, 1992, 1998a,b, 2005, 2008a,b) favoured the concept of migrating Khoe-herders that spread over southern Africa from northern Botswana where they obtained caprines and pottery from Iron Age farmers. The hunter-gatherers of southern Africa, who came into contact with herders, could not accept caprines into their egalitarian social system. Hunter-gatherers first had to be incorporated into a hierarchical society to be able to make the ideological shift from a hunter to a herder. Hunter-gatherers only accepted livestock due to gift exchanges between San- and Khoe-speaking communities. The archaeological record should therefore reflect two distinct identities, namely Khoe-speaking herders and San-speaking hunter-gatherers (Smith 1983, 1990, 1992).

Sadr (1998, 2003, 2008a,b) argued against the concept of migrating herders. He suggested that not all hunter-gatherers have an egalitarian worldview, and that pottery and caprines spread through the process of diffusion. According to him (Sadr 1998, 2008a,b), caprines and pottery did not arrive simultaneously in southern Africa as a cultural package. At sites such as Toteng in northern Botswana (Fig. 2.2), livestock is present prior to pottery (Robbins *et al.* 2005, 2008). In Namibia at Falls Rock and Geduld rock shelters, pottery is present prior to caprines, but at Mirabib and Leopard Cave, also in Namibia, pottery and sheep seems to coincide (Fig. 2.2) (Sandelowsky 1977; Kinahan 1991; Smith & Jacobson 1995; Pleurdeau *et al.* 2012). At Spoeg Rivier and Kasteelberg A in South Africa, sheep is present before pottery, while at /Hei/Khomas and Die Kelders, pottery is present prior to livestock (Fig. 2.2) (Schweitzer 1974, 1979; Smith *et al.* 1991; Webley 1992, 2001; Wilson 1996). This unsynchronised appearance of sheep and pottery (Sealy & Yates 1994; Webley 2007) seems to support the diffusion hypothesis (Sadr 1998, 2003, 2008a,b).

Pottery from the Western Cape Province, the Kunene region in Namibia, northern Botswana and western Zimbabwe are all thin-walled, suggesting that pottery production was similar over a vast area. However, this does not necessarily indicate that the same people made all the pottery. If the Khoe, as a linguistic group, made all the pottery found at Stone Age sites, then there should be similar vessel shapes and decorations (Sadr 1998). Sadr (1998) used ceramic decorative motifs from Geduld, Toteng and Kasteelberg as examples to illustrate that pottery decorations do not form a regional sequence. A number of additional examples are presented along with Geduld, Toteng and Kasteelberg, to indicate that no definitive regional sequence exists for herder pottery (Table 2.1). The regional differences between Zimbabwe, Botswana, Namibia and South Africa (Table 2.1) regarding the decoration of pottery and similarities in technological attributes indicate that pottery was made and used in the same way, but not necessarily by the same people, suggesting a process of diffusion. For the reason that pottery and domestic stock are often found together at herder sites, even if unsynchronised, it indicates that perhaps small-scale migration took place, but within a larger process of diffusion. Large-scale diffusion would have caused hunters to acquire knowledge of pastoralism and pottery making to become hunter-herders, but not pastoralists as defined by Smith (2005) (Sadr & Sampson 2006; Sadr 1998, 2008a,b).

FIGURE 2.2. *Location of archaeological sites having pottery prior to or after the introduction of caprines.*

TABLE 2.1. *Ceramic diversity at archaeological sites within southern Africa.* (**Oldest date taken from phase in which pottery first appeared, the date is thus not directly associated with the pottery).*

Site	**Pottery characteristics**
Affenfelsen (Wendt 1972; Richter 1991)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: undecorated. Temper: not discussed. Thickness: not stated. Date: surface collection. Type: none.
Austerlitz (Wendt 1972; Richter 1991)	Vessel shape: bag like. Rim profile: folded edge. Decoration: impressed dots. Temper: not discussed. Thickness: thin-walled. Date: 910 ± 55 BP (KN-I 635). Type: none.
Bambata Cave (Walker 1983; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: Bambata decorative style. Temper: not discussed. Thickness: thin-walled. Date: 115 BC / 2140 ± 60 BP (Pta-3072). Type: Bambata ware.
Biesje Poort 2 (Excavation 1) (Beaumont *et al.* 1995; Parsons 2006, 2007, 2008)	Vessel shape: not reconstructed but spout present. Rim profile: not discussed. Decoration: thin incised lines and rows of punctates .Temper: grass. Thickness: <10 mm. Date: AD 464 / 1580 ± 40 BP (Pta-9569). Type: none.
Big Elephant Shelter (Wadley 1979; Sadr 2008b)	Vessel shape: not reconstructed but spout present. Rim profile: not discussed. Decoration: two vertical rows of finger nail impressions. Temper: not discussed. Thickness: <10 mm. Date: AD 664 / 1400 ± 80 BP (UCLA-724B). Type: none.
Blinkklipkop (Humphreys & Thackeray 1983; Sadr & Sampson 1999; Sadr 2008b; Couzens & Sadr 2010)	Vessel shape: globular vessels and broken lug. Rim Profile: lips are simple round and half round. Decoration: comb-stamped, impressed dots and rippled. Temper: grit and mineral. Thickness: <10 mm. Date: AD 960 / 1154 ± 31 BP (Pta-2840, Pta-2835 - weighmean). Type: rippled rim ware.
Bloeddrift (Sadr & Sampson 1999; Smith *et al.* 2001)	Vessel shape: pot, bowl, and lugs present. Rim profile: not discussed. Decoration: chattermarks on rim and short dash notches, as well as undecorated sherds. Thickness: not stated. Temper: not stated. Date: AD 1453-1785 / 355 ± 15 BP (Pta-7942). Type: spouted incised type (SPINC) and lugged undecorated type (LUND).
Blombos (Sadr & Sampson 1999; Henshilwood 2008; Sadr 2008b)	Vessel shape: bag shaped with lugs. Rim profile: not discussed. Decoration: undecorated. Thickness: <10 mm. Temper: quartz. Date: AD 132 / 1904 ± 21 BP (Pta-6185, OxA-4543, Pta-6246, Pta-6175, Pta-6247 - weighmean). Type: none.
Bloubos BB5 and BB7 (Parsons 2000a,b)	Vessel shape: not reconstructed but lugs present. Rim profile: not discussed. Decoration: not discussed. Thickness: <10 mm. Temper: grit. Date: AD 416 /1810 ± 45 BP (Pta-7381) Type: none.
Bokvasmaak 3 (Beaumont *et al.* 1995; Sadr & Sampson 1999; Parsons 2006, 2007, 2008)	Vessel shape: not reconstructed but lugs present. Rim profile: not discussed. Decoration: undecorated. Thickness: <10 mm. Temper: grass. Date: AD 1690-1730; AD 1820-1930 / 120 ± 50 BP (Pta-4872). Type: none.
Boomplaas (Deacon *et al.* 1978; Sadr & Sampson 1999; Sadr 2008b)	Vessel shape: pot and bowl, spouts and lugs present. Rim profile: not discussed. Decoration: dragged or incised lines, impressed and punctate lines. Punctate dots and impressed patterns made with crab claw and a bone splinter. Thickness : <10 mm. Temper: quartz. Date: AD 434 / 1637 ± 32 BP (UW-307, UW-337, UW-338 - weighmean). Type: none.
Byneskranskop (Schweitzer & Wilson 1982; Sealy & Yates 1994; Sadr 2008b)	Vessel shape: not reconstructed but spout present. Rim profile: lips are everted, thickened round, simple round, tapered, thickened flat, flat-top. Decoration: impressed with *Donaxserra* shell, impressed bands and undecorated sherds present. Thickness: <10 mm. Temper: quartz and grit. Date: AD 151 / 1880 ± 50 BP (Pta-1865). Type: none.
De Hangen (Parkington & Poggenpoel 1971; Sadr & Sampson 1999)	Vessel shape: pot and lugs present. Rim profile: lips are simple round, thickened flat, and everted. Decoration: combined incisions and punctations. Thickness : <10 mm. Temper: shale grit and sand. Date: AD 1465 / 485 ± 45 BP (Pta-168 De Hangen CAR 1/6). Type: lugged incised ware (LINC)

	and De Hangen.
Die Kelders (Schweitzer 1979; Avery *et al*. 1997; Sadr 2008b)	Vessel shape: pots, spouted pot, and bowls. Rim profile: lips are plain rounded and thickened round. Decoration: one pot with comb-stamp and patella shell-like decoration. Undecorated ware also present but with no lugs. Thickness: <10 mm. Temper: quartz with shale/siltstone inclusions. Date: AD 68 / 1978 ± 53 BP (GX-1687, GX-1688, GX-1686 - weighmean). Type: none.
Dikbosch 1 (Humphreys & Thackeray 1983; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: lips are simple round. Decoration: undecorated. Thickness : <10 mm. Temper: grit. Date: AD 390 / 1720 ± 40 BP (Pta-3413).Type: none.
Driel Shelter (Maggs & Ward 1980; Sadr 2008b)	Vessel shape: pot, bag-shaped pot, and bowl. Rim profile: not discussed. Decoration: notched and finger pinched, diagonal incised lines. Thickness: <10 mm. Temper: quartz. Date: AD 282 / 1775 ± 40 BP (Pta-1381). Type: none.
Dunefield Midden (Steward 2005)	Vessel shape: spouted pots and lugged pots. Rim profile: lips are simple round, everted half round, thickened flat, and thickened round. Decoration: incised and undecorated. Thickness: not stated. Temper: quartz and sand. Date: 700-600 BP. Type: lugged incised ware (LINC) and lugged undecorated ware (LUND).
Falls Rock and Snake Rock Shelters (Kinahan 1991; Sadr 2008b)	Vessel shape: small globular. Rim profile: lips are simply rounded. Decoration: punctate, incised bands. Thickness: thin-walled. Temper: brittle clays from the area. Date: AD 151 / 1880 ± 50 BP (Pta-2927). Type: none.
Hasenbild (Wendt 1972; Richter 1991).	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: undecorated. Thickness: not stated. Temper: feldspar. Date: 370 ± 50 BP (KN-I 469). Type: none.
Geduld (Smith & Jacobson 1995; Sadr 2008b)	Vessel shape: not reconstructed but spout present. Rim profile: lips are everted, thickened flat and simple round. Decoration: vertical ripple marks, punctate with horizontal incised lines, oblique incisions and cross-hatching. Thickness: <10 mm. Temper: not discussed. Date: AD 18 / 2029 ± 21 BP (Pta-5875, Pta-4413, Pta-5873, Pta-5871, Pta-4414 - weighmean). Type: none.
Glen Elliot Shelter (Sampson 1967b; Klein 1986; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: lips are everted. Decoration: parallel lines of impressions and broad shallow parallel and diagonal lines. Undecorated sherds present. Thickness: <10 mm and ≥11 mm. Temper: grit, grass and sand. Date: AD 982 / 1120 ± 70 BP (Pta-3402/75). Type: none.
Good Hope Shelter (Cable *et al*. 1980; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: undecorated. Thickness: <10 mm. Temper: not discussed. Date: AD 365 / 1740 ± 40 BP (Pta-838). Type: none.
Grootrif G (Jerardino 2007)	Vessel shape: not reconstructed. Rim profile: lips are simply round and tapered. Decoration: two parallel grooved lines. Thickness: <10 mm. Temper: quartz Date: 690 ± 40 BP (Pta-4070). Type: none.
Hartmann's Valley 95/4 (Eichhorn & Vogelsang 2011)	Vessel shape: not reconstructed. Rim profile: thickened rim band. Decoration: oblique parallel lines. Thickness : <10 mm. Temper: not discussed. Date: AD 610 ± 40 / 1407 ± 50 BP* (KN-4851).Type: none.
/Hei-/Khomas (Webley 2001)	Vessel shape: not reconstructed, but lugs present. Rim profile: lips are bevelled, rounded and flat. Decoration: circular and oval punctations, diagonal lines and horizontal scoring below rim. Thickness: <10 mm. Temper: grit. Date: AD 353-307 / 1980 ± 120 BP (Pta-5530). Type: none.
Jagt Pan 7 (Beaumont *et al*. 1995; Parsons 2006, 2007, 2008; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: undecorated. Thickness : <10 mm. Temper: not sure, grass and fibre added. Date: 804-406 BC / 2550 ± 60 BP* (Pta-4193). Type: none.
Jakkalsberg A and B (Webley 1997, 2007; Sadr 2008b)	Vessel shape: not reconstructed but lugs and spouts present. Rim profile: lips are bevelled, tapered, rounded, or flat and externally thickened. Decoration: circular and oval punctations, diagonal lines, and cross-hatching. Thickness : <10 mm. Temper: grit. Date: AD 657 / 1318 ± 21 BP (Pta-6100, Pta-5958 - weighmean). Type: none.
Jubilee Shelter (Wadley 1996; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: Bambata decorative style and undecorated sherds. Thickness: <10 mm. Temper: not discussed. Date: AD 234 / 1840 ± 50 BP (Wits-1398). Type: Bambata ware.
Kasteelberg A and B (Sadr & Smith 1991; Smith *et al*. 1991; Sadr *et al*.	Vessel shape: spouted and lugged vessels. Rim profile: lips are bevelled and flat-topped. Decoration: shell-edge impressions, incisions, and undecorated sherds. Thickness: <10 mm.

2003; Smith 2006; Sadr 2007; Sadr 2008b)	Temper: quartz and sand. Date: AD 247 / 1812 ± 33 BP (Pta-3461, Pta-3711 - weighmean), AD 794 / 1249 ± 25 BP (Pta-3994, Pta-3998, Pta-3995, Pta-4373 - weighmean). Type: spouted shell-edge impressions(SPIMP), spouted incised ware (SPINC) and lugged undecorated ware (LUND).
Klein Kliphuis Rock Shelter (Van Rijssen & Avery 1992; Orton & Mackay 2008)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: undecorated. Thickness: not stated. Temper: quartz. Date: AD 70 / 1990 ± 50 BP (Pta-4671). Type: none.
Knersvlakte Reception Shelter (Orton *et al.* 2011)	Vessel shape: not reconstructed. Rim profile: not discussed for excavated sherds. Decoration: undecorated. Thickness: <10 mm. Temper: quartz, mica, and feldspar. Date: AD 1220 / 674 ± 44 BP (AA89907). Type: none.
Leopard Cave (Pleurdeau *et al.* 2012).	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: undecorated. Thickness: <10 mm and >10 mm. Temper: not discussed. Date: 2169 ± 127 BP (Beta-270163). Type: none.
Likoaeng (Plug *et al.* 2003; Mitchell 2009).	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: not discussed. Thickness: not discussed. Temper: not discussed. Date: AD 670-874 / 1310 ± 80 BP (Pta-7877). Type: none.
Limerock 1 and 2 (Humphreys & Thackeray 1983; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: cross-hatching and wide shallow impressions, and undecorated sherds. Thickness : <10 mm. Temper: grit. Date: AD 413 / 1681 ± 31 BP (Pta-1621, Pta-2095 - weighmean). Type: none.
Little Witkrans (Humphreys & Thackeray 1983; Sadr 2008b)	Vessel shape: Rim profile: lips are rounded. Decoration: undecorated. Thickness: <10 mm and ≥11 mm. Temper: grit. Date: AD 624 / 1490 ± 40 BP (Pta-2447). Type: none.
Makgabeng (Bradfield *et al.* 2009)	Vessel shape: bowl. Rim profile: not discussed. Decoration: undecorated. Thickness: <10 mm. Temper: mineral. Date: AD 1521 / 250 ± 50 BP (Beta-236646, Beta-236647 - weighmean). Type: none.
Mauermanshoek (Wadley 2001).	Vessel shape: open bowls and pot. Rim profile: not discussed. Decoration: undecorated. Thickness: not discussed. Temper: grass and grit. Date: AD 1669-1825 / 200 ± 50 BP (Pta-5929). Type: none
Mbabane Shelter (Mazel 1986b).	Vessel shape: bag shaped pot, bowl, and globular pot. Rim profile: not discussed. Decoration: cross-hatched. Thickness : <10 mm. Temper: not discussed. Date: AD 430 / 1520 ± 50 BP (Pta-3678). Type: none.
Melkboom 1 (Beaumont *et al.* 1995; Parsons 2006, 2007, 2008)	Vessel shape: not reconstructed, but lugs present. Rim profile: lips are simply rounded. Decoration: thick parallel horizontal incisions. Thickness: <10 mm. Temper: grass or fibre. Date: AD 1468-1666 / 350 ± 45 BP (Pta-4496). Type: none.
Melkbosstrand (Sealy *et al.* 2004; Sadr & Sampson 1999; Sadr 2003)	Vessel shape: lugged and spouted pots. Rim profile: lips are rounded, flattened, bevelled, round and thickened. Decoration: shell impressions, horizontal grooves and impressed diagonal lines. Thickness: <10 mm. Temper: not discussed. Date: AD 744 / 1825 ± 25 BP (Pta-7800). Type: spouted shell impressed ware (SPIMP) and lugged incised ware (LINC).
Mgede Shelter (Mazel 1986a)	Vessel shape: bowl and bag-shaped pot. Rim profile: not discussed. Decoration: not discussed. Thickness : <10 mm. Temper: not discussed. Date: AD 1130 / 820 ± 50 BP (Pta-3665). Type: none.
Mirabib (Sandelowsky 1977; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: undecorated. Thickness: thin-walled. Temper: dark and fine paste. Date: AD 557 / 1550 ± 50 BP (Pta-1535). Type: none.
Olieboomspoort (Van der Ryst 2006; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: Bambata decorative style. Thickness: <10 mm. Temper: grit. Date: AD 8 / 2038 ± 18 BP (Pta-8030, Pta-8410, Pta-8034, Pta-7424, Pta-7419 - weighmean). Type: Bambata ware.
Omungunda 99/1 (Eichhorn & Vogelsang 2011)	Vessel shape: not reconstructed. Rim profile: lips are rounded, flat, tapered rounded, thickened rim with rounded lip, bevelled flat lip, club-shaped rims and flared necks. Decoration: herring-bone, cross-hatched, colour-coating, vertical lines obscured by burnishing, appliqué moulding, rippled rims, horizontal lines, vertical lines. Thickness: <10 mm. Temper: quartz. Date: AD 30 ± 40 / 1956 ± 31 BP* (KIA-16043). Type: none.
Oruwanje 95/1 (Albrecht *et al.* 2001; Eichhorn & Vogelsang 2011)	Vessel shape: not reconstructed but spout present. Rim profile: thickened rim band and lips are everted, thickened round. Decoration: incised parallel lines, herringbone, comb-stamped, grooved parallel and oblique lines, and rippled rim and undecorated sherds. Thickness: <10 mm and >10 mm .Temper: quartz and mica. Date: AD 40 ± 40 / 1950 ± 35 BP* (KN-5303). Type: none.
Ovizorombuku 96/1 (Eichhorn &	Vessel shape: not reconstructed. Rim profile: Rim profile: tapered with a narrow rounded lip and a

Vogelsang 2011)	wider horizontally truncated lip. Decoration: cross-hatching bordered with horizontal lines, herring-bone motif, fingernail-impressions. Thickness: <10 mm. Temper: quartz. Date: AD 520 ± 60 / 1525 ± 35 BP* (KN-5259). Type: none
Pancho's Kitchen Midden (Jerardino 1998)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: row of circular impressions along an incised straight line and three semi-parallel grooved lines and undecorated sherds. Thickness : <10 mm. Temper: quartz. Date: 570 ± 20 BP (Pta-5605). Type: none.
Rooikrans (Thorp 1996, 1997)	Vessel shape: jars and bowls. Rim profile: not discussed. Decoration: undecorated. Thickness: not discussed. Temper: grass, grit and pottery grog. Date: AD 1443-1633 / 415 ± 65 BP (OxA-3386). Type: none.
Rooiwalbaai (Orton *et al.* 2005)	Vessel shape: not reconstructed. Rim profile: lips are flattened. Decoration: undecorated. Thickness: <10 mm. Temper: not discussed. Date: AD 1383 / 580 BP (Pta-8910). Type: lugged undecorated ware (LUND).
Roosfontein (Klatzow 1994)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: undecorated. Thickness: <10 mm. Temper: grass and grit. Date: AD 685-852 / 1290 ± 50 BP (Pta-5931). Type: none.
Rose Cottage Cave (Wadley 1992; Thorp 1996; Sadr 2008b)	Vessel shape: jar and bowl. Rim profile: not discussed. Decoration: punctated and undecorated sherds. Thickness: thin-walled. Temper: grass and grit. Date: AD 992 / 1100 ± 30 BP (GrN-5298). Type: none.
Rosh Pinah Shelter (Sievers 1984)	Vessel shape: not reconstructed. Rim profile: tapered lip. Decoration: horizontal bands of vertical incisions. Thickness: <10 mm. Temper: quartz, mica and grass. Date: 760 ± 50 BP (Pta-3521). Type: none.
Seacow River Valley (Sampson *et al.* 1989; Sadr & Sampson 1999; Sampson & Sadr 1999; Sadr & Sampson 2006; Sadr 2008b; Sampson 2009)	Vessel shape: spouted and lugged pots. Rim profile: lips are bevelled, simple round, flat-topped and thickened flat. Decoration: horizontal incised lines, herringbone, crossed-dashes and chatter marks (SPINC). Impressed and comb-stamped (COMB). Horizontal incisions, diagonal lines, and row of impressions (LINC). Undecorated but with lugs (LUND) Thickness: thin-walled. Temper: grass, fibre and silt. Date: AD 72 / 2160 ± 50 BP (Gr-A13564). Type: spouted incised ware (SPINC), spouted impressed ware (COMB), lugged incised ware (LINC) undecorated lugged ware (LUND).
Sehonghong (Mitchell 1996a; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: lips are flat top. Decoration: undecorated. Thickness : <10 mm. Temper: grit. Date: AD 397 / 1710 ± 20 BP (Pta-6063). Type: none.
Simon se Klip (Jerardino & Maggs 2007)	Vessel shape: small pot. Rim profile: lips are simply rounded. Decoration: horizontal incised line. Thickness: <10 mm. Temper: not discussed. Date: AD 704 / 1440 ± 60 BP (GX-32343). Type: none.
Skeleton Coast Site N2002/7 (Eichhorn & Vogelsang 2011)	Vessel shape: necked pot without lugs. Rim profile: not discussed. Decoration: herring-bone and single line of stab marks, and undecorated sherds. Thickness: not discussed. Temper: not discussed. Date: AD 840 / 1175 ± 25 BP (KIA18993). Type: none.
Skorpion Cave (Kinahan & Kinahan 2003)	Vessel shape: small necked pot, with lugs and a low necked pot. Rim profile: lips are tapered, bevelled, and thickened. Decoration: not discussed. Thickness : <10 mm. Temper: fine temper. Date: AD 1640 / 180 ± 50 BP (Beta-160048). Type: none.
Spoeg Rivier (Webley 1992; Vogel *et al.* 1997; Webley 2007; Sadr 2008b)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: horizontal lines and small circular impressions. Thickness: <10 mm. Temper: quartz. Date: AD 114 / 1930 ± 50 BP (Pta-6749). Type: none.
Toteng (Robbins *et al.* 2005; Robbins *et al.* 2008; Sadr 2008b)	Vessel shape: small jars and bowls. Rim profile: nicked lip. Decoration: Bambata decorative style and undecorated sherds. Thickness: <10 mm. Temper: grit and charcoal. Date: AD 11 / 2035 ± 26 BP (Beta-44963, Beta-186669, Beta-194888 - weighmean). Type: Bambata.
Uniondale Rock Shelter (Brooker 1989; Sadr 2008b)	Vessel shape: bowls. Rim profile: not discussed. Decoration: single row of crescentic impressions, grooved or impressed diagonal bands. Thickness: <10 mm. Temper: grass and grit. Date: 97 BC / 2127 ± 41 BP (Pta-1803, Pta-1804 - weighmean). Type: none.
Ururu Shelter (Wendt 1972; Richter 1991)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: not discussed. Thickness: not stated. Temper: not discussed. Date: 1000 ± 60 BP (Pta-2664). Type: none.
Vlermuisgat (Parsons 2006, 2007, 2008)	Vessel shape: not reconstructed. Rim profile: lips are simply rounded. Decoration: undecorated. Thickness: <10 mm. Temper: grass. Date: AD 1444-1632 / 430 ± 60 BP (Pta-9511). Type: none.

Wonderwerk Cave (Humphreys & Thackeray 1983)	Vessel shape: not reconstructed. Rim profile: not discussed. Decoration: undecorated. Thickness: <10 mm. Temper: grit. Date: 1210 ± 50 BP (Pta-2779) 3990 ± 60 BP (Pta 2785). Type: none.
Zaayfontein Shelter (Sampson 1967a; Klein 1986)	Vessel shape: not reconstructed. Rim profile: lips are everted. Decoration: parallel lines of impressions and broad shallow parallel and diagonal lines. Undecorated sherds present. Thickness: <10 mm. Temper: grass, grit and sand. Date: AD 1220 / 730 ± 75 BP (GXO-666). Type: none.
Zerrissene Mountains (Carr *et al.* 1978)	Vessel shape: pointed base pot and lug present. Rim profile: not discussed. Decoration: small point impressions. Thickness: not discussed. Temper: not discussed. Date: AD 1500-1800 / 345 ± 40 BP* (Pta-1577).Type: none.

More recently, Smith (2008a,b) indicated that Later Stone Age pottery from East Africa could have been a precursor to the thin-walled pottery of southern Africa. The pottery from East Africa has similar decorations than those found in southern Africa. Smith (2008a,b) also pointed out that Sadr (1998) assumes that decorative motifs on pottery have symbolic meaning, similar to interpretive models used in Iron Age studies (e.g., Huffman 2007). However, pastoralist pottery from East Africa indicates that these societies decorate vessels for the purposes of identifying the pots, so that children would recognise the family pots. Therefore, undecorated pottery would be more common and decorative motifs among pastoral groups would have had a limited geographical distribution (Smith 2008a). Huffman (1994, 2005) suggests that Bambata pottery, such as those found at Toteng, is not part of a pastoral tradition, but were made by Early Iron Age farmers for the purpose of trade with hunter-gatherers. Smith (2008a,b) agrees with this interpretation. However, thin-walled pottery including Bambata, predates Iron Age pottery (Sadr & Sampson 2006). Another possibility could be that the earliest pottery from southern Africa were invented locally and/or the knowledge of pottery production were introduced by a group of skilled potters (*cf*. Robbins *et al.* 2008; Sadr 2008a; Kinahan 2013).

According to Smith (2008a,b) the Kalahari became drier 2000 years ago. Based on linguistic studies and Elphick (1977), some Khoe-speaking groups in northern Botswana returned to a foraging subsistence strategy and at the same time, forced other Khoe-speaking groups away from river systems. The latter of the Khoe-speaking herders then migrated along the Kunene and Okavango/Caprivi river systems towards the eastern Kalahari and into the Limpopo Province, eventually reaching the Gariep and Vaal Rivers (Fig. 2.1). Ripple-rim decoration on pottery, occurring in north-eastern Namibia through to the Limpopo Province of South Africa, supports the migration route (Smith 2008a).

A key issue in the debate has been social organisation. Using ethnographic data from the Basarwa and Ju/'hoansi in Botswana, Smith (1990, 2001) regards the San as egalitarian with minimal ownership of property and no surplus storage. The social pressure of sharing meat would have prevented the San from accumulating and sustaining viable herds of caprines. Khoe-herder societies on the other hand are hierarchical as they have ownership over herds and grazing areas and accrue surplus in the form of livestock. Livestock also plays a social role in the form of status, initiation ceremonies, and bride wealth customs. However, Smith (1990) only focussed on Kalahari hunter-gatherers, but the San has a diversity of languages, kinship systems, settlement patterns, economies and historical circumstances. Sharing has different meanings for different hunter-gatherers (Sadr 1998). Among Kalahari hunter-gatherers, there are flexibility within their social organisation and their subsistence strategies are constantly adapting to suit local conditions (Barnard & Woodburn 1988; Barnard 1992; Guenther 1996; Kent 1996; Sadr 1998). Comparing faunal samples from hunter-gatherer with supposedly herder sites indicates a mixed hunter-herder economy. This suggests that the ethos of sharing would not prevent the adoption of livestock (Kent 1996; Sadr 1998). According to Sadr (1998), hunter-gatherers would have been able to adopt livestock without incorporation into a strong hierarchical society, since sites like Kasteelberg, having evidence of herder occupation are located hundreds of kilometres away from Iron Age farmers, who had a hierarchical social system.

From archaeological sites in the south-western Cape, Smith and colleagues (1991) indicate that lithics, OEB sizes and ceramic densities, associated with high proportions of hunted animals, are different at sites with considerable numbers of sheep. Moreover, small OEBs and formal lithic assemblages are characteristic of hunter-gatherers, whereas large OEBs with informal lithic assemblages are associated with herders. However, smaller numbers of faunal remains also occur at herder sites and herders were also hunting and exploiting marine resources (Smith *et al.* 1991). Pottery could not have been invented locally as pottery from early sites with sheep in the Cape is thin-walled and well-fired, whereas hunter-gatherer pottery from other Cape coastal sites and Zimbabwe is crude, vegetal-tempered vessels with no burnishing or sophisticated firing control (Smith 2005, 2008b). The concept that lithic assemblages can be used to distinguish hunter-gatherer and herder economies are questionable (Sadr 2008a). Differences in the sizes of OEBs may simply reflect changing fashion, as there is rarely a noteworthy difference (*cf*. Schweitzer 1974; Webley 1986, 1997, 2001, 2007; Kinahan 1991; Smith *et al.* 1991; Smith & Jacobson 1995; Smith *et al.* 2001; Sadr 2008a; Robbins *et al.* 2008).

Smith (2008a,b) also argued that the rate at which pottery and sheep spread from the Kalahari to the western and southern Cape coast was too fast for a slow diffusion process and local hunter-gatherers had no knowledge of herding practices. Without a period of apprenticeship from experienced herders, local hunter-gatherers could not have become hunters-with-sheep on their own. In Sadr's (2003, 2008a) view, burial practices, settlement layout with stock enclosures or anything else that would reflect a pastoral ideology, are lacking from the archaeological record, supportive of livestock and pottery being introduced *via* diffusion. Moreover, Sadr (2003, 2008a) suggests that the amount of sheep remains at final Later Stone Age sites does not reflect pastoralists, but casual herding by hunter-gatherers (Sadr 2003, 2008a).

2.4 Risk management as interpretative framework

Risk management, in the context of subsistence, represents strategies developed to promote subsistence security and prevent food shortages. In lithic technology, risk management strategies are reflected by the typology and function of lithics (Bleed 1986; Bousman 1993, 2005). This approach may also apply to recognising hunter-gatherers and herders in the archaeological record.

Therefore, a group of people occupying an area where there is minimal food available and who do not practice pastoralism and/or food storage, must have hunting success and is more dependent on a reliable toolkit (Bleed 1986; Bousman 1993, 2005; Lombard & Parsons 2008). In contrast, people occupying an area with an abundant food supply and practicing pastoralism and/or food storage (e.g., storage cairns), are less dependent on such reliable tool kits and have expedient reduction strategies, because hunting success is not key to survival. Also, if societies are more sedentary, as reflected by the presence of stock enclosures and/or storage structures (Testart 1982; Cunningham 2011), their toolkits are expected to be curated (as opposed to expedient) and when societies are mobile their toolkits are expedient (Bleed 1986; Bousman 1993, 2005).

Groups who do not have an abundance of food such as *veldkos* or milk and meat from domesticated animals, rely more on hunting success for their survival. Implicit is that the lithic assemblages associated with a greater dependence on hunting success, and the maintenance of toolkits, are expected to contain more specialised tools compared to informal tools and/or flaking debris. Should the occupants have greater food security, apart from that provided by hunting, toolkit maintenance become less critical, resulting in more expedient flaking and more informal products and debris compared to formal tools (Bleed 1986; Barham 1992).

Blades and bladelets are interpreted to have been used as arrow heads and/or inset points, which is associated bow and arrow hunting (*cf*. Deacon 1982; Wiessner 1983; Lombard & Parsons 2008). Therefore, blade- and bladelet-rich lithic assemblages are associated with risk-management strategies that rely on hunting success (Lombard & Parsons 2008). If hunting success is not critical for survival, a wider variety of flaking strategies is expected. Thus, it may be assumed that lithics reflect functional and/or subsistence strategies (Lombard & Parsons 2008). However, at most archaeological sites pertaining to the mentioned debate, toolkits do not reveal sudden or significant changes when pottery and livestock were noted (Wadley 1979; Kinahan 1991, 1996; Webley 1992, 2001; Smith & Jacobson 1995; Sadr 2008a; Sadr & Gribble 2010; Pleurdeau *et al*. 2012).

2.5 Chapter summary

There are no wild progenitors for caprines in southern Africa and they first appeared on the African continent *ca*. 8000 years ago. Subsequently, pastoralism had to either reach southern Africa *ca*. 2200 years ago *via* either migration and/or diffusion. There was a perception that living hunter-gatherer communities represent a pristine example of the past, as they remained culturally independent of horticulturalist influences. Some scholars argued that immigrant horticulturalist communities had socio-economic influences on local hunter-gatherer groups. Additional debates ensued about recognising the process of migration and/or diffusion of pastoralism in the archaeological record, as well as the impact such a migration and/or diffusion had on local hunter-gatherer populations. However, risk management as an interpretive framework may assist in identifying hunter-gatherer and herder occupations.

In Chapter 3, I discuss the archaeological sites pertaining to the current hunter-gatherer and hunter-herder debate. This will demonstrate the similarities and differences between artefact assemblages and if it is possible to distinguish between hunter-gatherer and herder archaeological sites.

Chapter 3

Archaeology of the hunter-gatherer and herder debate

3.1 Archaeological sites and assemblages associated with the introduction of herding in southern Africa

In this chapter I provide a summary of the material remains from key sites associated with Stone Age pastoralism in southern Africa. Many sites in the region have caprine remains and pottery (see summary in Mitchell 2002a). However, here I focus only on sites that have caprine remains and sufficient information of the other artefact classes for comparison. I divided the sites into Group A, which are older than 1500 BP and Group B that is younger than 1500 BP. I used the division of 1500 BP, because sites do not date exactly older or younger than a 1000 BP. The rationale for the division is to discern whether or not artefacts reflect different cultural identities after herders migrated (Smith 1990, 2006, 2008a,b) and/or if the practice of herding diffused to southern Africa during the first millennium AD, then material culture patterning should either be visible or not (*cf*. Sadr 1998, 2003; Orton 2012). Lastly, provided that a small scale migration took place during the second millennium when herding intensified in southern Africa, it should also be evident in artefact categories (Sadr 1998, 2003, 2008a,b; Orton 2012).

Orton (2012) distinguish between hunter-gatherers, hunters-with-sheep and herders based on lithic assemblages from Namaqualand. It seems that the variability and overlap within rock types and number of formal stone tools between the lithic assemblages of hunters-with-sheep and hunter-gatherers, relate to similar problems in distinguishing between hunter-gatherers and herders in general, for example, stone tools were made for similar activities using certain rock types (*cf*. Webley 2007; Parsons 2007, 2008; Sadr 2008a; de la Pèna *et al.* 2013). Also, the pottery and OEBs from Namaqualand seem inconclusive to differentiate between hunters-with-sheep and hunter-gatherers, which similar to the lithic assemblages are probably due to social interaction (Kinahan 1991, 2013; Sadr 1998, 2003, 2008a,b; Orton 2012; Breton *et al.* 2014). The sites and samples presented here will illustrate that hunter-gatherers and herders cannot be easily distinguished based on their material remains after 2000 BP. Caprines and pottery appeared at different times in southern Africa (Table 3.1), sites with such evidence predominantly have informal lithic assemblages, apart from Mirabib in Namibia (Fig. 3.1), which has the highest percentage of formal tools associated with herding practices

(Sandelowksy 1977). At most of the archaeological sites, except for Jakkalsberg (Table 3.1 and Fig. 3.1), wild animals dominate the faunal assemblages, indicating that no significant changes took place in subsistence strategies relating to meat consumption with the introduction of caprines (Wadley 1997, 2007). The potential use of milk and/or blood from live animals and how it may have substituted nourishment remains unexplored and difficult to trace in the archaeological record (Schapera 1930; Smith 1983, 1992; Voigt 1986; Casimir 1990; Wadley 2001; Sadr 2003; Fauvelle-Aymar 2008).

Thin-walled pottery (<10 mm) as defined by Sadr (2008b) occurs at all the sites I included in the overview, except for Leopard Cave and Oruwanje 95/1 having thick-walled (>10 mm) as well as thin-walled pottery (Table 3.1, Figs. 3.1 and 3.2). Fibre-tempered pottery have been attributed to hunter-gatherers and mineral tempered pottery to herders (Bollong *et al.* 1993; Sadr & Sampson 1999; Wadley 2001; Smith 2008a,b). Group A has only quartz and grit used as temper for manufacturing pottery and Group B has grass, grit and quartz (Table 3.1 and Fig. 3.2). At some sites, such as Bokvasmaak 3, Mauermanshoek and Vlermuisgat dating to the last 500 years only fibre-tempered pottery occurs (Beaumont *et al.* 1995; Wadley 2001; Parsons 2007, 2008). The pottery could indicate that either pastoralists used a fibre-temper as well, or hunter-gatherers made their own pottery but also kept livestock (Sadr 2008a; Sampson 2009; Orton 2012).

Jacobson (1987a) distinguished different OEB sizes for hunter-gatherers and herders, whereby small beads (<5 mm) characterise hunter-gatherers and larger beads (>5 mm) herders. The average diameter of OEBs used in my summary range between 3-10 mm, indicating that both smaller and larger OEBs are present in Groups A and B (Fig. 3.2). At both groups of sites discussed, copper beads and/or metal fragments occur in association with pottery and livestock (caprines and cattle), yet at others there is an absence of metal artefacts (Table 3.1 and Fig. 3.2).

Rock art only occurs at Leopard Cave and Mirabib in Namibia and Vlermuisgat in South Africa (Table 3.1, Figs. 3.1 and 3.2). The rock art at Leopard Cave consists of monochrome, fine-line depictions of two human figures (pers. obs 2010), while at Vlermuisgat, monochrome finger-painted geometric depictions with a polychrome feline occur (Parsons 2006). The rock art at Mirabib is not described (Sandelowsky 1977). An important aspect to recognise is that the variability of artefacts at sites listed in Table 3.1 could be due to variables in sample size, research questions, excavation/curation strategies, analytical approaches, as well as geographical differences in site locations (Fig. 3.1).

TABLE 3.1. *List of southern African archaeological sites with remains of caprines/cattle and associated artefacts. *OEB size ranges were not calculated by A.Veldman.*

Site	Pottery	Domestic fauna age	Domestic fauna %	OEB mean sizes*	Lithic %	Metal	Rock art
Big Elephant Shelter (Wadley 1979; Sadr 2008a,b)	Temper: not discussed. Thickness: <10 mm. Date: 1400 ± 80 BP (UCLA-724B)	2600 ± 50 BP (Pta-1556)	5.3% caprines and cattle	3-10 mm	8593: (299 formal = 3.4%)	metal surface layers	none
Blombos (Henshilwood 2008; Sadr 2008a,b)	Thickness: <10 mm. Temper: quartz. Date: 1904 ± 21 BP (Pta-6185, OxA-4543, Pta-6246, Pta-6175, Pta-6247 - weighmean)	1960 ± 50 BP (OxA-4543)	0.6% caprines	4.12-5.34 mm	LSA 7651: (13 formal = 0.2%)	none	none
Bokvasmaak 3 (Beaumont *et al.* 1995; Parsons 2006,2007, 2008)	Thickness: <10 mm. Temper: grass. Date: 120 ± 50 BP (Pta-4872)	120 ± 50 BP (Pta-4872)	caprines present	5.8 mm	763 (27 formal = 3.5%)	metal associated date 120 ± 50 BP (Pta-4872)	none
Boomplaas (Deacon *et al.* 1978; Sadr 2008a,b)	Thickness: <10 mm. Temper: quartz. Date: 1637 ± 32 (UW-307, UW-337, UW-338 - weighmean)	1700 ± 55 BP (UW-338) 1510 ± 75 BP (UW - 307)	10.8% caprines	not stated	10 898: (243 formal = 0.03%)	metal associated date 1630 ± 50 BP (UW-337)	none
Byneskranskop (Schweitzer & Wilson 1982; Sealy & Yates 1994; Sadr 2008a,b)	Thickness: <10 mm. Temper: quartz and grit. Date: 1880 ± 50 BP (Pta-1865)	1370 ± 60 bp (OxA-3863)	1.2% sheep (layer 1)	4-8 mm	16 477 (276 formal = 1.6%) (layer 1)	metal 255 ± 50 BP (Pta-1864) not associated with caprines and pottery dates	none
Die Kelders (Schweitzer 1979; Sealy & Yates 1994; Sadr 2008a,b)	Thickness: <10 mm. Temper: quartz with shale/siltstone inclusions. Date: 1978 ± 53 BP (GX-1687, GX-1688, GX-1686 - weighmean)	1325 ± 60 BP (OxA-3860)	1.62% caprines 0.1% cattle	6.8 mm	6709: (62 formal = 0.9 - 1%)	none	none
Geduld (Smith & Jacobson 1995; Sadr 2008a,b)	Thickness: <10 mm. Temper: not discussed. Date: 2029 ± 21 BP (Pta-5875, Pta-4413, Pta-5873, Pta-5871, Pta-4414 - Weighmean)	1790 ± 80 BP (Pta-4419)	2.8% caprines	5-7.5 mm	23 828: (68 formal = 0.3%)	metal associated date 1790 ± 80 BP (Pta-4419)	none
/Hei-/Khomas (Webley 2001)	Thickness: <10 mm. Temper: grit. Date: 1980 ± 120 BP (Pta-5530).	1980 ± 120 BP (Pta-5530)	caprines and cattle present	4.2-7.5 mm	15 704 (276 formal = 1.75%)	none	none
Jakkalsberg A and B (Brink & Webley 1996; Webley 1997, 2007; Sadr 2008a,b)	Thickness: <10 mm. Temper: grit. Date: 1318 ± 21 BP (Pta-6100, Pta- 5958 - Weighmean)	1380 ± 50 BP (Pta-6101) 1420 ± 25 BP (Pta-6122)	42.3% caprines	5-7 mm	13 757: (5 formal = 0.3%)	metal associated with pottery and caprine dates	none
Kasteelberg (Sadr & Smith 1991; Sadr *et al.* 2003; Smith 2006; Sadr 2007; Sadr 2008a,b)	Thickness: <10 mm Temper: quartz and sand. Date: 1812 ± 33 BP (Pta-3461, Pta-3711 - weighmean) 1249 ± 25 BP (Pta-3994, Pta-3998, Pta-3995, Pta-4373 - weighmean)	1630 ± 60 BP (OxA-3865)	6.43% caprines 0.24% cattle	5-6.7 mm	35 740: (286 formal = 0.8%)	metal association not clear	none

Leopard Cave (Pleurdeau *et al.* 2012)	Thickness: <10 mm and >10 mm. Temper: not discussed. Date: 2190 ± 40 BP (Beta-270163)	2270 ± 40 BP (Beta-270164)	0.2% caprines	4-5 mm	2651: no formal tools	none	fineline red human figures
Likoaeng (Mitchell 2003, 2009). Layer 1	Thickness: not discussed. Temper: not discussed. Date: 1310 ± 80 BP (Pta-7877)	1285 ± 40 BP (GrA-23237). (layer 1)	caprines and cattle present	none	665 (19 formal = 2.8%).(layer 1)	metal associated with date 1290 ± 30 BP (GrA-26831). (layer 1)	none
Mauermanshoek (Wadley 2001)	Thickness: not discussed. Temper: grass and grit. Date: 200 ± 50 BP (Pta-5929)	200 ± 50 BP (Pta-5929)	cattle present	none	1379 (74 formal = 5.3%)	metal associated with date 200 ± 50 BP (Pta-5929)	fineline eland, antelopes and human figures
Mirabib (Sandelowsky 1974, 1977)	Thin-walled	1550 ± 50 BP (Pta-1535)	no domestic fauna but sheep hair in dung layer	5-10 mm	dung and surface layers: 293 (66 formal = 22.5%)	metal associated with date 1550 ± 50 BP (Pta - 1535)	rock art present
Melkbosstrand (Sealy *et al.* 2004)	Thickness: <10 mm. Temper: not discussed. Date: AD 744 / 1825 ± 25 BP (Pta-7800)	1825 ± 15 BP (Pta-7800)	sheep present	4-8 mm	2111 (6 formal = 0.3%)	metal not associated with caprine and pottery dates	none
KN 2005/041 Namaqualand (Orton 2012; Orton *et al.* 2013)	no pottery present	1625 ± 25 BP 2(OxA-22933)	cattle present	4.87 mm	352 (2 formal = 0.5%)	none	none
Oruwanje 95/1 (Albrecht *et al.* 2001; Eichhorn & Vogelsang 2011)	Thickness: <10 mm and >10 mm.Temper: quartz and mica. Date: 1950 ± 35 BP (KN-5303)	3100 ± 37 BP(UtC-5588) 1306 ± 36 BP (UtC-5946)	caprines present	4.88 mm	32 191: (805 formal = 2.5%)	none	none
Spoeg Rivier, (Webley 1992; Vogel *et al.* 1997;Webley 2007; Sadr 2008a,b)	Thickness: <10 mm. Temper: quartz. Date: 1930 ± 50 BP (Pta-6749)	2105 ± 65 BP (OxA-3862)	3.51% caprines	4.4 -5.8 mm	1187: (22 formal = 1.85%)	none	none
Toteng (Robbins *et al.* 2005; Robbins *et al.* 2008; Sadr 2008a,b)	Thickness: <10 mm. Temper: grit and charcoal. Date: 2035 ± 26 BP (Beta-44963, Beta-186669, Beta-194888 - weighmean). Type: Bambata	2070 ± 40 BP (Beta-1904888) 2020 ± 40 (Beta-186669)	0.4% caprines 0.2% cattle	4-5 mm	1130: (59 formal = 5.2%)	metal association not clear	none
Vlermuisgat (Parsons 2006, 2007, 2008)	Thickness: <10 mm. Temper: grass. Date: AD 1444 -1525; AD 1560 - 1632 / 430 ± 60 BP (Pta-9511)	480 ± 50 bp (Pta-9510)	1% sheep	5.6 mm	805 (11 formal = 1.4%)	none	geometric finger paintings and feline

FIGURE 3.1. *Location of rock shelters, open-air sites and stone circles mentioned in this chapter.*

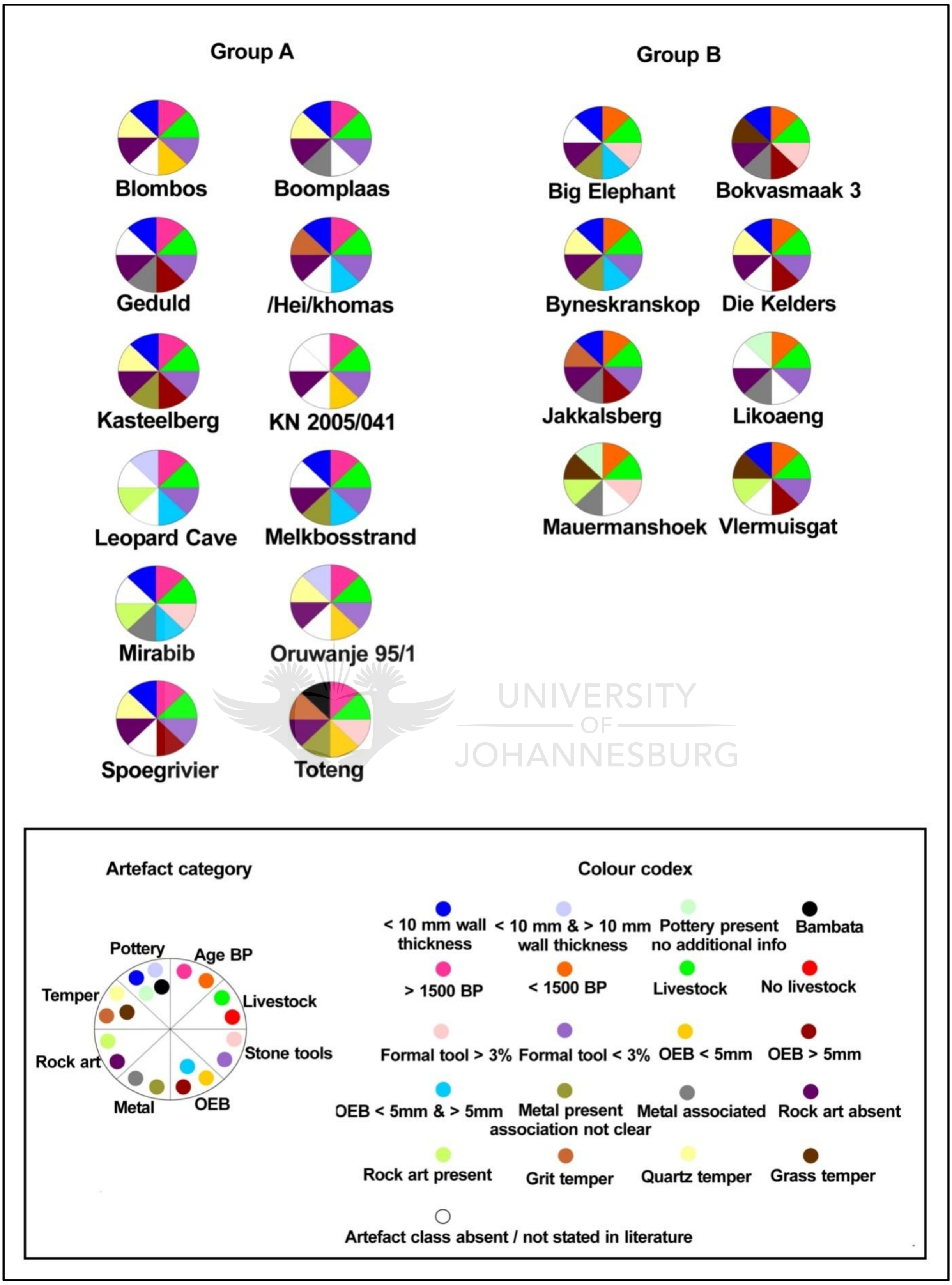

FIGURE 3.2. *Variability in material remains among known herder sites from southern Africa.*

3.2 Stone circles in southern Africa

Stone circles located in South Africa and Namibia are associated with both hunter-gatherers and herders (Sandelowsky 1974; Carr *et al*. 1978; Shackley 1983, 1985; Jacobson & Noli 1987; Noli & Avery 1987; Kinahan 1991; Miller & Sandelowsky 1999; Parsons 2000a, 2004; Sampson 2009; Eichhorn & Vogelsang 2011). In Namibia, many sites have been recorded (Veldman 2008; Speich 2010) (Fig. 3.3), but few were excavated and therefore only stone circle sites from South Africa and Namibia that have been excavated and described are included in the site summary (Table 3.2).

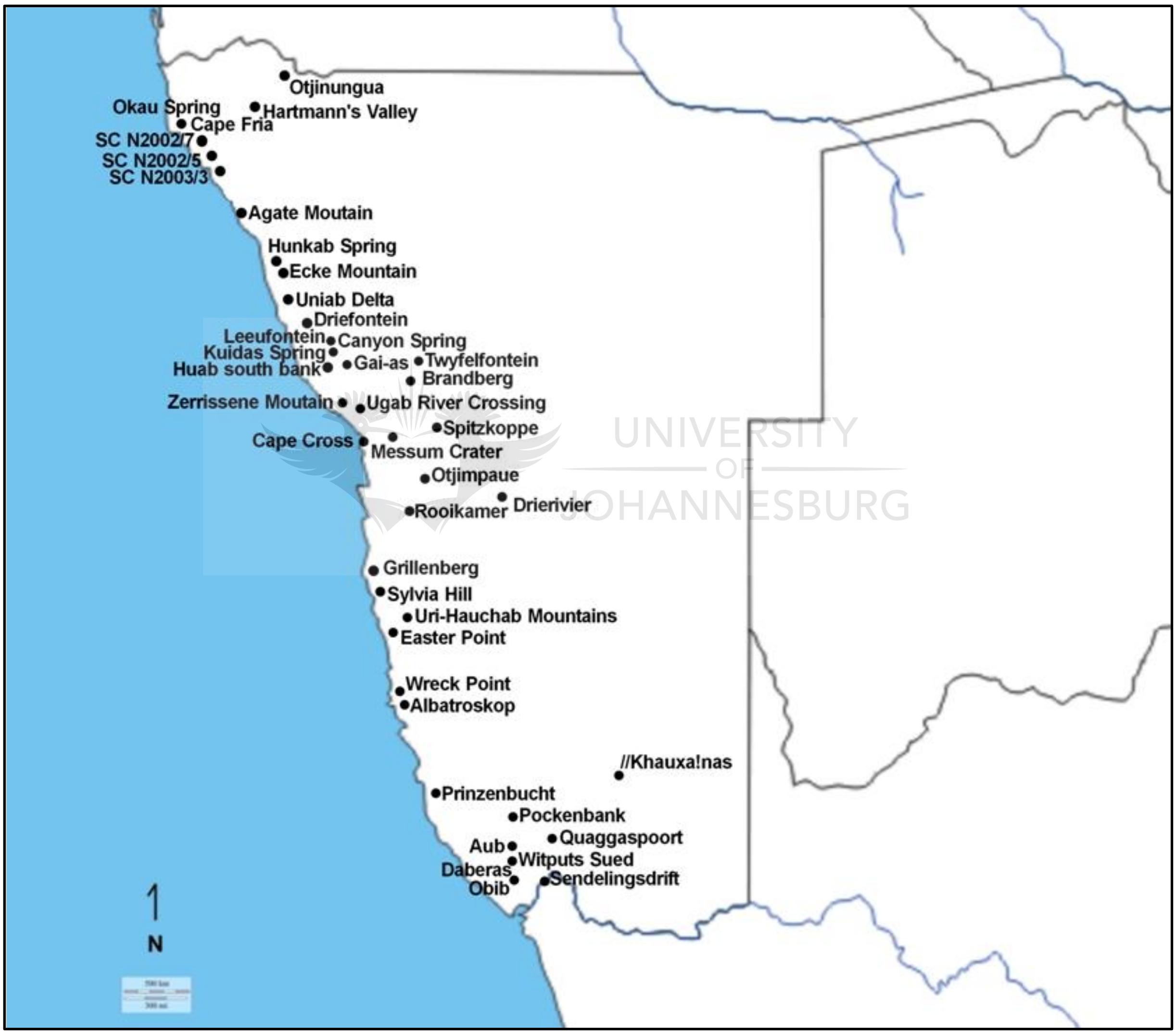

FIGURE 3.3. *Stone circle site distribution in Namibia.*

Stone circles are relatively more common in Namibia than in other areas of southern Africa. Some sites such as the Brandberg, Zerrissene Mountains and Ugab River Crossing are large settlements having more than 200 individual stone circles (Fig. 3.3) (Veldman 2008). The circles vary in building style. The most common styles include: a) stones stacked to form a walled rampart, b) simple stone stacking against each other, c) stones stacked upright as plates forming semi-circles, d) mixed styles, e) storage cairn, f) stones packed in layers, g) scattered stones forming a circle, h) round stones laid flat on a sand surface (Fig. 3.4). The forms of the stone circles vary from one simple cellular structure with an opening, to complex multi-cellular structures (Fig. 3.4) (Speich 2010).

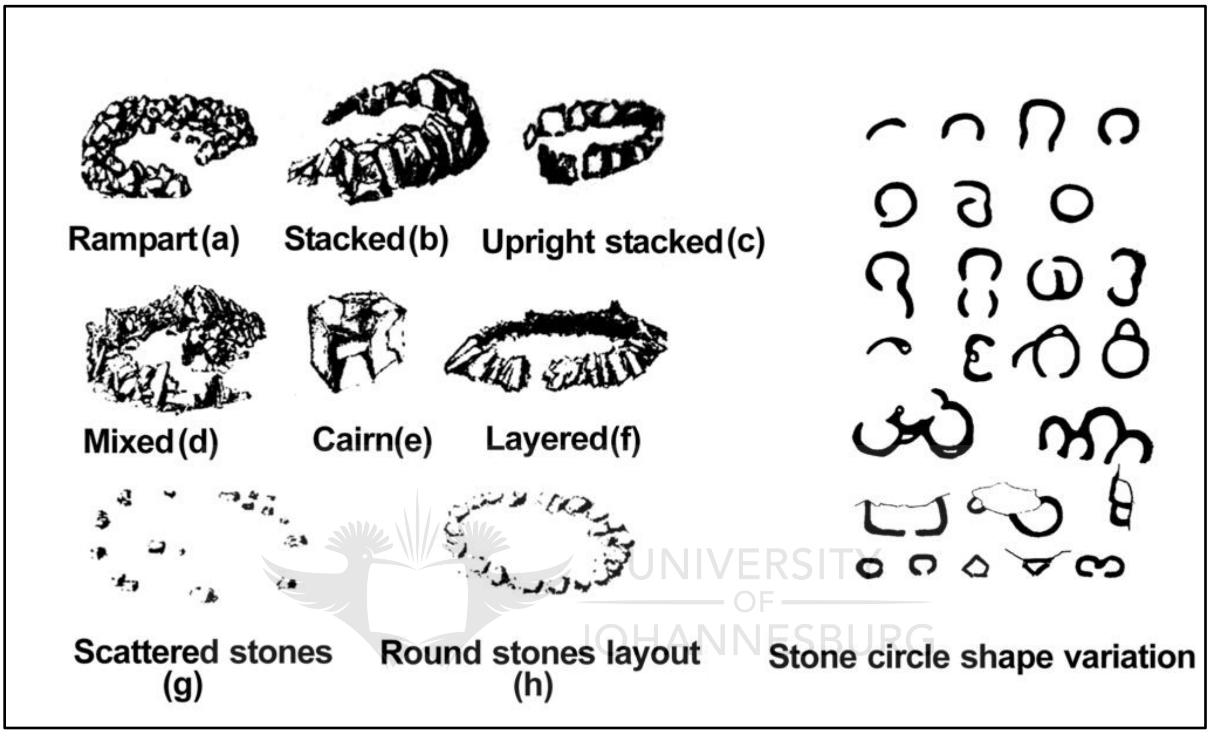

FIGURE 3.4. *Styles of stone circle construction and layout (after Speich 2010 pages 27 and 33, used with permission of the author).*

Most stone circle sites have thin-walled pottery made with grit and grass temper and a low percentage of formal stone tools (Table 3.2 and Fig. 3.5). OEB sizes range from small (<5 mm) to large (>5 mm). No faunal remains of domestic animals have been found at stone circle sites (Table 3.2). At Drierivier, Sylvia Hill and the Zerrissene Mountains (Fig. 3.3), human and dog burials have been found (Carr *et al.* 1978; Shackley 1983; Miller & Sandelowsky 1999). Again, the variability in material remains at stone circle sites could be due to sample size variations, differences in geographical location, as well as excavation and artefact analyses methodology (Fig. 3.5).

The only rock art found in direct association with stone circles is at Springbokoog 1 and Jagt Pan 7 in the Northern Cape Province (Morris 1988, 1990; Beaumont & Vogel 1989;

Beaumont *et al*. 1995; Parsons 2006, 2007) (Table 3.2 and Fig. 3.5). Rock art also occurs near stone circle sites such as the Zerrissene Mountains, Gai-as Spring and Kuidas Spring in Namibia (Fig. 3.3), but it remains ambiguous whether or not the art can be associated with the occupation of these features.

TABLE 3.2. *Attributes of stone circle sites in southern Africa. Note that the oldest date of a site is used in the summary. *OEB size ranges were not calculated by A.Veldman.*

Site	Building style	Lithics %	Pottery present	Caprine fauna	OEB size	Metal	Date*	Rock art
Bloubos 7 (Parsons 2000a,b, 2004)	scattered stones	665 (40 formal = 6%)	yes	none	4-5.7 mm	none	2370 ± 45 BP (Pta-7755)	none
Brandberg (Kinahan 1991)	rampart and mixed	not stated	yes	none	not stated	not stated	150 ± 50 BP (Pta-3891) and 570 ± 50 BP (Pta-3873)	none
Hartmann's Valley (Eichhorn & Vogelsang 2011)	scattered stones and mixed	no formal tools	yes	to be analysed	5.7-16 mm	present	1690 ± 110 BP (UtC-9880)	none
Jagt Pan 7 (Beaumont & Vogel 1989; Parsons 2006, 2007, 2008)	oval shaped	2476 (92 formal = 4%)	yes	game	5-10 mm	none	2550 ± 60 BP (Pta-4193)	pecked and scraped engravings
Seacow River Valley stone circles (Sampson 2009)	wall rampart scattered stones, and kraals	not stated	yes	none	not stated	not stated	1080 ± 40 BP (Beta-230584)	none
Simon se Klip (Jerardino & Maggs 2007)	wall rampart and plate style	no formal tools	yes	game	none	none	1440 ± 60 BP (GX32343).	none
Skeleton Coast N2002/7 (Eichhorn & Vogelsang 2011)	plate style	no formal tools	yes	to be analysed	11.36 mm	none	1175 ± 25 BP (KIA18993).	none
Skeleton Coast N 2003/3 (Eichhorn & Vogelsang 2011)	plate style	no formal tools	yes surface	to be analysed	not stated	none	165 ± 50 BP (KIA21033)	none
Skeleton Coast N2002/5 (Eichhorn & Vogelsang 2011)	plate style	no formal tools	no	none	none	none	400 ± 50 BP (KN-5565)	none
Springbokoog 1 (Morris 1988;Beaumont & Vogel 1989; Beaumont *et al.* 1995)	scattered stones	Wilton (78% backed pieces)	yes	not stated	not stated	present	4630 ± 60 BP (Pta-4091)	hairline and scraped engravings
Sylvia Hill (Shackley 1983)	various	not stated	yes	none	not stated	not stated	510 ± 45 BP (Pta-3294) and 1070 ± 60 BP (Pta-3295)	none
Zerrissene Mountains (Carr *et al.* 1978)	plate, mixed, stacked	not stated	yes	equid	10.5-20 mm	present	345 ± 40 BP (Pta-1577)	red coloured oryx, spoor and skeleton-like figure

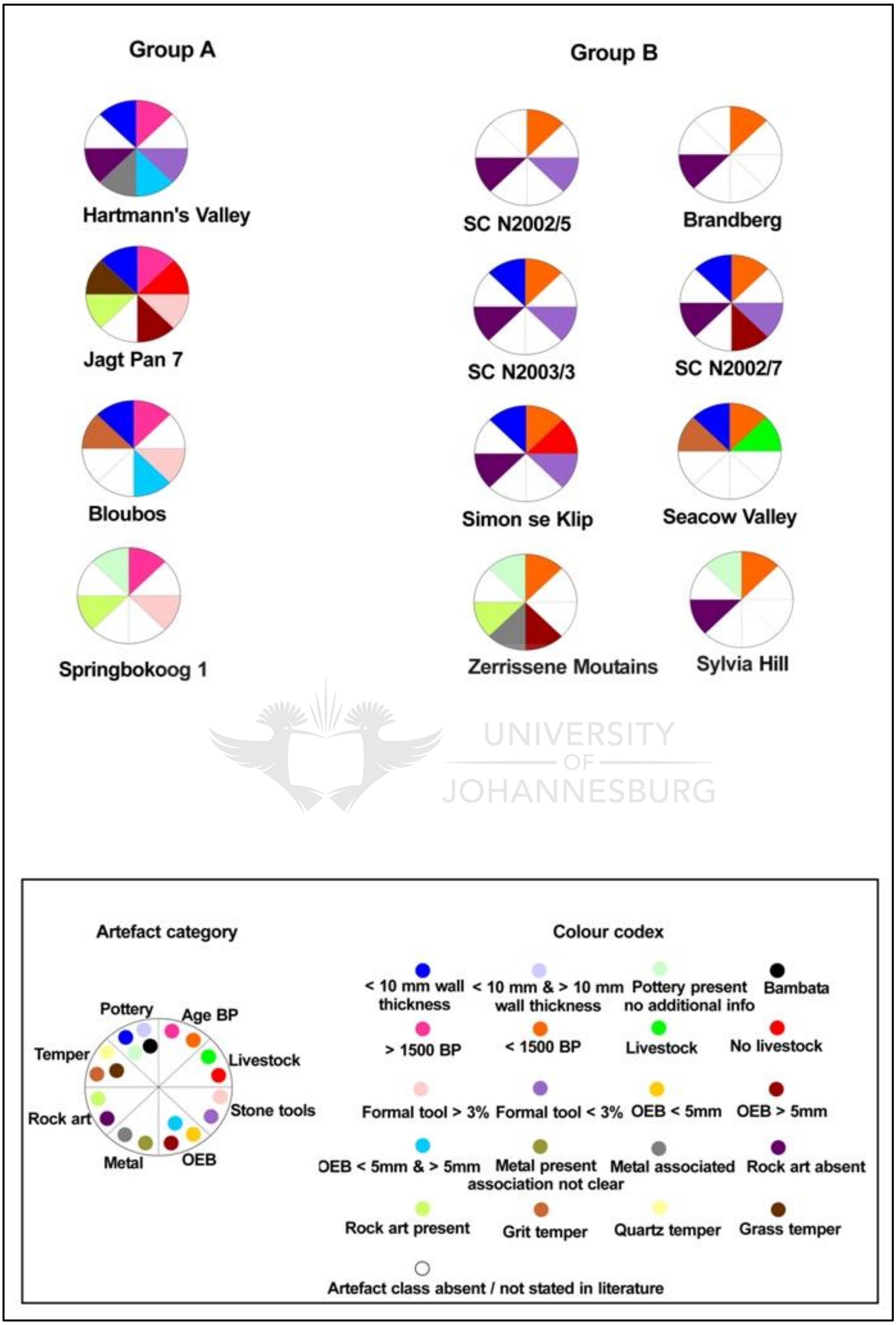

FIGURE 3.5. *Variability in material remains among stone circle sites from southern Africa.*

3.3 Who constructed and occupied stone circles?

Different interpretations have been presented of why these stone structures have been constructed as well as who occupied them. Stone circle sites are interpreted as hunting blinds, aggregation phases, permanent herder settlements, temporary encampments and some are associated with copper smelting activities (Sandelowsky 1974, 1977; Carr *et al.* 1978; Shackley 1983, 1985; Jacobson & Noli 1987; Noli & Avery 1987; Kinahan 1991; Miller & Sandelowsky 1999; Parsons 2000a, 2004; Sampson 2009; Eichhorn & Vogelsang 2011).

In the South African context, stone circle settlements are associated with both hunter-gatherers and herders based on the material culture and ethnographic accounts (Parsons 2000a, 2004; Sampson 2009). In the Namibian context, Kinahan (1991) proposed that stone tools and faunal assemblages are a vague and an unsuitable basis for distinguishing between hunter-gatherers and herders. Such differences are rather found in the social basis of hunting and herding economies, which is directly associated with rock art (Kinahan 1991).

Kinahan's (1991) model suggests that archaeological evidence relating to a social basis and therefore religious beliefs, is rock art and all rock art in the Brandberg forms a single system of belief (Fig. 3.3). Trance dancing is a ritual activity that serves to maintain an egalitarian social structure in a hunter-gatherer society, thereby inhibiting the development of inequalities that would arise from ownership of livestock. At Snake Rock Shelter in the Brandberg, (Figs. 3.1 and 3.3), a painted panel depicts men in polychrome superimposed onto monochrome painted men and women clapping hands and trance dancing. The male polychrome figures are not in the conventional trance dance posture and there is no women depicted among the polychrome figures. This implies that male figures were painted in a specific manner to emphasise their ritual potency and individuality, while the absence of dancing women also indicate that the ritual potency existed outside the social context of the dance. The polychrome figures suggest specialisation and male exclusivity, which is in contrast to the monochrome communal healing and trance dancing. In addition, the polychrome figures are superimposed onto the monochrome figures implying a later stage of painting and therefore represents change in ritual practice (Kinahan 1991). Ritual activity has changed because shamans gained importance due to being healing specialists and by acting as mediators they acquired material wealth, possibly in the form of livestock. Therefore, the shaman was able to exempt the livestock from egalitarian communal demands and then the social relations of property control emerged, and everyone else in the community could obtain livestock.

Consequently, as pastoralism became more established in the Brandberg, communal healing and rock art were not important anymore (Kinahan 1991). Doubt has been cast over Kinahan's model (Smith & Jacobson 1995; Smith *et al.* 1996; Jacobson 1997), because rock art are ambiguously associated with rock shelters and stone circles.

In conjunction with the rock art, a cache of metal beads and cowrie shells from the pastoral phases of Falls Rock Shelter at the Brandberg (Figs. 3.1 and. 3.3) also signifies economic change. Neighbouring communities shared the pottery that was introduced prior to livestock and thus livestock was also subject to the ethos of sharing. The cache of metal beads and cowrie shells have been hidden and hoarded, therefore signifying the change in social relations regarding property (Kinahan 1991). Changes in rock art depictions along with hoarded items reflect a changing economy and these changes were due local development and not migrating pastoralists, but Kinahan (1991) does not elaborate on the possible source of livestock (Smith & Jacobson 1995; Smith *et al.* 1996; Jacobson 1997). After accumulating livestock, hunter-gatherers abandoned rock shelters and stone circle encampments appeared as the main form of settlement because domestic herds requires pastoral organisation (Kinahan 1991). Because of the social changes that took place, the stone circles from the Brandberg are attributed to hierarchical pastoral communities that flourished until the colonial era of Namibia (Kinahan 1991).

In the Northern Cape Province of South Africa, differences in lithic assemblages have been noted between stone circle sites. The Swartkop Industry is associated with hunter-gatherers and the Doornfontein Industry, putatively, with herders (Beaumont *et al.* 1995; Parsons 2000a, 2003, 2004, 2007, 2008). The Swartkop Industry is characterised by relatively high percentages of formal lithics, especially backed blades, as well as small OEBs and thin-walled undecorated, grass-tempered ceramics. The Doornfontein assemblages are characterised by lower percentages of formal lithics, larger OEBs, as well as thin-walled and grit-tempered ceramics. However, overlapping characteristics between lithic assemblages, pottery and the size of OEBs hinder the conclusive labelling of a hunter-gatherer and herder/hunters-with-sheep assemblages (Sadr 2003; Parsons 2007, 2008; Orton 2012).

Parsons (2004) also drew on ethnographic accounts and material culture to discern the possible function of stone circle encampments in the Northern Cape Province of South Africa (Fig. 3.1). Prior to the introduction of livestock, hunter-gatherer societies preferred a circular camp layout with huts close to each other facing towards the centre of the encampment. After acquiring livestock, the settlement layout changed and stock pens are found outside the circle of huts and later the stock pens were an integral part of the settlement layout. With time the circular layout of huts disappeared completely and huts were further apart from each other. Therefore, the changes in settlement pattern are a clear indication of internal change in a society (Parsons 2004). The initial circular settlement patterns have symbolic connotations, such as equality among the inhabitants, but when internal stratification occurs due to the introduction of livestock, the spatial organisation reflects the demarcation of private space. The presence of engraved stones inside a stone circle is a further indication of symbolic connotations to stone circle occupation. From the ethnographic accounts and archaeological data from sites such as Bloubos, Springbokoog 1 and Jagt Pan 7 (Fig. 3.1), it is surmised that hunter-gatherers and herders could have occupied stone circles (Morris 1988; Beaumont & Vogel 1989; Parsons 2000a, 2004, 2007).

A similar scenario of stone circle occupation phases are proposed for the Seacow River Valley, also in the Northern Cape Province of South Africa (Fig. 3.1). Pottery types and a sequence of dates derived from pots with different decorative styles and manufacturing techniques indicates complex interaction between hunter-gatherers and herders. Hunter-gatherers once living in rock shelters produced fibre-tempered and undecorated bowls a millennium prior to the introduction of livestock. Herders who did not live in rock shelters but constructed stone circles, produced lugged-incised, spouted-incised, comb-decorated and undecorated lugged grit/sand-tempered pottery (Sadr & Sampson 1999). Hunter-gatherers still occupied rock shelters but built livestock enclosures near their rock shelters, therefore, becoming hunters-with-sheep and later on also occupied stone circles but kept to their fibre-tempered ware. The archaeology of the Seacow River Valley clearly indicates a diffusion of livestock, which some hunter-gatherer groups accepted, while others did not and migrant herders sharing the valley with both hunters-with-sheep and hunter-gatherers (Sampson 2009).

Considering the ethnographic record and historical sources from Namibia, some local groups could have built stone circles. The origins of the Damara-speaking groups are not known but in recent times, however, they used stones to support their grass huts (Alexander 1838, Viereck 1968). Stone piles known as *Haitse-aibebs* and copper beads are often found near stone circle sites. *Haitsi-eibeb* is a trickster deity in Damara cosmology and the Damara are also considered to be the first known ironsmiths in Namibia. Therefore, Damara-speakers are often said to have built and occupied stone circle sites (Alexander 1838; Du Pisani 1978; Wadley 1979; Kinahan 1986; Sullivan 1999; Speich 2010).

Herero-speaking groups entered Namibia from modern-day Angola during the 16th century (Fig. 1.1) (Mendelsohn *et al.* 2002), if they were responsible for building stone circles, most stone circle sites in Namibia should post date their arrival, which is not the case. Some sites pre-date their arrival and other sites do not (Speich 2010). OvaTjimba groups, who are Herero-speaking Himba people without cattle from the northern Kaokoveld, also built their huts with stone bases (MacCalman & Grobbelaar 1965; Malan 1973, 1980; Noli & Avery 1987) and Herero-speaking Himba with cattle built smaller stone-supported huts used for young livestock (Speich 2010). However, at permanent settlements, the Herero-speaking Himba follows a strict Central Cattle Pattern (*cf*. Malan 1973), whereas stone circles do not have a distinct spatial layout that can be associated with a particular group of people (Noli & Avery 1987; Veldman 2008). According to Noli & Avery (1987), a few Herero individuals that travelled to the coast for collecting salt, constructed stone huts with whalebones because of the lack of wood (*cf*. Smith & Kinahan 1984).

The Nama, who entered Namibia after AD 1700 from South Africa (Fig. 1.1), also built huts using stone bases (Alexander 1838; Haacke 1982; Speich 2010). Alexander (1838) described heaps of stones to which the Nama refer to as their father *Haije Aibeb,* and whenever they pass a heap of stones they would place another stone or branch on the heap and ask *Haije Aibeb* for more goats (Alexander 1838; Schapera 1930; Speich 2010). It is noteworthy that the Damara has the same practice of adding stones to a pile for good luck (Du Pisani 1978; Speich 2010). The Nama also mined copper and iron. The ǂAonin Topnaar were known to roam the coastal areas of Namibia harvesting !Nara melons and could therefore also have constructed stone circles along the coast (Sydow 1973; Budack 1977; Dentlinger 1977; Jacobson & Noli 1987; Noli & Avery 1987).

The settlement layout of the Hei//om are also similar to archaeological stone circles (Yellen 1976; Parkington & Mills 1991; Parsons 2004). The Hei//om of the Etosha region informed researchers that some circles were used for hunting blinds and others for cooking, living spaces and sleeping, while the smaller coops were dog enclosures (Peters *et al.* 2009).

Based on the foregoing, the builders and occupants of stone circles could have been hunter-gatherers or pastoralists, which include the Damara, OvaTjimba, Nama, ǂAonin Topnaar and Hei//om. In addition, groups that once had livestock could have returned to a hunter-gatherer way of life, and they may not have suddenly changed their settlement layouts (Steyn & Du Pisani 1985; Barnard 1992). Due to the variability of material culture between stone circle sites, it remains ambiguous to determine who built and occupied these structures (Parsons 2000a, 2004, 2008; Sampson 2009).

3.4 Rock art

Even though rock art cannot be directly associated with archaeological deposits unless found *in situ*, it still is an integral part of Later Stone Age sites of southern Africa. Insight into San rock art studies in southern Africa is based on ethnographic information obtained from past informants (Orpen 1874; Bleek & Lloyd 1911) and archaeologists interpret rock art as an artistic expression of San beliefs (Lewis-Williams & Dowson 1999; Eastwood 2003; Ouzman & Smith 2004; Eastwood & Smith 2005; Lewis-Williams 2006; Blundell *et al.* 2010). Historical sources have a context of their own and to infer meaning without considering the context is problematic, especially if specific ethnographic sources do not exist for all rock art depictions (Morris 1988). Shamanism is a radically different cognitive structure than that of a Western society, thus when relying on shamanic interpretations a possibility exists to lose information due to a cultural bias of both parties during an ethnographic interview. In a similar vein, some shamanistic cultures do not share deep information easily among their own members and it could be naive to expect that a member of such a society will share similar deep information with an outsider (Joralemon 1990; Ross 2001). However, without consulting an ethnographic record interpretations of rock art would have been limited to the 'gaze-and-guess' method, which will lead to far-fetched and unsubstantiated interpretations as it has in the past (Breuil 1948; Blundell *et al.* 2010; Price 2010; Walderhaug 2010). Due to information from the ethnographic record originating from a time period when indigenous communities already intermixed through trade and marriage (*cf.* Breton *et al.* 2014), distinguishing between hunter-gatherers and herders based on the shamanistic interpretation is limited.

In southern Africa, rock art includes both paintings and engravings. Three pre-colonial traditions existed in southern Africa. First, San paintings and engravings, second, Khoe-herder paintings and engravings and third, Late White paintings made by Bantu-speaking groups (Lewis-Williams 2006). San art consists of fine-line art using a variety of colours, brushes, and the paint has a fine consistency. Khoe-herder art is mostly finger-painted, using red and/or white paint and engraved panels are often dominated by geometric images. Late White art is mostly depictions in white paint with a thicker greyish pigment and are larger than San and Khoe rock art (Hall & Smith 2000; Ouzman & Smith 2004; Eastwood & Smith 2005).

Rock art studies aims to identify immigrant Khoe-herders based on geographical occurrence. Regional, chronological and representational variability of Khoe-art is an expression of a society that can adapt to different environments and to different people. Circular geometric depictions dominate Khoe rock art in the Northern Cape, whereas in the Western Cape there are more depictions of people, animals, aprons and loincloths (Ouzman & Smith 2004; Orton 2013). San and Khoe rock art also occur at the same sites showing fine-line depictions of fat-tailed sheep next to geometric designs, indicating cultural contact between hunter-gatherers and herders. At several sites, images imposed on one another suggest hunter-gatherer and herders shared the landscape. The blending of Khoe-art and San-art also show that there was an understanding of each other's world-view, which suggests these groups sustained contact over a long period of time (Hall & Smith 2000; Ouzman & Smith 2004; Eastwood & Smith 2005; Orton 2012).

In the Namibian context, Kinahan (1991) proposed that different stylistic depictions of human figures in painted panels signifies the adoption of livestock. Richter (2002) suggests hunter-gatherers stopped the practice of painting rock art once pastoralism became part of their economy and therefore art in the form of engraved panels replaced painting. However, at Twyfelfontein in northwest Namibia, engravings and paintings occur in combination signifying that both San and Khoe art traditions are present (Ouzman & Smith 2004). Twyfelfontein was a long-term focus for San and Khoe communities involving ceremonies and contact between the two groups, which is evident from the various depictions of animal and geometric designs (Ouzman 2002). Other sites in Namibia such as the Brandberg and Erongo Mountains also suggest cultural contact as fine-line art and finger paintings occur simultaneously (Eichhorn & Vogelsang 2011).

From rock art studies it seems that hunter-gatherers and herders had social interaction, shared the landscape and understood each other's world-view (Hall & Smith 2000; Ouzman & Smith

2004; Eastwood & Smith 2005; Eastwood *et al.* 2010; Orton 2013) and in a Namibian context one tradition possibly replaced the other (Kinahan 1991; Richter 2002). I would surmise that since hunter-gatherer and herder societies were interacting on such a level that they shared symbolic space on the landscape, they probably would have shared pottery and livestock as well regardless of whether one tradition replaced the other.

3.5 Chapter summary

Distinguishing between two different cultural identities being hunter-gatherers or herders is problematic. Even though there is distinguishable differences in the anthropological and ethnographical records between hunter-gatherers and herders, the material evidence from archaeological sites display a complex mosaic. From the archaeological record it is possible to identify similarities between individual sites. However, from a broad perspective no definite trends can be identified to distinguish culturally between hunter-gatherers, immigrant herders and hunters-with-sheep. In Chapter 4, I discuss the methods for excavation and artefact analysis for Kuidas Spring, with the aim to identify different subsistence strategies instead of cultural identities.

Chapter 4

Methods: archaeological excavation and artefact analysis

4.1 Excavation methodology applied at Kuidas Spring

The excavation, recording and curation methodology followed for this project is based on general archaeological practice (Balme & Paterson 2006; Kipfer 2007), as well as the Code of Conduct as set out in Appendix C of the constitution of the Association of Southern African Professional Archaeologists (ASAPA) (www.asapa.org.za, consulted June 2013). First, I mapped the features of KS1 (Fig. 4.1) using a Global Positioning System (GPS) theodolite, tape measure and compass. I established three datum points in order to triangulate the positions of all archaeological and most natural features. To illustrate that the site area is not a flat landscape and the general decline in height above sea level, the highest and lowest points of the 60-m-long valley was measured with a theodolite.

During 2009, I excavated test pits at two rock shelters and a stone circle (Fig. 4.1) at KS1 with the aim to establish whether the site has research potential for a Master's degree. The rock shelter (KRS1) test pit (F2) had a very shallow deposit. I chose a stone circle (KSC19) situated on a slope and the limited amount of artefacts from the test pit (F3) possibly washed in from above. Therefore, these features were not excavated during January 2013 and are not included in the current study. The artefacts from the 2009 excavated test pits will be studied at a later stage.

KS1 was further excavated in 2013 (permit no. 12/2012) (Fig. 4.1). I selected KSC14 for excavation because it is located near KRS2 and had more surface area than most other stone circles. Situated next to loose standing boulders, the stone circle construction is of a mixed style (*cf*. Speich 2010). The circle is 3.8 m in length and 2.5 m in width. The stones reach a height of *ca*. 1 m, but are lower in some areas (Fig. 4.2).

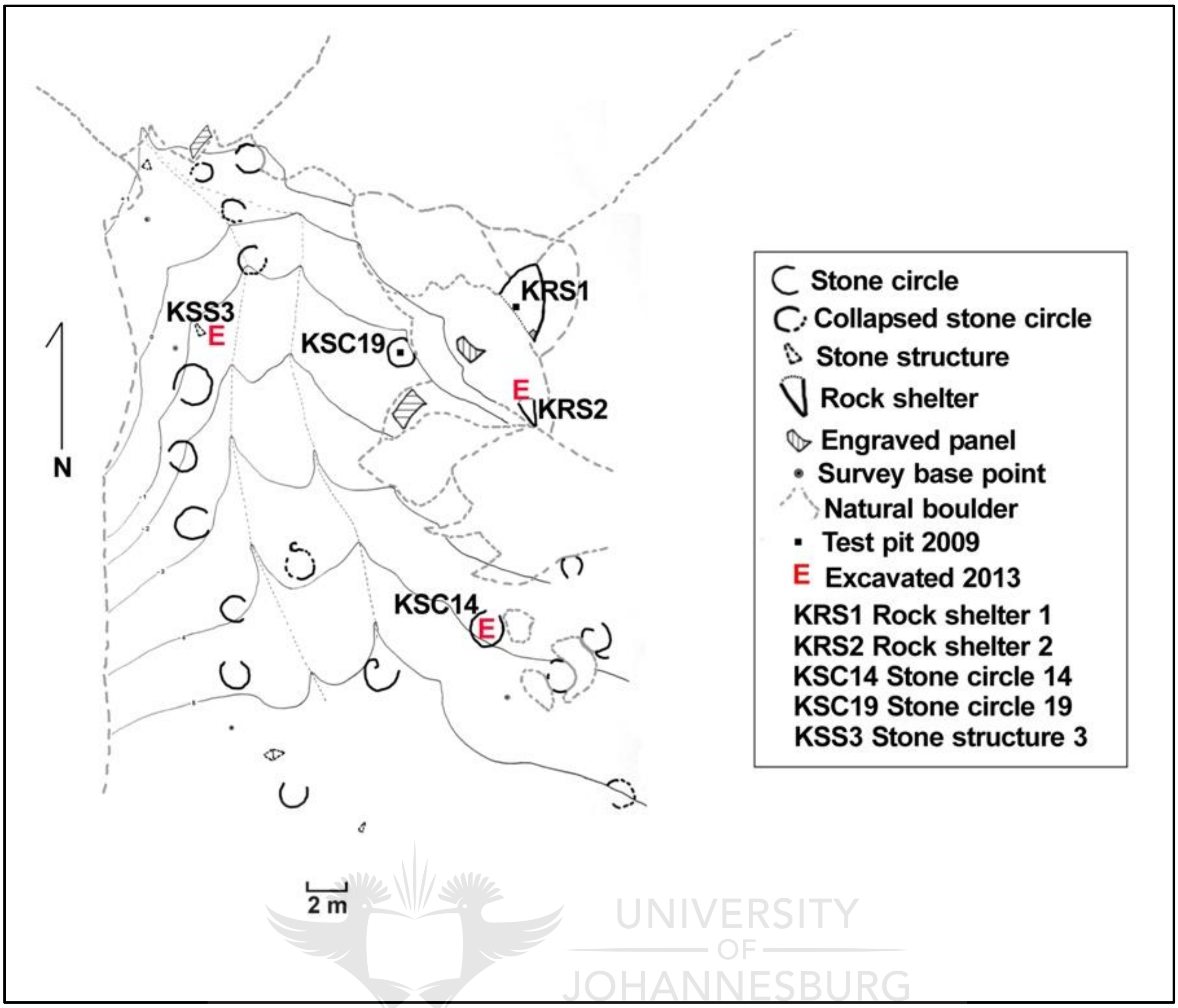

FIGURE 4.1. *Kuidas Spring Site 1 (KS1) map indicating the location of the 2009 test pits and 2013 excavated features.*

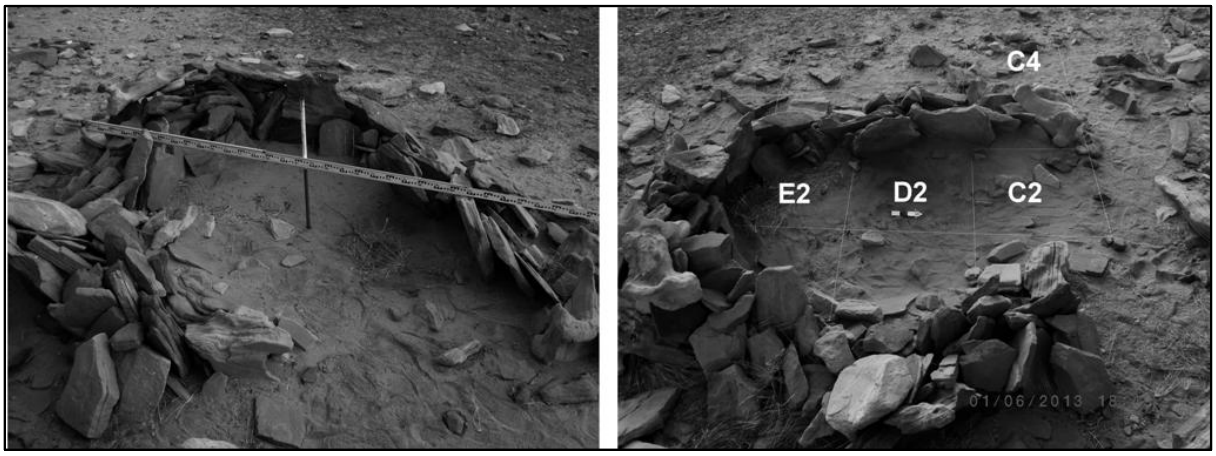

FIGURE 4.2. *Kuidas stone circle 14 (KSC14) viewed from above with height and width of the excavated squares.*

Surface artefacts collected prior to excavation at KSC14 included mainly OES and OEBs. Three 1 x 1 m squares (C2, D2 and E2) set out in a north-south orientation across the inner western half of the stone circle, was excavated. In addition I excavated a 1 x 1 m square (C4) adjacent to and outside the circle (Fig. 4.2). No stratigraphy was present in the squares inside the circle and excavation was conducted in 50 mm spits. The deposit inside the circle for all three blocks reached bedrock at 200 mm, whereas the square (C4) outside the circle was very shallow, reaching bedrock at 50 mm. All excavated deposits were sifted using 1 mm mesh sieves.

In 2009, I excavated a test pit (permit no. 14/2009) at the entrance of KRS2 (Fig. 4.3), which will not form part of this study. The shelter is small because it has a breadth of only 1.2 m and a horizontal length of 2 m. The boulders overhanging KRS2 is lower at the south and the height at the entrance is 1.8 m. For this study, I excavated a 1 x 1 m square (F1), south of, and adjacent to the original test pit. Using the stratigraphy exposed in the southern wall of the original test pit, excavation of square F1 proceeded stratigraphically. Four stratigraphic layers were recognised and named according to their colorimetric properties as defined by the Munsell Soil Chart (2002) (Fig. 4.3). Deposits were screened through a 1 mm mesh. The deposit reached bedrock at 300 mm.

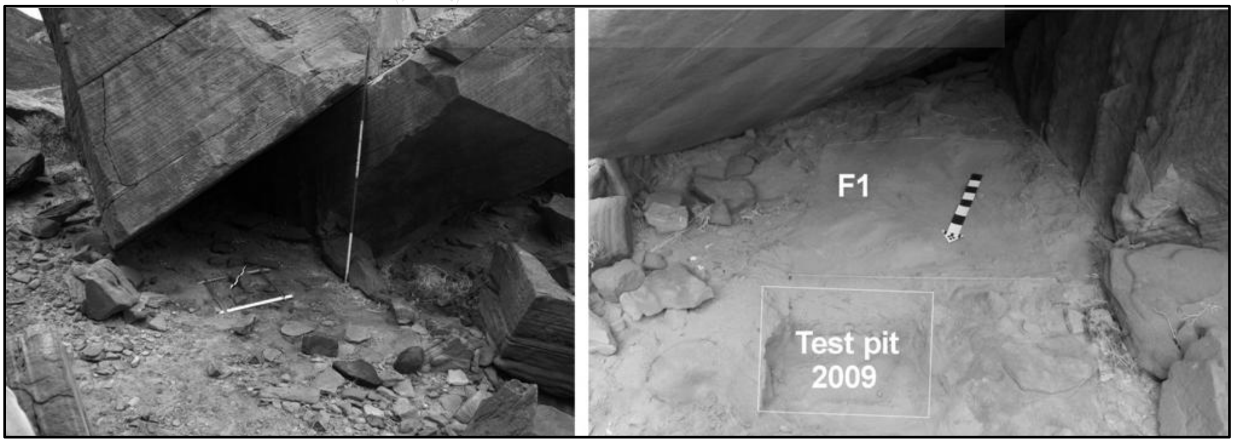

FIGURE 4.3. *Kuidas rock shelter 2 (KRS2) with the original test pit of 2009 and excavated square of 2013.*

Finally, the interior of a collapsed cairn (KSS3) (Fig. 4.4), was excavated. The feature is 50 cm in diameter. No surface artefacts were noted outside KSS3, and only the collapsed inner surface was excavated. As KSS3 could have been a human burial, I placed a 3 x 3 m square named F4 over the entire feature. This would have allowed the excavations to expand if a burial was found.

After removing surface collapsed stones it was clear that KSS3 did not have a sand filled deposit, nor a burial, but consisted mainly of stones, gravel and sand patches in between. Due to the gravelly nature of the deposit, after removing rubble the level was closer to 100 mm than 50 mm. There was no stratigraphy. Therefore, I chose to excavate in 100 mm spits and reached bedrock at 200 mm. A 1 mm sieve was used to retrieve the limited amount of artefacts.

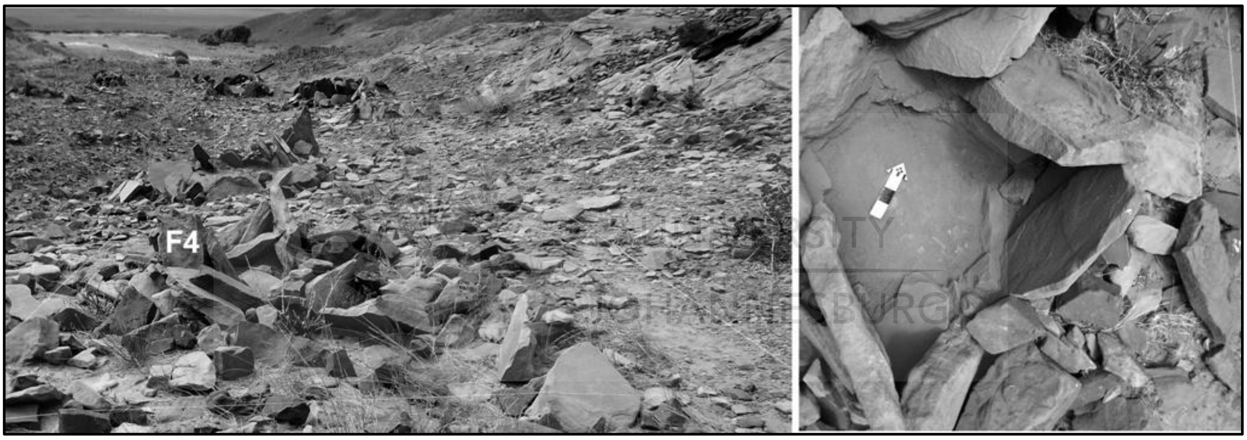

FIGURE 4.4. *Kuidas stone cairn 3 (KSS3) with the excavated structure (F4 marks the collapsed structure).*

4.2 Lithic analysis

4.2.1 Brief background to lithic analysis

Stone is an enduring artefact in the archaeological record. Lithic analyses enable archaeologists to detect typological and technological changes through time. Interpretations based on data obtained from such analyses also provide information on the planning abilities, thought processes and efforts required in making stone tools. Depending on the analytical approach, the daily tasks and subsistence strategies of past societies can be reconstructed (Andrefsky 1994, 2005, 2009; Odell 2003; Lombard 2005a; Lombard *et al.* 2012). Classifying stone pieces into manageable units facilitates standardised analyses (Andrefsky 2005).

Stone tool manufacture begins with selecting a rock of suitable size, referred to as a core. Using a hammerstone and striking a flake from the core is the first step in stone tool production. Thereafter, the flake is modified by removing small sections on either or both edges and this result in a formal stone tool (Table 4.1) (Odell 1988, 2003; Andrefsky 2005).

The rock types used to manufacture tools provide important information. Rock types occur in certain regions on a landscape due to different geological processes. Often researchers investigate where a rock type was sourced by toolmakers to determine if the material was local or not (Odell 1988, 2003; Andrefsky 1994, 2005, 2009). Toolmakers selected some rock types based on their qualities. Implements that require sharp edges, such as blades (Table 4.1), for example, are usually made from basalt, chert or crystalline silicates. Tools such as hammers and adzes that do not require a sharp edge are made from rocks such as granite and diorite (Odell 2003). In southern Africa, stone tools were made from a variety of rock types such as chert, chalcedony, jasper, quartz, silcrete, hornfels, basalt, quartzite and cryptocrystalline silicates (Lombard *et al.* 2012). Cryptocrystalline silicates (CCS) are a generic term used to indicate a wide range of fine-grained rock types, which were used to make stone tools (Orton 2012).

Typological analysis consists of sorting stones into classes based on their rock type, morphological appearance and formal attributes and together, the classes from a single site forms an 'assemblage' (Odell 2003; Andrefsky 2005). Such analyses are conducted to characterise assemblages and to investigate inter- and intra-site differences and trends within a comparative framework. For example, Later Stone Age studies in southern Africa use typological analyses to compare lithic assemblages with one another (e.g., Deacon 1982; Smith *et al.* 1991; Parsons 2003, 2008; Lombard & Parsons 2008; Lombard *et al.* 2012). The collective data may also provide information related to socio-economical similarities and/or differences between groups or through time. Also, interpretation of artefact density within a spatial framework may reveal activity areas at sites (Odell 1988, 2003; Nicholson & Cane 1991; Andrefsky 1994, 2005; Orton 2002, 2002/2003; Smith 2003).

Criteria for classifying lithics into assemblages include rock type, morphological appearance, and size of the stone tool, as well as the type and location of retouch. Stones are first sorted into the main typological classes of waste (*dèbitage*) and formal tools. Thereafter, the main categories are subdivided into the type of *dèbitage* and formal tools present. Tools are measured in length and breadth to place them into size classes. However, size differences between stone tools do not necessarily denote a certain function because of variability in rock types used, the position of retouch and variability between examples of stone tool use in the ethnographic record. When aiming to identify the function of stone tools, the application of use-wear analysis provides a better platform for such endeavours (Odell 1981, 2003; Wiessner 1983; Andrefsky 2005; Lombard 2005a).

Technological analyses investigate stone tool production sequences. Cores represent the basis of the stone tool production sequence (Table 4.1). Toolmakers had different production systems, referred to as ‘trajectories’ (Odell 2003; Andrefsky 2005). Technological analyses also characterise assemblages, similar to the typological analyses. Different knapping techniques result in artefact diversity, which reflects change through time in stone tool technology and may indicate different subsistence strategies. Therefore, technological analyses place artefacts into patterns that can be linked with past behaviour (Bleed 1986, 2001; Odell 2003; Andrefsky 2005, 2009).

Trajectories are dependent on the characteristics of cores and flakes. When striking flakes from a core, the blow cause different types of fractures, depending on whether the toolmaker used a hard or a soft hammerstone. A bending fracture is characterised by flakes with a small or no bulb of percussion and a small lip at the proximal end. Herzian fractures will have a larger bulb of percussion because harder percussion tools are used. If toolmakers used a bipolar flaking technique, it will result in wedging fractures, because the core was placed onto a hard surface and then struck in the center (Odell 2003; Andrefsky 2005). Fracture types determine the shape of the flake (flake termination) and are associated with the direction from which the core was struck. Flake termination shapes could be either feathered, hinged, stepped or axial. A feather termination is the desired shape, resulting in flakes with a thin edge making it easier to retouch. Hinge and step terminations occur when the distal end of flakes break off when struck making them unsuitable for retouch. An axial termination results from the bipolar flaking technique (Odell 2003; Andrefsky 2005).

After determining the fracture types and morphological appearances of the flakes, the next step is to analyse whether or not the toolmaker intentionally retouched the flake. Retouch on flakes classifies them as formal stone tools. Ultimately, morphological appearance and retouch are used to identify tool types such as unretouched blades or scrapers, while flake fracture and termination indicates a preferred technique by the knapper. Hence, in an interpretative framework typological and technological analytical techniques are interlinked (Odell 1981, 1988; 2003; Andrefsky 1994; 2005, 2009).

TABLE 4.1. *Definitions of stone artefact types (from Deacon 1982, Inizan* et al. *1999; Andrefsky 2005, Parsons 2006, Orton 2012).*

Classes	Description
Dèbitage/cores	Waste material generated during the knapping process
Chips	A piece having no striking platforms or a bulb of percussion and measuring <10 mm.
Chunks	A piece having no bulb of percussion measuring >10 mm.
Core-rejuvenation flake	The rejuvenation of an edge or piece of the core, resulting in a flake with several negative scars and a bulb of percussion.
Core-rejuvenation tablet	The renovation of a striking or pressure platform of a core. The ventral side of a core tablet shows negative marks of core preparation, being polygonal in shape flake removals are visible on the edge of the tablet.
Core-reduced piece	Cores that can no longer be flaked, they are quadrilateral in plan with a chisel-like striking platform that is often curved.
Bipolar core	A piece of stone that was struck in the middle causing an axial flake termination. They are concave in shape as the stone was worked on anvil. Flake removals are from thin opposing platforms
Bipolar-bladelet core	A piece of stone <20 mm from which bladelets have been removed, but the core does not have a flat platform. Instead the bladelets have been removed from a chisel-like end.
Blade core	A piece of stone from which three blades have been removed.
Bladelet core	A piece of stone from which three bladelets have been removed.
Irregular core	A piece of stone from which three flakes have been struck but there is no apparent pattern in which the flakes were removed.
Radial core	A disc-shaped piece of stone with three or more flakes removed from a thin platform causing a flake removal pattern towards the centre of the stone. This type of core can be unifacial or bifacial.
Unretouched flakes	Pieces with no visible retouch but that was struck off from cores
Whole flakes	A piece with no visible retouch but having a bulb of percussion and/or a striking platform without a step termination.
Broken flakes	A piece with no visible retouch but having a bulb of percussion and/or a striking platform with a step termination.
Whole blade	A parallel-sided or convergent flake with a striking platform and a bulb of percussion. The flake is twice as long as it is wide measuring >25 mm.
Whole bladelet	A parallel-sided or convergent flake with a striking platform and bulb of percussion. The flake is twice as long as it is wide measuring <25 mm.
Broken blade/bladelets	Pieces of fragmented blades and bladelets, having a striking platform and a bulb of percussion. These pieces are twice as long as they are wide.
Possible blade/bladelet fragments	Flake fragments that are not twice as long as they are wide, but are oblong in shape and are morphologically similar to blade/bladelets.
Retouched pieces	A piece of stone intentionally modified by the toolmaker
Backed blade	A blade having a blunted edge along one side of the stone.
Backed bladelet	A bladelet having a blunted edge along one side of the stone.
Double backed bladelet	A bladelet having a blunted edge on both sides of the stone.
Backed piece	A whole flake with backing opposing a sharp cutting edge but its morphological attributes do not conform to a backed blade, backed bladelet, or a segment.
Broken backed piece	A broken flake or piece of stone with backing but its morphological features do not conform to any other formal stone tool class.
Unifacial lateral point	A piece with blade/bladelet proportions having retouch on the ventral or dorsal side, with lateral retouch forming a point.
Unifacial bilateral point	A piece with blade/bladelet proportions having retouch on the ventral or dorsal side, with bilateral retouch forming a point.
Broken unifacial lateral point	A piece with blade/bladelet proportions with retouch on the ventral or dorsal side, having lateral retouch and a distal end with a step termination.
Broken unifacial bilateral point	A piece with blade/bladelet proportions having retouch on the ventral or dorsal side, with bilateral retouch and a distal end with a step termination.
Truncated flake	A flake that has been truncated by applying backing in opposition to the distal end.
Trapeze	A trapezium shaped piece having opposing truncations on the ends with an unretouched margin.
Triangle	A triangular piece of stone with two straight intersecting backed margins of similar length opposing a straight, sharp edge.
Segment	A piece of stone forming a portion of circle with a curved arc that is backed, and having a straight sharp chord.
Scraper	Flakes with relatively shallow to steep retouch along a convex or straight edge. Scrapers are broken down into subclasses, such as endscrapers, sidescrapers or end- and sidescrapers, depending on the position of the retouch.

	Different sizes includes small scraper <20 mm, medium scraper >20 mm but <30 mm and a large scraper >30 mm.
Adze	Pieces of flakes or chunks with straight or concave lateral edges deliberately shaped by means of retouch on one or both edges. Adze size is between 25 mm and 40 mm.
Burin	A flake with two spalls removals at right angles to one another creating a very sharp edge.
Borer	Blades or bladelets that has been retouched on both margins in order to form a blunt point.
Awl	Usually made on flakes and the distal end of the flake has been shaped by retouch to form an elongated point
Notched piece	Flakes of various shapes with one or two notches made deliberately. The notches are the only retouch present on the flake.
Miscellaneous Retouch piece	A piece of stone that has retouch but the retouch does not conform to any clear pattern.
Other	Stone nodules brought to a site for possible future use by knapper.
Manuport	Unused stone nodules that could have been used as knapping material.

4.2.2 Examples of lithic analysis and their interpretative potential in the southern African hunter/herder context

In southern Africa, typological and technological analyses of lithic assemblages have been used to distinguish hunter-gatherers and herders from one another in Later Stone Age studies. In the Northern Cape, Beaumont and colleagues (1995) argued that hunter-gatherers made the Swartkop Industry, consisting of hornfels and a high percentage of formal tools. On the other hand, herders supposedly made the Doornfontein Industry, which contains mainly quartz and a low percentage of formal stone tools (Beaumont *et al.* 1995). Parsons (2003, 2007, 2008) re-evaluated the lithic assemblages from Jagt Pan 7, Melkboom 1, Bokvasmaak 3 and Biesje Poort 2 in the Northern Cape Province, which were originally excavated by Beaumont and colleagues (1995). In addition, Vlermuisgat Shelter in the same region was also excavated. Her results confirm that assemblages from hunter-gatherers may have more formal stone tools compared to those from herder sites but because of an overlap between characteristics from the different assemblages no clear differences could be discerned (Parsons 2003, 2007, 2008).

Orton and colleagues (2005) studied differences in stone tool typologies from Rooiwalbaai Hollow and Rooiwalbaai Midden in the Northern Cape Province. Rooiwalbaai Hollow had no pottery or remains of domestic livestock, while Rooiwalbaai Midden had pottery and possible cattle remains. Quartzite dominated both Rooiwalbaai Hollow and Rooiwalbaai Midden lithic assemblages. Both sites had bipolar flaking techniques and an equal percentage of formal stone tools. From this data, it is clear that the Rooiwalbaai Hollow ‘hunter-gatherer’ assemblage is similar to the Rooiwalbaai Midden ‘herder’ assemblage (Orton *et al.* 2005; Orton 2006).

The studies of Parsons (2007, 2008) as well as Orton and colleagues (2005) cast doubt onto the notion by some that herders mainly used quartz to knap, and that hunter-gatherers did not use bipolar flaking (e.g., Smith *et al.* 1991; Beaumont *et al.* 1995). Sadr (2008b) is of the opinion that lithic assemblages cannot distinguish between hunter-gatherers and herders and that differences in lithic assemblages reflect different activities.

Higher or lower percentages of formal tools are used to reconstruct subsistence strategies of the occupants. A smaller number of blades is taken to indicate a decrease in hunting activities due to having livestock (*cf*. Smith *et al*. 1991; Sadr 2008a,b; Smith 2008a,b). Conventional typological analyses place unretouched flakes and blades under '*dèbitage*' thereby separating them from retouched tools without considering the possible function of unretouched flakes (e.g., Deacon 1982).

Including unretouched flakes and bladelets into a non-*dèbitage* stone tool class and studying them from a functional point of view could indicate whether or not the stone pieces were inset points (Lombard & Parsons 2008). This approach is connected with risk management strategies. Curated tools and toolkits usually have a complex design, a high formal component, and are reliable and maintainable as tool production takes place with the expectation of inadequate resources. Expedient tools and toolkits, on the other hand, require minimal technological effort, thus such assemblages have a low formal component. These toolkits are not curated or maintained since natural resources are predictable and abundant (e.g., Bamforth 1986; Bleed 1986; Nelson 1991; Bousman 1993, 2005). Therefore, complex hunting weapons could have served as a risk management strategy. Hunter-gatherers had to have had optimal hunting success in environments with unpredictable protein resources, whereas herders, having a more stable protein source in livestock, are less dependent on hunting success (Bousman 1993, 2005; Lombard & Parsons 2008).

4.2.3 Lithic analysis applied in this study

My analysis of lithic artefacts excavated from KS1 included typological and technological approaches. The aim is to explore differences and/or similarities between the rock shelter (features commonly attributed to hunter-gatherers) and the stone circle (features commonly attributed to herders).

The typological analyses included sorting of rock types, types of lithic artefacts and their dimensions. This method will assist in identifying trends and possible differences between the lithic assemblages of KRS2 and KSC14 (Deacon 1982; Parsons 2003, 2007, 2008; Andrefsky 2005). The technological analyses focused on the methods used to produce lithic artefacts.

This approach aimed at highlighting potential differences and/or similarities between the two site types at KS1. So-called utilised pieces are not included in this study and will be analysed when larger samples have been excavated.

Lithic artefacts were sorted according to rock type. Fine-grained rock types include CCS, hornfels, chert, vesicular basalt and agate. Medium-grained rock types are quartz, while coarse-grained is dolerite (Farndon 2012). The typological analyses included sorting the stones into primary and secondary typologies. The primary typology consists of *dèbitage* and cores, unretouched flakes and retouched pieces. The secondary typology includes the type of *dèbitage*, core, unretouched flake and retouched piece. The category 'other' includes manuports.

Apart from chips and chunks, I measured the length and width of all other lithic artefacts using a calliper. Flakes, blades, bladelets and other formal stone tools (except scrapers, adzes and backed pieces) were measured as follows: length was taken as the maximum distance from the proximal to the distal end, breadth were taken as the maximum measurement at right angles to the length. Scrapers, adzes and backed pieces were measured as follows: length was taken as the measurement between the butt and retouch of the piece and breadth as the maximum at right angles to the length (Deacon 1982; Odell 2003; Andrefsky 2005).

For the technological analysis, I recorded the initiation and termination attributes on whole and broken flakes. Analysis of core initiation and flake termination will assist in identifying technological trajectories (Wiessner 1983; Odell 2003; Andrefsky 2005, 2009). The technological trajectories of the shelter and stone circle will be compared with each other and interpreted in the context of other data obtained from the OEBs production sequences and metric dimensions.

After analysis, the artefact class percentages were calculated and compared to investigate if there is a higher component of formal tools at KRS2 and a lower percentage of formal tools at KSC14. In addition to the typological and technological analysis, I performed statistical tests on the data sets. *Chi*-square tests are appropriate to determine if differences in data are significant or whether such differences are purely chance variations.

Each *chi*-square test therefore has a null hypothesis, which is a statement that maintains there is no real difference between data sets and is represented by the symbol H_o. I classified data from excavations for the *chi*-square tests as exhaustive and mutually exclusive. This means that all the data are included but assigned to a particular category only. Where sample size permitted, data were *chi*-squared. *Chi*-square tests must have a minimum 2x2 contingency table that requires four values (numbers) and the maximum contingency table is 9x9. The *chi*-square test results and degree of freedom (d.f) designates a probability value (*p*-value) that should be less than 0.05 to reject the null hypothesis, which is whether there are real differences between data sets or if differences are merely due to chance (Lachenicht 2002).

4.3 Non-lithic artefact analysis

4.3.1 Brief background to ostrich eggshell analysis

OES flasks, flask fragments, beads, pendants, buttons and engraved pieces are relatively common in Later Stone Age contexts of southern Africa (e.g., Smith *et al.* 1991; Webley 1992, 1997, 2001; Smith & Jacobson 1995; ; Mitchell 1996b; Avery *et al.* 1997; Sadr *et al.* 2003; Robbins *et al.* 2008; Pleurdeau *et al.* 2012). Ostrich eggs were often a source of food. The shells were often utilised as storage containers, decoration, currency for bartering and included burials. The analyses of OEBs may assist in interpreting information about the duration of site occupation and gender roles. In addition, a difference in bead sizes could be used to distinguish between hunter-gatherer and herder sites (Schapera 1930; Jacobson 1987a,b; Smith *et al.* 1991; Mitchell 1996b; Kandel & Conard 2005).

Various examples of the production of OEB among the Khoe-San have been recorded ethnographically (e.g., Schapera 1930; Lee 1979; Silberbauer 1981). Schapera (1930) describes how a piece of eggshell is broken into pieces then a hole is drilled with a stone or iron borer. The final step in making an OEB is to smooth the rough edges with a grooved stone. An alternative method is to first trim the blank piece of shell and then drill the hole (Orton 2008). For making a flask, a hole is drilled at the narrow end of the egg and its content emptied. Flasks were sometimes decorated with engraved patterns, charcoal or ochre (Schapera 1930; Kandel 2004).

Carnivores such as hyenas, known for eating ostrich eggs can cause holes, similar in appearance to flask apertures. Using Kandel's (2004) checklist, it can be assessed whether such holes are anthropogenic or not. To establish if holes in shards are anthropogenic or not the archaeological context from which the OES came should have no evidence of carnivore activity. Also, if engravings or decoration is present on the OES and use wear on the outer surface (such as polishing) are present, it may indicate that the OES was a flask. Traces of contents, such as ochre and OES with openings that consistently occurs at one location on several eggs are the final requirements (Kandel 2004).

OEB analysis revolve around the production sequence. Sorting the different pieces into stages of production indicates how the beads were produced (Table 4.2) and includes criteria such as the type of perforation, the direction of perforation, production stage, patina present, burnt, polished or not, and bead size (Kandel & Conard 2005).

TABLE 4.2. *Definitions of the OEB production sequence (compiled from Kandel & Conard 2005 and Orton 2008, 2012)*

Production sequence	**Definition**
Circular blank (stage 2)	Angular or circular piece of ostrich eggshell <20 mm.
Complete or partially drilled blank (stage 3)	A circular blank with a dimple from drilling of varying depth. The blank was drilled from the inner, concave surface of the ostrich eggshell.
Broken partially drilled blank (stage 4)	A blank that is broken with a visible dimple from drilling.
Complete perforated blank (stage 5)	A blank that is completely drilled. The final perforation causes a part of the cortical surface of the ostrich eggshell to flake away from the edges.
Broken perforated blank (stage 6)	A blank that is completely drilled but broken.
Complete, perforated, slightly formed bead (stage 7)	The perforation is complete but the inner cortical surface of the bead still requires drilling to smooth the hole. The irregular edges are trimmed producing tiny flake scars.
Broken, perforated, slightly formed bead (stage 8)	A broken perforated bead that still requires drilling to smooth the inner hole.
Complete, perforated almost bead form (stage 9)	A complete perforated bead that still requires edge trimming by placing the beads on a groove stone.
Broken, perforated almost bead form (stage 10)	A broken perforated bead that required edge trimming.
Finished bead (stage 11)	A complete bead with smooth inner and outer edges. Complete beads vary in size 5-10 mm.
Broken finished bead (stage 12)	A complete bead that is broken.

4.3.2 Examples of ostrich eggshell analysis in southern Africa

Jacobson (1987a,b) proposed that certain stages in bead production might indicate the length of occupation at an archaeological site and the extent of bead making activity. Finished beads and greater variability of production phases would be more common at sites where groups lived for a longer period, while shorter occupations or a smaller group of people, results in a lesser variability of production phases and in fewer unfinished beads in the assemblage (Jacobson 1987a,b).

In addition, there is a difference in bead sizes from early assemblages (≥ 2000 years) and later assemblages (<2000 years), possibly indicating earlier hunter-gatherer and later herder occupation. Jacobson (1987a) defined small beads (<5 mm) as characteristic of hunter-gatherers and large beads (>5 mm) of herders. Large OEBS were possibly made as trade items, because San-speaking women would not wear large beads, but traded with horticulturalists (Jacobson 1987a). Apparently, the relationship between hunter-gatherers and caprines are not as symbolic as it is between a herder and his flock. Therefore, continuation in cultural identity results in making small OEBs among hunter-gatherers even when accepting livestock (Jacobson 1987a).

Smith and colleagues (1991) used Jacobson's (1987a) criteria to differentiate between hunter-gatherer and herder occupation phases at Kasteelberg, resulting in OEB size being accepted as a socio-economic marker (Smith *et al.* 1991; Smith & Jacobson 1995; Orton 2008). However, other archaeologists suggest that different bead sizes indicate change through time instead of being a representation of distinct cultural groups. Also, copper beads are known to have been produced for livestock exchange and differences of copper bead sizes seem to be irrelevant (Kinahan 1996a; Sadr 2008).

4.3.3 Ostrich eggshell analysis applied to this study

I analysed the OES following the methods of Kandel and Conard (2005) and Orton (2008) and sorted the fragments into the twelve stages of OEB production (Fig. 4.6 and Table 4.2). After measuring the aperture (internal diameter) outside diameter and thickness of whole OEB, I documented the following attributes for all the phases of the production sequence, including OES fragments:

- patina present (yes/no)
- burnt (yes/no)
- polished (yes/no).

Similar to the lithic analyses the amount within the OEB production stage and attributes of OES fragments were *chi*-squared to ascertain whether differences are significant or not. Therefore, I did not quantify the angular blank stage one, because any of the OES fragments could have been used for bead production. If I did quantify the OES angular fragments, then the results would have indicated a very high phase one. Due to this element of doubt, I quantified circular blanks that were clearly intended for OEB production (Orton 2008).

Ultimately, this method of analysis allowed me to discern whether the different methods of OEB production correspond to possible different lithic trajectories. If the results indicated that bead sizes correspond with different lithic trajectories from KRS2 and KSC14, I would be able to reconstruct the trend over time to establish if occupation at KS1 is characteristic of hunter-gatherers and/or herders (Jacobson 1987a; Kinahan 1991; Smith *et al.* 1991; Smith & Jacobson 1995).

4.3.4 Pottery, copper and rock art

Due to time constraints in-depth analyses of pottery fragments and copper pieces did not take place. I did measure the diameter and thickness of pottery fragments and copper beads with a calliper. The rock paintings and engraved panels were photographed, but detail studies of the art is lacking, as it was not the focus of the study.

4.3.5 Analysis of faunal and organic remains

The faunal remains analyses will indicate dietary aspects associated with the occupants and changes in diet through time. Ultimately, these remains will assist in reconstructing the occupational history of KS1. Dr. Shaw Badenhorst (Ditsong National Museum of Natural History) analysed the faunal remains and the results are included in Appendix B. The organic remains were not analysed for this study due to time constraints.

4.3.6 Accelerator Mass Spectrometry dating of KS1

I submitted charcoal fragments from KSC14, KRS2, and KSS3 for AMS dating to the University of Oxford Radiocarbon dating Laboratory in Great Britain. The samples include charcoal from each square at a depth of 100-115 mm (spit 3) from KSC14, charcoal remains from KSS3 at a depth of 100-200 mm and from KRS2 charcoal samples from stratigraphic units Brown II and Brown III.

4.4 Summary of chapter

Archaeological excavations took place KS1, an archaeological site in north-west Namibia during January 2013. The aim is to reconstruct the occupational history, and to possibly identify different subsistence strategies between the excavated rock shelter and stone circle. The typological and technological analysis of lithic artefacts provides a basis for identifying different typologies and possible different ways in which stone tools were made at Kuidas Spring. Analysis of OES will contribute to current knowledge regarding their use and whether or not there is variation in OEBs size between the rock shelter and stone circle. Faunal remains have been analysed by an expert and samples for AMS dating from KS1 has been submitted to the Oxford University Laboratory. I will discuss the excavation results in Chapter 5.

Chapter 5

Results of the Kuidas Spring archaeological excavations

5.1 The stratigraphy and age of the rock shelter and stone circle at Kuidas Spring

In this chapter, I discuss the results of the archaeological excavation and artefact analyses of KS1. Unless stated otherwise, all tables named according to alphabetic letters are in Appendix A of this dissertation.

The natural stratigraphy was followed during excavation at KRS2. The uppermost layer Surface Brown I, comprised fine-grained brown soil (Munsell chart colour 7.5yr 5/4) that included oryx faeces, dried grass and large stones. The deposit became compacted in Brown II at 50 mm to 60 mm below the surface, which consisted of brown soil (Munsell chart colour 7.5yr 4/6) with powdery patches. Brown III had a firm brown (Munsell chart colour 10yr 5/3) deposit, 170 mm and 154 mm below the surface. An embedded rock in the south section, on top of the ash lens in the middle of Brown III extending into Brown II, is likely to have been a hearthstone. Due to its position, the ash lens is associated with Brown III and was not excavated separately. The lowermost Yellowish Brown IV layer (Munsell soil chart 10 yr 5/4) had fine-grained soil patches among rock rubble. I reached bedrock at 300 mm (Fig. 5.1).

Charcoal samples for accelerator mass spectrometry (AMS) recovered from KRS2 in layer Brown II dates to 1513 ± 24 BP (OxA-27896) and Brown III to 2264 ± 27 BP (OxA-27894) (Table 5.1). Surface Brown I and Yellowish Brown IV had insufficient charcoal samples for AMS dating.

TABLE 5.1. *AMS dates of KRS2.*

Stratigraphic layer	Lab reference	Years before present	Calibrated range
Brown II (KRS2)	OxA-27896	1513 ± 24	AD 530 - AD 613
Brown III (KRS2)	OxA-27894	2264 ± 27	301 BC - 209 BC

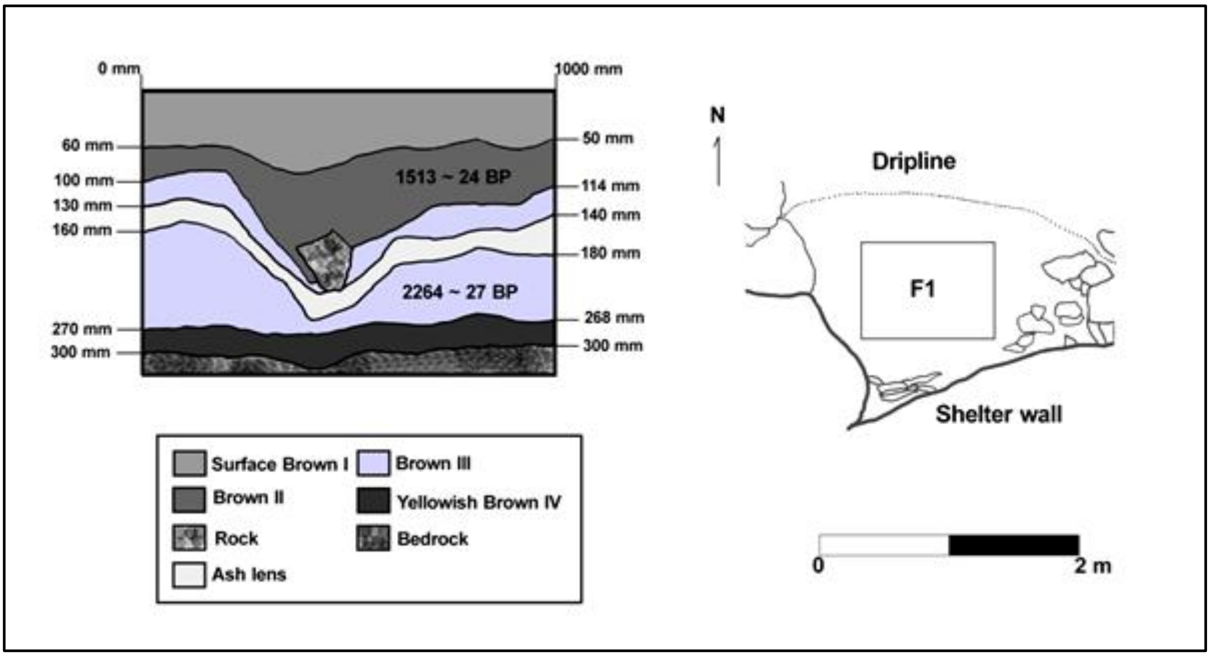

FIGURE 5.1. *The south section of the rock shelter (KRS2).*

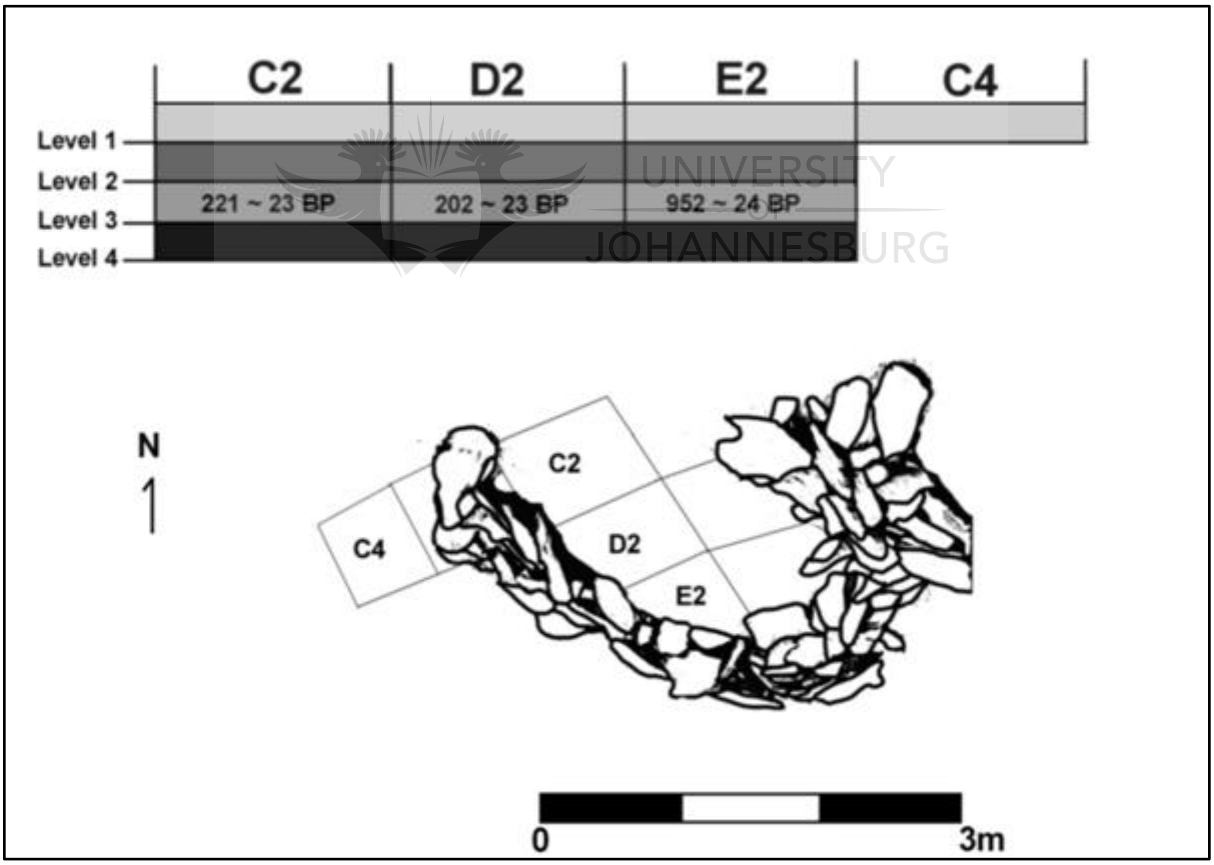

FIGURE 5.2. *Arbitrary levels with square numbers of the stone circle (KSC14).*

The KSC14 deposit contains wind-blown and/or trampled sand that does not display any visible stratigraphic layering. All the arbitrary levels (spits) contained oryx faeces. Level 1 consisted of loose sand, charcoal pieces and windblown grass, while in level 1 of square C4 rubble was found. Levels 2, 3 and 4 had partly compacted deposits in the western, northern and middle sections near the sandstone wall with ash concentrations (Fig. 5.2).

Prior to, and during the excavation of KSC14, it became apparent that oryx used the stone circle to lie in (own observation). This likely caused the horizontal and vertical disturbance of hearth features and other material remains. Consequently, analysing the spatial organisation at KSC14 was not possible. The disturbance was evident from dung pellets found throughout the excavations. Levels 3 and 4 had the least amount of oryx dung pellets, but level 3 had the most charcoal. As a result, charcoal samples of level 3 were selected for AMS dating. The dates from KSC14 indicate occupation between 952 ± 24 BP (OxA-27893) and 202 ± 23 BP (OxA-27891) (Fig. 5.2 and Table 5.2).

TABLE 5.2. *AMS dates of KSC14.*

Unit	Lab reference	Years before present	Calibrated range
Square C2 level 3 (KSC14)	OxA-27892	221 ± 23	AD 1763 - AD 1801
Square D2 level 3 (KSC14)	OxA-27891	202 ± 23	AD 1735 - AD 1805
Square E2 level 3 (KSC14)	OxA-27893	952 ± 24	AD 1155

5.2 Lithic artefacts from the rock shelter and stone circle at Kuidas Spring

5.2.1 Lithic typology at KRS2 and KSC14

The 2240 lithic artefacts from KRS2 and the 181 lithic artefacts from KSC14 are categorised into primary and secondary types. The primary type includes *dèbitage* and cores, unretouched flakes, retouched pieces and a category named ‘other’ which is manuports. The secondary type is the type of *dèbitage*, cores, unretouched flakes and retouched pieces.

Brown III at KRS2 has the highest percentage of primary types, followed by Brown II, Yellowish Brown IV and Surface Brown I. Surface Brown I has more *dèbitage* than unretouched flakes and no retouched pieces. Within Brown II, *dèbitage* and unretouched flakes are most numerous, with retouched pieces representing 0.49%. Layer Brown III consists mainly of *dèbitage* (54.1%) and unretouched flakes (19.1%) having the least retouched pieces (4.42%). Yellowish Brown IV also has more *dèbitage* than unretouched flakes and a low percentage of retouched pieces (0.04%). In all the layers, manuports are equally and poorly represented (0.08%) (Fig. 5.3 and Table 5.3).

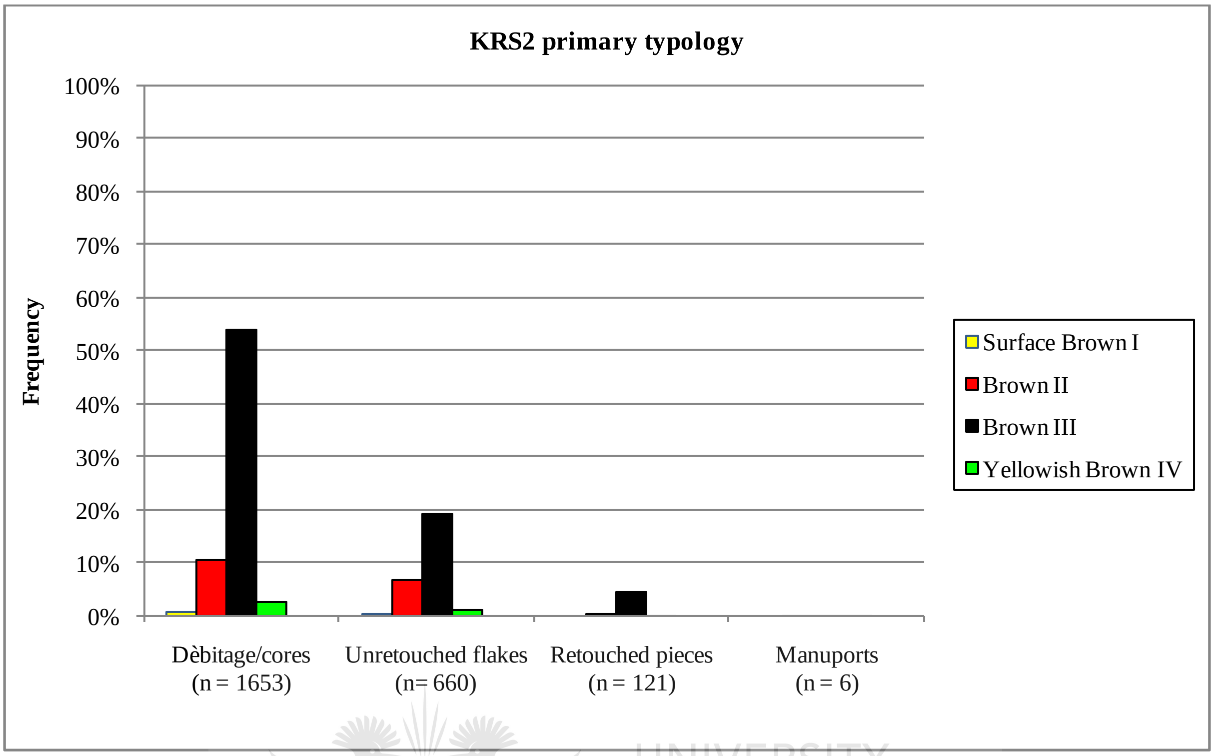

FIGURE 5.3. *The primary type frequency of the rock shelter (KRS2).*

TABLE 5.3. *Summary of primary types at KRS2, for detailed inventory see Table A in Appendix A.*

Layer	Surface Brown I	Brown II	Brown III	Yellowish Brown IV	Total
Dèbitage/cores	15	256	1320	62	**1653**
Unretouched flakes	6	163	466	25	**660**
Retouched pieces	0	12	108	1	**121**
Manuports	0	2	2	2	**6**
Total	**21**	**433**	**1896**	**90**	**2440**

At KRS2, chips, chunks, unretouched flakes, core-rejuvenation flakes and bladelets occur in all the layers (Table A, Appendix A). Chips and chunks represent the majority of lithic artefacts. Core-reduced pieces are only present in Brown II and Brown III. Irregular cores are present in all layers except Surface Brown I. Bipolar-bladelet cores along with whole and broken blades are only present in Brown II and Brown III. Brown II and III have a variety of retouched pieces, whereas the other layers have none or only one piece (Figs. 5.4 and 5.5).

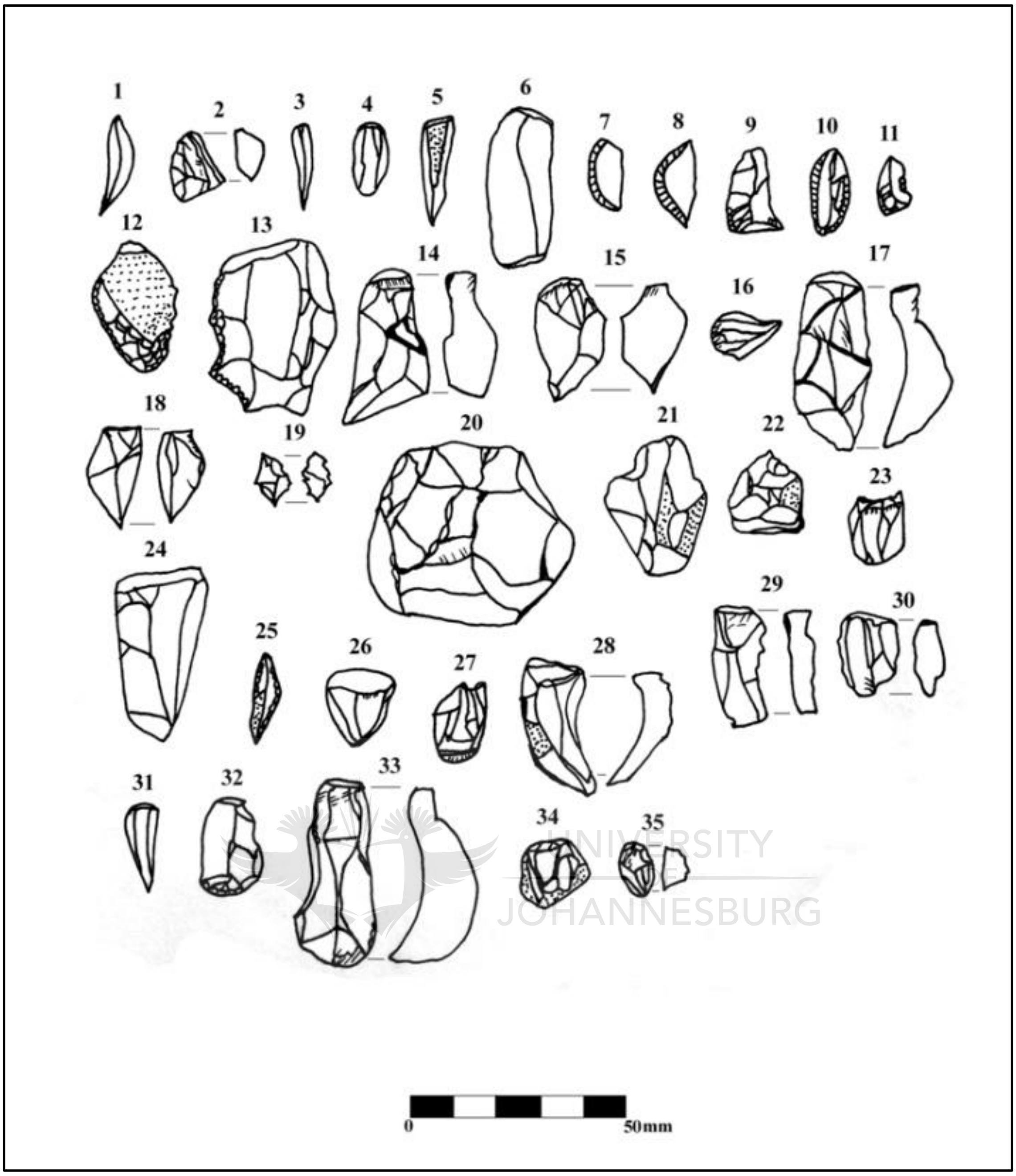

FIGURE 5.4. *A selection of lithic artefacts from the rock shelter (KRS2).* **Surface Brown I**: *1: bladelets (CCS); 2: core-rejuvenation flake (quartz).* **Brown II**: *3-4: bladelet (CCS), (agate); 5: blade (chert); 6: broken blade (dolerite); 7-8: segments (CCS), (agate); 9: small endscraper (CCS); 10: small backed scraper (CCS); 11: small side scraper (agate); 12: medium side- and endscraper (quartz); 13: large side scraper (vesicular basalt); 14-17: core-rejuvenation flakes (chert), (hornfels), (quartz), (dolerite); 18-19: core-reduced pieces (hornfels), (agate); 20-22: irregular cores (hornfels), (agate), (CCS); 23: bladelet core (agate); 24: irregular core (dolerite); 25: unifacial lateral point (chert); 26: bladelet core (CCS); 27: bipolar-bladelet core (quartz); 28-30: core-rejuvenation flakes (CCS), (agate), (quartz);.* **Yellowish Brown IV***: 31: bladelet (CCS); 32: medium endscraper (CCS); 33: core-rejuvenation flake (hornfels); 34: irregular core (quartz); 35: core-rejuvenation flake (quartz).*

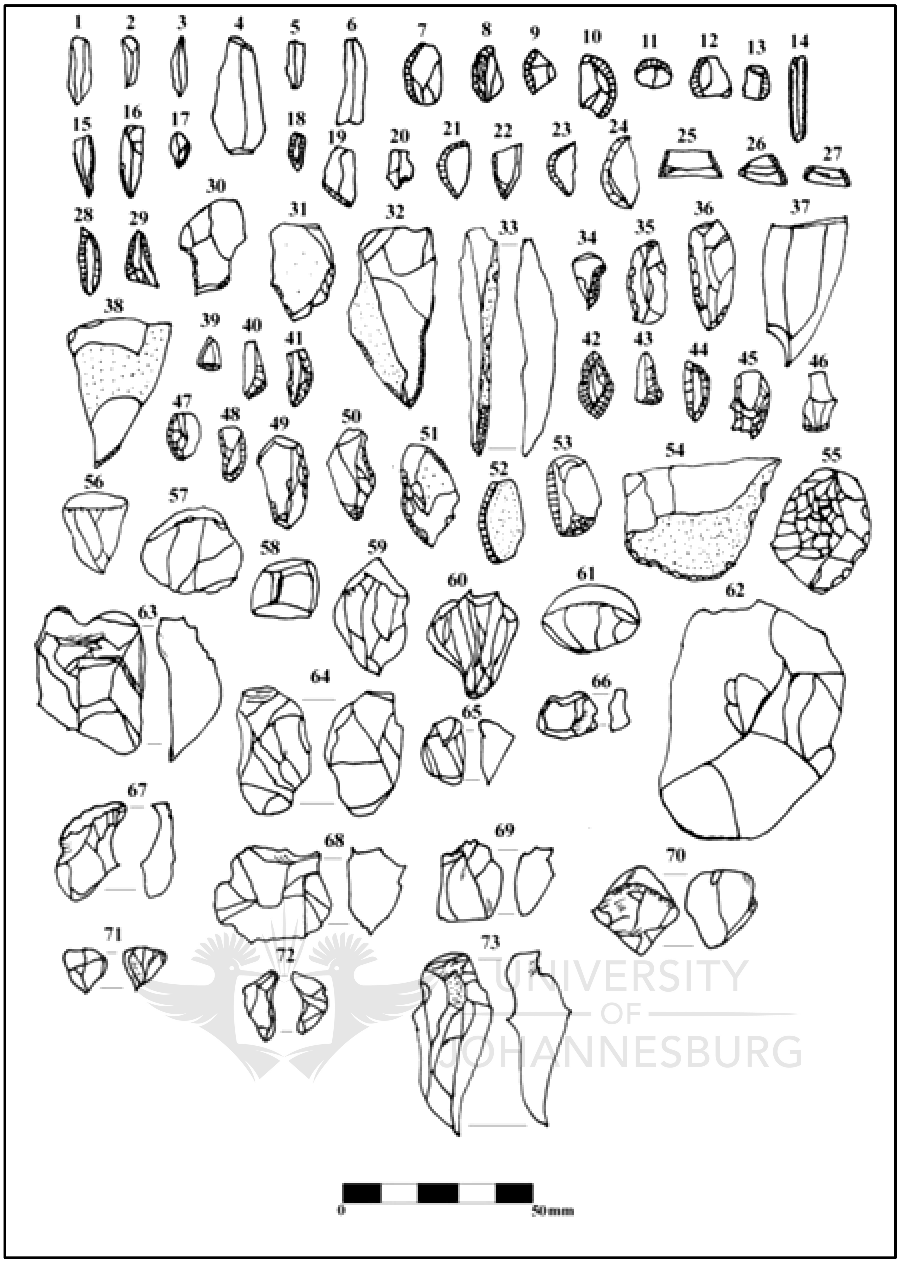

FIGURE 5.5. *A selection of lithic artefacts from the rock shelter (KRS2), layer Brown III. 1-3: bladelets (chert), (hornfels), (CCS); 4: broken blade (vesicular basalt); 5-6: bladelets (quartz), (dolerite); 7-8: backed pieces (CCS), (chert); 9-13: broken backed pieces (CCS), (chert), (agate), (quartz), (quartz); 14: double backed bladelet (chert); 15: unifacial bilateral point (chert); 16-17: unifacial lateral points (CCS), (quartz); 18: unifacial bilateral point (quartz); 19: truncated flake (CCS); 20: notched piece (CCS); 21: segment (CCS); 22: broken unifacial lateral point (agate); 23-24: segments (chert, (quartz); 25-27: trapeze (CCS), (agate),(quartz); 28-29: borers (CCS), (hornfels); 30-32: awls (CCS),(vesicular basalt),(chert); 33: borer (chert); 34: awl (quartz); 35-36: adzes (quartz), (CCS); 37-38: burins (dolerite),(chert); 39-40: small endscraper (CCS),(agate); 41: small side scraper (CCS); 42: small double side scraper (CCS); 43: small side- and endscraper (agate); 44-45: small backed scraper (agate),(CCS); 46: small endscraper (quartz); 47: small side scraper (quartz); 48: small backed scraper (quartz); 49-52: medium side scrapers (CCS); (hornfels), (vesicular basalt), (quartz); 53: medium backed scraper (quartz); 54: large endscraper (vesicular basalt); 55: large backed scraper (agate); 56: bladelet core (chert); 57-58: irregular cores (CCS),(agate); 59: bladelet core (quartz); 60: bipolar-bladelet core (quartz); 61-62: irregular cores (quartz),(dolerite); 63: core-rejuvenation flake (chert); 64: core-reduced piece (agate); 65-69: core-rejuvenation flakes (quartz), (agate), (CCS), (hornfels), (vesicular basalt); 70-72: core-reduced pieces (CCS),(chert),(quartz); 73: core-rejuvenation flake (dolerite).*

Within Brown III, segments and scrapers represent the majority of retouched pieces. Brown II includes three segments and one unifacial lateral point, with the six scrapers being the most numerous. Large- and small side scrapers are predominantly found in Brown II. In Brown III, small-and medium side scrapers are the most common, followed by large-and small endscrapers, and then backed scrapers of all sizes. Yellowish Brown IV has one medium endscraper (Table A, Appendix A). Of the total lithic artefact sample, formal tools are not common, as Brown II and Yellowish Brown IV has <1% and Brown III has 4%. Respectively, scrapers and segments represent 40% and 12% of the total retouched piece frequency at KRS2. Collectively, backed pieces, trapezes, awls and borers are <10% with adzes, burins, points and truncated flakes representing <5% of the entire lithic sample.

KSC14 has a small lithic sample and the majority of lithic artefacts are from levels 1 and 4. Considering the primary types at KSC14, within level 1 *dèbitage* and unretouched flakes are more frequent than retouched pieces. Level 2 includes mostly unretouched flakes and retouched pieces. Level 3 also consists of more *dèbitage* and unretouched flakes, with very few retouched pieces. Level 4 also has more *dèbitage* and unretouched flakes, but a higher percentage of retouched pieces (2.8%) compared to levels 2 and 3. Only levels 1, 2 and 4 included manuports (Fig. 5.6 and Table 5.4).

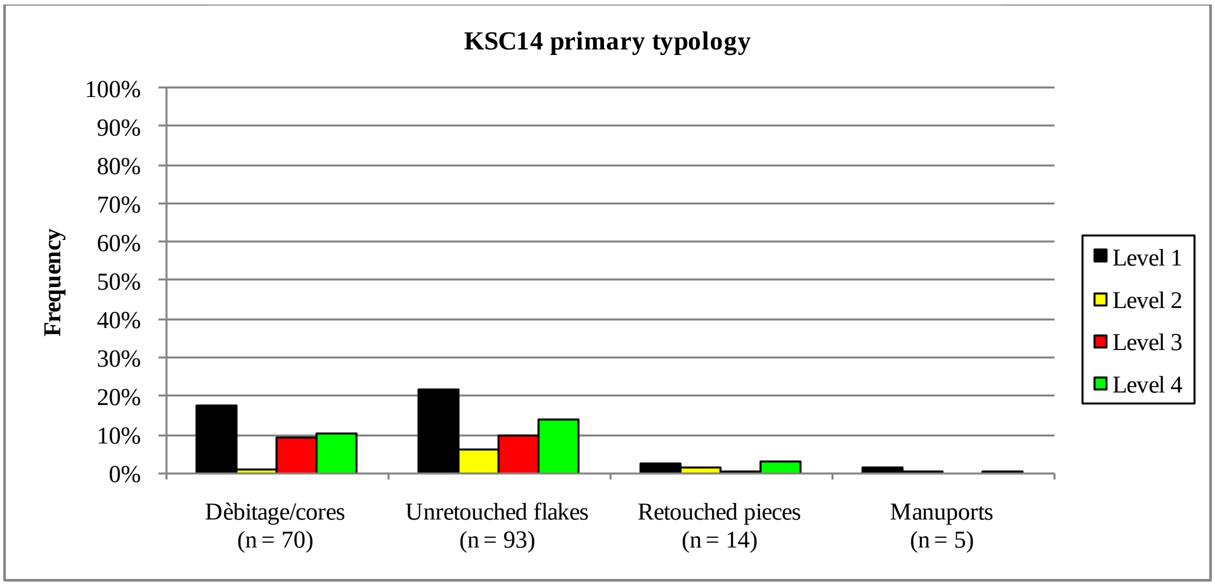

FIGURE 5.6. *The primary type frequency of the stone circle (KSC14).*

TABLE 5.4. *Summary of primary types at KSC14, for a detailed inventory see Table B in Appendix A.*

Primary type	Level 1	Level 2	Level 3	Level 4	Total
Dèbitage/cores	32	2	17	19	**70**
Unretouched flakes	39	11	18	25	**93**
Retouched pieces	4	3	1	5	**13**
Manuports	3	1	0	1	**5**
Total	**78**	**17**	**36**	**50**	**181**

Most levels include chips and chunks, apart from level 2 that has no chunks. There are irregular cores in levels 1 and 4, and a radial core occurs only in level 1. The lithic assemblage does not contain bladelet, bipolar-bladelet, or blade cores. Core-reduced pieces are present in levels 3 and 4, core-rejuvenation flakes in levels 1, 3 and 4, and core-rejuvenation tablets in level 4 (refer to Table 4.1 in Chapter 4 for definition). Excavated units have whole and broken flakes, but no complete bladelets. Although no blade-and bladelet cores were excavated, a broken bladelet from level 1 and a whole blade from level 2 are present in the lithic assemblage (Fig. 5.7 and Table B, Appendix A).

Levels 1 and 4 include the majority of retouched pieces (Fig. 5.7 and Table B, Appendix A). A large endscraper and double-side scraper, along with a small endscraper, side scraper and backed scraper are present in level 1. Level 4 includes a medium side scraper, a side- and endscraper as well as a small side scraper. There are no scrapers in levels 2 and 3. The denticulate awl and unifacial lateral point is present only in level 2. Both levels 3 and 4 have one backed piece (Table B, Appendix A). Of the 13 formal stone tools, scrapers represent the majority of retouched pieces, followed by backed pieces with the awl and denticulate being the least. When comparing the lithic distribution between excavated squares, the front opening and middle area in the stone circle had the most *dèbitage* and cores, unretouched flakes and retouched pieces, as well as manuports.

KRS2 has a higher number of primary types than KSC14. Irregular cores are present at both units while only KRS2 has bladelet- and bipolar-bladelet cores. In addition, KSC14 has radial cores, whilst KRS2 does not include radial cores. Core-rejuvenation flakes and core-reduced pieces are present at KRS2 and KSC14, but core-rejuvenation tablets (refer to Table 4.1 for definition) do not occur at KRS2. Chips and chunks, flakes, blades and whole bladelets are also more numerous at KRS2, whereas KSC14 has no whole bladelets (Table C, Appendix A).

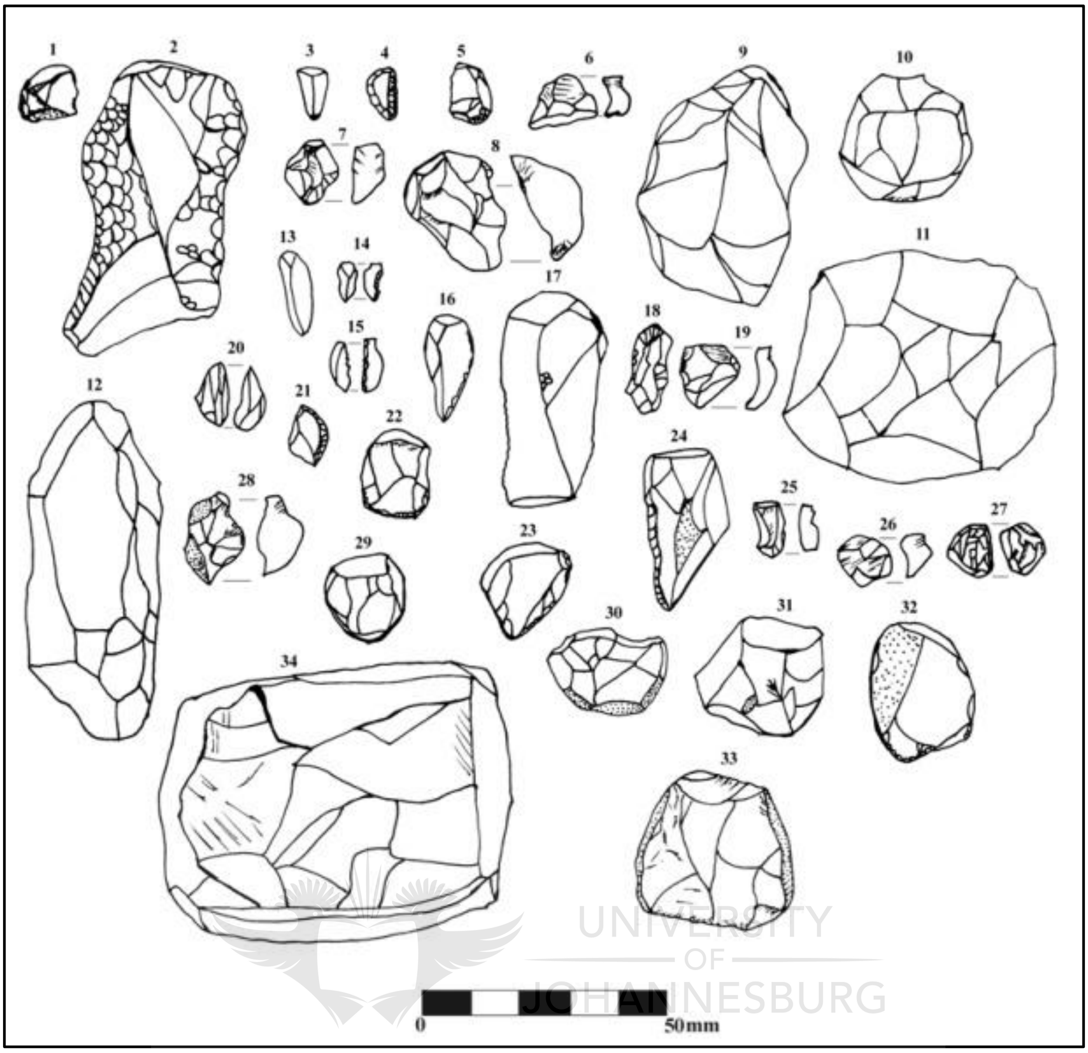

FIGURE 5.7. *A selection of lithic artefacts from the stone circle (KSC14).* **Level 1**: *1: large scraper (agate); 2: large double-sided scraper (dolerite); 3: broken bladelet (dolerite); 4: small backed scraper (CCS); 5: small endscraper (quartz); 6: core-rejuvenation flake (CCS); 7: core-rejuvenation flake (quartz); 8: core-rejuvenation flake (hornfels); 9: irregular core (dolerite); 10: irregular core (hornfels); 11: radial core (dolerite); 12: irregular core (dolerite).* **Level 2**: *13: whole blade (dolerite); 14: unifacial lateral point (dolerite); 15: denticulate (dolerite); 16: awl (dolerite); 17: broken blade (dolerite).* **Level 3**: *18: backed piece (CCS); 19: core-rejuvenation flake (CCS); 20: core-reduced piece (quartz).* **Level 4**: *21: small side scraper (quartz); 22: medium side- and endscraper (chert); 23: medium side scraper (quartz); 24: backed piece (dolerite); 25: core-rejuvenation flake (CCS); 26: core-rejuvenation flake (quartz); 27: core-reduced piece (quartz); 28: core-rejuvenation flake (CCS); 29: irregular core (quartz); 30: core-rejuvenation tablet (dolerite); 31: core-rejuvenation tablet (vesicular basalt); 32: large endscraper (hornfels); 33: irregular core (vesicular basalt); 34: irregular core (dolerite).*

H_o: the relative proportions of one categorical variable (total number of primary type at KRS2) do not differ significantly from the second categorical variable (total number of primary type at KSC14). The difference in values of primary types occurring at KRS2 and KSC14 (Table 5.5) are statistically significant (*p*-value <0.05). Therefore, the observed differences in sample sizes are most likely not coincidental. It could indicate the production of a wider range of lithic artefacts at KRS2 than at KSC14, or the significant differences are due to the sample size excavated.

TABLE 5.5. *Data contingency table and* chi-*square tests results of the primary types at KRS2 and KSC14.*

Primary type	KRS2	KSC14
Dèbitage/cores	1653	70
Unretouched flakes	660	93
Retouched pieces	121	13
Manuports	6	5
Chi-squared = 83.4; d.f = 3; *p*-value = 0.0001. Significant at *p*-value <0.05		

The only formal tools that KRS2 and KSC14 have in common are scrapers, unifacial lateral points, awls and backed pieces. Scrapers dominate at both KRS2 and KSC14 (Table E, Appendix A). Collectively, the formal component represents 5% at KRS2 and 0.5% at KSC14. H_o: the relative proportions of one categorical variable (KRS2 formal stone tool component and informal stone tool component) are not significantly different from the second categorical variable (KSC14 formal stone tool component and informal stone tool component). The formal and informal tool component from KRS2 and KSC14, (Table 5.6) do not differ significantly (*p*-value >0.05) and are due to chance variation. The differences in primary types between KRS2 and KSC14 are significant, but not the formal stone tool component. This contradiction in data may be because, collectively, each feature has a low number of formal stone tools. Perhaps with further excavation, analyses of the lithic artefacts will confirm whether the current results are merely due to sample size or not.

TABLE 5.6. *Data contingency table and* chi-*square tests results of the formal tool component at KRS2 and KSC14.*

Site	Number of formal lithic artefacts	Number of informal lithic artefacts
KRS2	121	2319
KSC14	13	168
Chi-squared = 1.72; d.f = 1; *p*-value = 0.189693. Not significant at *p*-value <0.05		

5.2.2 Rock types of KRS2 and KSC14

The rock types used at KRS2 and KSC14 include quartz, cryptocrystalline silicates (hereafter CCS), agate, hornfels, vesicular basalt, chert, and dolerite. Although agate, chert and hornfels are part of the fine-grained rock types that comprise CCS, it is regarded here as separate groups, because the rock types are identifiable within the CCS category.

At KRS2, quartz and CCS are the most common rock type throughout the occupation phases of Yellowish Brown IV, Brown III and Brown II, with vesicular basalt and hornfels being the least common. In Surface Brown I, CCS and agate are more frequent than quartz. Compared to Brown II, III and Yellowish Brown IV, Surface Brown I has no hornfels, agate, chert, dolerite, or vesicular basalt (Fig. 5.8 and Table 5.7). However, collectively all the rock types that comprise CCS dominate at KRS2.

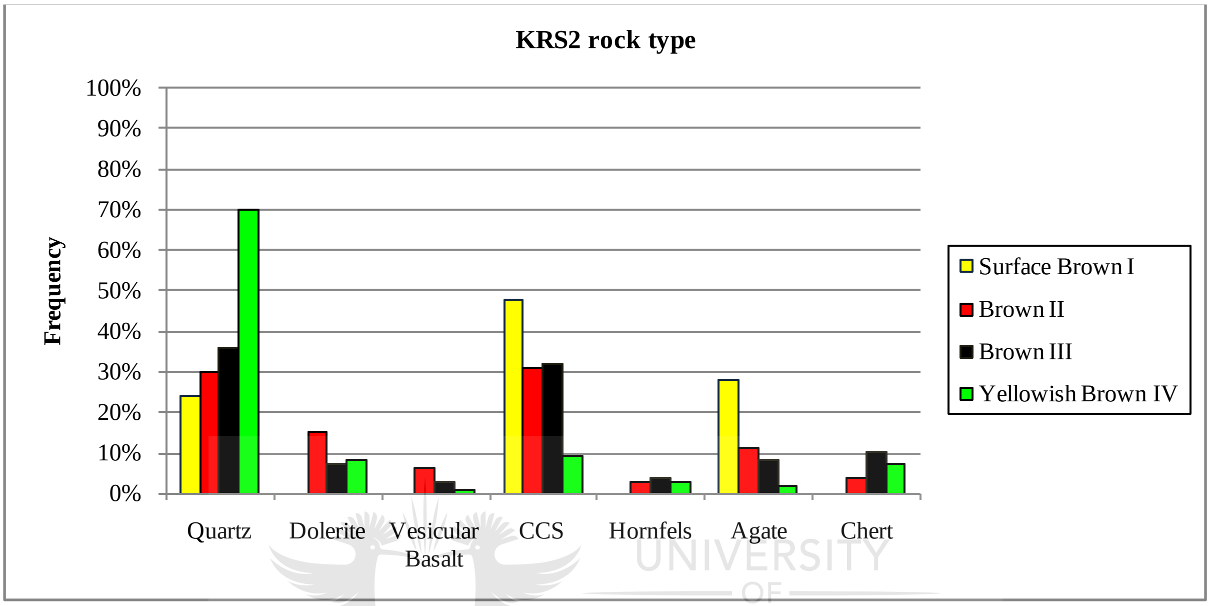

FIGURE 5.8. *The relative frequency of rock types at the rock shelter (KRS2).*

TABLE 5.7. *Summary of rock types occurring at KRS2, for a detailed rock type composition see Tables D to G in Appendix A.*

Rock type	**Surface Brown I**	**Brown II**	**Brown III**	**Yellowish Brown IV**	**Total**
Quartz	5	131	684	63	**883**
Dolerite	0	64	144	7	**215**
Vesicular Basalt	0	25	48	1	**74**
CCS	10	133	609	8	**760**
Hornfels	0	12	70	3	**85**
Agate	6	50	155	2	**213**
Chert	0	18	186	6	**210**
Total	**21**	**433**	**1896**	**90**	**2440**

At KSC14, dolerite and quartz have the highest representation in all the levels, followed by CCS. Hornfels, agate, vesicular basalt and chert occur in low quantities throughout the levels, and is absent in level 2 (Fig. 5.9 and Table 5.8). Collectively, all the rock types that comprises CCS occur almost equally in number to dolerite, followed by quartz.

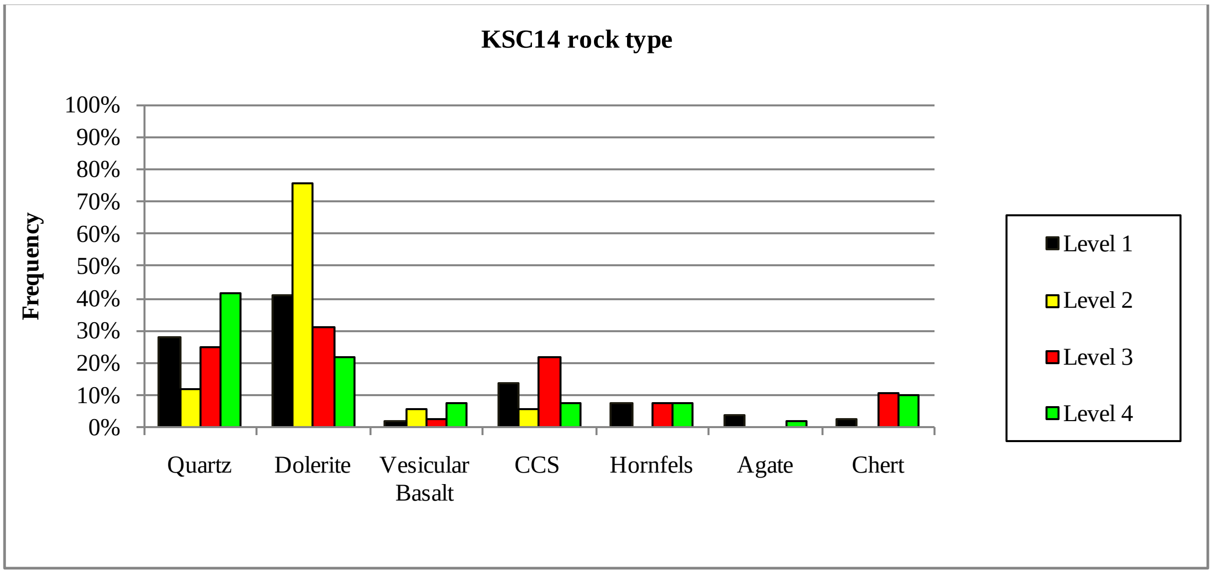

FIGURE 5.9. *The relative frequency of rock types at the stone circle (KSC14).*

TABLE. 5.8. *Summary of rock types between excavated levels at KSC14, for a detailed rock type composition see Tables H to K in Appendix A.*

Rock type	Level 1	Level 2	Level 3	Level 4	Total
Quartz	22	2	9	21	**54**
Dolerite	32	13	11	11	**67**
Vesicular Basalt	2	1	1	4	**8**
CCS	11	1	8	4	**24**
Hornfels	6	0	3	4	**13**
Agate	3	0	0	1	**4**
Chert	2	0	4	5	**11**
Total	**78**	**17**	**36**	**50**	**181**

Although KRS2 and KSC14 have the same set of rock types, the number of types excavated is inconsistent between the two features (Table 5.9). H_o: the relative proportions of one categorical variable (KRS2 total number of rock types) do not differ from the second categorical variable (KSC14 total number of rock types). The different rock types excavated from KRS2 and KSC14 (Table 5.10) are statistically significant (p-value <0.05). Due to the statistical significance, variation in rock types could signify that occupants of KRS2 and KSC14 preferred different rock types for stone tool production.

TABLE 5.9. *Rock type comparison of KRS2 and KSC14.*

Site	Quartz	Dolerite	Vesicular Basalt	CCS	Hornfels	Agate	Chert
KSC14	54	67	8	24	13	4	11
KRS2	883	215	74	760	85	213	210
Total	**937**	**282**	**82**	**784**	**98**	**217**	**221**

TABLE 5.10. *Data contingency table and* chi-*square tests results of the rock types at KRS2 and KSC14.*

Rock type	KRS2	KSC14
Quartz	883	54
Dolerite	215	67
Vesicular basalt	74	8
CCS	760	24
Hornfels	85	13
Agate	213	4
Chert	210	11
Chi-squared = 162; d.f = 6; *p*-value = 0.0001. Significant at *p*-value <0.05		

5.2.3 Morphometric data of lithic artefacts

At KRS2, most of the unretouched flakes have similar mean sizes that are consistently microlithic (<25 mm in longest measurement). The largest (3.5 mm) and smallest (0.2 mm) difference of broken and complete flakes between layers is not significant. Bladelets in Yellowish Brown IV and Surface Brown I have exact lengths of 19.0 mm, while between Brown II- and III bladelet lengths differ by 2.0 mm. The average variation of 4.4 mm in bladelet lengths between layers also seem insignificant. The broken blades in Brown II- and III are macrolithic (>25 mm in longest measurement) and the mean lengths differ by 6.0 mm (Table 5.11).

TABLE 5.11. *Summary of metric data based on direct measurements from unretouched flakes from KRS2 (all measurements are in mm). The stratigraphic layers that are not present in the table do not include the lithic artefact and thus have no measurement.*

Whole flakes							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Surface Brown I	5	14.6	6.02	8-24	8.6	3.04	5-13
Brown II	96	18.1	9.22	10-65	12.3	7.17	5-41
Brown III	296	16.9	8.47	10-66	11.5	7.29	3-58
Yellowish Brown IV	17	15.2	5.01	10-27	11.0	7.3	4-35
Total	**414**	**17.0**	**8.52**	**8-66**	**12.0**	**7.23**	**3-58**
Broken flakes							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown II	52	17.1	9.01	10-54	12.4	6.47	4-32
Brown III	134	15.5	7.69	5-50	11.9	6.08	4-35
Yellowish Brown IV	7	15.3	8.63	10-36	11.8	4.68	8-23
Total	**193**	**15.9**	**8.09**	**5-54**	**12.0**	**6.11**	**4-35**
Whole bladelets							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Surface Brown I	1	19.0	-	-	5.0	-	-
Brown II	7	12.4	4.31	7-19	4.5	1.27	3-7
Brown III	14	14.4	4.34	8-23	4.5	0.93	4-7
Yellowish Brown IV	1	19.0	-	-	6.0	-	-

Total	**23**	**14.2**	**4.39**	**7-23**	**4.7**	**1.02**	**3-7**
Broken bladelets							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	7	10.0	0.81	9-11	3.8	0.37	3-4
Total	**7**	**10.0**	**0.81**	**9-11**	**3.8**	**0.37**	**3-4**
Whole blade							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown II	1	25.0	-	-	5.0	-	-
Total	**1**	**25.0**	**-**	**-**	**5.0**	**-**	**-**
Broken blades							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown II	1	35.0	-	-	14.0	-	-
Brown III	1	29.0	-	-	11.0	-	-
Total	**2**	**32.0**	**4.24**	**29-35**	**12.5**	**2.12**	**11-14**

Retouched pieces, similar to the unretouched flakes slightly differ in average size. Complete points and segments from Brown II are longer (average 3.3 mm) than those of Brown III. The mean width and length of small scrapers vary by a maximum of 2.0 mm between Brown II and Brown III. The average medium scraper size increases with 3.0 mm from the older (Yellowish Brown IV, Brown III) to younger layers (Brown II). Mean large scraper sizes tend to become smaller (average 6.5 mm) in the younger layer of Brown II compared to the mean sizes of Brown III (Table 5.12).

TABLE 5.12. *Summary of metric data based on direct measurements from retouched pieces from KRS2 (all measurements are in mm). The stratigraphic layers that are not present in the table do not include the lithic artefact and thus have no measurement.*

Whole points							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown II	1	19.0	-	-	6.0	-	-
Brown III	6	14.3	4.76	9-21	5.5	2.88	3-11
Total	**7**	**15.0**	**4.69**	**9-21**	**5.6**	**2.63**	**3-11**
Broken points							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	3	12.0	2.0	10-14	6.0	1.73	4-7
Total	**3**	**12.0**	**2.0**	**10-14**	**6.0**	**1.73**	**4-7**
Whole backed pieces							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	8	8.2	3.28	4-13	13.1	4.18	6-20
Total	**8**	**8.2**	**3.28**	**4-13**	**13.1**	**4.18**	**6-20**
Broken backed pieces							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	8	9.25	3.8	5-17	8.0	1.41	5-9
Total	**8**	**9.25**	**3.8**	**5-17**	**8.0**	**1.41**	**5-9**
Segments							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**

Brown II	3	16.6	3.05	14-20	7.6	0.57	7-8
Brown III	12	14.7	3.49	10-22	7.6	1.72	4-10
Total	**15**	**15.1**	**3.39**	**10-22**	**7.6**	**1.54**	**4-10**
Trapeze							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	5	13.8	1.78	12-16	6.4	0.89	5-7
Total	**5**	**13.8**	**1.78**	**12-16**	**6.4**	**0.89**	**5-7**
Truncated flakes							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	3	15.3	1.15	14-16	7.3	0.57	7-8
Total	**3**	**15.3**	**1.15**	**14-16**	**7.3**	**0.57**	**7-8**
Double backed bladelet							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	1	22.0	-	-	4.0	-	-
Total	**1**	**22.0**	**-**	**-**	**4.0**	**-**	**-**
Notched piece							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	1	10.0	-	-	5.0	-	-
Total	**1**	**10.0**	**-**	**-**	**5.0**	**-**	**-**
Burins							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	2	38.5	0.70	38-39	24.5	4.94	21-28
Total	**2**	**38.5**	**0.70**	**38-39**	**24.5**	**4.94**	**21-28**
Borers							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	7	23.6	16.68	14-61	7.6	1.81	7-10
Total	**7**	**23.6**	**16.68**	**14-61**	**7.6**	**1.81**	**7-10**
Awls							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	6	24.0	11.2	11-42	11.6	6.37	4-21
Total	**6**	**24.0**	**11.2**	**11-42**	**11.6**	**6.37**	**4-21**
Small scrapers							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown II	3	8.3	2.3	7-11	15.6	4.04	11-18
Brown III	28	10.25	4.39	6-20	13.7	3.67	4-17
Total	**31**	**10.0**	**4.24**	**6-20**	**11.8**	**3.86**	**4.18**
Medium scrapers							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown II	1	17.0	-	-	26.0	-	-
Brown III	8	14.0	3.02	10-19	22.1	3.60	17-29
Yellowish Brown IV	1	11.0	-	-	21.0	-	-
Total	**10**	**15.0**	**3.52**	**10-21**	**21.1**	**4.99**	**17-29**
Large scrapers							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown II	2	21.0	7.07	16-26	39.5	0.7	39-40
Brown III	2	27.5	3.53	25-30	37.5	3.53	35-40
Total	**4**	**24.3**	**5.90**	**16-30**	**38.5**	**2.38**	**35-40**
Adzes							
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
Brown III	3	20.3	6.65	13-26	16.6	9.86	10-28
Total	**3**	**20.3**	**6.65**	**13-26**	**16.6**	**9.86**	**10-28**

The bladelet cores from Brown II are on average shorter by 11.8 mm than those from Brown III. In addition, bipolar-bladelet cores from Brown II are shorter by 12.6 mm compared to Brown III. Irregular cores from Brown II are 5.5 mm longer than cores from Brown III and 15.6 mm longer compared to Yellowish Brown IV. Between Brown III and Yellowish Brown IV irregular core sizes on average differ by 10.1 mm. Based on the measurements, I suggest that irregular core sizes lengthened through time in stratigraphic units, whereas bladelet- and bipolar-bladelet cores became smaller (Table 5.13).

TABLE 5.13. *Summary of metric data based on direct measurements from cores at KRS2 (all measurements are in mm). The stratigraphic layers that are not present in the table do not include the lithic artefact and thus have no measurement.*

Bladelet cores				
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**
Brown II	2	14.5	2.12	13-16
Brown III	3	26.3	3.21	24-30
Total	**5**	**21.6**	**6.94**	**13-30**
Bipolar-bladelet cores				
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**
Brown II	1	16.0	-	-
Brown III	5	28.6	5.68	23-38
Total	**6**	**26.5**	**7.23**	**16-38**
Irregular cores				
Stratigraphic layer	**N**	**Mean length**	**Stan. Dev.**	**Range**
Brown II	5	32.6	12.21	17-49
Brown III	9	27.1	15.66	18-68
Yellowish Brown IV	1	17.0	-	-
Total	**15**	**28.3**	**14.12**	**17-68**

At KSC14, complete flake average sizes in levels 1, 3 and 4 are similar, but level 2 includes longer flakes with a mean length of 31.5 mm (n=6). Broken flakes in all the levels are similar in length. The complete blade from level 2 has a mean length of 26.0 mm, yet the broken blade measured 59.0 mm. When combining flake and blade mean lengths, level 2 has larger unretouched flakes than the other levels (Table 5.14).

TABLE 5.14. *Summary of metric data based on direct measurements from unretouched flakes at KSC14 (all measurements are in mm). The levels that are not present in the table do not include the lithic artefact and thus have no measurement.*

Whole flakes							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
1	28	19.6	12.30	10-68	17.2	10.86	8-52
2	6	31.5	12.94	20-56	25.3	10.94	14-43
3	10	16.9	7.48	7-30	16.9	8.22	6-32
4	18	19.0	6.81	10-32	14.0	5.68	7-27
Total	**62**	**20.1**	**10.81**	**10-68**	**17.0**	**9.51**	**6-52**
Broken flakes							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
1	9	18.2	5.62	10-27	14.7	6.96	9-28
2	3	21.3	2.51	19-24	23.0	7.93	14-29
3	6	19.2	11.83	10-39	14.6	9.17	6-26
4	7	21.1	6.98	11-28	19.8	11.98	6-43
Total	**25**	**19.6**	**7.37**	**10-39**	**17.2**	**9.18**	**6-43**
Broken bladelets							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
1	1	14.0	-	-	7.0	-	-
Total	**1**	**14.0**	**-**	**-**	**7.0**	**-**	**-**
Whole blades							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
2	1	26.0	-	-	9.0	-	-
Total	**1**	**26.0**	**-**	**-**	**9.0**	**-**	**-**
Broken blades							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
2	1	59.0	-	-	26.0	-	-
Total	**1**	**59.0**	**-**	**-**	**26.0**	**-**	**-**

Between levels 3 and 4, the mean lengths of backed pieces differ by 27.0 mm. Among levels 1 and 4 the average sizes of small scrapers fluctuate with 6.4 mm and large scrapers with 37.0 mm. The medium scrapers in level 4 measure 21.5 mm in length and 24.0 mm in width. Large scrapers are lengthier in level 1 (average 80.0 mm) than in level 4 (average 43.0 mm). Although scrapers and backed pieces are not present, the denticulate and unifacial lateral point occurring only in level 2, has mean lengths of 13.0 mm and 15.0 mm respectively, but the awl is larger measuring 30.0 mm (Table 5.15).

TABLE 5.15. *Summary of metric data based on direct measurements from retouched pieces at KSC14 (all measurements are in mm). The levels that are not present in the table do not include the lithic artefact and thus have no measurement.*

Backed piece							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
3	1	22.0	-	-	11.0	-	-
4	1	49.0	-	-	24.0	-	-

Total	**2**	**35.5**	**19.09**	**22-49**	**17.5**	**9.19**	**11-24**
Unifacial lateral point							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
2	1	13.0	-	-	5.0	-	-
Total	**1**	**13.0**	**-**	**-**	**5.0**	**-**	**-**
Denticulate							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
2	1	15.0	-	-	6.0	-	-
Total	**1**	**15.0**	**-**	**-**	**6.0**	**-**	**-**
Awl							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
2	1	30.0	-	-	14.0	-	-
Total	**1**	**30.0**	**-**	**-**	**14.0**	**-**	**-**
Small scrapers							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
1	3	13.6	5.77	7-17	14.0	3.0	11-17
4	1	10.0	-	-	16	-	-
Total	**4**	**12.8**	**5.05**	**7-17**	**14.5**	**2.64**	**11-17**
Medium scrapers							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
4	2	21.5	2.12	20-23	24.0	5.0	19-24
Total	**2**	**21.5**	**2.12**	**20-23**	**24.0**	**5.0**	**19-24**
Large scrapers							
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
1	1	80.0	-	-	38.0	-	-
4	1	43.0	-	-	34.0	-	-
Total	**2**	**61.5**	**26.16**	**43-80**	**36.0**	**2.82**	**34-38**

The mean lengths of irregular cores in levels 1 and 4 differ by 14.7 mm, and the radial core from level 1 with a length of 84.0 mm is larger than the irregular cores (Table 5.16). The conflicting fluctuation of metric dimensions of all lithic artefacts between levels supports the fact that along with the excavation in arbitrary levels, the primary context of KSC14 is doubtful. Moreover, KSC14 has a very small lithic sample and to interpret a difference between such a small number of lithic artefacts is problematic.

TABLE 5.16. *Summary of metric data based on direct measurements from cores at KSC14 (all measurements are in mm). The levels that are not present in the table do not include the lithic artefact and thus have no measurement.*

Irregular core				
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**
1	3	65.0	31.43	31-93
4	3	50.3	35.38	22-90
Total	**6**	**57.7**	**30.99**	**22-93**
Radial core				
Level number	**N**	**Mean length**	**Stan. Dev.**	**Range**
1	1	84.0	-	-
Total	**1**	**84.0**	**-**	**-**

Comparison of KSR2 and KSC14 indicate that complete and broken flakes have similar proportions. The complete blade mean lengths are also similar within both features, but a broken blade at KSC14 is larger (27.0 mm) than the broken blade from KRS2 (Table 5.17).

TABLE 5.17. *Summary of metric data based on direct measurements from unretouched flakes between KRS2 and KSC14 (all measurements are in mm).*

Whole flakes							
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
KRS2	414	17.0	8.52	8-65	12.0	7.23	3-58
KSC14	62	20.1	10.81	10-68	17.0	9.51	6-52
Broken flakes							
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
KRS2	193	15.9	8.09	5-54	12.0	6.11	4-35
KSC14	25	19.6	7.37	10-39	17.2	9.18	6-43
Broken bladelets							
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
KRS2	7	10.0	0.81	9-11	3.8	0.37	3-4
KSC14	1	14.0	-	-	7.0	-	-
Whole blades							
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
KRS2	1	25.0	-	-	5.0	-	-
KSC14	1	26.0	-	-	9.0	-	-
Broken blades							
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
KRS2	2	32.0	4.24	29-35	12.5	2.12	11-14
KSC14	1	59.0	-	-	26.0	-	-

Retouched pieces such as complete points, awls, and small- and medium scrapers are also similar in mean metric dimensions at KRS2 and KSC14, as the 6.0 mm variation of average lengths are not a large difference (Table 5.18). However, between KRS2 and KSC14 mean lengths of backed pieces differ by 27.0 mm and large scrapers differ by 37.0 mm.

TABLE 5.18. *Summary of metric data based on direct measurements from retouched pieces of KRS2 and KSC14 (all measurements are in mm). Only retouched pieces present at both units were compared.*

Whole points							
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
KRS2	7	15.0	4.69	9-21	5.6	2.63	3-11
KSC14	1	13.0	-	-	5.0	-	-
Whole backed pieces							
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
KRS2	8	8.2	3.28	4-13	13.1	4.18	6-20
KSC14	2	35.5	19.09	22-49	17.5	9.19	11-24
Awls							

Site	N	Mean length	Stan. Dev.	Range	Mean width	Stan. Dev.	Range
KRS2	6	24.0	11.2	11-42	11.6	6.37	4-21
KSC14	1	30.0	-	-	14.0	-	-
Small scrapers							
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
KRS2	31	10.0	4.24	6-20	11.8	3.86	4-18
KSC14	4	12.8	5.05	7-17	14.5	2.64	11-17
Medium scrapers							
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
KRS2	10	15.0	3.52	10-21	21.1	4.99	17-29
KSC14	2	21.5	2.12	20-23	24.0	5.0	19-24
Large scrapers							
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**	**Mean width**	**Stan. Dev.**	**Range**
KRS2	4	24.3	5.90	16-30	38.5	2.38	35-40
KSC14	2	61.5	26.16	43-80	36.0	2.82	34-38

Irregular and radial cores at KSC14 are much larger than irregular, bladelet and bipolar-bladelet cores at KRS2 (Table 5.19 and Fig. 5.10). It is not feasible to compare the core sizes separately because the *chi*-square test would require a 1x1 (two values) contingency table, which is not possible. Comparing the mean length core sizes combined is problematic as there are five values, for a contingency table, I need six or four values. Taking the raw metric data from all the cores results in too many values (n=33) for a contingency table. I would have to either eliminate categories and/or values and this will defeat the purpose of a *chi*-square test.

TABLE 5.19. *Summary of metric data based on direct measurements of cores from KRS2 and KSC14 (all measurements are in mm).*

Bladelet cores				
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**
KRS2	5	21.6	6.94	13-30
KSC14	-	-	-	-
Bipolar-bladelet cores				
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**
KRS2	6	26.5	7.23	16-38
KSC14	-	-	-	-
Irregular cores				
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**
KRS2	15	28.3	14.12	17-68
KSC14	6	57.7	30.99	22-93
Radial cores				
Site	**N**	**Mean length**	**Stan. Dev.**	**Range**
KRS2	-	-	-	-
KSC14	1	84.0	-	-

Chi-square tests for whole unretouched flakes did not indicate significance, as the measurements differ with no more than 5.0 mm. Since the broken blades differ by more than 15.0 mm, it should be significant. H_o: the relative proportions of one categorical variable (mean broken blade length and width at KRS2) do not differ significantly from the second categorical variable (mean broken blade length and width at KSC14). However, the difference in mean measurement of broken blades at KRS2 and KSC14 (Table 5.20) is also statistically insignificant (*p*-value >0.05) and can thus not be excluded as a chance variation.

Regarding the size differences between retouched pieces, H_o: the relative proportion of one categorical variable (mean retouched piece length and width at KRS2) do not differ significantly from the second categorical variable (mean retouched piece length and width at KSC14). The mean measurements of backed pieces and large scrapers at KRS2 and KSC14 (Table 5.20) indicates that the size variations of the backed pieces and large scrapers are statistically significant (*p*-value <0.05) and are most probably not a chance variation. Compared to KRS2, it seems from the *chi*-square tests results that occupants of KSC14 preferred larger scrapers and backed pieces.

TABLE 5.20. *Data contingency tables and* chi-*square tests results of metric dimensions of lithic artefacts at KRS2 and KSC14. Only where the type of lithic artefact is present at both KRS2 and KSC14* chi-*square tests were done.*

Type of data	**Artefacts and sites**	
Metric	**Whole flakes KRS2**	**Whole flakes KSC14**
Mean length mm	17	20
Mean width mm	12	17
Chi-squared = 0.138; d.f = 1; *p*-value = 0.710277. Not significant at *p*-value <0.05		
Metric	**Broken blades KRS2**	**Broken blades KSC14**
Mean length mm	32	59
Mean width mm	12	26
Chi-squared = 0.153; d.f = 1; *p*-value = 0.695685 Not significant at *p*-value <0.05.		
Metric	**Backed pieces KRS2**	**Backed pieces KSC14**
Mean length mm	8	36
Mean width mm	13	18
Chi-squared = 5.09; d.f = 1; *p*-value = 0.024064. Significant at *p*-value <0.05		
Metric	**Large scrapers KRS2**	**Large scrapers KSC14**
Mean length mm	24	62
Mean width mm	39	36
Chi-squared = 9.76; d.f = 1; *p*-value = 0.001783. Significant at *p*-value <0.05		

FIGURE 5.10. *A selection of lithic artefacts from the rock shelter (KRS2) and stone circle (KSC14).* **KRS2, Surface Brown I**: *A: bladelet (quartz).* ***Brown II****: B: blade (chert); C: segment (agate); D: small backed scraper (CCS); E: large scraper (vesicular basalt).* **Brown III**: *F: irregular core (dolerite); G: bladelet core (chert); H: core-rejuvenation flake (hornfels); I: bladelets (quartz, hornfels, dolerite and chert); J: truncated flake (CCS); K: borer (chert).* **Yellowish Brown IV**: *L: bladelet (CCS); M: medium endscraper (CCS).* **KSC14, Level 1**: *N: irregular core (hornfels); O: core-rejuvenation flake (hornfels); P: small backed scraper (CCS); Q: large double-side scraper (dolerite); R: radial core (dolerite).***Level 2**: *S: whole bladelet (dolerite); T: broken blade (dolerite); U: awl (dolerite); V: denticulate (dolerite); W: unifacial lateral point (dolerite).* **Level 3**: *X: core-rejuvenation flake (CCS);* **Level 4**: *Y: medium side- and endscraper (chert); Z: large endscraper (vesicular basalt); AA: core-rejuvenation tablet (vesicular basalt); BB: irregular core (dolerite).*

5.2.4 Technological results

At KSR2 and KSC14, core initiations include bending, wedging, herzian and flake terminations include feather, hinge, plunging, step and axial (Figs. 5.11 and 5.12). Specimens retrieved from Surface Brown I, Brown II and Brown III have mostly herzian initiations and lesser quantities of bending and wedging initiations. Yellowish Brown IV has slightly more bending initiations than herzian. However, plunging termination frequency is lower than the hinge and feather terminations in all layers. In Brown III and Yellowish Brown IV, the wedging initiations and axial terminations are indicative of bipolar stone knapping technology. Surface Brown I did not yield any evidence for bipolar knapping technology. A bipolar-bladelet core is present in Brown II, but wedging initiations and axial flake terminations only occur in Brown III and Yellowish Brown IV. Broken flakes resulting in step terminations were recovered from Brown II, Brown III and Yellowish Brown IV only (Fig. 5.11).

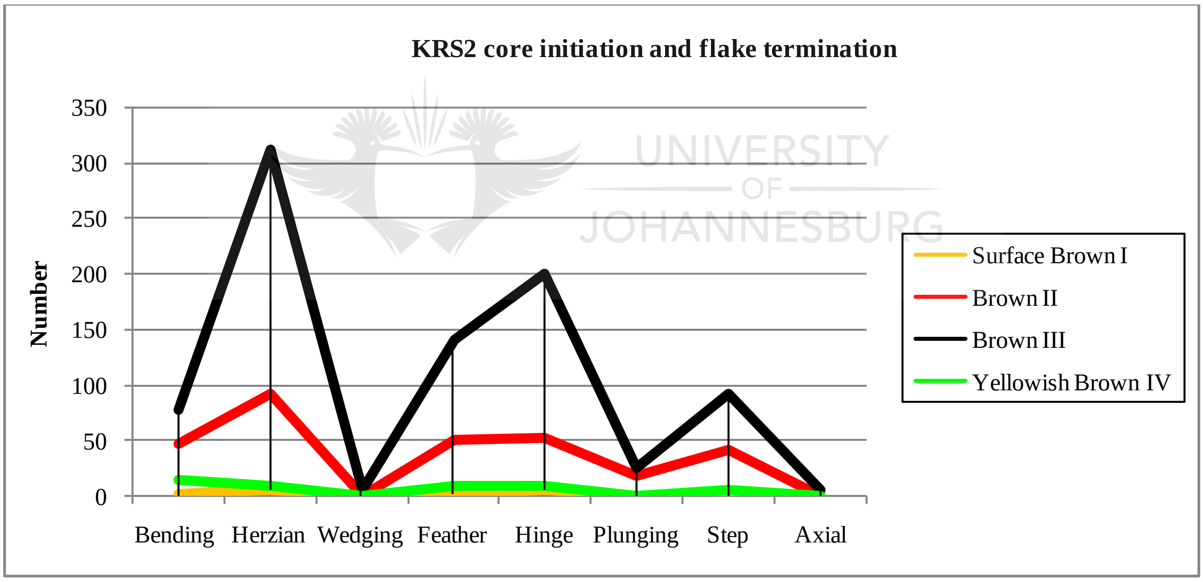

FIGURE 5.11. *The initiations and terminations on unretouched flakes from the rock shelter (KRS2).*

At KSC14, all the excavated levels have a higher number of bending initiations instead of herzian initiations. Flake terminations include mostly feather, except in level 4 where feather and hinge terminations are equally distributed. Plunging terminations are not present in levels 2 and 3, and all the levels include step terminations. There is no bipolar technology present at KSC14 (Fig. 5.12).

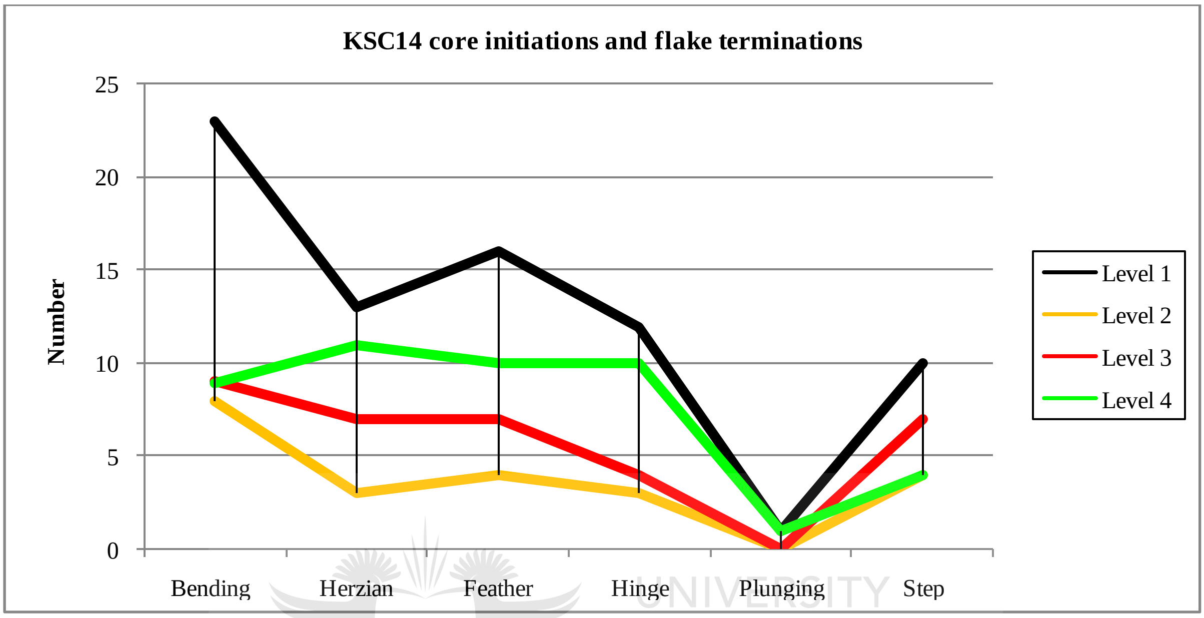

FIGURE 5.12. *The initiations and terminations on unretouched flakes from the stone circle (KSC14).*

KRS2 includes herzian initiation with a majority of hinge termination, followed by feather termination. KSC14 has mostly bending initiations but with feather terminations, having a lesser amount of hinging terminations. Plunging terminations have a low number at both features. A more noteworthy difference is that at KRS2 the use of bipolar technology is present, which is not the case at KSC14 (Figs. 5.11 and 5.12).

H_o: the relative proportions of one categorical variable (total core initiation and flake termination types at KRS2) are not significantly different of the second categorical variable (total core initiation and flake termination types at KSC14). The number of initiations and terminations at KRS2 and KSC14, (Table 5.21) indicate that differences in frequency are statistically significant (*p*-value <0.05). The significance could also be due to sample size as KRS2 inherently has a higher number of lithic artefacts than KSC14.

TABLE 5.21. *Data contingency table and* chi-*square tests results of core initiation and flake termination at KRS2 and KSC14.*

Core initiation and flake fracture type	KRS2	KSC14
Bending	140	49
Herzian	419	34
Wedging	7	0
Feather	202	37
Hinge	269	29
Plunging	45	2
Step	141	25
Axial	7	0
Chi-squared = 51.4; d.f = 7; *p*-value = 0.0001. Significant at *p*-value <0.05		

5.3 Non-lithic artefacts of the rock shelter and stone circle at Kuidas Spring

Table 5.22 presents the production phases of OEB identified in this study at KRS2. I did not observe any pieces >20 mm that would have resembled broken OES flasks at KRS2 and KSC14. At KRS2, Surface Brown I has a broken perforated blank present. Brown II includes partially drilled blanks, broken perforated blanks, slightly formed beads, finished and broken beads. A complete OEB production sequence only occurs in layer Brown III. No evidence for OEB production was present in Yellowish Brown IV.

TABLE 5.22. *The production phases of OEB identified at KRS2 (after Kandel & Conard 2005), key to Figure 5.13.*

OEB production phase (number is key)	Surface Brown I	Brown II	Brown III	Total
Circular blank (2)	-	-	8	**8**
Complete partially drilled blank (3)	-	2	2	**4**
Broken partially drilled blank (4)	-	2	29	**31**
Complete perforated blank (5)	-	-	3	**3**
Broken perforated blank (6)	1	7	22	**30**
Complete, perforated, slightly formed bead (7)	-	-	1	**1**
Broken, perforated, slightly formed bead (8)	-	-	13	**13**
Complete, perforated almost bead form (9)	-	1	11	**12**
Broken, perforated almost bead form (10)	-	1	35	**36**
Finished bead (11)	-	2	9	**11**
Broken finished bead (12)	-	1	8	**9**
Total	**1**	**16**	**141**	**158**

At KRS2, the production phases of OES pieces are similar in the layers as most are unburnt, have patina present, and complete OEBs are polished. Perforation of OES was initiated from the dorsal (inside eggshell) side in Surface Brown I and Brown III. In Brown II, perforation was from the ventral (outside of eggshell) surface of the shell but for only two of the 13 pieces. The perforation type and direction of the majority of pieces from Brown II is therefore the same as Surface Brown I and Brown III (Table L, Appendix A).

Brown III has the most polished OES fragments and some of them were possibly intended for producing pendants being >20 mm. Throughout the occupation of KRS2, unburnt fragments were preferred for OEB production, and the removal of eggshell patina does occur, but the majority of pieces have patina present (Table L, Appendix A). The total weight of OES fragments from Brown III is 215.88g, whilst that from Brown II it is 32.6g, and 5.2g in Surface Brown I. The fragment from Yellowish Brown IV weighs less than 1.0g.

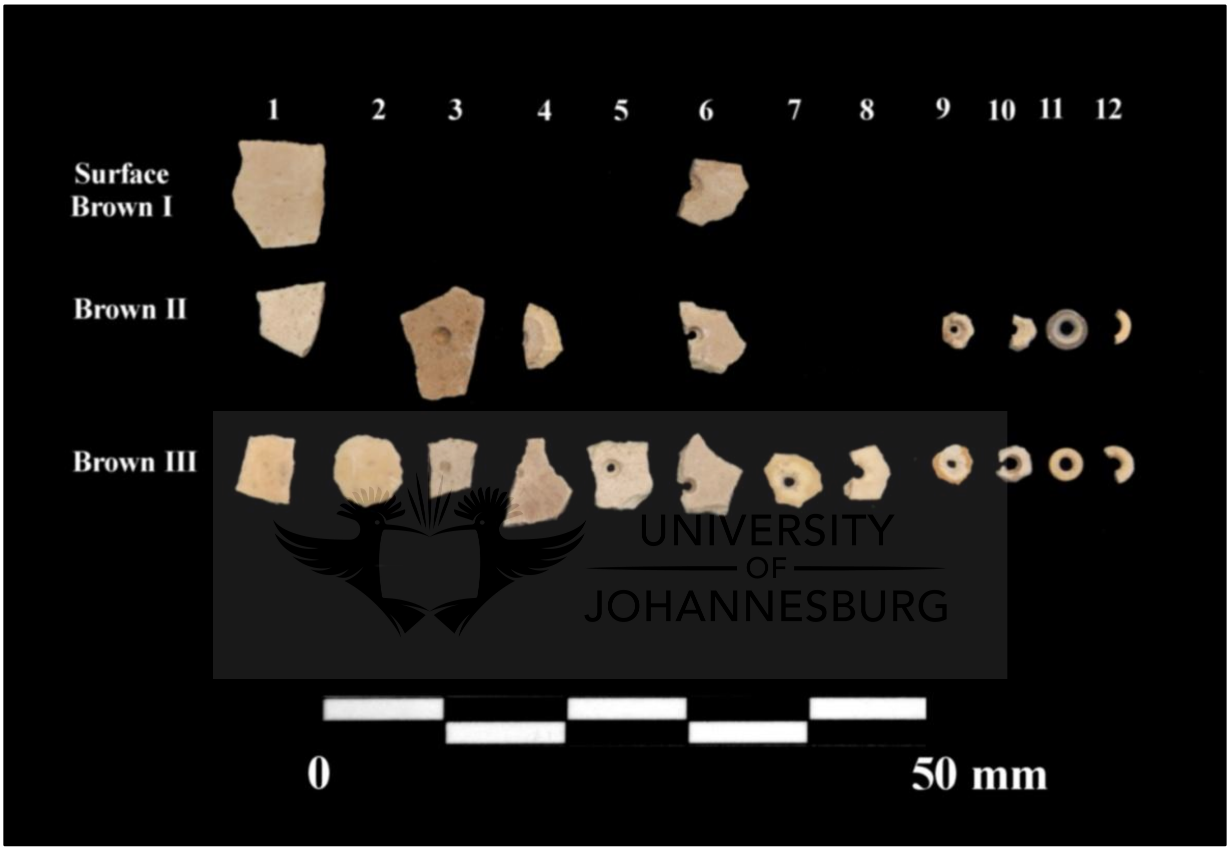

FIGURE. 5.13. *The rock shelter (KRS2) OEB production phases per stratigraphic layer.*

The OEBs from Brown II are slightly larger than that of Brown III (Fig. 5.13 and Table 5.23), similar to the trend of Brown II, which have some larger lithic artefacts. When compared to the variety of formal stone tools of Brown III, the OEB production sequence is similar in the sense of having all the production phases present. As with the lithic artefacts, the minimum and no OEB production phases are present at Surface Brown I and Yellowish Brown IV.

TABLE 5.23. *Summary of metric data based on direct measurements from OEB at KRS2 (all measurements are in mm).*

Complete OEB										
Stratigraphic Layer	**N**	**Mean diameter**	**Stan. Dev.**	**Range**	**Mean aperture**	**Stan. Dev.**	**Range**	**Mean thickness**	**Stan. Dev.**	**Range**
Brown II	2	5.2	0.89	4-6	1.5	0.07	1.5-1.6	1.3	0.17	1.2-1.4
Brown III	9	4.1	0.84	3-5	1.2	0.29	0.75-1.6	1.4	0.22	1.0-1.65
Total	**11**	**4.3**	**0.92**	**3-5**	**1.2**	**0.3**	**0.75-1.6**	**1.4**	**0.2**	**1.0-1.65**

At KSC14, level 1 includes a complete production phase while level 4 has the most incomplete phase by having one broken partially drilled blank and three broken perforated blanks (Table 5.24 and Fig. 5.14). The production of OEBs includes mostly unburnt and unpolished pieces, with a majority of pieces having no patina left. Perforation occurs on the ventral and dorsal surfaces, yet collectively perforation of the majority of pieces was on the dorsal surface. All the levels have a lower number of burnt OES fragments, and a higher rate of patina removed. Polished fragments are only present in levels 1 and 4 (Table M, Appendix A).

TABLE 5.24. *The production phases of OEB identified at KSC14 (after Kandel & Conard 2005), key to Figure 5.14.*

OEB production phase (number is key)	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Total**
Circular blank (2)	2	1	2	-	**5**
Complete partially drilled blank (3)	2	-	-	-	**2**
Broken partially drilled blank (4)	7	1	-	1	**9**
Complete perforated blank (5)	4	1	1	-	**6**
Broken perforated blank (6)	2	1	5	3	**11**
Complete, perforated, slightly formed bead (7)	1	1	-	-	**2**
Broken, perforated, slightly formed bead (8)	1	2	2	-	**5**
Complete, perforated almost bead form (9)	1	-	2	-	**3**
Broken, perforated almost bead form (10)	1	-	-	-	**1**
Finished bead (11)	3	-	1	-	**4**
Broken finished bead (12)	2	1	1	-	**4**
Total	**26**	**8**	**14**	**4**	**52**

At KSC14, the bead production phases are similar, with the patina removed from most fragments. Most are unburnt and were spatially more concentrated in the front and middle area of the stone circle. The mean OEB diameter from level 1 is greater than the single bead from level 3 (Table 5.25 and Fig. 5.14). Similar to the bead sizes, lithic artefacts also differ in size between the levels and no clear differentiating trends emerge between excavated units at KSC14. The total weight of OES at KSC14 is 69.1g with the OES in level 1 having the greatest weight.

TABLE 5.25. *Summary of metric data based on direct measurements from OEBs at KSC14 (all measurements are in mm).*

Complete OEB										
Level	**N**	**Mean diameter**	**Stan. Dev.**	**Range**	**Mean aperture**	**Stan. Dev.**	**Range**	**Mean thickness**	**Stan. Dev.**	**Range**
1	3	7.2	0.23	7.0-7.5	2.3	0.47	1.8-2.7	1.3	0.04	1.0-1.39
3	1	4.5	-	-	1.2	-	-	1.85	-	-
Total	**4**	**6.6**	**1.36**	**4.5-7.5**	**2.0**	**0.65**	**1.2-2.7**	**1.5**	**0.25**	**1.0-1.85**

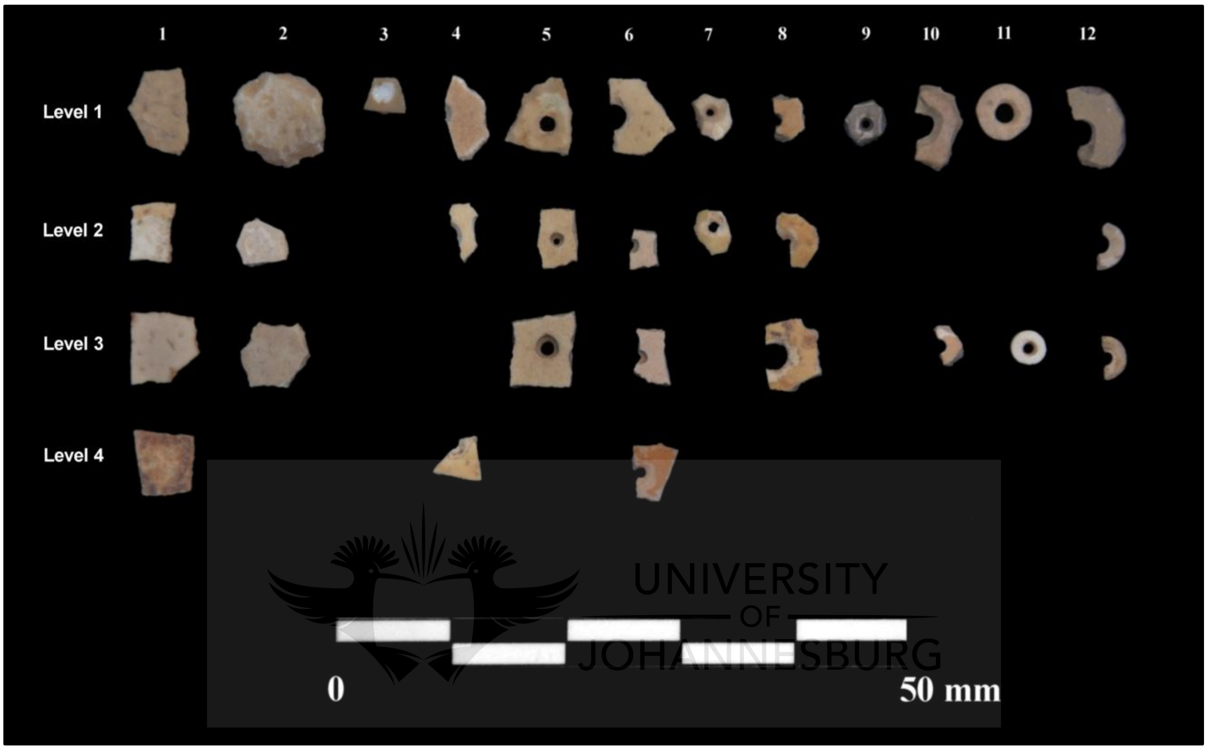

FIGURE. 5. 14. *The stone circle (KSC14) OEB production phases per excavated level.*

Some of the OEBs at KSC14 are larger than the OEBs of KRS2 (Tables 5.23, 5.25 and Fig. 5.15) the differences in bead sizes correlate with some of the larger lithic artefacts from KSC14 and some of the smaller lithic artefacts of KRS2. However, it should be kept in mind that KSC14 has small sample that is of a secondary context. A higher number of burnt OES fragments occur at KRS2 than KSC14. Both features include few OES fragments that are polished, but KSC14 includes more fragments that had their patina removed than KRS2 (Table 5.26).

H_o: the relative proportions of one categorical variable (number of OES characteristics at KRS2) do not differ significantly from the second categorical variable (number of OES characteristics at KSC14). The OES that are burnt, polished, and have patina removed at the archaeological features (Table 5.27) indicate that differences in frequency are statistically significant (*p*-value <0.05). Based on the *chi*-square test results, I infer that the occupants of KSC14 preferred to remove most of the OES patina, while the inhabitants of KRS2 did so to a lesser degree. The total OES at KRS2 has a greater weight than the total OES at KSC14 (Table 5.28).

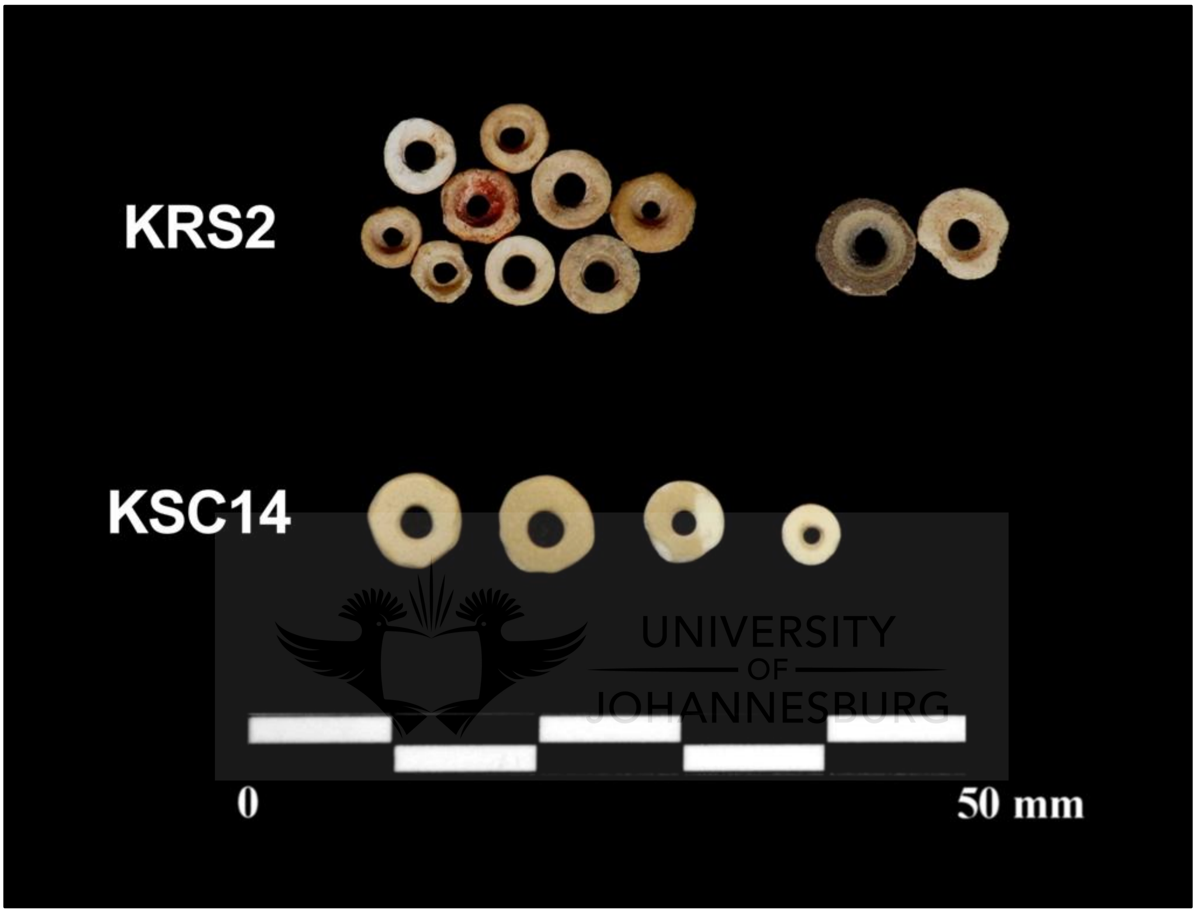

FIGURE. 5.15. *Complete OEBs from the rock shelter (KRS2) and stone circle (KSC14).*

TABLE 5.26. *Comparison of OES fragment attributes of KRS2 and KSC14. Note: numbers of pieces do not equal number of attributes because one piece can have multiple attributes.*

Site (n of pieces)	Burnt	Polished	Patina removed
KRS2 (n=938)	74	1	13
KSC14 (n=249)	46	2	118
Total	**120**	**3**	**131**

TABLE 5.27. *Data contingency table and* chi-*square tests results of OES fragment attributes at KRS2 and KSC14.*

OES fragment	KRS2	KSC14
Burnt	74	46
Polished	1	2
Patina removed	14	118
Chi-squared = 72.1; d.f = 2; *p*-value = 0.00001. Significant at *p*-value <0.05		

TABLE 5.28. *Comparison of OES weight at KRS2, KSC14 and KSS3.*

KSC14 OES	Level 1	Level 2	Level 3	Level 4	Total
Weight in gram	33.2g	11.9g	14.1g	9.9g	69.1g
KRS2 OES	**Surface Brown I**	**Brown II**	**Brown III**	**Yellowish Brown IV**	
Weight in gram	5.2g	32.62g	215.88g	0.0g	253.7g
KSS3 OES	**Level 1**	**Level 2**			
Weight in gram	0.9g	1.1g	-	-	2.0g

Other material remains excavated from KRS2 includes red ochre pieces that are only present in Brown III (Table N, Appendix A). Although there are rock paintings in the adjacent valley of KS1, it does not necessarily mean that ochre at KRS2 was used only for rock painting purposes. One of the beads from Brown III (Fig. 5.15) has a red ochre stain. I have not recovered any lower or upper grinding stones or grooved stones from excavations at KRS2.

Material remains of KSC14 include pottery, copper fragments and beads (Table N, Appendix A). The pottery pieces from levels 2 and 3 are undecorated and three have a black appearance. Shards have a mean thickness of 4.4 mm and are therefore categorised as thin-walled pottery (Fig. 5.16 and Table 5.29). Copper fragments and beads were excavated in the square outside the stone circle (square C4, level 1), but copper fragments also occurred in level 3 inside the stone circle. The copper beads have a mean diameter of 8.92 mm and are larger than the OEBs from KSC14 (Fig. 5.16 and Table 5.30).

FIGURE 5.16. *Pottery fragments and copper pieces from the stone circle (KSC14).*

The spatial distribution of the copper fragments from level 3 corresponds with the ash concentrations, lithic artefacts, OES pieces and pottery shards, which are near the opening and middle area of KSC14 (Table N, Appendix A).

TABLE 5.29. *Summary of metric data based on direct measurement of KSC14 pottery fragments (all measurements are in mm).*

Pottery fragments				
Level	**N**	**Mean thickness**	**Stan. Dev.**	**Range**
2	2	4.2	1.05	3.5-5.5
3	2	4.5	0.07	4.0-5.0
Total	**4**	**4.4**	**0.74**	**3.5-5.0**

TABLE 5.30. *Summary of metric data based on direct measurement of KSC14 copper beads (all measurements are in mm).*

Copper beads							
Level	**N**	**Mean diameter**	**Stan. Dev.**	**Mean aperture**	**Stan. Dev.**	**Mean thickness**	**Stan. Dev.**
1	1	8.9	-	5.0	-	3.0	-
1	1	8.95	-	4.0	-	2.0	-
Total	**2**	**8.92**	**0.03**	**4.5**	**0.70**	**2.5**	**0.70**

No livestock was identified at KSC14 or KRS2 but the following taxa are present: springbok, possible oryx, possible kudu, zebra, dassie rats, hares and marine shell (Appendix B). A partly smoothed, but broken piece of bone measuring 61.0 mm occurred in layer Brown II of KRS2 (Appendix B). Plant remains have not yet been analysed for either KRS2 or KSC14 and are not included in this study.

5.4 Results of the cairn excavation

KSS3 is a stone cairn. The AMS date from charcoal samples indicate that the cairn was in use between AD 1762 and AD 1803 (OxA-27897), which are similar to some of the AMS dates at KSC14 (Tables 5.2 and 5.31).

TABLE 5.31. *The AMS date of KSS3.*

Unit	Lab reference	Years before present	Calibrated Range
Level 2 (KSS3)	OxA-27897	216 ± 24	AD 1762 - 1803

KSS3 had no lithic artefacts, but charcoal, pottery fragments, faunal remains, plant material, one OEB and six OES fragments were excavated. The minuscule and elliptic-shaped dung pellets inside KSS3 is probably that of dassie rats or other small animals using the feature as a latrine. Plant material was not analysed. Faunal remains include a canine (jackal or dog), dassie, as well as indeterminate medium and large antelopes (Appendix B).

The unburnt OEB was not polished, but the eggshell patina was removed. OES fragments were also not burnt, but polished and still had patina present (Table 5.32). The OEB from KSS3 is smaller than those in level 1 but similar in size to the bead from level 3 at KSC14 (Tables 5.25 and 5.33). Burnt and undecorated pottery shards occurring in levels 1 and 2 have a mean thickness of 6.25 mm and are thin-walled (Fig. 5.17 and Table 5.34). The pottery fragments from KSS3 are slightly thicker (1.85 mm) than those from KSC14 (Tables 5.29 and 5.34). Due to the date and similarities of artefacts, the cairn could be contemporary with the stone circle features at KS1, even though KSC14 is 50 m away from the cairn (Fig. 4.1 in Chapter 4).

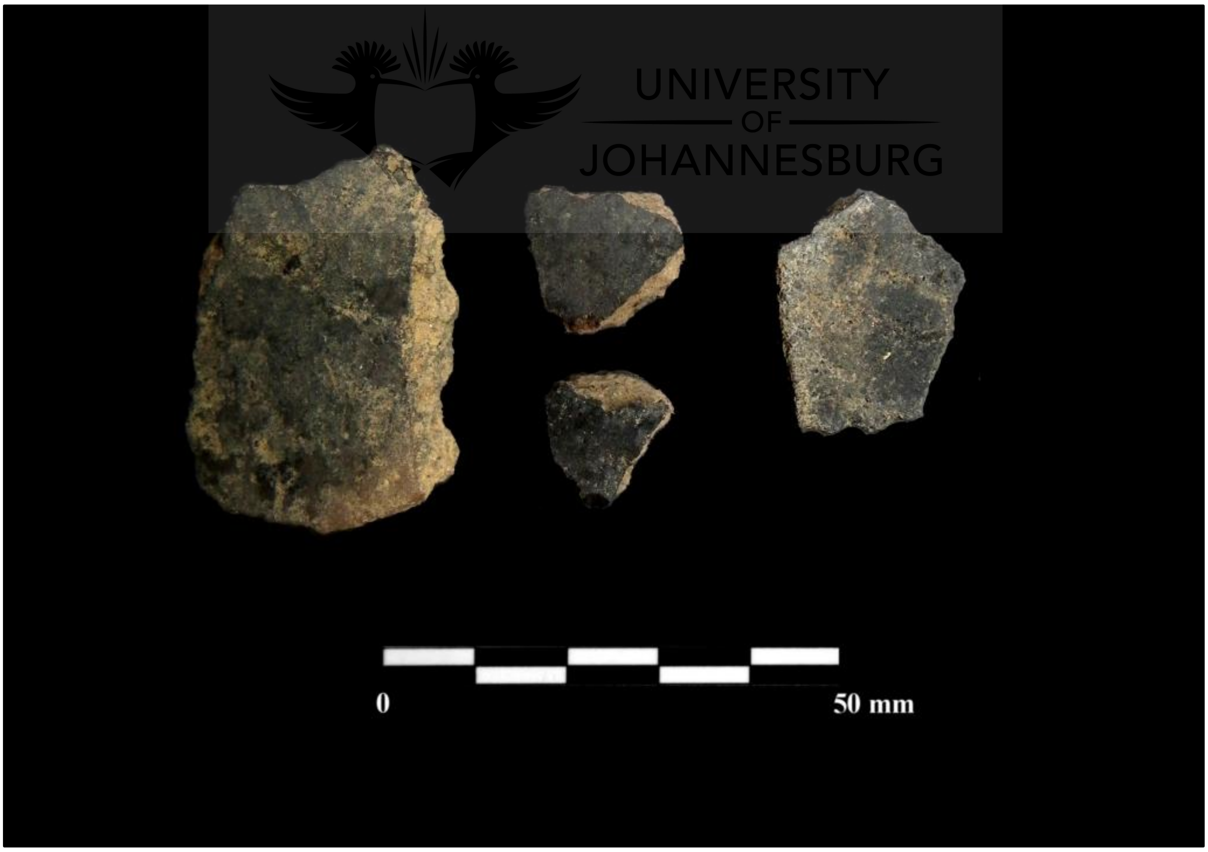

FIGURE 5.17. *Pottery fragments from the cairn (KSS3).*

TABLE 5.32. *The OES and OEB from KSS3 with attribute. Note: numbers of pieces do not equal number of attributes because one piece can have multiple attributes.*

Production phase (n of pieces)	Burnt	Not burnt	Polished	Not polished	Patina	Patina removed
Finished bead (n=1)	1	-	-	1	-	1
Fragments (n=6)	-	6	3	3	6	-
Total	1	6	3	4	6	1

TABLE 5.33. *Summary of metric data based on direct measurements of the OEB from KSS3 (all measurements are in mm).*

Complete OEB				
Level	N	Mean Diameter	Mean Aperture	Mean thickness
2	1	4.5	1.45	1.64
Total	1	4.5	1.45	1.64

TABLE 5.34. *Summary of metric data based on direct measurement of KSS3 pottery fragments (all measurements are in mm).*

Pottery fragments				
Level	N	Mean thickness	Stan. Dev.	Range
1	1	6.5	-	6.5
2	3	6.0	1.04	5-7
Total	4	6.25	0.86	5-7

5.5 Rock art at Kuidas Spring

In-depth analysis of the rock art at KS1 and KS2 is part of a future project and is not the focus of the current study. Nevertheless, I present a few preliminary remarks here. Panels A, B and C are free-standing sandstone boulders with engravings situated within KRS1 and KRS2 but also near to KSC19. Panel D is the furthest away from the other engraved boulders, but adjacent to a stone circle (Fig. 5.18). The age of the rock engravings from KS1 are unknown and not necessarily associated with either one of the rock shelters or stone circles.

The engravings on panel A, situated within KRS1 (Figs. 5.18 and 5.19), do not have deep engraved images such as panels B and C, making some images ambiguous to recognise. However, visible features include cupules, an antelope, human figures and possibly a seal. This boulder is smaller than others, measuring, 1.35 m x 1.26 m. On panel B, measuring 2.15 m x 0.78 m, the engravings were pecked, thereby exposing the lighter inner rock (Figs. 5.18 and 5. 19). Identifiable animal depictions of panel B include three possible equid-like figures. The human figures appear to be walking, and one is lying on top of an object. A circular feature, dots and broad lines, some in the rough shape of a letter “H”, along with other depictions, may indicate entoptic phenomena. Antelope tracks that could possibly be that of oryx and giraffe are also present. Panel C measures 2.53 m x 0.95 m and has a serrated edge forming a border around pecked images. Depictions include human footprints walking in one direction with cupules situated between them and some antelope tracks, one of which is possibly an oryx (Figs. 5.18 and 5.19).

Panel D is a large boulder situated at the most northern part of KS1, just before 'entering' another stone circle site *via* a gulley known as KS3 (Figs. 5.18 and 5.19). The lower and central part of the boulder includes pecked and incised engravings. Among the depictions are antelopes, horizontal and vertical lines, and one human figure. Some animal tracks are lighter than other engravings and may have been made at a later stage. The incised feline (E in Fig. 5.19) is situated on a high boulder behind KRS2. Two pecked oryx tracks (F in Fig. 5.19) appear on a boulder forming the entrance of KRS2.

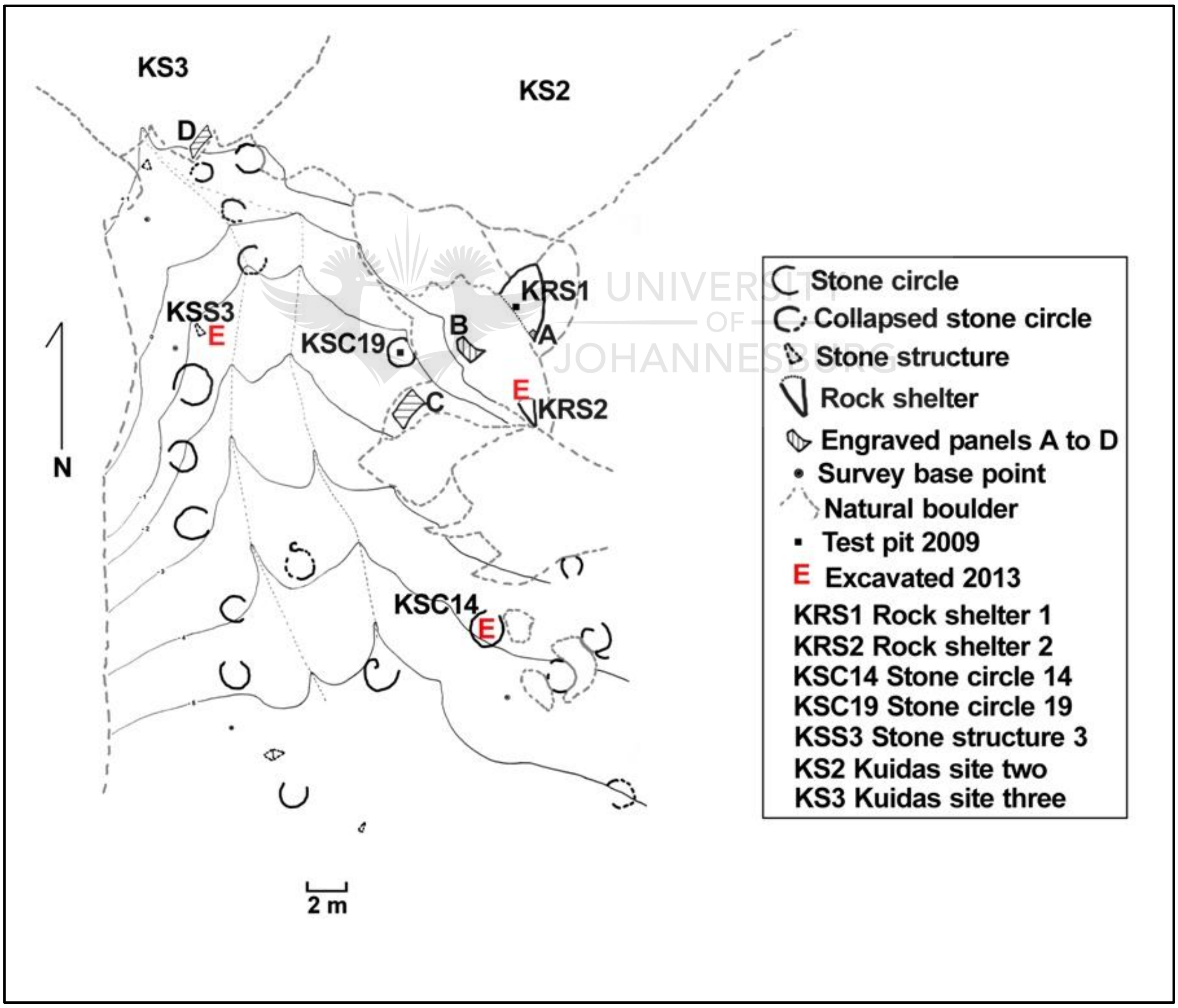

FIGURE 5.18. *Site map of Kuidas Spring indicating the location of engraved panels mentioned in this chapter.*

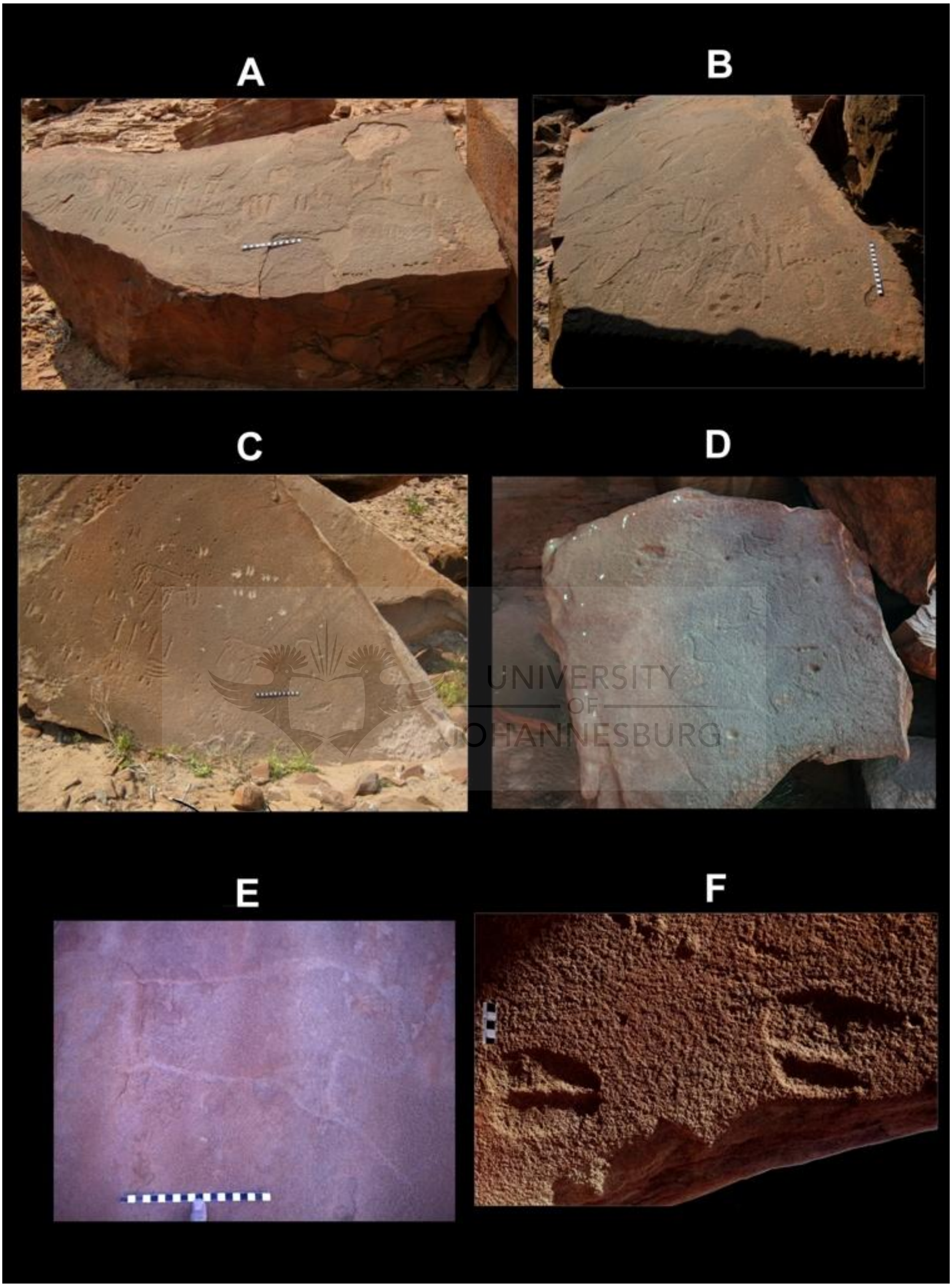

FIGURE 5.19. *The engraved panels at Kuidas Spring site 1 (KS1).*

Panels G and H (Fig. 5.20) are within rock shelters located at KS2, which is an archaeological site in the adjacent valley to KS1. The painting of panel G illustrates red-coloured human figures that have peck marks, an elephant and an unknown object. Panel H consists of polychrome images and identifiable images include a zebra, a calf and white-coloured human figures where they appear to go into the direction of the zebras. The zebras seem to be standing on a white surface and in front of and beneath the zebra there are objects that resemble personal belongings. The antelope on the left hand side of the panel could be an oryx, springbok, or eland. There are also sticks/spears and faded red-coloured human figures near the antelope. The small white spots on the panels are not painted but are gecko dung. Closer inspection of these panels in future will reveal more detail.

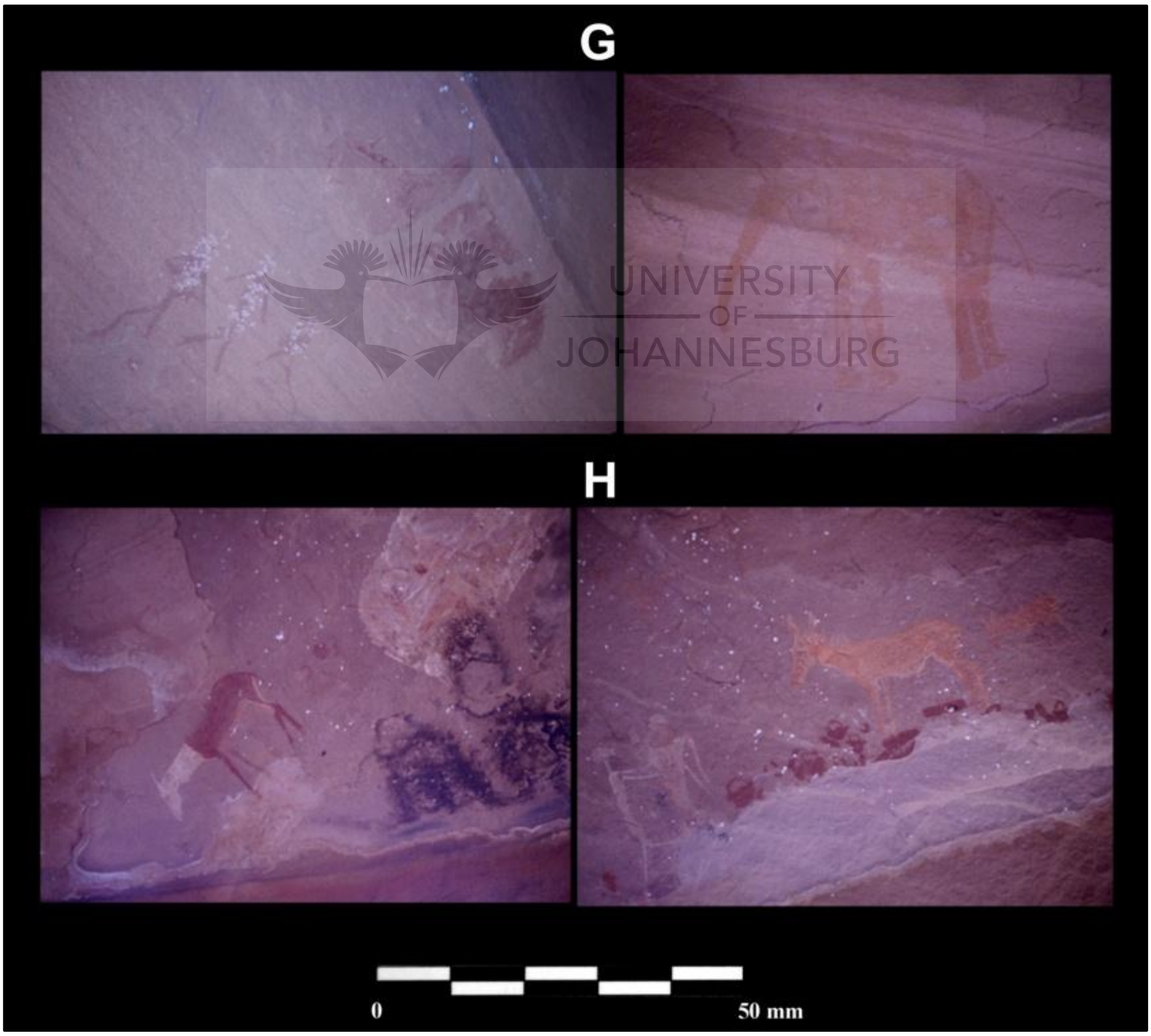

FIGURE 5.20. *Rock paintings at Kuidas Spring site 2 KS2.*

5.6 Chapter summary

KS1 had occupancy within KRS2 and KSC14 over a considerable period. Both KRS2 and KSC14 have a low number of retouched pieces, and a higher number of *dèbitage* and/or unretouched flakes. Comparison of data illustrates the use of different rock types and manufacture techniques of stone tools at KRS2 and KSC14. Metric dimensions of lithic artefacts also vary between the living spaces, with some larger formal stone tools in the stone circle. OEB production techniques are similar, with the exception at KSC14 where the removal of eggshell patina was more frequent. Similar to the metric dimensions of lithic artefacts, the rock shelter has smaller OEBs. Therefore, due to the variation in rock type preferences, metric dimensions of lithic artefacts and OEB patina removal, it is feasible to suggest that KRS2 and KSC14 has intra-site continuity, but inter-site differences.

Variations in other material remains include red ochre, which is present at KRS2, while pottery, copper fragments and beads occur only at KSC14. Analyses of faunal remains indicate that no livestock was present at either of the features, and both have a similar subsistence strategy based on antelopes. KSS3 is associated with KSC14 since they have the same type of artefacts such as the OEB and pottery shards. The AMS date of KSS3 is contemporaneous with some AMS dates at KSC14. Whether the usage of the stone cairn was simultaneous to the occupation of KSC14 is doubtful, because the charcoal sample from KSS3 could have been wind-blown. The rock art at KS1 cannot yet be associated with either KRS2 or KSC14, because the age of the art is unknown. Depictions include animals, animal tracks, cupules, human figures and geometric designs.

Although the excavated sample is small, there are slight differences in material culture between KRS2 and KSC14. I will discuss the interpretation of the results in Chapter 6.

Chapter 6

Discussion: hunter-gatherers or herders at Kuidas Spring

6.1 Summary of the theoretical context at Kuidas Spring

The domestication of animals and plants were important events in Holocene human history, because the onset of food production and subsequent spread thereof contributed towards the rise of world civilisations, for example, Mesopotamia, Babylon, Egypt (Diamond 2002; Fagan 2004). Caprines first appeared in northern Africa *ca.* 8000 years ago and by 4000 BP they are present in eastern Africa (Bower 1991; Gifford-Gonzalez 2005; Smith 2005). During the past 2200 years, caprines reached southern Africa through migrant herder communities and/or a process of diffusion. There were no wild progenitors in southern Africa and caprines were thus not domesticated locally (Smith 1992, 2008a,b; Sealy & Yates 1994; Sadr 1998; 2008b; Robbins *et al.* 2008; Pleurdeau *et al.* 2012).

Hunter-gatherers inhabited southern Africa prior to the arrival of herder communities and their flocks. A perception among researchers used to be that modern-day San communities represented an original hunter-gatherer society (Schrire 1984; Kent 1996; Barnard 2007). Ethnographic records and anthropological research contributed to the perception that San communities are a pristine example of how people lived in the past (Sparrman 1785; Campbell 1815; Alexander 1838; Bleek & Lloyd 1911; Schapera 1930; Marshall 1976; Lee 1979; Mitchell 2005), but scholars began to question the validity of the ethnographic record based on archaeological research. The argument was that modern-day hunter-gatherer groups are not pristine examples of the past, since Khoe-speaking herders and Bantu-speaking horticulturalists had socio-economic influences on local hunter-gatherer communities (Denbow 1984, 1986; Schrire 1984, 1992; Wilmsen & Denbow 1990; Barnard 1992).

The Kalahari debate influenced research regarding the introduction of livestock to southern Africa. Another debate ensued about aspects such as migration *versus* diffusion, possible changes in hunter-gatherer ideology, the role of artefacts signalling subsistence changes, and the detection of herder encampments in the archaeological record (e.g., Robertshaw 1978; Kinahan 1991; Sadr 1998, 2003, 2005, 2008b; Smith 1998a,b, 2005, 2008; Smith & Jacobson 1995; Smith *et al.* 1996, 2001; Parsons 2004, 2008). Previous research on the Later Stone Age of southern Africa suggests that artefacts associated with hunter-gatherer occupation includes a high percentage of formal stone tools made from fine-grained rock types, <5 mm OEB, little or no pottery and the absence of caprines. Herder sites are recognised by the presence of thin-walled pottery, >5 mm OEB, an informal stone tool assemblage made from coarse-grained rock types, faunal remains of livestock and metal beads (Kinahan 1984; Jacobson 1987a; Sadr, 2003, 2008b; Smith 2005, 2008a,b; Parsons 2007, 2008). However, as discussed in Chapter 3, the lack of unambiguous or rigid differences between lithic assemblages, pottery, and the size of OEBs between Groups A and B after 2000 BP, limits their potential use in the identification of hunter-gatherer and herder artefact assemblages (Sadr 1998, 2003, 2008a,b; Orton 2012).

With the archaeological study of KS1, I evaluated risk management strategies to deduce if one group mainly subsisted on hunting or whether there was a lesser need for risk management as they had secured food resources in the form of caprines (Lombard & Parsons 2008). In addition, to possibly recognising the occupants of the immediately adjacent habitations (natural rock shelter versus constructed stone circle) based on such subsistence strategies. Therefore, I aimed to explore whether changes in subsistence strategies (hunting-and-gathering to herding) can be identified based on lithic artefacts.

Based on the ethnographic record, as discussed in Chapter 3, present-day Namibian groups that are likely to have occupied KS1 is Damara, Hei//om and/or Nama. Historic accounts suggest that the Damara lived in central Namibia preferring mountainous and riparian areas. The Nama groups were in the south and coastal regions. The Hei//om appear to be scattered more towards the north-east of Namibia (Fig. 1.1). It is possible that the Hei//om had a more widespread distribution prior to the colonial era (Alexander 1838; Galton 1853; Vedder 1928; Fourie 1928; Wadley 1979; Steyn & Du Pisani 1985; Barnard 1992). Even though having different ideologies, these groups would have continued hunting while owning livestock. When they possessed no livestock, hunting and gathering were the main form of subsistence (*cf*. Fourie 1928; Vedder 1928; Schapera 1930). Such flexibility in subsistence modes makes it particularly difficult to distinguish between hunter-gatherers and herder archaeological sites with similar cultural practices reflected in the archaeological record.

6.2 Kuidas rock shelter and stone circle in the southern African context

The archaeological context of KS1 is within the ceramic final Later Stone Age (<2000 years ago) of southern Africa. The period is characterised by microlithic stone tool assemblages, which are dominated by scrapers and few backed microliths, but in general these assemblages have a low formal tool component. OEB and OES along with ochre, metal objects and glass artefacts also occur. Thin-walled coarse or well-fired ceramics with or without decoration, some having spouts and lugs, while others are bowl-shaped, also form part of the broad final ceramic Later Stone Age package (Lombard *et al.* 2012).

The occupation phases of KRS2 are in the middle of the Huab River Valley and neighbouring Twyfelfontein known occupation sequences (Wendt 1972; Richter 1991). Zwei Schneider rock shelter that has no pottery or faunal remains of caprines, dates to 5000 BP (Wendt 1972; Richter 1991). Affenfelsen, Ururu, Austerlitz and Hasenbild rock shelters have occupation sequences from 3000 until 180 years ago (Freundlich *et al.* 1980; Vogel & Visser 1981). Similar to Zwei Schneider the mentioned rock shelters have no faunal remains of caprines, but include pottery shards on the surface and in upper layers (Fig. 2.2) (Wendt 1972; Richter 1991).

KRS2 has neither pottery nor caprine remains. Layer Brown III (2264 ± 27 BP), is contemporary with Big Elephant Shelter (Wadley 1979), Leopard Cave (Pleurdeau *et al.* 2012) and the pottery phases of Falls Rock Shelter (Kinahan 1991). The younger layer Brown II (1513 ± 24 BP) is contemporaneous to Mirabib (Sandelowsky 1974, 1977) and the pottery phases of Snake Rock Shelter (Kinahan 1991), but younger than Geduld (Smith & Jacobson 1995) and Leopard Cave (Pleurdeau *et al.* 2012), where livestock and pottery are present. The communities that had pottery and caprines nearest to KRS2 were at the Brandberg and Mirabib, and slightly further away at Geduld (Figs. 3.1 and 3.2). The absence of any evidence for pottery or caprine at KRS2 could indicate that its occupants were part of a larger community, and when visiting KRS2, the animals and pottery remained elsewhere with the rest of the group. Alternatively, the residents of KRS2 were mobile hunter-gatherers who never acquired pottery and/or caprines.

The excavation of KSC14 is the first formal study of a stone circle in the Huab River Valley. A site on the southern river bank dates to 180 years ago, which is younger than KSC14. Since no published information is available regarding excavations of the Huab south bank, the date probably derives from surface charcoal (Speich 2002, 2010). Previous research at stone circle sites in the area focused on architecture, including the Huab River south bank and Gai-As

Spring, Leeufontein and Canyon Spring. Consequently, the lack of archaeological data from the vicinity makes comparison to KSC14 impractical (Fig. 3.3) (Speich 2010).

The early occupation of KSC14 (952 ± 24 BP) is prior to Portuguese exploration of the Namibian coast, which occurred at the end of the 15th century AD (Kinahan 1989), and coincides with a period when livestock and pottery were already present in the archaeological record of southern Africa (Robbins *et al.* 2008; Sadr 2008b; Pleurdeau *et al.* 2012). The later dates of KSC14 (221 ± 23 BP and 202 ± 23 BP) correspond with frequent European visits and trade on the Namibian coast (Kinahan 2000).

KSC14 is contemporaneous with other stone circle sites in Namibia, for example, Zerrissene Mountains (Carr *et al.* 1978), Sylvia Hill (Shackley 1983) the Upper Hungorob sites (Kinahan 1991) and some of the Skeleton Coast sites (Eichhorn & Vogelsang 2011). Stone circle sites from South Africa, such as Springbokoog 1, Bloubos 7, Jagt Pan 7 and Seacow River Valley dates to between to *ca.* 4000 BP to 1000 BP (Morris 1988; Beaumont & Vogel 1989; Parsons 2000a, 2003, 2004, 2007; Sampson 2009). Apart from one stone circle in the Hartmann's Valley, which dated to 1690 BP (Eichhorn & Vogelsang 2011), the majority of Namibian stone circles post-date 1500 BP (Figs. 3.1 and 3.5) (Speich 2010).

Based on the regional occurrence of stone circle sites, it is possible that the older stone circles originated in South Africa and the idea of the architecture spread at different rates to Namibia through migration and/or cultural diffusion. Stone circles are probably not exclusively related to the introduction of livestock, because no such sites have caprine remains and some sites predate herding. However, most assemblages from stone circle sites do include pottery (Fig. 3.5) (Morris 1988; Beaumont & Vogel 1989; Kinahan 1991; Parsons 2000a, 2004, 2007; Sampson 2009; Eichhorn & Vogelsang 2011).

6.3 Hunter-gatherers or herders: lithic artefacts

Using various lines of evidence, I will next consider whether it is possible to determine whether hunter-gatherers or hunters occupied the shelter and stone circle at Kuidas Spring. There is a large difference in sample size between KRS2 and KSC14, but compared to other sites, both have a low number of artefacts.

The artefact sample from KRS2 is very small in comparison to rock shelters from Namibia (Table 3.1 and Fig. 3.2), for example, at Mirabib (Sandelowsky 1974, 1977), Big Elephant (Wadley 1979), Falls Rock and Snake Rock shelters (Kinahan 1991), Geduld (Smith & Jacobson 1995) and Leopard Cave (Pleurdeau *et al.* 2012). Artefact numbers from KRS2 are also low compared to sites in southern Africa such as Boomplaas (Deacon *et al.* 1978), Spoeg Rivier (Webley 1992) and Toteng (Robbins *et al.* 2005) (Table 3.1 and Fig. 3.2). Artefacts from rock shelter excavations near KS1 at Zwei Schneider, Affenfelsen, Austerlitz and Hasenbild (Wendt 1972; Richter 1991) were only partly analysed and lithic assemblages from these shelters cannot be compared to KRS2.

KSC14 has a low artefact number compared to excavated stone circles in South Africa such as Jagt Pan 7, Springbokoog 1 and Bloubos 7 (Beaumont & Vogel 1989; Parsons 2000a, 2004, 2008). In the Namibian context, the amount and type of artefacts from KSC14 are similar to the Skeleton Coast sites (Eichhorn & Vogelsang 2011), the Zerrissene Mountains (Carr *et al.* 1978) and Sylvia Hill (Shackley 1983) (Table 3.2). Unfortunately artefact descriptions from stone circle excavations in the Brandberg are either unpublished or non-existent (*cf*. Kinahan 1986, 1989, 1991, 1995, 1996a,b, 2004).

6.3.1 Lithic rock types at KRS2 and KSC14

The rock types found during excavations of KRS2 and KSC14 have two sources. Lithic sources are pebbles from the Huab River bed located about 5 km away, as well as outcrops around KS1. The occupants of KRS2 and KSC14 most likely utilised the same sources, because lithic artefacts from the rock shelter and stone circle have the same set of rock types, but in significantly different frequencies (Table 5.9).

In consecutive order CCS, quartz and dolerite dominate the formal and informal lithic artefact components of KRS2 (Table 5.9). In contrast, dolerite, CCS and quartz are the most common rock types at KSC14. The choice of rock types may be used to distinguish between herders and hunter-gatherers, since quartz (medium-grained) and coarse-grained materials more frequently dominate the final ceramic Later Stone Age assemblages after the introduction of livestock into southern Africa (Wadley 1993; Orton 2002, 2012; Orton *et al.* 2005; Sadr 2008b; Sadr & Gribble 2010).

However, hunter-gatherers in southern Africa often chose quartz during the Middle Stone Age and Later Stone Age for its knapping properties prior to livestock being present in the archaeological record. Quartz produces flakes with long-lasting, sharp edges and its brittle nature often causes it to shatter on impact, thereby being a more lethal hunting weapon (Lombard 2011; de la Pèna *et al.* 2013). Choices of rock types for stone tool production were not exclusively informed by cultural identity, but also by practicalities concerning hunting strategies and probably other functional properties. Both hunter-gatherers and herders could have chosen specific rock types for similar purposes such as hunting (Smith *et al.* 1991; Parsons 2003, 2008; Lombard & Parsons 2008; Sadr 2008b; Lombard 2011).

Although the rock types represented in the lithic assemblage might have been more readily available in the area that hunters and herders shared, occupants of KS1 made choices about the use of the available types (*cf.* Parsons 2003, 2008; Orton *et al.* 2005; Orton 2006, 2013; Henshilwood 2008). The statistically significant differences in utilised rock types between KRS2 and KSC14 lead me to infer that occupants of KRS2 chose fine-grained rock types, quartz and lastly dolerite. At KSC14 they preferred coarse-grained and fine-grained rock types and lastly quartz.

Due to its knapping properties, the lower number of quartz in the lithic assemblage at KSC14 may be more indicative of either alternative hunting strategies such as snares or poisoning of the spring (Schapera 1930; du Pisani 1978), or the occupants were not dependent on hunting success and thus did not use quartz for hunting purposes (*cf.* Lombard 2011; de la Pèna *et al.* 2013). Based on rock types, the possibility exists that at KRS2 the occupants used quartz for hunting strategies and hence hunting activities might have been more prevalent at KRS2 than at KSC14. The difference of *ca.* 500 to a 1000 years between the rock shelter occupation and that of the stone circle could also have influenced the choice of lithic raw material. However, the stone circle includes rock types from the same sources as the rock shelter, which is the Huab river bed and the outcrops among KS1 itself. This suggests that occupants of the rock shelter and stone circle were familiar with the same rock type sources, even though living at KS1 during different times.

6.3.2 Lithic typology at KRS2 and KSC14

Even though the excavation of KSC14 covered a larger area than KRS2, the rock shelter has a much higher number of lithics than the stone circle. The smaller number of artefacts may indicate less intensified stone tool production at KSC14 than KRS2 (Table C, Appendix A).

6.3.2.1 Cores

KRS2 has bladelet cores and bipolar-bladelet cores, whereas KSC14 has a radial core. At both sites, irregular cores dominate (Table C, Appendix A). Slender flakes can be struck from bladelet cores, but at the same time, an opportunity to make something else from the same piece of stone is lost. The irregular and radial cores indicate that systematic core configuration or continuous core maintenance were not required. Flakes can be detached as the need arises, with little consideration for core efficiency or the need to maintain tool-making potential in the future (Wallace & Shea 2006; Hertell & Tallavaara 2011). Based on the core types present, I infer that both KRS2 and KSC14 have predominantly expedient reduction strategies. The fact that the rock type sources are nearby supports expedient reduction strategies (Bamforth 1986; Andrefsky 1994, 2005). The bipolar-bladelet cores from KRS2 are only made from quartz. A reason for this could be that quartz nodules are small, and are more difficult to knap than other rock types (Andrefsky 2005). Bladelet cores and irregular cores were predominantly made from fine-grained materials at KRS2. At KSC14, the radial core and irregular cores are equally represented by coarse-grained and fine-grained rock types.

The size of cores at KRS2 is similar and at KSC14 the core sizes are also uniform, I suggest that at the rock shelter and stone circle the core sizes were standardized (Tables 5.13 and 5.16). Even though there is *ca.* 500-1000 years difference in occupation between KRS2 and KSC14, the majority of core sizes between KRS2 and KSC14 are similar, with the exception of one irregular core and one radial core from KSC14 (Table 5.19). These two large cores could have been chosen for a specific task that probably did not take place at KRS2.

Smith (2006) suggests that bipolar technology indicate herding practices. Bipolar technology is only present at KRS2. However, the practice of bipolar technology in southern Africa is present at sites dating from the late Middle Stone Age and Later Stone Age, prior to the introduction of livestock and both hunters and herders could have used bipolar technology for hunting (Barham 1989; Wadley 1993; Orton 2002; Cochrane 2006; de la Pèna *et al.* 2013). I therefore conclude that bipolar technology is not a distinct indicator of a herder society.

The presence of bipolar-bladelet and bladelet cores at KRS2 and absence thereof at KSC14 may indicate that occupants of KRS2 used a reduction strategy specifically for producing bladelets intended for hunting. Bladelets were insert points for composite tools with various functions such as saw-knives, spears and arrowheads. The bladelets were hafted onto a wooden shaft and in so doing residents constructed knives, spears and arrows (Schapera 1930; Odell 1988; Shott 1997; Ambrose 2002; Shea 2006; Lombard & Parsons 2008). The absence of bladelet and blade cores at KSC14 suggests that not all stages of stone tool manufacture are present at the site, since a broken blade and bladelet are present. However, the radial and irregular cores produced flakes that could also have been utilised for hunting. Similar to bladelets, some flakes could have also functioned as arrowheads, knives and spears (Schapera 1930; Odell 1988; Shott 1997; Ambrose 2002; Shea 2006; Lombard & Parsons 2008).

6.3.2.2 Unretouched flakes

At KRS2 the majority of whole and broken flakes were from fine-grained rock types. At KSC14, similar to cores the unretouched flakes were based on coarse-grained and fine-grained rock types, with quartz being the least. Whole and broken blades/bladelets from KRS2 is mainly from fine-grained rock types, whereas at KSC14 the whole blade, broken blade and broken bladelet is from a coarse-grained rock type.

All the unretouched flakes (whole and/or broken flakes and bladelets) are of similar size between KRS2 and KSC14 and therefore do not indicate major different technological trajectories between KRS2 and KSC14 (Table 5.17). It seems that the rock shelter and stone circle have standardised, unretouched flakes. Yet, there is a considerable size difference between the broken blades of KRS2 and KSC14, but not between whole blades from the sites. I am not sure whether the size difference of broken blades is really significant. It could be that the broken blades were of a similar size but a larger piece of the blade broke off at KSC14 (Table 5.17). I suggest, based on the fact that the whole blades are of a similar size between KRS2 and KSC14, that broken blade sizes are related to taphonomy or the residents broke the blade intentionally.

Blade and bladelet-rich lithic assemblages have been associated with risk-management strategies that rely on hunting success. Even though herders also rely on hunting, they supplemented their diet with milk and the occasional slaughtering of livestock. In contrast hunter-gatherer societies that do not own livestock are at greater risk if they do not have hunting success (Lombard & Parsons 2008). At archaeological sites with evidence of herding practices, for example, Mirabib (Sandelowsky 1974, 1977), Big Elephant Shelter (Wadley 1979), Boomplaas (Deacon *et al.* 1978), Byneskranskop (Schweitzer & Wilson 1982), Spoeg Rivier (Webley 1992), Mauermanshoek (Wadley 2001), Oruwanje 95/1 (Albrecht *et al.* 2001; Eichhorn & Vogelsang 2011), Melkbosstrand (Sealy *et al.* 2002), Kasteelberg (Smith 2006) and Blombos Cave (Henshilwood 2008), bladelets are in the minority. At /Hei-/Khomas and Bokvasmaak 3 bladelets are either the majority or equal in number to other formal stone tool types (Beaumont *et al.* 1995; Webley 2001; Parsons 2007, 2008). The stone circle Jagt Pan 7 has a majority of blade/bladelets that suggests a mode of subsistence based on hunting (Parsons 2000a, 2008; Lombard & Parsons 2008).

At both KRS2 and KSC14, bladelets are in the minority, indicating that occupants were either not dependent on hunting success or that bladelets remained lodged in hunted animals (Lombard & Parsons 2008). Another possibility that could explain the low numbers of bladelets is alternative hunting strategies, such as the use of spears, snares and/or the poisoning of game watering places at KS1 (Schapera 1930; Du Pisani 1978). At KRS2 and KSC14 whole and broken flakes are more numerous than blades and bladelets. The use of unretouched flakes and possible blade/bladelet fragments for insert points could also be why bladelets are in the minority. To confirm the use of whole and broken flakes as insert points require macro-fracture and residue analyses (Lombard 2005a, 2011; Lombard & Parsons 2008).

6.3.2.3 Retouched pieces

The majority of retouched pieces at KRS2 are from fine-grained rock types and quartz. Formal pieces from KSC14 are equally distributed between fine-grained and coarse-grained with the minimum on quartz.

Apart from whole backed pieces and large scrapers, the size of all other retouched pieces at KRS2 and KSC14 is similar (Table 5. 18). Comparable to the core sizes the larger backed pieces and scrapers of KSC14 could indicate a different activity that did not take place at KRS2. Also, similar to the unretouched flakes, the formal pieces are similar in size and there is thus no trajectory regarding formal tool sizes between KRS2 and KSC14.

Both KRS2 and KSC14 have a low number of formal tools in their lithic assemblages, but scrapers are the main formal tool type at the rock shelter and stone circle. In general, scrapers are the dominant formal lithic type in southern Africa after 2500 BP (Sadr 2008b). The dominance of scrapers at KRS2 and KSC14 is consistent with herder sites, such as Mirabib (Sandelowsky 1974, 1977), Boomplaas (Deacon *et al.* 1978), Big Elephant Shelter (Wadley 1979), Byneskranskop (Schweitzer & Wilson 1982), Spoeg Rivier (Webley 1992), Oruwanje 95/1 (Albrecht *et al.* 2001; Eichhorn & Vogelsang 2011), Mauermanshoek (Wadley 2001), Melkbosstrand (Sealy *et al.* 2002), Kasteelberg (Smith 2006) and Blombos Cave (Henshilwood 2008). However, KRS2 and KSC14 have no conclusive evidence of herding practices.

Not all post-2500 BP sites have a majority of scrapers. At Geduld, segments and backed pieces dominate, (Smith & Jacobson 1995), while Leopard Cave (Pleurdeau *et al.* 2012) and stone circle sites such as Simon se Klip (Jerardino & Maggs 2007), the Hartmann's Valley and Skeleton Coast sites (Eichhorn & Vogelsang 2011) have no formal pieces. Most sites associated with herding have a low formal component (Tables 3.1 and 3.2). Based on the variability of stone tool assemblages, I suggest that formal tool counts do not indicate different subsistence strategies at KS1, but rather different and/or similar activities (Parsons 2008; Sadr 2008b).

An explanation for the low number of formal tools at KRS2 could be that occupants had greater food security in the form of predictable hunting resources (Table A, Appendix A). Resultant is that toolkit maintenance became less critical, ensuing in expedient flaking and more informal products and debris occur compared to formal tools (Bleed 1986; Barham 1992; Bousman 1993, 2005; Lombard & Parsons 2008). Similar to KRS2, if the occupants of KSC14 did practice herding and/or physical food storage or had alternative hunting strategies (use of spears, snares, traps, poisoning of the spring) without owning livestock at all, maintaining a formal lithic toolkit may also not have been a necessity (Table B, Appendix A) (Schapera 1930; Bleed 1986; Barham 1992; Bousman 1993, 2005; Lombard & Parsons 2008). Thus, food security in the form of the spring that attracts game would have the same effect on lithic assemblages similar as a scenario where occupants of KRS2 and KSC14 practiced herding.

The specialised formal toolkits (consisting mainly of scrapers) of KRS2 and KSC14 reflects low tool diversity. KS1 possibly was a seasonal encampment designed to acquire and process a narrow range of resources, hence the few specialised implements. In contrast, tool assemblages are more diverse at base and/or residence camps, since a wider range of activities takes place, and people do not focus on a single task (Andrefksy 1994a, 2005).

Segments, truncated flakes and backed pieces could have been used as insert points. Whether these tools functioned as insert points require further studies of macro-fracture and residue analyses (Lombard 2005a, 2007, 2008, 2011; Lombard & Phillipson 2010; Wurz & Lombard 2007). Based on the current evidence, I suggest that residents of KRS2 and KSC14 performed similar activities, which involved hunting and possible hide-processing over a period of 2000 years (Deacon 1982).

6.3.3 Lithic technological organisation

The inhabitants of KRS2 and KSC14 had expedient reduction strategies, regardless of living at KS1 during different times. Apart from the wedging initiations and step terminations at KRS2, no other core initiation and flake termination type is exclusive to KRS2 or KSC14 (Table 5.21). Maximising raw materials for stone tool production is often the interpretative framework for bipolar technology (Odell 2003; Andrefsky 2005). Yet, at KS1 rock type sources are nearby and wedging initiations are the least. Therefore, instead of economising quartz at KRS2, the bipolar-bladelet cores that produces sharp-edged bladelets, may indicate a preference of quartz for hunting strategies (de la Pèna *et al.* 2013).

The core-rejuvenation flakes and tablets at KRS2 and KSC14 also illustrate expedient core reduction strategies. Should flakes have stepped, plunging or hinge terminations the best way to ensure getting sharp feather flake terminations, is to correct the core by striking off core-rejuvenation flakes and tablets (Odell 2003; Andrefsky 2005). Therefore, instead of signalling economical use of rock resources, the aim was probably to eliminate further undesired flakes (Odell 2003; Andrefsky 2005). At both KRS2 and KSC14 the number of core-reduced pieces is low and indicative of wastefulness, which supports expedient reduction strategies at KS1 instead of curated toolkits (*cf*. Bleed 1986; Andrefsky 2005; Bousman 2005).

The lithic organisation of KRS2 and KSC14 indicate secure food resources in the form of predictable prey and/or livestock and neither practiced explicit risk management strategies.

Both groups probably had high residential mobility and seasonally occupied KS1 for its hunting/grazing resources (Bleed 1986; Bousman 2005; Lombard & Parsons 2008; Lombard 2011).

The lithic assemblages recovered from KRS2 and KSC14 differ in some respects, sometimes enough to be statistically significant. Even though KRS2 and KSC14 were not inhabited simultaneously, there is no evident change in the cultural identity of the occupants during the last 2000 years, either from socio-economic changes due to the introduction of livestock and/or from the migration of people with different socio-cultural norms. I expected some changes in the lithic assemblages would have been visible because of pastoralism and access to new technologies resulting from ceramic and metallurgical traditions. Contact with different cultures such as pastoralists, Bantu-speaking horticulturalists and Europeans should have reverberated in all communities. As such, I conclude that the relative continuity in lithic assemblages indicate that the socio-cultural roots of occupants at KS1 remained intact.

6.4 Hunter-gatherers or herders: non-lithic artefacts

6.4.1 Ostrich eggshell beads and fragments

OEB sizes may indicate the presence of pastoralists. Depending on the context of the archaeological deposit, type I assemblages are associated with pre-herding Later Stone Age sites (prior to 2500 BP) and contain predominantly small beads (<5 mm). Type II assemblages are associated with sites where pottery fragments and/or caprine remains are present. Such assemblages contain a mixture of small and large beads. Type III (>5 mm) assemblages are characteristic of herder occupation phases post-dating 800 BP (Jacobson 1987a; Smith *et al.* 1991; Kandel & Conard 2005).

KRS2, KSC14 and KSS3 have small and large beads (Tables 5.23, 5.25 and 5.33). According to Jacobson (1987a), this would mean that KRS2 has pre-herding and mixed occupation, similar to KSC14 and KSS3. Considering the lack of pottery and caprine faunal remains at KRS2, changes in OEB sizes are not conclusive. KSC14 and KSS3 have pottery but also small beads. This is consistent with sites having direct evidence of herding where bead sizes range between 3.0 mm and 10.0 mm (Tables 3.1 and 3.2). Variability of OEB diameters may be better evidence for changing fashions during the ceramic final Later Stone Age, or of local/regional trading networks (Jacobson 1987a; Kinahan 1996b; Sadr *et al.* 2003; Kandel & Conard 2005; Sadr 2008b; Orton 2008, 2012).

Some OES fragments at both KRS2 and KSC14 were polished. A higher number of OES fragments are burnt at KRS2, while KSC14 includes significantly more fragments that had the patina removed (Table 5.26). It could be that occupants of KSC14 preferred to remove the patina from the OES prior to producing OEBs (Table. 5.27).

The different stages of OEB production also indicate more or less how much time was spent at KS1 (Tables 5.22 and 5.24). When most of the OEB production phases are present, it indicates either an aggregation or base camp (Jacobson 1987a; Kandel & Conard 2005). Based on the individual numbers of OEB production phases present at KRS2 and KSC14, KS1 was a seasonal encampment. It is possible that a short term encampment can also yield most phases of the production sequence (Orton 2008).

Two complete, empty ostrich eggshells weigh between 250g and 300g (pers.obs. 2014). It is likely that ostrich eggs were not abundant during the occupation of KRS2 and KSC14 (Table 5.28). This could be due to a limited number of ostrich in the area when KS1 had inhabitants. The fresh-water spring nearby the site indicates that there was no need for water storage or water transport that may require OES as water containers.

6.4.2 Pottery and copper

Exactly from where and when pottery was introduced to Namibia is unclear. The high quality of early pottery suggests that knowledge of pottery production was already well developed (Kinahan 1991, 2004, 2013b; Sadr 2008a; Eichhorn & Vogelsang 2011), when it started to appear in the local archaeological record. It could be that hunter-gatherers were in contact with pottery-producing societies, and thereafter created their own unique manufacturing techniques and styles.

Kinahan (2013b) suggested that hunter-gatherer groups living on the periphery of pottery producing communities in north-east Namibia during the first millennium AD adopted pottery and thereafter created a unique style of manufacture (Sadr 1998). This is a plausible scenario of how Khoe-herder ceramic styles and manufacture techniques came into being and casts doubt on the functional link between pottery and livestock as the archaeological signature of pastoralists migrating into the Namib from elsewhere (Smith 1990, 2006, 2008a,b; Kinahan 1995, 2004, 2013b; Sadr 2003, 2008b). Also, the possibility exists that hunter-gatherers acquired and distributed broken pieces of pottery for ritualistic purposes, as a result pottery present at an archaeological site do not necessarily denote herders (Kinahan1991, 2004, 2013b; Sadr 1998, 2008a, 2008b; Sadr & Sampson 2006; Sampson 2009).

The pottery shards from KSC14 and KSS3 are thin-walled and consistent with the pottery thickness of other stone circle sites such as the Zerrissene Mountains (Carr *et al.* 1978), Skeleton Coast and Hartmann's Valley sites (Eichhorn & Vogelsang 2011), as well as sites within South Africa that have evidence of herding (Tables 3.1 and 3.2). The pottery shards from KS1 are small and undecorated, consequently, vessel reconstruction and comparison of decorative designs are not possible (Table 2.1).

The appearance of copper in southern Africa post-dates the introduction of pottery and livestock *ca.* 2000 years ago. The migration of Bantu-speaking peoples into southern Africa brought an agricultural, iron- and copper-producing society to the subcontinent in the early first millennium AD (Mitchell 2002a; Huffman 2007; Kinahan 2013b). The earliest evidence of iron-working in Namibia dates to 1000 AD at Kapako along the Okavango River and at Omungunda 99/1 in northwest Namibia (Sandelowsky 1979; Kose & Richter 2007; Kose 2009; Eichhorn & Vogelsang 2011). The use of a stone-based smelting technology instead of clay in central Namibia suggests a local adaptation that contradicts the possession of clay ceramic technology as a necessary precursor to metal production (Kinahan & Vogel 1982; Miller *et al.* 2005). If the adoption of copper-smelting techniques diffused in the same way as pottery did, it is reasonable to accept that the pastoral nomad society evolved from the preceding hunter-gatherer culture that acquired livestock *via* cultural diffusion (Miller *et al.* 2005; Sadr 2008b; Kinahan 2013b; Breton *et al.* 2014).

Copper beads could have been used as currency for livestock or decoration and are relatively common at rock shelters and open-air pastoral sites (Wadley 1979; Kinahan 1991; 1996b; Widlok 2000). However, copper pieces are absent at the majority of stone circle sites, and only present at Springbokoog 1, Hartmann Valley and the Zerrissene Mountains (Table 3.2). This could be due to a variety of reasons. Some occupants might not have had copper beads, or already had livestock and no need to trade, they did not want livestock or copper beads and/or it is a sampling problem. Copper pieces and beads are present at KSC14. As no stone *tuyères* or any other metal-working evidence is present at KS1, the occupants received the copper pieces and beads *via* trade links with other groups or made beads at the copper source (Kinahan & Vogel 1982).

6.4.3 Fauna

During Namibia's Holocene wetter and drier environmental conditions occurred during 6000 BP and 1000 BP. Yet, in general the Holocene climate in Namibia was similar to what it is today. During the first occupation (2264 ± 27 BP) of KRS2, rainfall could have been slightly higher (Mendelsohn *et al.* 2002; Heine 2005; Gil-Romera *et al.* 2006). The later occupation of KRS2 (1513 ± 24 BP) and KSC14 (952 ± 24 BP), did not experience moist conditions and the environmental conditions were arid, similar to modern-day Namibian climate (Mendelsohn *et al.* 2002; Heine 2005; Gil-Romera *et al.* 2006). Thus, the environment of KS1 was not much different than it is today. KS1 is a secure hunting ground, because herbivores graze in the area throughout the year due to the spring, which provides the only perennial freshwater source nearby KS1. The Huab River is an ephemeral river and thus do not provide reliable water for animals and humans alike (Jacobson *et al.* 1995; Mendelsohn *et al.* 2002). I infer that the knowledge of hunting grounds in arid conditions attracted hunter-gatherer/and or herder communities to KS1.

The faunal remains of KRS2 and KSC14 include herbivores such as oryx, springbok and zebra (Appendix B). The sparse grasses and riverine shrubs are sufficient to support herds of these animals (pers. obs. 2013). Carnivores such as lion, jackal, leopard and brown hyena also inhabit the Huab Valley (Mendelsohn *et al.* 2002). The carnivore identified from KSS3 could either be a domestic dog or a jackal (Appendix B).

It is possible that goats (*Capra hircus*) rather than sheep (*Ovis aries*) were herded in an arid area like KS1, being hardy animals that are adaptable and therefore easy to manage (Badenhorst 2006). However, goats are predominantly browsers and not grazers. As such, a possible food source in the immediate vicinity of KS1 is *Euphorbia damarana* (milk-bush) and the sedges and reeds along the terraces of Kuidas Spring (Craven & Marais 1993; pers. obs 2013). Most *Euphorbia* have a milky latex that is poisonous and would cause paralysis and/or death, thus livestock would have avoided or been herded away from such plants (Vahrmeijer 1981). More substantial food sources such as riparian vegetation are available in the dry riverbeds of the Huab Valley some 5 km away from the spring close to KS1 (Jacobson *et al.* 1995; pers. obs 2013). The permanent spring and dense vegetation around the spring may have supported small flocks for an extensive period of time, or larger flocks during seasonal occupation after the area has recovered or after good rain.

To ascribe an archaeological site to pastoralism, some evidence for herding must be present. For example, a high incidence of caprine remains or livestock enclosures will indicate herders. Alternatively, hunter-gatherers could have acquired a small number of livestock such as caprines (Sadr 1998; 2008b). No caprine remains have ever been found at any stone circle in southern Africa (Table 3.2). Kinahan (2004) suggested that stone circles are associated with herders in the Namib Desert, who exploited summer pastures from aggregation camps situated near strategic springs. In contrast to the dry season dispersal sites that pastoralists occupied year after year, the aggregation sites would have been subject to unpredictable rainfall. During favourable summer conditions, numerous households occupied aggregation sites as a local pastoral strategy. In Kinahan's (1991, 1996b, 2004) model, most livestock were kept at scattered stock posts several kilometres away from the encampment, which implies that little evidence of faunal remains from caprines can be expected at aggregation sites.

The definition of a stock post ranges from a seasonal outpost to a large settlement (Bollig 2000; Henrichsen 2000). In addition, there are sedentary pastoralists and mobile pastoralists (Hendricks *et al.* 2005; Baker & Hoffman 2006). Some herders may choose not to move their livestock because they have reliable water sources and the animals know where to find grazing in the dry season. Mobile pastoralists' motives for moving, range from good rainfall in an area, overgrazing in an area, sharing the labour of herding and having a shorter walk back home from the stockpost (Widlok 2000; Baker & Hoffman 2006). Otjiherero, Nama, Damara, G//ana and G/wi communities move with their livestock between pasture and water resources, or entrust some of their livestock to other family members who then manage culling and oversee lambing periods (Malan 1973; Du Pisani 1978; Fuller 1993; Ikeya 1993; Rohde 1993; Bollig 2000; Henrichsen 2000; Van Wolputte 2000; Werner 2000; Linstädter & Bolten 2007; Webley 2009).

The possibility of stockposts existing away from KS1, such as suggested by Kinahan (1991, 2004), cannot be discounted. Ethnographic records indicate that despite the use of stockposts, generally some cattle or goats are also present in a pastoral settlement because animals were milked and some slaughtered for eating, clothes-making from skins, or for ritual purposes at settlements (Hoernlè 1925; Schapera 1930; Laidler 1936; Malan 1973; Du Pisani 1978; Ikeya 1993; Fuller 1993; Rohde 1993; Webley 2009; Badenhorst 2012). There are exceptions, such as with Tswana communities, where cows are absent at villages during the dry season and milk is sent in milk-sacks to villages (Schapera 1930; Schapera & Goodwin 1937). However, this is only during some times during the year, therefore, faunal remains should be present in any event, due to the household use of cattle/goats during the rainy season (Du Pisani 1978; Badenhorst 2012)

Given the relative socio-economic importance of livestock, my own observations indicated that people often live in close proximity with their animals, especially when they only have a limited number of animals that represent all their wealth (*cf*. Schapera 1930; Du Pisani 1978; Ikeya 1993; Rohde 1993; Baker & Hoffman 2006; Veldman 2008). The practice of stockposts may also be an introduced concept from Iron Age livestock management practices rather than an inherent tradition among Khoe-San communities (Solway & Lee 1990; Wilmsen & Denbow 1990; Sadr 1997; Smith & Lee 1997; Badenhorst 2012).

In contrast to Kinahan (1991, 1996b; 2004), percentages of livestock faunal remains should be higher at supposed aggregation sites than at dispersal sites, due to the greater likelihood of rituals, feasts or funerals when larger numbers of people are present (Sadr 2004; 2008b). Also, for a stone circle site to be confirmed as an aggregation site, all the stone circles in an area should be dated to determine if they were in fact occupied simultaneously. There is currently no published archaeological data available to support stone circles being aggregation or dispersal sites (*cf*. Carr *et al*. 1978; Shackley 1983; Noli & Avery 1987; Kinahan 1991, 2004; Parsons 2004; Sampson 2009; Eichhorn & Vogelsang 2011).

Therefore, regardless of aggregation or dispersal patterns, faunal remains of livestock should be evident for a site to be unambiguously considered a herder encampment (Webley 1997; Sadr 2008b; Badenhorst 2012). The absence of such evidence cannot be conveniently ascribed to stockposts or seasonal nomadism without some form of supporting evidence. I accept that stockposts may be an important aspect of nomadic pastoralism as suggested by Kinahan (1991, 2004, 2014), but do not support the view that an absence of livestock remains at putative pastoral settlements can be argued away on a presumption that the use of stockposts explains the absence of livestock remains.

I did not find any archaeological sites in the KS1 area that could resemble a stockpost. The amount of caprines would determine the size of the enclosure. Actual enclosure sizes may range from 33 to 300 m^2 with a minimum height of 1.5 m (Du Pisani 1978; Jacobsohn 1988; Ikeya 1993; Veldman 2008). There are no such large stone walled structures and/or vitrified dung patches nearby KS1. Alternative explanation for the absence of caprine faunal remains is that it could be that hyenas, jackals, or dogs digested some of the bones, or scattered them around the encampment. The durability of the bone, environmental conditions and general housekeeping tasks determine the survival rate of fauna. An absence of livestock remains could signal that livestock were not slaughtered due to their socio-economic importance. However, sometimes livestock were slaughtered and subsequently eaten and if not, surely herders would have suffered losses due to sickness or accidents (Schapera 1930; Du Pisani 1978; Brain 1981; Fuller 1993; Sadr 2008b).

The absence of livestock remains and the presence of antelopes suggest that occupants of KS1 mainly subsisted on hunting and stored foods evidenced by pottery fragments and the storage cairn (KSS3). Whether caprines were present at KS1 remains purely speculative.

6.5 Spatial analysis of Kuidas Spring

Oryx disturbed KSC14 by scraping hollows to lie down in and therefore the circle is of a secondary context. However, most of the artefacts were concentrated at the front and middle area of the stone circle around the hearth. This spatial distribution is consistent with other excavated stone circles (Eichhorn & Vogelsang 2011). Based on the concentration of charcoal, it is possible that occupants made fire in front of the circle at the entrance (*cf*. Schapera 1930; Parkington & Mills 1991). Artefact distribution was also mainly near the entrance and middle area, and occupants likely used the space for household activities such as cooking, knapping and ostrich eggshell production. The AMS dates ranging from 900-200 years ago, from the same spit in KSC14 suggest that charcoal from the hearth was re-used as the area is not rich in wood resources. Due to the hard gravel and stone surface of KS1, the possibility exists that residents filled the stone circle with sand to have a softer surface for sitting and/or sleeping. Alternatively, sand accumulated in the circle due to strong winds that is also responsible for forming sand dunes in the area.

Like most other stone circles at KS1, KSC14 is situated in direct sunlight. Only four stone circles are built beneath natural boulders and has shade during certain times of the day (Fig. 5.18). During excavations, I did not find remnants of postholes that could have facilitated a roof structure. Night temperatures at KS1 are often below 6 Cº or less. It could be that occupants purposefully left the circle uncovered during the day because they wanted the sand within to heat up through sunlight. During night time they possibly covered themselves with blankets made from animal hides (Schapera 1930) and had no roof at all. If occupants did in fact have no roof, this practice could account for the stone circles constructed beneath natural boulders that were used during mid-day when other stone circles had no shade (pers.obs 2013). Alternatively, stone circle residents could have used KRS2 and other shelters as well, since KRS2 has shade most of the day.

The stratigraphic layers of KRS2, in contrast to KSC14, clearly indicate occupation during the past 2000 years. KRS2 is older than KSC14 and based on current AMS dates, during the occupation of KRS2 there were no stone circle structures. The surface of KRS2 was also disturbed due to oryx activity. Therefore, comparing artefact similarity between the surface soils of KRS2 and KSC14 to discern whether KSC14 occupants did utilise the shelter for shade was not feasible. Similarly to KSC14, the hearth of KRS2 was situated in front of the rock shelter beneath the drip line, but the activity area could have extended towards the outside of the shelter.

Open-air settlement layout is subject to variability due to reasons that includes socio-cultural aspects, defence, topography, weather, water sources, pasture and availability of *veldkos* (Schapera 1930; Du Pisani 1978; Nicholson & Cane 1991; Fuller 1993; Widlok 1999). The conventional layout of a pastoral encampment according to ethnographic sources have huts that are facing the centre of the enclosed encampment with either kraal/s in the middle, or no kraal and livestock sleeping in front of their owner's hut (Hoernlè 1925; Vedder 1928; Schapera 1930; Barnard 1992). Hunter-gatherer encampments are also in some cases circular, in other instances there is no fixed form of settlement (Schapera 1930; Barnard 1992).

Hunter-gatherer spatial organisation, where hut entrances and/or windbreaks face a central space enforces concepts of sharing, interdependence and a lack of hierarchy. With the acquisition of livestock, the direction of hut entrances and/or wind-breaks faced away from the central space, barriers were built around shelters and huts are further apart, and this spatial organisation reflects privacy and territoriality (Schapera 1930; Parkington & Mills 1991; Parsons 2004). In contrast to hunter-gatherer groups, herder settlements reflect material wealth and huts are arranged according to individual status. The livestock in the centre underlines the system of social relations affected through the ownership of animals (*cf*. Hoernlè 1925; Schapera 1930; Parkington & Mills 1991).

Kinahan (1991, 2004) suggests that the layout of stone circle sites at the Branberg provides diagnostic evidence of pastoral community organisation. Despite Kinahan's (1991, 2004) interpretation, stone circle sites in Namibia do not have a distinct layout pattern that may be associated with a particular social arrangement or economic activity (Carr *et al.* 1978; Shackley 1983, 1985; Noli & Avery 1987; Veldman 2008; Peters *et al.* 2009; Speich 2010; Eichhorn & Vogelsang 2011). Given the vast number of stone circle sites in western Namibia, 160 sites, with more than 2000 individual stone circles (Veldman 2008), for which the site layout of many have been mapped (e.g., Carr *et al.* 1978; Speich 2002, 2010), such a hierarchical organisation as suggested by Kinahan (1991, 2004) would have been evident. This is not the case. Some stone circle sites are in a circular or oval arrangement, but others may be linear, semi-circular, parallel lines, or undulating (Fig. 6.1) (Carr *et al.* 1978; Noli & Avery 1987; Kinahan 1991; Veldman 2008; Speich 2010).

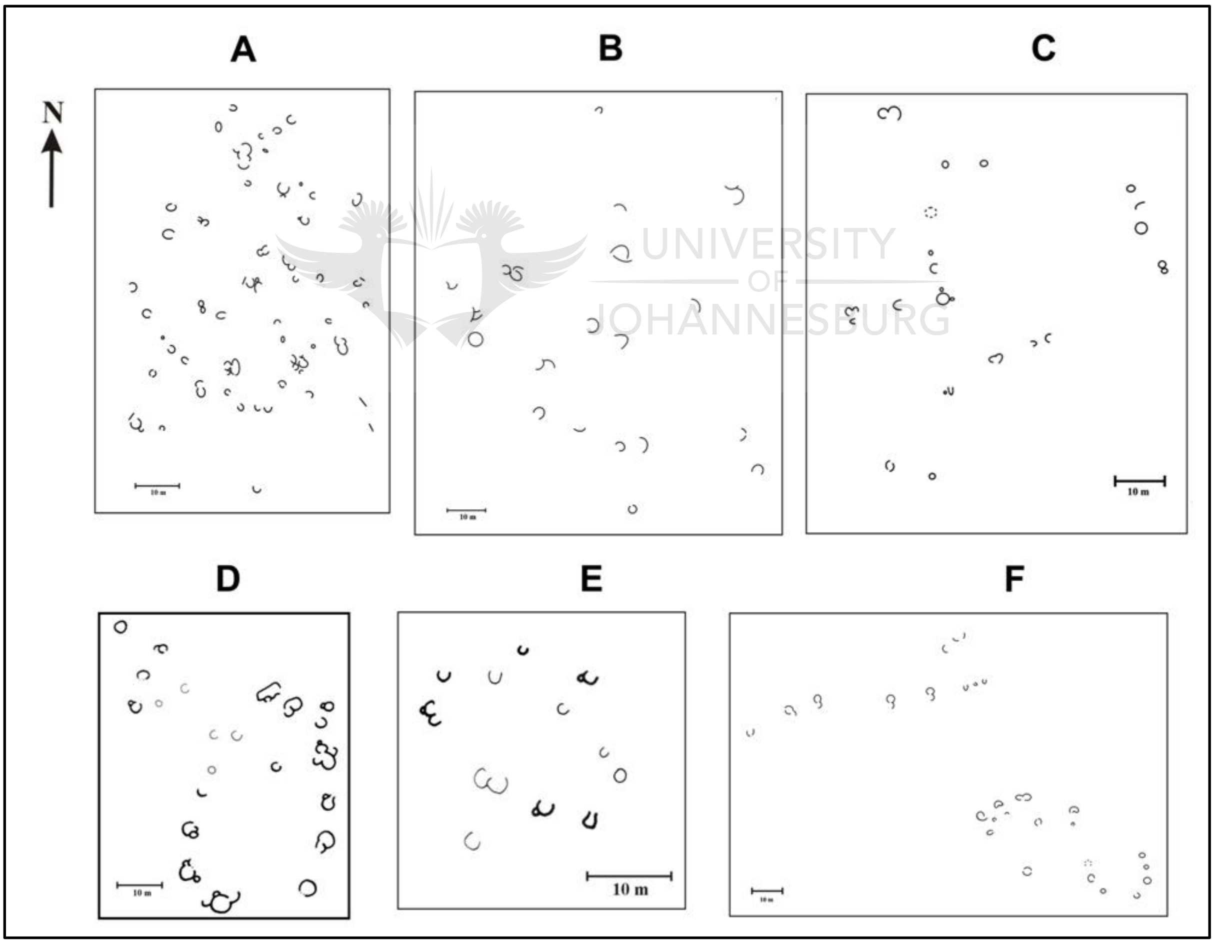

FIGURE 6.1. *Examples of stone circle site layouts from the Brandberg (A) and Spitzkoppe (B) after Kinahan 1990, 1991; Ugab Crossing (C, F) after Speich 1991 and the Zerrissene Mountains (D, E) after Carr* et al. *1978.*

The spatial organisation at KS1 is linear on the western side, with clusters in the north and south and a single circle in the east (Fig. 6.2). The general layout and clusters suggest that a central space was not essential (Fig. 6.2) (*cf*. Hoernlè 1925; Vedder 1928; Schapera 1930; Parkington & Mills 1991). KS1 has no complex multi-cellular stone circles, such as those at the Brandberg and Zerrissene Mountains (Carr *et al*. 1978; Kinahan 1991). These multi-cellular stone circles were interpreted as belonging to members of higher status within the community (Kinahan 1991), but it could also be to accommodate a larger family (Widlok 1999; Peters *et al.* 2009). Similar to other stone circle sites in Namibia, the entrances at KS1 face away from the prevailing wind and at the majority of sites the hut-openings do not face each other (Carr *et al*. 1978; Shackley 1983; Noli & Avery 1987; Kinahan 1991; Eichhorn & Vogelsang 2011; Speich 2010). Therefore, at KS1, as at other stone circle sites, there seems not to be a definite hierarchy nor a layout that reflects the importance of livestock (Fig. 6.2). However, some settlement patterns may be influenced by the fact that some sites are contemporary and subject to horticulturalist and colonial influence.

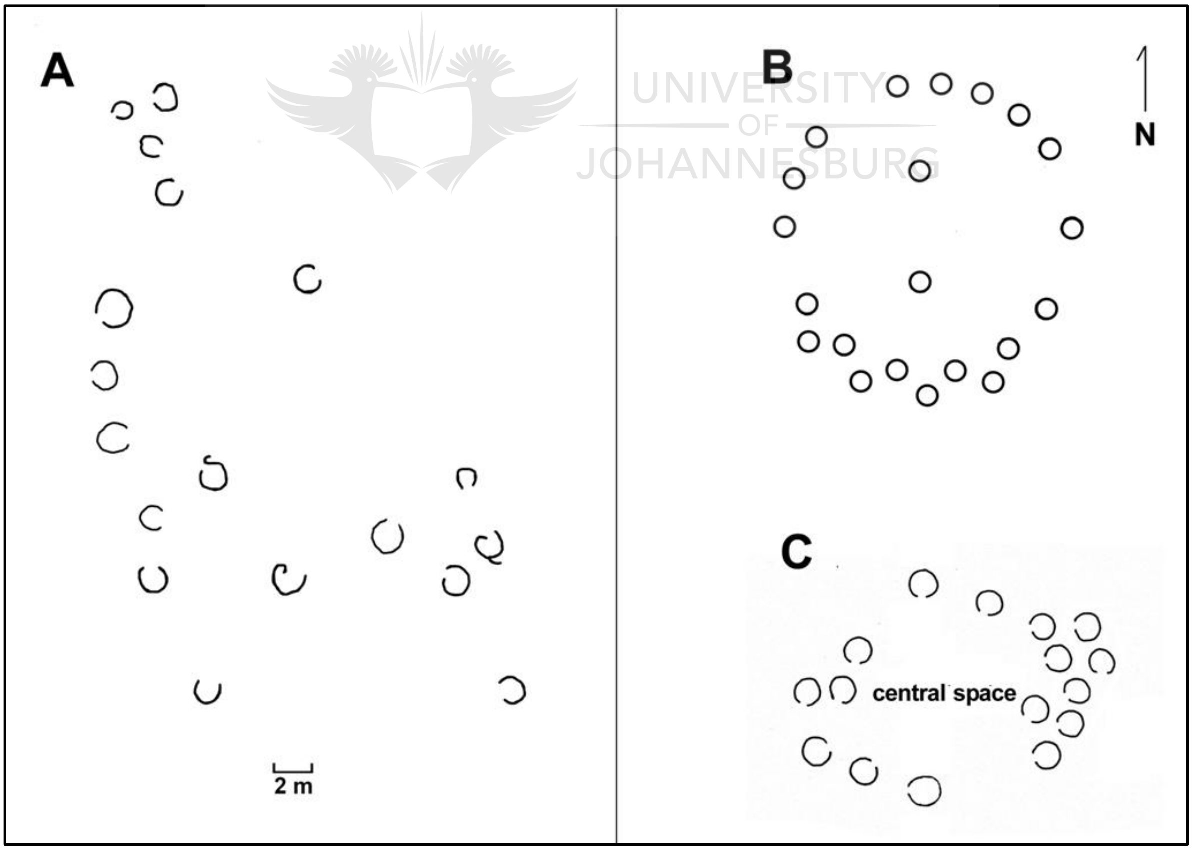

FIGURE 6.2. *The spatial layout of Kuidas Spring site 1 (KS1) (A), a Hei//om settlement layout after Fourie 1926 (B) and a herder encampment (C) after Burchell's 1822 painting.*

Kinahan (1991) observed stone kraals at some stone circle settlements on the upper Brandberg that would be consistent with herder occupation. There is not sufficient wood or trees around KS1 to build a kraal (Jacobson *et al.* 1995; Mendelsohn *et al.* 2002; pers.obs 2013), thus stone kraal structures would have been required. The absence of a stone-built kraal at KS1 indicates that the occupants had no livestock with them, or that livestock slept near the huts and no kraal was built (Schapera 1930). Most herder communities build a kraal, which is integral to the settlement layout because of the socio-economic importance of livestock (*cf*. Hoernlè 1925; Schapera 1930; Du Pisani 1978; Ikeya 1993; Kinahan 1991; 1996b; Parkington & Mills 1991). Similarly, hunter-gatherers who acquired livestock changed their settlement layout and also built enclosures for livestock, unless they were hunters-with-sheep residing in rock shelters (Parkington & Mills 1991; Parsons 2004; Sadr 2003, 2008b; Peters *et al.* 2009).

I considered the possibility that some stone circles may have functioned as a small livestock enclosure at KS1. However, the stone circle wall is too low (*cf*. Parsons 2000a, 2004). Animals, especially goats may therefore simply jump over, as would predators (Veldman 2008). Alternatively, residents could have used tree branches from the Huab River to construct a kraal and the stone circle functioned as a support structure thereof. Given that wood is a scarcity at KS1, using the vast amount of stones at KS1 would have provided easy building material for an enclosure. In addition, using stones as building material, instead of wood, possibly provided more fire-wood. Considering the cold temperatures at night using wood sparingly might have been the better choice. Smaller structures are frequently observed to be adjacent to a stone circle. Hollow cairns were suggested to be where young animals were confined, and/or storage for household goods (Carr *et al.* 1978; Kinahan 1991) and in some cases graves (Sandelowsky 1977; Shackley 1983). Recent research indicates coops to be a sleeping place for household dogs (Peters *et al.* 2009).

If livestock was important to herders, they would not have left their animals unprotected against predators. In most cases, herders build a kraal or arrange their huts to form a protective centre, but would not leave their livestock at the mercy of predators (Hoernlè 1925; Schapera 1930; Malan 1973; Du Pisani 1978; Ikeya 1993; Badenhorst 2012).

In the Huab Valley, springs, ephemeral rivers and mountains are a choice habitat for desert lions. Lions have been consistently sighted in the area for the past 22 years, with a total number of 477 lions recorded (Stander 2007). Historical records also mention a high number of lions in the present-day Skeleton Coast area and lions are accustomed to the habitat, so they are not newcomers to the area (Stander 2006, 2007). Contrary to beliefs that people in the past were less afraid of lions, it seems from folktales that they feared the possibility of being eaten and approached lions with caution (Lloyd 1889; Bleek & Lloyd 1911; Bleek 1933, 1935, 1936). Conflict between lions and local communities still remains an ecological and economic problem as predators prey on livestock (Stander 2007). Predators did, and still do, roam the Huab River Valley. I therefore suggest that if the occupants at KS1 had livestock they would have considered building a kraal, or at the least arranged their huts in a circular layout in order to protect their livestock from predators.

At KS1 there are more than enough stones to build a high and proper kraal, thus based on the spatial layout, I suggest that a very small number of goats may have been present at KS1, if any at all. In such a scenario some cairns may have been used to confine lambs/kid goats. KSS3 did not yield any evidence of livestock, and based on the artefacts seem to have been used as a storage facility. Therefore, an interpretation of the cairns at KS1 as lamb/kid goat pens would be constructed only to fit an argument that stone circle sites represent herder occupations. Assuming that the stone circles were occupied simultaneously, KS1 spatial organisation does not reflect a typical herder or hunter-gatherer settlement layout as described in ethnographic sources (*cf.* Hoernlè 1925; Vedder 1928; Schapera 1930; Barnard 1992). KS1 consists of stones covering the surface and strong winds blow into the valley. Therefore, more than anything else, topography and dominant wind direction appear to have controlled the layout of stone circles at KS1, similar to other stone circle sites in Namibia (Carr *et al.* 1978; Veldman 2008; Speich 2010; Eichhorn & Vogelsang 2011).

6.6 Rock art

The rock art at KS1 was not analysed in depth because it was not the focus of this study and therefore, the current interpretation is subject to change upon future investigation. For example, the exact number of different depictions, the composition of the art and its relation to the spatial layout of KS1 would all need to be considered for a detailed rock art analysis.

The discipline of archaeology developed through three main theoretical stages, namely culture history, processualism, and postprocessualism (Johnson 1999; Trigger 2006). Rock art interpretation evolved from these underlying theoretical contexts. In the culture historical approach, attributing changes due to local initiative rarely happened. Ideas had to spread *via* cultural diffusion and migration, in addition some cultures were perceived to be superior to others because they had advanced technology (Johnson 1999; Trigger 2006). The archaeologists studying southern African rock art during the early 19th century had a Eurocentric social context informed by the cultural historical approach. Therefore, rock art was presumed to have been made by foreigners and not local Khoe-San communities (Balfour 1893; Breuil 1948; Lewis-Williams & Dowson 1999; Lewis-Williams 2006). When accepting that local inhabitants created the rock art, the depictions were interpreted as art for art sake (Burkitt 1928; Lewis-Williams & Dowson 1999; Lewis-Williams 2006). During the 1960s, interpretation changed to understand rock art from an empirical point of view. It was then proposed that rock art resembled the number of people and/or animals that were present in an area, or that the artists were merely communicating about hunted animals (Lewis-Williams & Dowson 1999; Lewis-Williams 2006). However, since the 1980s, a revolution in rock art interpretation considered the spiritual and mythological context of the art that referred to research of Wilhelm Bleek, Lucy Lloyd and Joseph Orpen (Orpen 1874; Bleek & Lloyd 1911; Lewis-Williams 2006; Blundell *et al.* 2010). They recorded accounts of hunter-gatherer beliefs, customs, folklore and rituals, which allow researchers to interpret the art from the artists' point of view (Lewis-Williams & Dowson 1999; Lewis-Williams 2006; Blundell *et al.* 2010).

However, the oral accounts from /Xam-speaking informants were recorded during the late 19th century, by which time southern Africa was already a mixture of different cultures that had socio-cultural and economic influences on one another prior to colonialism, either *via* diffusion or migration. It is thus not surprising to find similar versions of hunter-gatherer and herder folktales along with aspects of cosmology (Schapera 1930; Marshall 1957; Schmidt

1975, 2005; Deacon 1988; Barnard 1992; Hoff 1997; Lewis-Williams 1999; Hall & Smith 2000; Ouzman & Smith 2004; Eastwood & Smith 2005; Sullivan & Low 2014). Ethnographic records are time-specific and they simplified the complex cultural context from which they derived. Yet, interpretation of rock art without ethnography will be reduced to a gaze-and-guess method. Therefore, ethnography remains a valuable resource for interpretative models (Morris 1988; Kinahan 1991; Barnard 1992; Hoff 1997; Lewis-Williams & Dowson 1999; Van der Ryst *et al.* 2004; Smith 2008; Blundell *et al.* 2010; Wittenberg 2012; Sullivan & Low 2014).

The current paradigm for rock art interpretations are based on the dual ethnographic-neuro-psychological approach that discounts hunter-gatherer mythology as explanations of the art, and concentrates on a shamanistic interpretation of the art. According to this paradigm, most rock art is perceived to depict the spiritual realm (Lewis-Williams 1982; Lewis-Williams & Dowson 1999; Blundell *et al.* 2010). Alternative approaches have been raised. For example, Solomon (1997) suggested that the art is better understood in relation to recorded ethnographic myths and to beliefs about the spirits of the dead. Thackeray (2005) suggested that rock art is related to hunting magic, where the art reflects hunters dressed up in animal skins with the aim of tricking the animals to approach the hunter within a closer range. The examples of alternative interpretations are based on the variability of rock art, since not all paintings or engravings are clear depictions of trance and/or shamanism and interpretations should perhaps not be exclusive (Groenfeldt 1982; Inskeep 1982; Morris 1988; Solomon 1997; Thackeray 2005).

Another problem is that, in Later Stone Age contexts, there are no archaeological evidence for shamanistic practices apart from rock art. Attempts have been made to define physical evidence for shamanism, such as the shiny quartz stone tools from the Howiesons Poort lithic industry (Lewis-Williams & Pearce 2006), but such tools fall outside of the Later Stone Age time frame. This theory connects with a debate on when symbolic thought came into being (e.g., Wurz 1999; Henshilwood & Marean 2003; Villa *et al.* 2005; Lombard 2012; Wadley 2013). Stone Age lithic assemblages are variable, and discerning whether some stones were used for ritual purposes would not be easy (Lombard 2005b). What is more, several quartz pieces from the Howiesons Poort were clearly shown to have been hafted and used, some as arrowheads (Lombard 2007, 2008, 2011; Wurz & Lombard 2007; Lombard & Phillipson 2010). To reconstruct social interplay between symbolism and functionalism in a Later Stone

Age context, based on material culture other than rock art, will be similarly difficult. Shamanism, apart from the rock art interpretations, remains a theoretical construct, based only on certain aspects and certain sections of the ethnographic record.

Using rock art to differentiate between hunter-gatherer and herder communities is based on certain characteristics. Art made by hunter-gatherers are usually fine-lined and using a variety of colours. Varied depictions include animals, therianthropes, entoptic phenomena and human figures (Lewis-Williams & Dowson 1999; Lewis-Williams 2006). Herder art is cruder, being finger-painted, using less colours and geometric designs dominate the images (Lewis-Williams & Dowson 1999; Ouzman & Smith 2004; Eastwood & Smith 2005; Lewis-Williams 2006).

There are no rock paintings at KS1 itself. The engravings at KS1 could be either of hunter-gatherer or herder identity because the depictions include some geometric designs, but mainly realistic and unrealistic animals, human figures, antelope spoor, a lion, human footprints and cupules (Fig. 5.19) (Deacon 1988; Ouzman & Smith 2004; Eastwood & Smith 2005; Orton 2013). Similar to Twyfelfontein, these panels may be related to folklore, trance experiences, rainmaking and warding off evil spirits, such as evidenced by non-realistic animals (Scherz 1975; Ouzman 2002). The cupules are associated with human footprints and oryx spoor and a lion engraving (Bleek 1932a; Schmidt 1975, 2005; Ouzman 2002; Van der Ryst *et al.* 2004). An alternative explanation for the footprints and cupules is ownership of waterholes, or directions to waterholes (Walker 1998, 2010). It is also likely that their occurrence at waterholes relates partly to the coincidental location of camps and religious activities (Walker 1998, 2010).

The fine-line bichrome paintings at KS2 (Fig. 5.18) do not exhibit clear manifestations of specific trance stages. There are no therianthropical or entoptic images, such as some panels at the Brandberg, Twyfelfontein and elsewhere in southern Africa (Fig. 5.20) (Scherz 1975; Kinahan 1991; Lewis-Williams & Dowson 1999; Sullivan & Low 2014). One panel at KS2 includes a red elephant and three red pecked out human figures (G in Fig. 5.20). Elephants may be associated with rain making but their prominence in /Xam mythology is vague, however, they are mentioned in Nama/Damara mythology as cannibalistic monsters (Schmidt 1975, 2005). The main theme of the cannibal stories is flight from a life-threatening force from the spiritual realm. These life-threatening forces may also appear in the shape of lions and snakes. Therefore, the elephant and pecked out human figures might indicate the elimination of evil spirits such as oppressive supernatural beings, rather than rain making rituals. It is not implied that Nama or Damara-speaking groups were responsible for creating the rock art at KS1, but since /Xam ethnography has similar versions of evil shamans in the form of animals that eat people, the interpretation may apply (Lloyd 1889; Bleek & Lloyd 1911; Bleek 1933, 1935, 1936).

Another panel at KS2 has two zebras, a possible springbok and human figures (H in Fig. 5.20). Zebras are related to the north-west and south-east wind and with female rain for /Xam-speaking communities (Bleek 1932c, 1935; Marshall 1957). The zebras probably relate to the cumulonimbus clouds, a thunderstorm that seems to be far away, but suddenly bursts out in rain (Bleek 1932c, 1935; Marshall 1957). Springbok are associated with the rainy season, sorcery and hunting precautions against lions, as the springbok will lure the hunters to their death (Bleek 1932b, 1935; Marshall 1957). The painted zebra and springbok along with the human figures could be interpreted as symbolic for rain, wind and/or hunting practices.

The rock art at KS1 cannot be directly associated with either KRS2 or KSC14. Currently it is not possible to determine if hunter-gatherers and/or herders produced the art. Clearly, KS1 was a place of importance to local inhabitants 2000 years ago, probably due to the permanent water source. The presence of rock art attests to a spiritual connection that occupants had with the site (*cf*. Deacon 1988; Van der Ryst *et al.* 2004; Walker 2010). Future, in-depth studies of the rock art at KS1 could provide a more detailed interpretation of its relationship with known Khoe-San cosmology.

6.7 Who lived at Kuidas Spring?

Recent DNA studies support an initial migration and subsequent diffusion pulse from East African pastoral societies to southern Africa. These migrant groups intermixed with southern San groups and formed the Khoekhoe (Breton *et al.* 2014; Lombard 2014). Consequently the diffusion of caprines occurred through interaction, which may have included trade and marriage between immigrant and local groups. This is also evident from the site summary indicating that no definite boundaries could be identified after 2000 BP (Table 3.1. and Fig. 3.2).

If an initial migration route was *via* Botswana and Namibia it may explain the early dates for caprines at Toteng and Leopard Cave (Robbins *et al.* 2005; Pleurdeau *et al.* 2012). At archaeological sites with firm evidence of pastoralism, such as Mirabib (Sandelowsky 1974, 1977), Die Kelders (Sealy & Yates 1994), Kasteelberg (Smith 2006; Sadr 2008b), Toteng (Robbins *et al.* 2005) and Leopard Cave (Pleurdeau *et al.* 2012), the lithic assemblages and OEB sizes do not indicate sudden significant changes with the introduction of livestock. The continuity in artefacts supports a migrant group that assimilated with the local hunter-gatherers and from those communities, pottery and livestock diffused at different rates across southern Africa (Sadr 2008b; Kinahan 2013b; Breton *et al.* 2014; Lombard 2014).

Stone circle settlements are not securely related to the introduction of livestock to southern Africa *ca.* 2000 years ago. In Namibia, stone circle sites in general date within the last 1500 years (Speich 2010; Eichhorn & Vogelsang 2011), while older South African stone circles date between 4000 and 2300 BP (Parsons 2000a, 2004, 2007, 2008; Sampson 2009). This may suggest a migration and diffusion pulse (Sadr 2008b), from modern-day South Africa to Namibia. The majority of stone circles occur in Namibia, whereas fewer stone circle sites have been recorded in South Africa, and the existence of stone circle sites in Botswana are unknown (Parsons 2004; Veldman 2008). Similar to Namibia, many stone circle sites do occur in East Africa dating to the fifth millennium BP (Hildebrand & Grillo 2012). Therefore, to confirm such a migration and/or diffusion pulse and from where it originated, requires regional dating of all stone circle sites in Africa. This would indicate the oldest stone circle occupation and a possible migratory and/or diffusion routes during different times. Another problem with making regional connections between stone circle sites, is that the purpose of individual stone circles differ and that diverse purposes are informed by socio-economical norms (e.g., Carr *et al.* 1978; Shackley 1983, 1985; Speich 1999, 2000, 2010; Parsons 2000a, 2004; Peters *et al.* 2009). Also, regardless of diffusion and/or migration, independent cultural innovations possibly caused stone circle construction because of practical necessities in treeless and barren environments (Parsons 2000a, 2004).

Determining whether such diffusion/and or migration was mainly from herder societies are problematic, since there are no livestock remains at any stone circle sites in southern Africa. The absence of livestock remains could be due to various reasons. The slaughter of livestock did not take place nor did animals accidently die at a stone circle site. Another scenario could be that herders travelled without livestock and constructed stone circle encampments. Another explanation is that hunter-gatherer groups built and occupied stone circle encampments (Beaumont & Vogel 1989; Parsons 2000a, 2004, 2008; Jerardino & Maggs 2007). The last possibility could be that archaeologists excavating stone circle encampments are unfortunate in finding no evidence of pastoralism. If excavated stone circles were constructed while people were travelling across the landscape, it may explain why a majority of stone circles in Namibia have a limited number of material remains.

Similar to the lithic assemblages, the OEB sizes from KRS2 and KSC14 are slightly different, but clear changes are not visible. I come to conclusion that no obvious changes occurred in the cultural identity of the occupants at KS1. Neither KRS2 nor KSC14 has faunal remains of caprines, which is indicative of hunter-gatherer subsistence at the rock shelter and stone circle. Based on the low number of pottery and copper with no evidence for manufacture at KS1, it is likely trade acquired objects. I cannot deduce significant cultural differences between KRS2 and KSC14 based solely on the few potsherds and copper pieces. It seems that the cultural continuity in artefacts could mean communities and their descendants from the same cultural background occupied KS1 over the past 2000 years.

The engraved panels at KS1 do not indicate a clear differentiation between hunter-gatherers and herders. Further studies will provide more detailed information. No archaeological research has been done at KS2, but the rock art from the site is characteristic of hunter-gatherers. How KS2 relates to KS1 is currently unknown.

However, there are a number of possibilities of who occupied Kuidas Spring. First, it is possible that only hunter-gatherers used Kuidas. The evidence in support of this possibility includes the lack of livestock remains, the presence of small and large OEBs and continuity in the lithic assemblages. The pottery and copper beads could have been traded in such a scenario. The hunter-gatherers used Kuidas as a hunting encampment, following game and water sources on a seasonal basis.

The second possibility is that herders, who made similar lithic artefacts as hunter-gatherers, occupied Kuidas. The similar artefacts would account for the lack of significant differences in the lithic assemblages and bead sizes between the shelter and the stone circle. The lack of livestock remains could be due to factors such as small sample size, poor preservation, or that livestock were kept elsewhere when they visited Kuidas (*cf*. Kinahan 1991, 2004). However, assuming that all stone circles at Kuidas were occupied simultaneously, the spatial organisation of the stone circles does not reflect a distinctive settlement pattern associated with pastoral communities with livestock (Hoernlè 1925; Schapera 1930; Malan 1973; Du Pisani 1978; Ikeya 1993; Badenhorst 2012).

The third possibility is that the builders and occupants were not exclusively only hunter-gatherers or pastoralists (such as the Damara, Nama, Hei//om and San). In this scenario, both hunter-gatherers and herders used stone circles and shelters at different times. In such fluid circumstances, herders would have lost livestock and returned to hunting and gathering, while hunter-gatherers may at times have obtained livestock (hunters-with-sheep), only to lose it sometime thereafter (Sadr 1998, 2003; Orton 2012). It may then not be possible to find an unambiguous pattern for either type of society. These groups could have used stone circle sites inter-changeably from time to time. Support for this notion would be the kraals found at some stone circles sites but not at others, such as the Brandberg (*cf*. Kinahan 1991).

Since the artefacts of KS1 do not reveal unambiguous differences between the rock shelter and stone circle it reflects continuity in lithic assemblages and OEBs. The continuity only supports the local development of pastoralism *via* diffusion if stone circles are indeed exclusive to pastoral societies (Kinahan 1991, 2004; Sadr 2003, 2008b).

At both KRS2 and KSC14 occupants relied on secure hunting resources and may have stored foods, evidence by artefacts retrieved from the cairn (*cf*. Carr *et al.* 1978). I suggest that Kuidas Spring was a seasonal encampment where the occupants travelled along river beds exploiting various seasonal or permanent resources on their way to and from the Atlantic coast for salt, seal fat and skins and trading (Noli & Avery 1987). For a more secure interpretation and further testable hypotheses, more extensive excavations must be conducted at Kuidas Spring and at more stone circle sites.

Chapter 7

Conclusion

Hunter-gatherer communities inhabited southern Africa prior to the first appearance of caprines during the Later Stone Age. Faunal remains of caprines are present in the archaeological record from 2200 years ago. There are no wild progenitors for caprines in southern Africa and livestock have been introduced through a process of migration and/or diffusion. Similarly, thin-walled pottery first occurs around the same time caprines are present in the archaeological record.

Inspired by the Kalahari debate of the 1990s, a second debate followed concerning whether the introduction of livestock and pottery was a process of migration or diffusion. Currently, there are no unambiguous archaeological evidence for immigrant herder groups in southern Africa. Rather the unsynchronised appearance of caprines and pottery in the archaeological record reflects a process of diffusion. However, some hunter-gatherer groups have egalitarian social structures, while other groups do not. Therefore, distinguishing between local hunter-gatherers that accepted caprines and immigrant herders, after the introduction of livestock is difficult within an anthropological and archaeological context.

In the anthropological framework there are some distinguishable differences, such as language, settlement patterns and ideologies that differentiates between hunter-gatherers and herders. Apart from diverse languages, the material differences are ambiguous. For example, Damara and Nama groups are Khoe-speakers, these communities make OEBs, copper, pottery and own livestock while hunting wildlife. They would also return to hunter-gatherer subsistence if they were to lose their livestock through sickness or raids. Similarly, the Hei//om that are linguistically grouped as San-speaking hunter-gatherers, also make OEBs, pottery and may acquire copper *via* trade, they also have livestock and hunt game. Settlement patterns may reflect different social structures, such as hierarchical pastoralists and egalitarian hunter-gatherers. However, not all hunter-gatherers have an egalitarian social structure, nor do all herders have a strict hierarchy. The inter-changeable subsistence strategies have an influence on settlement layout. If communities have no livestock during certain times they might arrange their huts closer to one another, in contrast if livestock are present huts may reflect status and ownership.

The archaeological characteristics have similar problems to anthropological distinctions. If livestock were distributed as a process of cultural diffusion through marriage or local trading, artefacts such as lithics, OEBs and pottery would not reflect a clear hunter-gatherer or herder occupation, but a continuum of material culture. People continued hunting game while possessing livestock regardless of their linguistic affiliation. In most cases the faunal remains of wildlife dominate archaeological assemblages. The amount of caprine remains excavated also poses a problem, because a large number of caprine remains may reflect pastoralists and a low amount of faunal remains rather indicate the presence of hunters-with-sheep. It is thus difficult to differentiate hunters from herders based on their archaeological remains.

Stone circles are an enigmatic feature of the southern African final Later Stone Age record. Stone circle sites are widespread in Namibia and also occur in South Africa. The majority of stone circles in Namibia post-date 1500 BP, which is after the introduction of livestock. While in South Africa some stone circles date to between 4000 and 2300 BP, which is prior to caprines being present in archaeological record. These features also occur in East Africa. Recent DNA studies confirmed the migration of initial migrant pastoralist groups from East Africa to southern Africa. A possibility is that, similar to pottery and caprines, the idea of stone circle settlements diffused at different rates. However, no caprine remains have ever been identified in the faunal assemblages from stone circle sites in southern Africa. Nor can stone circles yet be firmly associated with the introduction of livestock to southern Africa. It is therefore possible that the architecture was a local development caused by practical choices when living in arid environments and either hunter-gatherers and/or herders may have occupied them at different times.

Stone circle settlements in Namibia are sometimes attributed to the local adoption of caprines, with residents requiring more space for their herds, subsequently abandoning rock shelter habitation (Kinahan 1991). Data from excavated stone circles in Namibia and South Africa suggest that either hunter-gatherers or herders constructed and occupied them. Based on the archaeological evidence and ethnographic sources, stone circles could have been used as hunting blinds, bases for huts and in some cases have associated livestock enclosures.

The site, Kuidas Spring, situated within the arid Huab River Valley includes two rock shelters, eighteen circles and four stone cairns. I excavated one small rock shelter, a stone circle and a cairn. Rock engravings also occur at Kuidas Spring and paintings at an adjacent site. The aim of my study was to test whether hunter-gatherers occupied the rock shelter and herders the stone circle as proposed by Kinahan (1991). The rock shelter was occupied during 2200-1500 BP, while the stone circle yielded dates between 900-220 BP. The excavated cairn dated to 216 BP. During these occupation phases, the environment of Kuidas Spring was similar to today. Annual rainfall is between 50 mm and 100 mm and during some years there could be no rainfall at all. The perennial spring is the only water source because the Huab River is ephemeral. Vegetation consists of desert-adapted shrubs and some trees in Huab River bed. Based on the harsh environment and scarcity of material remains at Kuidas Spring, I suggest short and temporary site occupations.

The taphonomic history of the rock shelter and stone circle is complex. The entire surface around Kuidas Spring consists of gravel and stones and therefore, it is possible that sand within the rock shelter and stone circle is because of anthropic factors. Alternatively, sand accumulated due to strong coastal winds at both features. Due to the softer sand inside these features, adult and juvenile oryx prefer to lie down and defecate inside rock shelters and stone circles at the site. Also, with their hoofs they create noticeable depressions to lie down in. The excavated rock shelter is narrow, an adult oryx will not fit inside and the small dung pellets indicate that the shelter had visits from young oryx. The excavated deposit is within the shelter and not outside the drip line. Thus, the limited oryx disturbance means than the archaeological context of the shelter sediments is relatively intact. Apart from the trampling of the oryx, there were no other biotic activities, for example, rodents within the shelter. The stone circle is larger than the excavated rock shelter. Adult and juvenile oryx utilise the stone circles, thereby destroying the archaeological deposit and in some cases the stone circle structures itself. Therefore, the excavated stone circle is of a secondary context and inferences made about occupational history and spatial organisation are limited.

To determine whether hunter-gatherers or herders occupied the stone circle and the rock shelter, it is important to distinguish archaeologically between hunter-gatherers and herders. Artefacts that designates hunter-gatherer occupation include a high percentage of formal stone tools made from fine-grained rock types, <5 mm OEB, no or few pottery or faunal remains of caprines. Herders are recognised by the presence of thin-walled pottery, >5 mm OEB, an informal stone tool assemblage made from coarse-grained rock types and faunal remains of livestock and metal beads (Kinahan 1984a; Jacobson 1987a; Sadr, 2003, 2008b; Smith 2005, 2008; Parsons 2007, 2008).

Caprine remains were absent from the faunal assemblages excavated at all features, but oryx, zebra and springbok faunal remains were present at the rock shelter and stone circle. The fauna from the cairn included a canine, a dassie and indeterminate medium to large bovidea. Only 9% of the entire faunal sample had identifiable specimens. The limited sample of faunal remains may be due to taphonomic processes, short occupation phases and seasonal dispersal patterns of past occupants. Based on current evidence, I conclude that throughout all occupation phases of the rock shelter and stone circle residents subsisted on wild resources.

The lithic assemblages show slight differences in quantity, rock types, typology and technology as well as the size of some formal lithics. The rock shelter had a greater amount of lithic artefacts made predominantly from fine-grained rock types. The stone circle had few lithic artefacts made from fine-grained and coarse grained rock types. However, both features had an informal lithic assemblage and made use of expedient reduction strategies. The reduction strategies indicate that occupants did not practice explicit risk management strategies, because the perennial spring at the site attracts predictable prey. Due to the predictability of prey, residents had secure food resources that is similar to a subsistence strategy based on caprines. I was therefore not able to discern any major changes in subsistence strategies based on the lithic artefacts. Consequently, at Kuidas Spring the lithic assemblages thus far excavated do not reflect a clear cultural hunter-gatherer or herder life way. It seems that occupants of the rock shelter and stone circle had similar subsistence strategies through time.

Other artefacts such as OEBs also did not indicate socio-economical differences between the occupants of the rock shelter and stone circle, because both features have few OEBs and the beads are similar in size. The only noteworthy distinction between the archaeological assemblages includes a few thin-walled pottery fragments and copper beads that were excavated from the stone circle and which were absent at the rock shelter. However, thin-walled pottery and copper beads may have been produced and/or traded by either hunter-gatherers or herders. These artefacts are therefore inconclusive regarding cultural identity. The cairn had one OEB and three thin-walled pottery shards, but no lithic artefacts. I conclude that the structure was used as a storage facility associated with the stone circle.

Currently it is not possible to discern different ideologies of past residents, because the rock art was not the focus of the study and was not analysed in detail. Future rock art research at

Kuidas Spring will aim to investigate whether occupants with different ideological systems created the engraved panels, or whether a particular group of people created the engravings during a single occupation event.

Considering the archaeological features of Kuidas Spring in their landscape, some observations are possible. For example, the rock shelter provides natural protection from environmental elements. Concerning the spatial organisation within the rock shelter, charcoal and artefacts were concentrated near the drip line. A small fire would have warmed up the shelter, thereby providing a comfortable sleeping area and shade for activities such as making stone tools and OEBs. The residents constructed their stone circles on the uneven topography. The circle openings face away from the prevailing wind direction. Inside the stone circle charcoal was concentrated near the opening. Therefore, the circle-opening faces away from the prevailing wind to ensure that the wind is less likely to extinguish the fire. Lithics, OES, OEBs, copper pieces and pottery fragments were also concentrated near the opening and middle area of the structure. It seems likely that household activities were concentrated in the front and middle of the structure. The circle is situated in direct sunlight and if the occupants had no roofing, they probably sat inside during early mornings or late afternoon, when it was no longer extremely hot. The settlement layout of stone circles at Kuidas Spring, provided that they were occupied simultaneously, does not reflect the ethnographically-known herder encampment layouts. The spatial layout of stone circles at Kuidas Spring is linear with the circle entrances facing in various directions, whereas ethnographically-known herder encampments are circular with hut entrances facing towards the middle of the encampment.

My study situated Kuidas Spring within the South African and Namibian regional context. I established that people hunted for subsistence while occupying the rock shelter and stone circle. Little else was revealed about their socio-economic behaviours apart from the fact that they had access to metal and pottery at the later stages of occupation. Also, within the framework of the hunter-gatherer/herder debate and based purely on their archaeological remains, distinguishing between the groups that occupied the different features at the site is not feasible. The research at Kuidas Spring, along with the other excavated stone circles from Namibia and South Africa, was however able to confirm these features as living spaces and that they were probably not constructed as hunting blinds or for purely ritualistic purposes.

Kuidas Spring has potential for future research that may yield alternative evidence of pastoralism, because the remaining, unexcavated rock shelters and stone circles might yield caprine remains and extend the material culture samples. It would be worthwhile to find and excavate a stone circle with an undisturbed deposit and further studies will enlarge the archaeological assemblage and may provide more information about the use of space within the settlement, allowing for comparison with ethnographically documented settlement layouts. In addition, the rock art should be dated to situated it with either the rock shelter, stone circles or both. Such a study may present clues as to the social identity of the group that built and lived in the structures at Kuidas. Also, all stone circles from a particular site should be dated to discern if occupations were contemporaneous, this may potentially clarify issues concerning aggregation and dispersal patterns of past communities. Collaborative international studies of stone circle sites from East Africa, which include dating and artefact analyses would contribute towards identifying possible migration routes and/or diffusion. Ultimately such regional and international research will further contribute to clarifying who built and occupied stone circles and for what purpose – or whether they originated at different times and places on the sub-Saharan landscape.

Based on the seeming continuity in the stone tool assemblages, I conclude that no major socio-economic changes occurred at Kuidas Spring during the last 2000 years. Rather, communities with interchangeable subsistence strategies, perhaps similar to that of the current Damara, Nama and Hei//om communities, were responsible for constructing and occupying the stone circles, as well as the rock shelter. Groups of people most probably visited Kuidas Spring as a seasonal encampment. The perennial spring that provided fresh water enabled residents to exploit the predictable hunting grounds.

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Appendix A

TABLE A. *Inventory of lithic artefacts analysed from KRS2.*

Layer	Surface Brown I	Brown II	Brown III	Yellowish Brown IV	Total
Dèbitage/cores					
Chips	10	179	871	35	**1095**
Chunks	3	50	360	22	**435**
Core-rejuvenation flakes	2	14	47	4	**67**
Core-reduced pieces	-	5	25	-	**30**
Bipolar-bladelet cores	-	1	5	-	**6**
Bladelet cores	-	2	3	-	**5**
Irregular cores	-	5	9	1	**15**
Unretouched flakes					
Whole flakes	5	96	296	17	**414**
Broken flakes	-	52	134	7	**193**
Whole blade	-	1	-	-	**1**
Whole bladelets	1	7	14	1	**23**
Broken blades	-	1	1	-	**2**
Broken bladelets		-	7	-	**7**
Possible blade/bladelet fragments	-	6	14	-	**20**
Retouched pieces					
Double backed bladelet	-	-	1	-	**1**
Backed pieces	-	-	8	-	**8**
Broken backed pieces	-	-	8	-	**8**
Unifacial lateral points	-	1	3	-	**4**
Unifacial bilateral points	-	-	3	-	**3**
Broken unifacial lateral points	-	-	2	-	**2**
Broken unifacial bilateral point	-	-	1	-	**1**
Truncated flakes	-	-	3	-	**3**
Trapezes	-	-	5	-	**5**
Segments	-	3	12	-	**15**
Large scrapers					
Endscraper	-	-	1	-	**1**
Side scrapers	-	2	-	-	**2**
Backed scraper	-	-	1	-	**1**
Broken scraper	-	1	-	-	**1**
Medium scrapers					
Endscraper	-	-	-	1	**1**
Side- and endscraper	-	1	-	-	**1**
Side scrapers	-	-	7	-	**7**
Backed scraper	-	-	1	-	**1**
Small scrapers					
Endscrapers	-	-	8	-	**8**
Side- and endscraper	-	-	1	-	**1**
Side scrapers	-	2	11	-	**13**
Double side scrapers	-	-	3	-	**3**
Backed scrapers	-	1	5	-	**6**
Broken scrapers	-	1	1	-	**2**
Adzes	-	-	3	-	**3**
Burins	-	-	2	-	**2**
Borers	-	-	7	-	**7**
Awls	-	-	6	-	**6**
Notched piece	-	-	1	-	**1**
Miscellaneous retouch pieces	-	-	4	-	**4**
Other					
Manuports	-	2	2	2	**6**
Total	**21**	**433**	**1896**	**90**	**2440**

TABLE B. *Inventory of lithic artefacts analysed from KSC14 per excavated level.*

	Level 1	Level 2	Level 3	Level 4	Total
***Dèbitage*/cores**					
Chips	16	2	12	6	**36**
Chunks	9	-	3	4	**16**
Core-reduced pieces	-	-	1	1	**2**
Core-rejuvenation flakes	3	-	1	3	**7**

Core-rejuvenation tablets	-	-	-	2	**2**
Radial core	1	-	-	-	**1**
Irregular cores	3	-	-	3	**6**
Unretouched flakes					
Whole flakes	28	6	10	18	**62**
Broken flakes	9	3	6	7	**25**
Whole blade	-	1	-	-	**1**
Broken blade	-	1	-	-	**1**
Broken bladelet	1	-	-	-	**1**
Possible blade/bladelet fragments	1	-	2	-	**3**
Retouched pieces					
Denticulate	-	1	-	-	**1**
Awl	-	1	-	-	**1**
Unifacial lateral point	-	1	-	-	**1**
Backed pieces	-	-	1	1	**2**
Large scraper					
Endscraper		-	-	1	**1**
Double side scraper	1	-	-	-	**1**
Medium scraper					
Side- and endscraper	-	-	-	1	**1**
Side scraper	-	-	-	1	**1**
Small scraper					
Endscraper	1	-	-	-	**1**
Side scrapers	1	-	-	1	**2**
Backed scraper	1	-	-	-	**1**
Other					
Manuports	3	1	-	1	**5**
Total	**78**	**17**	**36**	**50**	**181**

TABLE C. *Comparison of primary and secondary lithic typologies between KRS2 and KSC14.*

***Dèbitage*/cores**	**Number at KRS2**	**Number at KSC14**
Chips	1095	36
Chunks	435	16
Core-rejuvenation flakes	67	7
Core-rejuvenation tablets	0	2
Core-reduced pieces	30	2
Bipolar-bladelet cores	6	0
Bladelet cores	5	0
Irregular cores	15	6
Radial cores	0	1
Unretouched flakes		
Whole flakes	414	62
Broken flakes	193	25
Whole blade	1	1
Whole bladelet	23	0
Broken blades	2	1
Broken bladelets	7	1
Possible blade/bladelet fragments	20	3
Retouched pieces		
Double backed bladelet	1	0
Backed pieces	8	2
Broken backed pieces	8	0
Unifacial lateral points	4	0
Unifacial bilateral points	3	0
Broken unifacial lateral points	2	0
Broken unifacial bilateral point	1	0
Truncated flakes	3	0
Trapeze	5	0
Segments	15	0
Scrapers	48	8
Adzes	3	0

Burins	2	0
Borers	7	0
Awls	6	1
Denticulate	0	1
Notched piece	1	0
Miscellaneous retouch pieces	4	0
Manuports	6	5
Total	**2440**	**181**

TABLE D. *Rock type composition of KRS2, Surface Brown I lithic assemblage.*

Rock type	**Quartz**	**Dolerite**	**Vesicular Basalt**	**CCS**	**Hornfels**	**Agate**	**Chert**	**Total**
Dèbitage/cores								
Chips	2	-	-	6	-	2	-	**10**
Chunks	1	-	-	-	-	2	-	**3**
Core-rejuvenation flakes	2	-	-	-	-	-	-	**2**
Unretouched flakes								
Whole flakes	-	-	-	3	-	2	-	**5**
Broken flakes	-	-	-	-	-	-	-	**-**
Whole bladelet	-	-	-	1	-	-	-	**1**
Total	**5**	**0**	**0**	**10**	**0**	**6**	**0**	**21**

TABLE E. *Rock type composition of KRS2, Brown II lithic assemblage.*

Rock type	**Quartz**	**Dolerite**	**Vesicular Basalt**	**CCS**	**Hornfels**	**Agate**	**Chert**	**Total**
Dèbitage/cores								
Chips	75	6	4	64	5	18	7	**179**
Chunks	11	11	4	11	1	11	1	**50**
Core-rejuvenation flakes	4	4	-	1	1	1	3	**14**
Core-reduced pieces	2	-	-	-	1	2	-	**5**
Bipolar-bladelet core	1							**1**
Bladelet core	-	-	-	1		1	-	**2**
Irregular cores	-	1	-	1	1	2	-	**5**
Unretouched flakes								
Whole flakes	23	20	10	27	3	8	5	**96**
Broken flakes	12	20	5	13	-	2	-	**52**
Whole blade	-	-	-	-	-	-	1	**1**
Whole bladelets	-	-	-	6	-	1	-	**7**
Broken blade	-	1	-	-	-	-	-	**1**
Possible blade/bladelet fragments	1	1	-	2	-	2	-	**6**
Retouched pieces								
Unifacial lateral point	-	-	-	-	-	-	1	**1**
Segments	-	-	-	2	-	1	-	**3**
Large scrapers								
Side scrapers	-	-	2	-	-	-	-	**2**
Broken scraper	-	-	-	1	-	-	-	**1**
Medium scrapers								
Side- and endscraper	1	-	-	-	-	-	-	**1**
Small scrapers								
Side scrapers	-	-	-	1	-	1	-	**2**
Backed scraper	-	-	-	1	-	-	-	**1**
Broken scraper	1	-	-	-	-	-	-	**1**
Other								
Manuports	-	-	-	2	-	-	-	**2**
Total	**131**	**64**	**25**	**133**	**12**	**50**	**18**	**433**

TABLE F. *Rock type composition of KRS2, Brown III lithic assemblage.*

Rock type	**Quartz**	**Dolerite**	**Vesicular Basalt**	**CCS**	**Hornfels**	**Agate**	**Chert**	**Total**

Dèbitage/cores								
Chips	362	29	7	315	27	60	71	**871**
Chunks	133	25	16	96	16	50	24	**360**
Core-rejuvenation flakes	7	5	2	20	3	3	7	**47**
Core-reduced pieces	14	-	-	6	-	2	3	**25**
Bipolar-bladelet cores	5	-	-	-	-	-	-	**5**
Bladelet cores	2	-	-	-	-	-	1	**3**
Irregular cores	3	1	-	3	-	2	-	**9**
Unretouched flakes								
Whole flakes	87	50	15	66	12	22	44	**296**
Broken flakes	27	31	4	38	9	8	17	**134**
Whole bladelets	3	2	-	7	1	-	1	**14**
Broken blade	-	-	1	-	-	-	-	**1**
Broken bladelets	1	-	-	4	-	-	2	**7**
Possible blade/bladelet fragments	7	-	-	7	-	-	-	**14**
Retouched pieces								
Double backed bladelet	-	-	-	-	-	-	1	**1**
Backed pieces	2	-	-	4	-	-	2	**8**
Broken backed pieces	1	-	-	3	-	2	2	**8**
Unifacial lateral points	1	-	-	2	-	-	-	**3**
Unifacial bilateral points	1	-	-	-	-	-	2	**3**
Broken unifacial lateral points	-	-	-	-	-	1	1	**2**
Broken unifacial bilateral point	1	-	-	-	-	-	-	**1**
Truncated flakes	-	-	-	3	-	-	-	**3**
Trapezes	1	-	-	3	-	1	-	**5**
Segments	5	-	-	5	-	-	2	**12**
Large scrapers								
Endscraper	-	-	1	-	-	-	-	**1**
Backed scraper	-	-	-	-	-	1	-	**1**
Medium scrapers								
Side scrapers	3	-	1	2	1	-	-	**7**
Backed scraper	1	-	-	-	-	-	-	**1**
Small scrapers								
Endscrapers	3	-	-	4	-	1	-	**8**
Side- and endscraper	-	-	-	-	-	1	-	
Side scrapers	3	-	-	8	-	-	-	**11**
Backed scrapers	2	-	-	2	-	1	-	**5**
Broken scraper	1	-	-	-	-	-	-	**1**
Adzes	2	-	-	1	-	-	-	**3**
Burins	-	1	-	-	-	-	1	**2**
Borers	-	-	-	2	1	-	4	**7**
Awls	2	-	1	2	-	-	1	**6**
Notched piece	-	-	-	1	-	-	-	**1**
Miscellaneous retouch pieces	2	-	-	2	-	-	-	**4**
Other								
Manuports	2	-	-	-	-	-	-	**2**
Total	**684**	**144**	**48**	**609**	**70**	**155**	**186**	**1896**

TABLE G. *Rock type composition of KRS2, Yellowish Brown IV lithic assemblage.*

Rock type	**Quartz**	**Dolerite**	**Vesicular Basalt**	**CCS**	**Hornfels**	**Agate**	**Chert**	**Total**
Dèbitage/cores								
Chips	31	-	-	2	1	-	1	**35**
Chunks	15	-	-	3	-	1	3	**22**
Core-rejuvenation flakes	3	-	-	-	1	-	-	**4**
Irregular core	1	-	-	-	-	-	-	**1**
Unretouched flakes								

Whole flakes	6	5	1	1	1	1	2	**17**
Broken flakes	5	2	-	-	-	-	-	**7**
Whole bladelet	-	-	-	1	-	-	-	**1**
Endscraper	-	-	-	1	-	-	-	**1**
Other								
Manuports	2	-	-	-	-	-	-	**2**
Total	**63**	**7**	**1**	**8**	**3**	**2**	**6**	**90**

TABLE H. *Rock type composition of KSC14, level 1 lithic assemblage.*

Level 1	**Quartz**	**Dolerite**	**Vesicular Basalt**	**CCS**	**Hornfels**	**Agate**	**Chert**	**Total**
***Dèbitage*/cores**								
Chips	6	1	-	7	1	-	1	**16**
Chunks	6	3	-		-	-	-	**9**
Core-rejuvenation flake	-	-	-	1	2	-	-	**3**
Radial core	-	1	-	-	-	-	-	**1**
Irregular cores	-	2	-	-	1	-	-	**3**
Unretouched flakes								
Whole flakes	6	17	1	1	2	-	1	**28**
Broken flakes	1	6	1	1	-	-	-	**9**
Broken bladelet	-	1	-	-	-	-	-	**1**
Possible blade/bladelet fragment	1	-	-	-	-	-	-	**1**
Retouched pieces								
Large scrapers								
Double sided scraper	-	1	-	-	-	-	-	**1**
Small scrapers								
Side scraper	-	-	-	-	-	1	-	**1**
Endscraper	1	-	-	-	-	-	-	**1**
Backed scraper	-	-	-	1	-	-	-	**1**
Other								
Manuport	1					2		**3**
Total	**22**	**32**	**2**	**11**	**6**	**3**	**2**	**78**

TABLE I. *Rock type composition of KSC14, level 2 lithic assemblage.*

Level 2	**Quartz**	**Dolerite**	**Vesicular Basalt**	**CCS**	**Hornfels**	**Agate**	**Chert**	**Total**
***Dèbitage*/cores**								
Chips	1	-	-	1	-	-	-	**2**
Unretouched flakes								
Whole flakes	-	5	1	-	-	-	-	**6**
Broken flakes	-	3	-	-	-	-	-	**3**
Broken blade	-	1	-	-	-	-	-	**1**
Whole blade	-	1	-	-	-	-	-	**1**
Retouched pieces								
Denticulate	-	1	-	-	-	-	-	**1**
Awl	-	1	-	-	-	-	-	**1**
Unifacial lateral point	-	1	-	-	-	-	-	**1**
Other								
Manuport	1	-	-	-	-	-	-	**1**
Total	**2**	**13**	**1**	**1**	**-**	**-**	**-**	**17**

TABLE J. *Rock type composition of KSC14, level 3 lithic assemblage.*

Level 3	**Quartz**	**Dolerite**	**Vesicular Basalt**	**CCS**	**Hornfels**	**Agate**	**Chert**	**Total**
***Dèbitage*/cores**								
Chips	4	2	1	4	1	-	-	**12**
Chunks	2	-	-	-		-	1	**3**
Core-reduced piece	1	-	-	-	-	-	-	**1**
Core-rejuvenation flake	-	-	-	1	-	-	-	**1**
Unretouched flakes								
Whole flakes	1	6	-	2	-	-	1	**10**

Broken flakes	1	3	-	-	-	-	2	**6**
Possible blade/bladelet fragments	-	-	-	-	2	-	-	**2**
Retouched pieces								
Backed piece	-	-	-	1	-	-	-	**1**
Total	**9**	**11**	**1**	**8**	**3**		**4**	**36**

TABLE K. *Rock type composition of KSC14, level 4 lithic assemblage.*

Level 4	**Quartz**	**Dolerite**	**Vesicular Basalt**	**CCS**	**Hornfels**	**Agate**	**Chert**	**Total**
***Dèbitage*/cores**								
Chips	4	1	-	1	-	-	-	**6**
Chunks	4	-	-	-	-	-	-	**4**
Core-reduced piece	1	-	-	-	-	-	-	**1**
Core-rejuvenation flakes	1	-	-	2	-	-	-	**3**
Core-rejuvenation tablets	-	1	1	-	-	-	-	**2**
Irregular core	1	1	1	-	-	-	-	**3**
Unretouched flakes								
Whole flakes	7	3	1	1	3	-	3	**18**
Broken flakes	-	4	1	-	-	1	1	**7**
Retouched pieces								
Backed piece	-	1	-	-	-	-	-	**1**
Large scrapers								
Endscraper	-	-	-	-	1	-	-	**1**
Medium scrapers								
Side- and endscraper	-	-	-	-	-	-	1	**1**
Side scraper	1	-	-	-	-	-	-	**1**
Small scrapers								
Side scraper	1	-	-	-	-	-	-	**1**
Other								
Manuport	1	-	-	-	-	-	-	**1**
Total	**21**	**11**	**4**	**4**	**4**	**1**	**5**	**50**

TABLE L. *OEB production sequence with attributes and fragments from KRS2, (abbreviation: perfd = perforated). Note: numbers of pieces do not equal number of attributes because one piece can have multiple attributes.*

Production phase (n of pieces)	**Burnt**	**Not burnt**	**Polished**	**Not polished**	**Patina**	**Patina removed**	**Perforation type**	**Perforation direction**
Surface Brown I								
Broken perfd blank (n=1)	0	1	0	1	1	0	one side	dorsal
Fragments (n=3)	0	3	0	3	2	1	-	-
Total Surface Brown I	**0**	**4**	**0**	**4**	**3**	**1**	**-**	**-**
Brown II								
Complete partially drilled blank (n=2)	0	2	0	2	2	0	one side	dorsal and ventral
Broken partially drilled blank (n=2)	0	2	0	2	2	0	one side	dorsal
Broken perfd blank (n=7)	1	6	0	7	7	0	one side	dorsal
Complete, perfd almost bead form (n=1)	0	1	0	1	1	0	one side	dorsal
Broken, perfd almost bead form (n=1)	0	1	0	1	0	1	one side	dorsal
Finished bead (n=21)	1	1	0	2	0	2	-	-
Broken finished bead (n=1)	0	0	1	0	0	1	-	-
Fragments (n=129)	13	116	0	128	122	6	-	-
Total Brown II	**15**	**129**	**1**	**143**	**134**	**10**	**-**	**-**
Brown III								
Circular blank (n=8)	2	6	0	8	8	0	-	-
Complete partially drilled blank (n=2)	1	1	0	2	2	0	one side	dorsal
Broken partially drilled	0	29	0	29	29	0	one side	dorsal

blank (n=29)								
Complete perfd blank (n=3)	0	3	0	3	3	0	one side	dorsal
Broken perfd blank (n=22)	0	22	0	22	22	0	one side	dorsal
Complete, perfd, slightly formed bead (n=1)	0	1	0	1	1	0	one side	dorsal
Broken, perfd, slightly formed bead (n=14)	0	14	0	14	14	0	one side	dorsal
Complete, perfd almost bead form (n=11)	1	10	0	11	3	8	one side	dorsal
Broken, perfd almost bead form (n=35)	0	16	0	35	8	27	one side	dorsal
Finished bead (n=9)	0	9	4	5	0	9	-	-
Broken finished bead (n=8)	3	5	1	7	3	4	-	-
Fragments (n=807)	60	747	1	806	800	7	-	-
Total Brown III	**67**	**863**	**6**	**943**	**893**	**55**		
Yellowish Brown IV								
Fragments (n=1)	0	1	0	1	1	0	-	-
Total Yellowish Brown IV	**0**	**1**	**0**	**1**	**1**	**0**	**-**	**-**
Total	**82**	**997**	**7**	**1091**	**1031**	**66**	**-**	**-**

TABLE M. *Total OEB production sequence with attributes and fragments from KSC14 (abbreviation: perfd = perforated). Note: numbers of pieces do not equal number of attributes because one piece can have multiple attributes.*

Production phase (n of pieces)	**Burnt**	**Not burnt**	**Polished**	**Not polished**	**Patina**	**Patina removed**	**Perforation type**	**Perforation direction**
Level 1								
Circular blank (n=2)	-	2	-	2	-	2	-	-
Complete partially drilled blank (n=2)	-	2	-	2	2	-	one side	dorsal
Broken partially drilled blank (n=7)	1	6	-	7	2	5	one side	dorsal
Complete perfd blank (n=4)	1	3	-		2	2	both sides	dorsal and ventral
Broken perfd blank (n=2)	1	1	-	2	1	1	one side	dorsal
Complete, perfd, slightly formed bead (n=1)	-	1	-	1	-	1	one side	dorsal
Broken, perfd slightly formed bead (n=1)	1	-	-	1	-	1	one side	dorsal
Complete, perfd almost bead form (n=1)	1	-	-	1	1	-	both sides	ventral and dorsal
Broken, perfd almost bead form (n=1)	-	1	-	-	-	1	both sides	ventral and dorsal
Finished bead (n=3)	-	3	1	2	1	2	-	-
Broken finished bead (n=2)	-	2	2	-	2	-	-	-
Fragments (n=105)	18	87	1	104	37	68	-	-
Total Level 1	**23**	**108**	**4**	**122**	**48**	**83**	**-**	**-**
Level 2								
Circular blank (n=1)	-	1	-	1	-	1	-	-
Broken partially drilled blank (n=1)	-	1	-	1	1	-	one side	dorsal
Complete perfd blank (n=2)	-	2	-	2	1	1	both sides	ventral and dorsal
Broken perfd blank (n=1)	-	1	-	1	1	-	one side	dorsal
Broken, perfd, slightly formed bead (n=2)	-	2	-	2	1	1	one side	dorsal
Broken finished bead	-	1	1	-	-	1	-	-

(n=1)								
Fragments (n=61)	12	49	-	61	35	26	-	-
Total Level 2	**12**	**57**	**1**	**68**	**39**	**30**	**-**	**-**
Level 3								
Circular blank (n=2)	1	1	-	2	1	1	-	-
Complete perfd blank (n=1)	-	1	-	1	1	-	one side	dorsal
Broken perfd blank (n=5)	-	5	-	5	5	-	both sides	ventral and dorsal
Broken, perfd slightly formed bead (n=2)	-	2	-	2	1	1	both sides	ventral and dorsal
Complete, perfd almost bead form (n=2)	-	2	-	2	2	-	one side	dorsal
Finished bead (n=1)	-	1	1	-	-	1	-	-
Broken finished bead (n=1)	-	1	-	1	-	1	-	-
Fragments (n=64)	11	53	1	63	47	17	-	-
Total Level 3	**12**	**66**	**2**	**76**	**57**	**21**	**-**	**-**
Level 4								
Broken partially drilled blank (n=1)	-	1	-	1	1	-	one side	dorsal
Broken perfd blank (n=3)	-	3	-	3	3	-	one side	dorsal
Fragments (n=19)	5	14	-	19	12	7	-	-
Total Level 4	**5**	**18**	**0**	**23**	**16**	**7**	**-**	**-**
Total	**52**	**249**	**7**	**289**	**160**	**141**		

TABLE N. *Inventory of non-lithic and non-OES artefacts from KRS2 and KSC14.*

KRS2				
Artefact	**Surface Brown I**	**Brown II**	**Brown III**	**Yellowish Brown IV**
Oryx dung pellets	x	x	-	-
Charcoal	x	x	x	x
Faunal remains	x	x	x	x
Plant remains	x	x	x	x
Red ochre	-	-	x	-
Pottery	-	-	-	-
Copper beads	-	-	-	-
Copper pieces	-	-	-	-
KSC14				
	Level 1	**Level 2**	**Level 3**	**Level 4**
Oryx dung pellets	x	x	x	x
Charcoal	x	x	x	x
Faunal remains	x	x	x	x
Plant remains	-	-	-	-
Red ochre	-	-	-	-
Pottery	-	x	x	-
Copper beads	x	-	-	-
Copper pieces	x	-	x	-

Appendix B: Report on faunal analysis by Dr. S. Badenhorst

Hunters or Herders? The Fauna from Kuidas Spring, a Late Holocene Stone Circle Site in Namibia

Shaw Badenhorst

Archaeozoology and Large Mammal section, Vertebrate Department

DITSONG: National Museum of Natural History (formerly Transvaal Museum)

Introduction

Stone circles constructed by Later Stone Age people occur from north to south along the western escarpment of Namibia (Veldman 2008) and were used during the last 1500 years (Speich 2010). Although there are more than 100 complexes containing several hundred stone circles, very little is known about the associated material culture and zooarchaeology of these features (*cf*. Kinahan 2001; Eichhorn & Vogelsang 2011). This is not surprising, considering the small quantity of archaeofauna from Namibia that have been analysed up to date (e.g., Plug & Badenhorst 2001).

A stone circle and rock shelter, located at Kuidas Spring in the Kunene region in north-western Namibia, were excavated in 2009 and 2013. For the purpose of this paper, all the faunal material from these two excavations were combined after it was screened through a 1 mm mesh. Faunal material was retrieved from the following contexts: during 2009, a surface collection at Kuidas Spring site 1 (KS1SC), which include some specimens found close to stone circle 17 (KSC17), inside stone circle 23 and at stone circle 7, was made. In addition, a 50 x 50 cm square was excavated at stone circle 19 (KSC19), a 25 x 25 cm test square was excavated at Rock Shelter 1 (KRS1), and a 25 x 25 cm square at Rock Shelter 2 (KRS2). In 2013, a 1 x 1 m excavation was conducted inside stone circle 14 (KSC14) and a 1 x 1 m excavation in KRS2, adjacent to and south of the 2009 test square.

Methodology

The faunal remains were analysed and identified at the DITSONG: National Museum of Natural History in Pretoria. It was analysed according to methods used by Driver (1999) who suggests that any bone and tooth specimen is considered 'identifiable' if the element (e.g., humerus, femur, phalange, etc.) can be determined. The Number of Identified Specimens (NISP), the most basic and widely used method to quantify animal remains (e.g., O'Connor

2000) was used to quantify the faunal material. For the purpose of this paper all layers and squares for each feature were combined, as the samples are small. However, for KRS1, the faunal remains are clustered and presented according to the coding of the individual excavated spits. Due to the small sample sizes, skeletal parts were not calculated for Bovidae. The order of the mammals follows Meester *et al.* (1986).

Results

The faunal sample from Kuidas Spring consists of 2308 specimens, of which 205 or 9% were identifiable (Table 1). The percentage identified specimens per excavation is generally low, except for those of the Surface Collection and from KSC14. The high percentage of identified specimens of the Surface Collection is probably the result of the very small sample size. At Stone Circle 14 (KSC14), the high percentage of identified specimens may be due to the high number of indeterminate mammal teeth fragments, which inflated the NISP.

TABLE 1. *Kuidas Spring sample size.*

Context	Identified Specimens (NISP)	Unidentified Specimens	Total	Percentage Identified
KS1SC	2	3	**5**	40%
KSS3	34	750	**784**	4%
KSC19	22	414	**436**	5%
KSC14	60	85	**145**	41%
KRS1	28	309	**337**	8%
KRS2	59	542	**601**	10%
Totals	**205**	**2103**	**2308**	**9%**

Although the sample is relatively small, a number of taxa were identified, including mammals, birds, reptiles and molluscs (Table 2). Mammals include a carnivore, zebra, dassie (hyrax), springbok, possibly gemsbok, possibly kudu, dassie rat and hare. Due to the extreme fragmentation of the sample, most specimens could only be categorised as indeterminate mammals. As the collection consisted of teeth fragments no relative size could be determined. No domestic animals were identified from the sample.

The tooth of the (possible) kudu from KRS1 is a lower left second premolar. The central islands have disappeared from the tooth, suggesting that the specimen is from an older individual. The classification also included a lower right second premolar of an adult (possible) gemsbok (from KS1SC). As the tooth is hypsodont, it is more likely from a gemsbok and not a kudu. Based on the highly fragmented specimens from KS1, it was not possible to determine whether they belonged to a plains or mountain zebra. The Canidae specimen is a lower, right first molar. The tooth is as yet unerupted, and from a young individual.

TABLE 2. *Taxa present at Kuidas Spring 1 (NISP).*

Taxa	**KS1C**	**KSS3 C**	**KSC19**	**KSC14**	**KRS1**	**KRS2**	**Total**
Canidae		1					**1**
Equus sp. (zebra)	1			1			**2**
Procaviacapensis (dassie)		1					**1**
Antidorcasmasupialis(springbok)						1	**1**
cf. *Oryx gazelle* (possibly gemsbok)	1			1			**2**
cf. *Tragelaphusstrepsiceros*(possibly kudu)					1		**1**
Bov I				1			**1**
Bov I – II		1					**1**
Bov II		8		1		2	**11**
Bov III			1		1	4	**6**
Petromustypicus(dassie/ rat)			1			3	**4**
Rodent small					2	18	**20**
Lepus sp. (hare)						1	**1**
Mammal small				1	2	1	**4**
Mammal small – medium				2			**2**
Mammal medium		1	1				**2**
Mammal medium – large		3	1		1		**5**
Mammal large		3	5	6	9	14	**37**
Mammal		8	9	44	5	15	**81**
Bird small					1		**1**
Bird small - medium					1		**1**
Sauria sp. (lizard)		8					**8**
Reptile small			2		4		**6**
Xerocerastus cf. *damarensis*(terrestrial gastropod)			2	2			**4**
Gastropod terrestrial small					1		**1**
Bivalve marine				1			**1**
Total	**2**	**34**	**22**	**60**	**28**	**59**	**205**

KS1SC = Surface Collection (2009), KSS3 = Cairn (2013), KSC19 = Stone Circle 19 (2009), KSC14 = Stone Circle 14 (2013), KRS1 = Shelter 1 (2009), KRS2 = Shelter 2 (2009 + 2013)

The shaft of a first phalange from KSC14 was identified as probably belonging to a gemsbok. The proximal breadth (Von den Driesh 1976) is more comparable to examples of gemsbok than hartebeest, kudu or eland in the collections of the DITSONG: National Museum of Natural History (Table 3). Apart from the possible gemsbok, the only other specimen that could be measured was a distal, fused humerus of a dassie (Bd: 10.1 mm).

TABLE 3. *Measurement (mm) of the possible gemsbok specimen.*

Taxa	**Accession Number**	**Sex**	**Side**	**Proximal Breadth (mm)**
cf. *Oryx gazella*	n/a	n/a	n/a	25.49 (est)
Oryx gazella	AZ 815	♀	Left front	22.09
Oryx gazella	AZ 815	♀	Left hind	23.09
Alcelaphusbuselaphus	AZ 463	♀	Right hind	17.64
Alcelaphusbuselaphus	AZ 645	♀	Left hind	19.34
Alcelaphusbuselaphus	AZ 645	♀	Left front	20.61
Tragelaphusstrepsiceros	AZ 1261	♀	Left hind	19.95
Tragelaphusstrepsiceros	AZ 1261	♀	Left front	18.90
Taurotragusoryx	AZ 1457	n/a	Front	32.06
Taurotragusoryx	AZ 1457	n/a	Left hind	30.69
Taurotragusoryx	AZ 1586	n/a	Hind	28.23
Taurotragusoryx	AZ 1586	n/a	Front	29.30

Although the sample from KRS2 is small, the fauna was divided into the different layers identified in 2013 (Table 4). However, no information can be obtained that could inform on changes in species composition over time.

TABLE 4. *Taxa present at Kuidas Spring, KRS2 (NISP).*

Taxa	**Surface Brown I**	**Brown II**	**Brown III**	**Yellowish Brown IV**	**Total**
Antidorcasmasupialis(springbok)			1		**1**
Bov II			2		**2**
Bov III	1	1	2		**4**
Petromustypicus(dassie rat)		1	2		**3**
Rodent small		10	8		**18**
Lepus sp. (hare)			1		**1**
Mammal small		1			**1**
Mammal large		5	6		**11**
Mammal		5	3		**8**
Total	**1**	**23**	**25**	**0**	**49**

Taphonomic modifications were noted on the specimens (Table 5). The burnt specimens indicate that brown is the most common colour, then black and followed by white. The majority of brown burnt bone is from KRS2. Black burnt specimens occur in all contexts, except the KS1SC.

TABLE 5. *Burnt specimens from Kuidas Spring (number of specimens).*

Context	Burnt Brown	Burnt Black	Burnt White	Total	Percentage of Sample
KS1SC				**0**	0%
KSS 3		1	4	**5**	1%
KSC19		9	1	**10**	2%
KSC14		14		**14**	10%
KRS1	2	2		**4**	1%
KRS2	87	49	5	**141**	24%
Totals	**89**	**75**	**10**	**174**	**7%**

Apart from burnt and bone tools (see below), other forms of natural and anthropogenic modifications occur in low numbers (Table 6). The samples are too small to make any inferences about the spatial distribution of modified specimens at KS1. The weathered specimen is from KS1SC. Fresh taxa include indeterminate small rodents and small reptiles. No carnivore chew marks were present on any specimens.

TABLE 6. *Taphonomy at Kuidas Spring*.

Modification	Number of Specimens
Cut mark	3
Chop mark	1
Rootlet etching	6
Weathering	1
Fresh	6

Two bone tools were recovered from excavations at KS1.The first specimen was from KS1SC, and was collected near KSC17. The outer surface of the bone is smooth, although it contains some cut marks. The specimen was 53 mm long but broken. The context is unknown. The second tool was recovered from the Surface Brown I layer from KRS2 (Fig. 1). It appears to be either a rib, lumbar or thoracic vertebrae. It is also weathered and the outer surface is cracked. One end, and part of the outer surface near the end, has been smoothed. The tool's length is 61 mm and it is broken.

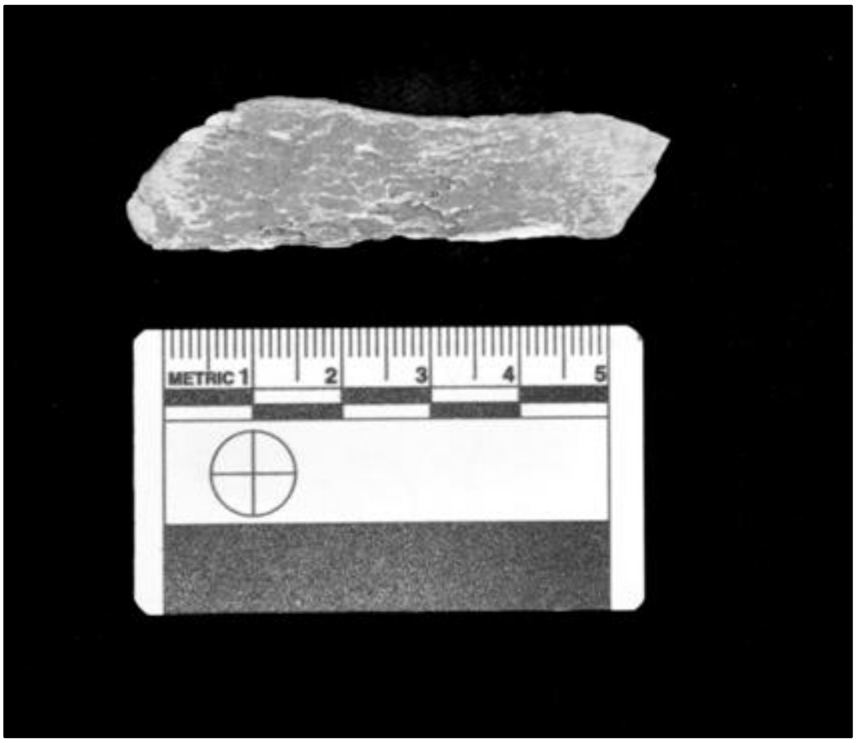

Fig. 1. *Polished bone from KRS2 (photo by W. van Zyl).*

An indeterminate Bov I – II specimen from the cairn is possibly a neonate. The surface of the humerus is porous in appearance, but without weathering.

Current gemsbok activity

Before the fauna from Kuidas Spring KS1 complex is discussed, additional information on current gemsbok activities at the site is essential, as it has an effect on the interpretation of the archaeofauna. For several tens of square kilometres in and around Kuidas Spring the surface of the landscape is covered with stones. During excavations in January 2013, it was observed that on the vast plain in front of Kuidas Spring, gemsbok were laying on the ground during part of the day (no observations during the night). Upon closer inspection, it was determined that they cleared an area of about one to two meters in diameter. As gemsbok is known to dig wells with the forefeet in search of water (Hamilton *et al.* 1977:8), it is assumed that they used their hoofs to clear the area. The gemsbok would then lie in the small cleared areas (Fig. 2). They would also defecate in the same area (Fig. 3).

Fig. 2. *Gemsbok lying in cleared areas (photo by A. Veldman).*

Fig. 3. *Relatively fresh gemsbok dung pellets.*

During excavations in January 2013, it was noted that some stone circles had a slightly depressed appearance. In addition, gemsbok dung pellets were found scattered on the surface of KSC14 and in the different excavated spits (Fig. 4). Smaller pellets, assumed to be that of gemsbok, were also found in some layers of KRS2 (Fig. 5). A gemsbok tooth was found on the surface of an unexcavated stone circle at Kuidas Spring (this specimen is not reported in the tables above (Fig. 6). These observations are very significant in understanding the fauna of Kuidas Spring. Firstly, gemsbok made use of stone circles and it is possible that they disturbed at least some of the material remains, both horizontally and vertically. This must be taken into consideration when material remains from stone circles are spatially analysed. Secondly, if a gemsbok uses stone circles to lie in, there is a possibility that some may drop their teeth, both deciduous and permanent. The teeth would become mixed with archaeological faunal remains, allowing the probability of misrepresentation of hunting activities of people that used stone circles. For example, the large number of indeterminate mammal teeth fragments from KSC14 may be those of gemsbok that were dropped naturally and subsequently getting weathered and fragmented.

Fig. 4. *Gemsbok dung from layer 0-5cm at the Stone Circle 14 (photo by W. van Zyl).*

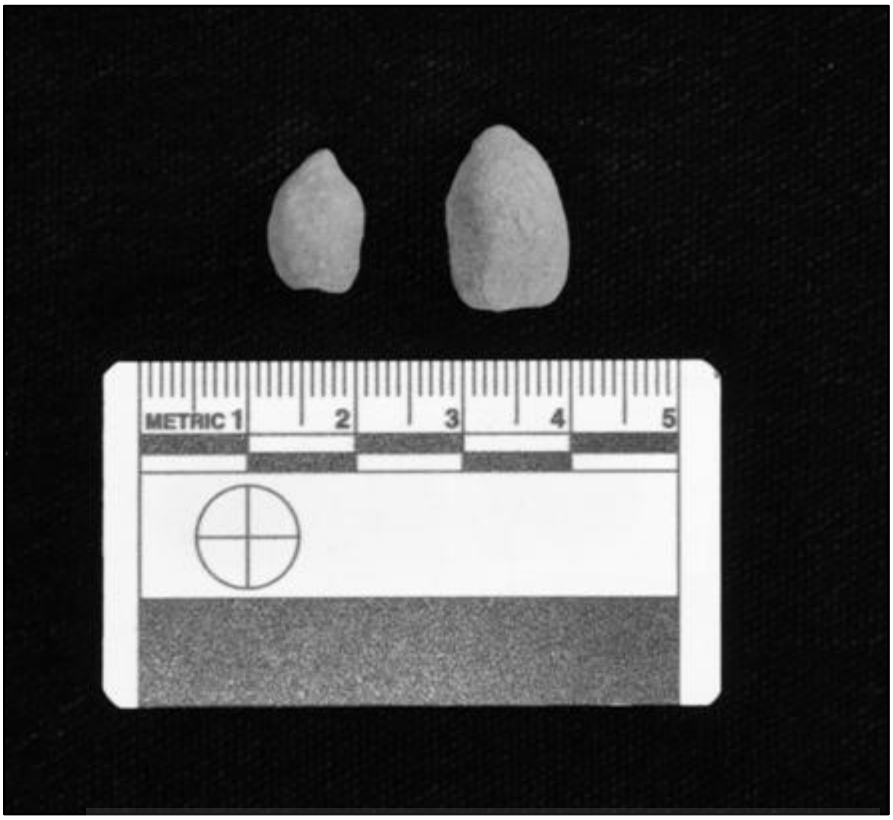

Fig. 5. *The gemsbok dung pellet on the left is from square F1, Loose soil brown I. The larger pellet on the right is from layer 0-5cm at the Stone Circle 14 (photo by W. Van Zyl)*

Fig. 6. *Gemsbok tooth found on the surface (photo by S. Badenhorst).*

Little is known about the number of droppings, the size, weight and content of gemsbok dung pellets in the arid parts of southern Africa (but see Murray 2011). Some observations were made from pellets that were retained during excavations. Gemsbok pellets are shaped like the tip of a bullet: a flat base (often with a shallow/depression), with a convex shaped cone (Fig. 7). They differ from the round shapes of sheep and goat pellets. However, many of the pellets found, were more cylindrical in form, but a fair amount of pellets looked like bullets. All pellets from the excavations were dry, mostly complete (Fig. 4) and of different sizes (Table 7). Most pellets weighed between 0.1 and 0.6 grams in a dried state (Table 8). The pellets from KRS2 were slightly smaller and weighed less than those of KSC14. This may suggest that a younger individual or a female used the shelter and it also suits the physical character of KRS2, which is small. A young gemsbok would therefore have been able to utilise it to defecate. The difference in weight of the dung pellets can be contributed to the animals' sex, age, diet and health (Badenhorst 2009a).

Fig. 7. *Gemsbok dung pellets from Kuidas Spring (photo by S. Badenhorst).*

TABLE 7. *Gemsbok dung pellets from KSC14 and KRS2.*

Square	Layer	n	Weight (g)	Average Weight per dry pellet (g)
KSC14				
D2	0 – 5 cm	~30	8.1g	~0.27
E2	0 – 5 cm	~234	79.9g	~0.34
C2	5 – 10 cm	~29	5.6g	~0.19
D2	5 – 10 cm	10 (exactly)	2.5g	0.25
E2	5 – 10 cm	37 (exactly)	12.7g	0.34
C2	10 – 15 cm	23 (exactly)	4.7g	0.20
D2	10 – 15 cm	~40	14.8g	~0.37
E2	15 – 20 cm	2 (exactly)	0.9g	0.45
KRS2				
F1	Surface Brown I	~38	14.1g	~0.37

TABLE 8. *Weight of random individual gemsbok pellets KSC14 and KRS2.*

Square	Layer	Weight of two random pellets for square/layer (g)
KSC14		
D2	0 – 5 cm	0.2g
D2	0 – 5 cm	0.3g
E2	0 – 5 cm	0.3g
E2	0 – 5 cm	0.3g
C2	5 – 10 cm	0.2g
C2	5 – 10 cm	0.2g
D2	5 – 10 cm	0.6g
D2	5 – 10 cm	0.2g
E2	5 – 10 cm	0.6g
E2	5 – 10 cm	0.5g
C2	10 – 15 cm	0.2g
C2	10 – 15 cm	0.3g
D2	10 – 15 cm	0.4g
D2	10 – 15 cm	0.4g
E2	15 – 20 cm	0.5g
E2	15 – 20 cm	0.4g
KRS2		
F1	Surface Brown I	0.1
F1	Brown II	0.1

Discussion

Faunal composition

The faunal remains from KS1 represent the occurrences of animals such as zebra, kudu and springbok which were also hunted. Springbok and kudu are common animals in Namibia (e.g., Tönnesen 1917; Marshall 1962; Du Plessis 1969; Smithers 1983) and both species are depicted in rock art at Twyfelfontein (Viereck & Rudner 1957). It is proposed that one of the two gemsbok specimens is a natural deposition. Gemsbok remains are occasionally found in archaeological deposits from sites in arid areas (Plug & Badenhorst 2001). These antelopes had ritual and social value amongst the Khoisan of recent times. For example, they appear in the folklore of the modern !Kung Bushmen of the NyaeNyae region of Namibia (Marshall 1962:245,249). In Namaqualand (Northern Cape), the Khoekhoen used to bury their chiefs with a "…gemsbok-horn-tipped stick first used as a spade to excavate the grave and then left standing upright in the graves" (Laidler 1929:151). Gemsbok horn sheaths were commonly used as digging implements and trumpets by the Herero-speaking Himba (Gibson 1962). Gemsbok also occur in the rock art of Namibia. A significant example is at the 'White Lady' painting site in the Brandberg (Breuil 1948:5) and in the petroglyphs at Twyfelfontein (Viereck & Rudner 1957:17), both close to Kuidas Spring.

According to Du Plessis (1969), both the plains zebra (*Equus quagga*) and Hartman's zebra (*Equus zebra hartmannae*) occurred in the Kuidas area in historical times. In recent times, their distributions do not overlap much, at least in the region of Kuidas Spring (Smithers 1983). Du Plessis's observations must be used with caution as the distributions of Du Plessis (1969) are based on early historical accounts and may not be useful and applicable in the regions such as the Skeleton Coast and Namib Desert. The Hartman's zebra occurs in the former Damaraland (Penzhorn 1988) and have been identified from faunal remains from Spitzkoppe (Kinahan 1990:7). According to recent distribution maps (Mendelsohn *et al.* 2009:120), only the mountain zebra and not the plains zebra (= *Equusburchelli*) is currently found in the vicinity of Kuidas. The zebra specimen from Kuidas may be that of a mountain zebra. Unfortunately, there were insufficient diagnostic morphological features left on the single specimen to identify it more precise.

Two subspecies of *Procavia capensis* dassies are found in Namibia (Meester *et al.* 1986:179, Skinner & Chimimba 2005:42), namely the rock dassie (*Procavia capensis capensis*) and Kaokoveld rock dassie (*Procavia capensis welwitschii*). The rock dassie occurs as far north as the former Damaraland while the Kaokovelddassie is found further north. No overlap in distribution has been found (Bothma 1967). According to Shortridge (1934:385, also Gil-Romera *et al.* 2006), the Kaokoveld dassie occurs as far south as Franzfontein and the mountains west of Otjiwarongo (the latter town located at 20.46 42ºS). No Kaokoveld dassies have been found further than 21º south in Namibia (Bothma 1967), suggesting that the dassie specimen from Kuidas (20ºS) is the Kaokoveld dassie. The two subspecies are distinguished by their exterior coat, skulls and relative size. The Kaokoveld dassie is smaller than the rock dassie and Bothma (1967) used these factors to regard them as two distinct species. The dassiespecimen from the cairn at Kuidas is a humerus.

The habits of the rock- and Kaokoveld dassie are similar (Shortridge 1934:385). Colonies of dassies defecate in the same spot, resulting in large accumulations (e.g. Skaife 1942:35). While no dung accumulations of this kind were noted at KS1, a dung patch was recorded within a small stone-built enclosure against a rock wall in the adjacent valley (KS2). The dung inside the patch was moist and several centimetres deep. The top layer was flat. The sampled dassie dung has not yet been analysed. This occurrence may represent a dassie latrine.

Only a single specimen associated with the dassie was identified from the excavations, suggesting that dassies never occurred in large numbers in the area. The ease with which dassies can be caught when compared to large herbivores, suggests that they were easy prey (Badenhorst *et al.* 2014).

Both the Cape (*Lepuscapensis*) and the scrub hare (*Lepussaxatilis*) occur in the region of Kuidas (Smithers 1983, Skinner & Chimimba 2005). Unfortunately, it is almost impossible to identify these two species based on post-cranial remains.

The dassie rat from the sample was most likely not consumed, although the possibility cannot be entirely excluded. These small mammals live in small rock crevices (Smithers 1983) and were observed on the site during the January 2013 fieldwork. Latrines, most likely belonging to dassie rats, were also observed around KS1 (Fig. 8). In addition, the indeterminate rodents (probably dassie rats) and lizards from the samples, many of which are fresh in appearance, are most likely natural intrusions.

*Xerocerastus*is a small gastropod common in the dry areas of southern Africa (Van Bruggen 1970:56-58), such as the Little and Great Namaqualand, former Damaraland, Botswana and Griqualand West, where dead shells are often found on the surface. These snails aestivate and emerge from the ground after the first rains (Barnard 1951:150-151). Their shells are too small to have been eaten and are also natural intrusions.

Fig. 8. *Droppings of small rodents under a rock at Kuidas Spring (photo by S. Badenhorst).*

A marine bivalve was found in KSC14. A cowry shell was found on the surface in another stone circle close to Kuidas. These marine shells, which presence is not entirely unusual, indicate coastal contact, 40 km away from the site. Marine shells have been found at Mirabib Hill Rock Shelter, 40 km northwest of Gobabeb, as much as 35 cm below the surface. At this site, a sample taken 25 cm below the surface was dated to 6470 ± 80 BP, and a layer deeper in the deposit dated to 8200 ± 80 BP (Sandelowsky 1974). Shackley (1984) found marine shells at an inland site close to Gobabeb dating to 8470 ± 90 BP. Other late Holocene shelters such as Messum, Big Elephant Shelter and Falls Rock Shelter have also yielded marine shells (Wadley 1979; Richter 1984; Kinahan 2001:43). Carr *et al.* (1978:252) also found marine shells at stone circle sites in the Zerrissene Mountains. This suggests that it was common practice to transport marine shells from their place of origin since the early Holocene. This practice may have continued until recently, as Galton (1852:155-156) noted that (referring to Ovamboland) : ''… From the mouth of the river a kind of sea-shell, much prized, and called by the natives *Ombou,* is frequently brought."

No carnivore chew marks were noted on any of the bone specimens. This may suggest that the inhabitants of Kuidas kept no dogs, although it does not exclude the possibility that the remains of dogs might be found at the site in future. The cairn yielded an indeterminate Canid, but this could belong to an undomesticated species. The bone sample also lacks evidence of gnaw marks by rodents, despite the presence of dassie rats. This may be because dassie rats do not dig burrows into the ground, but rather live in crevices in rock outcrops. These animals are also vegetarians (Smithers 1983:219) and may not prefer to sharpen their incisors on bone objects. It may also be that the highly fragmented nature of the bone assemblage from Kuidas spring would not have been useful for sharpening incisors.

The cut and chop marks are the result of butchering activities. Considering the high level of bone fragmentation it is not unusual that only a few were identified and actualistic studies have indicated that even animals that were butchered, showed little evidence thereof (Parsons & Badenhorst 2004). The rootlet etching noted on some specimens may be the result of pre-burial fungi or lichen growing on specimens, or humic acid secreted from plant roots after burial (Lyman 1994:375-377). It remains possible that the rootlet etching could have contributed to post-depositional fracturing (Behrensmeyer 1978). The bone tool found could have been applied for scraping of or drilling into skin (*cf*. Badenhorst 2009b), food preparation and processing food (e.g., Moifatswane 1990).

The neonate Bov I-II from the cairn may suggest spring to summer occupation, as most antelopes give birth in the wet season (*cf*. Skinner & Chimimba 2005). However, this interpretation is tentative and needs to be supported by more evidence.

Cairns

The function of cairns at stone circle sites remains unclear. The three excavated cairns at Sylvia Hill, contained human burials (Shackley 1983). According to Carr and others (1978:251-252) apart from pelletal dung, organic materials (hair, small bone fragments), ostrich eggs (as a food supply) and sometimes wind-blown charcoal, cairns usually do not contain cultural objects. They argued that the dung could have been collected, stored and used for fires. They also observed small cairns being used for keeping young lambs (Carr *et al*. 1978:251-252).

While the suggestions of Carr and others (1978) are valuable, some of their listed uses are not applicable to the cairn at Kuidas. It is too small for keeping lambs and the pelletal dung from the cairn at Kuidas is most likely the result of recent dassie rat and other rodent activities. The cairn at Kuidas yielded the remains of an indeterminate carnivore and a dassie. While it is uncertain what this feature was used for, it may have been used for drying or smoking meat. Dry branches lodged between the stones would offer a safe place to dry or even smoke meat, and may explain the presence of the dassie bones in the cairn at Kuidas Spring (but not the indeterminate carnivore) (Fig. 9). More anthropological research and archaeological excavations of this feature type are necessary to get a more clear understanding of its utilisation and function.

Fig. 9. *A cairn with a branch added to indicate its possible use for drying meat (photo by S. Badenhorst).*

Stone circles

The lack of surface material in most of the stone circles (which may actually contain deposits), linear spatial arrangement, location in narrow game passes and near pans, may be the reason why many scholars consider stone circles to be hunting stands (Eichhorn & Vogelsang 2011:165). Some circles like those at Rooikamer were probably built as hunting blinds, as they are located along game trails (Shackley 1985:23). Some historical observers who visited the arid parts of southern Africa identified stone circles as hunting blinds. Alexander (1838:12) noted during his travels in Namibia: "…we saw hunters following on the spoor or track of these huge animals [referring to rhinoceros], to destroy them with their javelins, which they do from behind circular enclosures of stone, breast high, darting their light weapons into the tough hide as the rhinoceros passes, the monster having been previously scared from his liar by stones thrown at him." He made this statement in reference to Bushmen. According to the notes of Moffat (1858:168-169) who visited the Little Bushmanland: "On the summit I observed the little circular hiding places of stone, from which the ancient Bushmen were wont to shoot the Zebra and Quagga."

While some stone circles could have been used as hunting blinds (Shackley 1985:23, see Kinahan 2001:81), not all these structures necessarily served this purpose. At Kuidas Spring it would have required extreme effort to direct animals such as gemsbok, zebra, springbok and kudu from the open plains into a narrow valley. This is evident from Hamilton and others (1977) who studied gemsbok migration and movement patterns in the Kuiseb River canyon of the Namib Desert. They found observing gemsbok behaviour from behind contemporary blinds at waterholes unsatisfactory. The gemsbok, presumably aware of the scent of humans, would flee and not return (Hamilton *et al.* 1977:6).

While comparative faunal samples from stone circles are limited, the current evidence suggests that animals were hunted from the local surroundings. A scapula of a seal from an excavated stone circle N2002/5 with a radiocarbon date of AD 1520 ± 80 was amongst the meagre material finds on the Skeleton Coast of Namibia. This cluster of structures, containing numerous stone circles, is located inland in a small gorge leading to a pan (Eichhorn & Vogelsang 2011:165).At stone circle sites in the Zerrissene Mountain area of Namibia, only remains of domestic dogs and a zebra were identified. The remains of the dogs are from a burial site close to Site 10, and have been dated to 260 ± 30 BP. The zebra remains are from Site 3 but were not dated (Carr *et al.* 1978:252-253).

The sparse faunal evidence from stone circles in Namibia is augmented by fauna from two similar features in South Africa: Jagt Pan 7 and Simon se Klip. At Jagt Pan 7 in the Northern Cape, the faunal sample included steenbok, springbok, mountain reedbuck, dassie, Cape hare, porcupine, mongoose, jackal, warthog, monitor and tortoise. The site dates from the early 9^{th} and 3^{rd} centuries BC, with another dating to the 7^{th} century AD (Parsons 2006:128). At Simon se Klip in the Western Cape, the stone circle site yielded the remains of steenbok/grysbok, possibly seal, tortoise and snake/lizard. The site dates to between 650 and 1000 AD (Jerardino & Maggs 2007). Whether the stone circles from Jagt Pan 7 and Simon se Klip bear any cultural resemblance to those in Namibia is unknown and could be incidental.

It remains difficult to determine why the stone circles at Kuidas Spring, N2002/5 on the Skeleton Coast (Eichhorn & Vogelsang 2011:165) and those in the Zerrissene Mountains (Carr *et al.* 1978:252-253) are not associated with the keeping of livestock. The keeping of livestock has been a characteristic of life in Namibia and southern Africa for more than 2000 years (Pleurdeau *et al.* 2012, Robbins *et al.* 2005, 2008). The assumption that indeterminate medium Bovidae remains are those of sheep or goats (e.g., Kinahan 2001:112), cannot be justified. At Falls Rock Shelter, dating to the last 4500 years, Kinahan (2001:35-36) mentioned the presence of dung accumulations, of livestock but without skeletal remains. At !Nâu-aib, a stone circle site in the Hungorob ravine and dating from the late 18^{th} century, Grundlach tests inside a coop close to stone circles indicated that these features were most probably used to keep the young of small stock (Kinahan 2001:59).

Kinahan (2001:67-68) found huts and stock enclosures elsewhere in the Hungorob ravine and suggested that livestock were kept some distance from encampments. He argued that herds of separate households were combined at stockposts (Kinahan 2001:77-78). During the dry season when encampments were disassembled families moved their livestock to isolated homestead sites (Kinahan 2001:125). By the 18^{th} century, nomadic pastoralism declined with a rapid depletion of herds, leading to a renewed dependence on hunting and gathering (Kinahan 2001:126).

While Kinahan's (2001) suggestion is valuable, it needs critical discourse. Firstly, even if livestock were kept at stockposts, faunal remains would have been found in situ. Occasional slaughtering would have left bone remains in the archaeological stratigraphy. In South Africa, both residential sites and cattle stockposts of Late Iron Age farmers, are dominated by the remains of cattle (e.g., Badenhorst 2011). Secondly, the presence of livestock dung must be empirically established. Regarding Kuidas Spring, gemsbok used the stone circles to rest, leaving ample evidence of their dung inside. Dassies and other small rodents like the dassie rat leave dung latrines that could appear similar to livestock dung patches. Unfortunately the remains of faunal material are not well preserved and not common at sites in the region (e.g., Sandelowsky & Viereck 1969; Watson 2001:38).

Speich (2010:130-131) has compiled 62 radiocarbon dates from individual stone circles from Sylvia Hill, Brandberg, Messum Crater, Unterm Tafelkop, Zerrissen Mountains, Ugab river mouth, Huab south river bank, Uniab River Mouth, and the Northern Skeleton Coast area. Most of these (37 dates, or 60%) date to the last 500 years. Holocene palaeo-climate reconstructions in central Namibia indicate intricate patterns reflecting on the last few thousand years. A study of micro-mammal remains from Mirabib revealed that survival conditions were generally more favourable during the last 6000 years than at present. The study indicates that the environment became drier during the last 500 years. At about 5200 BP, conditions were similar to today. However, wetter conditions persisted at Mirabib between 8200 and 5570 BP (Brain & Brain 1977). This initial study seems to have been broadly confirmed by a study of pollen from rock dassie dung from the Huab River valley, some 100 km inland in the Damaraland region. The arid conditions of today were also prevalent between 6000 and 1000 BP, and around 1000 BP, (Gil-Romera *et al.* 2006) and occupation of stone circles probably occurred during arid periods.

Stone circles are associated with domestic activities inside and in the vicinityof these circles (Kinahan 2001:81). Kinahan (2001:84) suggested that the distribution of stone circle sites is an indication that pastoralists used them or created them while searching for grazing and water sources. The theory regarding more complex social activity and settlement based on associated materials around the stone circles as suggested by the presence of evidence for livestock presented by Kinahan (1990:9, 2001) presupposes more complex cultural activity. The evidence includes quantities of dung, assuming some medium Bovidae remains of sheep or goats, the presence of livestock enclosures, the presence of waterholes nearby, the large size of the settlement and cattle on rock art.

While faunal evidence may still be exposed and recorded in future, it remains evident that the people who utilised stone circles at KS1, did not keep livestock. Archaeological evidence and the remains of material culture indicate that the stone circles at KS1 were the remains of habitation rather than hunting blinds.

KS1 would have attracted people due to the resources offered in the area, such as freshwater, game, the presence of materials to manufacture stone tools and specific plants to process hides (Badenhorst 2009b). When Europeans arrived the region formerly known as Damaraland in Namibia, it was occupied by the Damara and Bushmen (e.g., Wadley 1979). Two possible scenarios can be proposed regarding the identity of the people who utilised or created the stone circles at Kuidas Spring (assuming it was a single group). Firstly, it is possible that Bushmen hunter-gatherers used the stone circles. Ethnographic studies determined that the Bushmen were builders of stone circles. A second possibility is that they were used by hunter-gatherers who became herders during the last two millennia (Kinahan 2001). However, the lack of livestock remains- based on current evidence – contradict this possibility. While it is still possible that livestock were kept at stockposts, this assumption must still be proven beyond any doubt. The evidence used by Kinahan (2001) is not based on actual archaeological evidence such as livestock remains, but was based on circumstantial evidence. Isotopic analyses of human remains and faunal evidence from stone circles would provide the missing critical evidence. The mere presence of bone material of livestock at stone circles, should such evidence be found in the future, must be considered with some caution. For example, fauna from Xaro in northern Botswana, occupied by the baNoka or “River Bushmen”, who were clearly hunter-gatherers, also contained a few sheep specimens, which they most likely obtained from farmers in the region (Van Zyl *et al.* 2013).

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