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PRELIMINARY REPORT ON THE LATE HOLOCENE ARCHAEOLOGY OF THE AWASIB-GORRASIS BASIN COMPLEX IN THE SOUTHERN NAMIB DESERT

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Archaeological evidence from the Awasib-Gorrasis basin complex confirms the late Holocene occupation hiatus observed elsewhere in the southern Namib Desert. The second millennium AD re-occupation of the study area is related to the development of specialized hunting and gathering strategies which maximized the opportunities of a highly episodic environment.

Des preuves à partir d'une reconnaissance archéologique montrent que pendant les deux derniers millénaires des chasseurs-cueilleurs du Désert Namibien méridional se sont déplacés entre la côte Atlantique et l'escarpement. Ils ont suivi des stratégies très spécialisées pour chasser l'antilope migratrice, et pour exploiter d'autres ressources telles que les cachettes enterrées de graines d'herbe sauvage accumulées par les fourmis moissonneuses.

INTRODUCTION

The southern Namib Desert is a hyper-arid zone lying between the interior escarpment and the Atlantic coast of Namibia. A vast treeless erg, a sea of shifting sand, occupies much of the desert, but there are a number of rocky mountain ranges, too, and several drainage systems that lie dormant for years on end. In this landscape, sparse stands of camelthorn trees *Acacia erioloba* survive from episodes of high rainfall, and the most characteristic large mammal of the southern Namib, the oryx *Oryx gazella*, migrates between escarpment and desert in search of pasture and water.

Archaeological evidence presented in this paper shows that late Holocene occupation in the Awasib-Gorrasis basin of the southern Namib was limited to sporadic and short-lived hunting and gathering expeditions. Our investigation sought to establish a chronological framework for the archaeological evidence, as well as to identify key relationships between the archaeological sites as evidence of human responses to ecological opportunities in an unpredictable environment. To this end, we carried out a detailed survey of the Awasib-Gorrasis area, recording a total of 38 archaeological sites, of which four were selected for detailed investigation in the 2005 field season covered by this report[1].

Previous investigations in the southern Namib Desert have yielded a consist-

1 In the field documentation, Sites 1-38 are designated QRS 42/1-38.

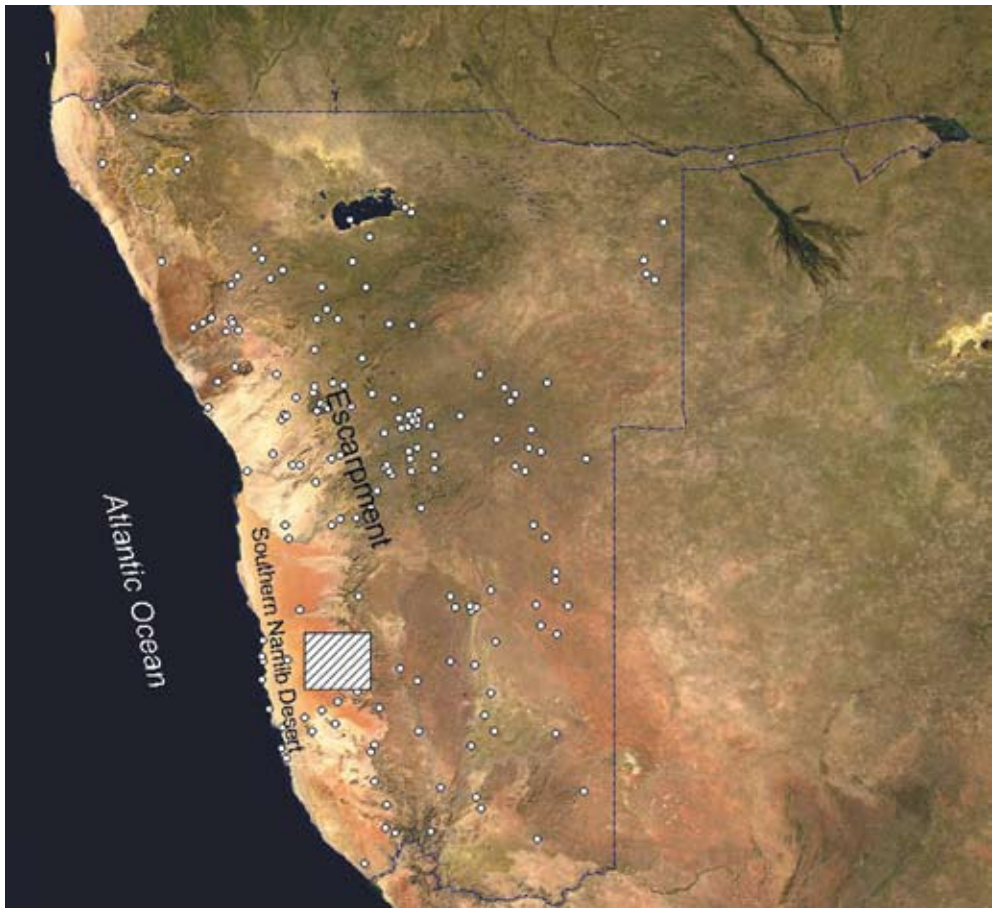

Figure 1. The distribution of late Holocene archaeological sites in Namibia, and the location of the Awasib-Gorrasis survey area

ent pattern of radiocarbon dates for the occupation of rock shelter sites, leading Vogel and Visser (1981) to postulate an occupation hiatus between 5 100 BP and 2 300 BP in southern Namibia. This hypothesis has been confirmed by subsequent work, including that of Sievers (1984) and Vogelsang (1998). The re-occupation of the southern Namib in the last two millennia correlates with evidence of climatic amelioration (e.g. Eitel 2005; Vogel 2003). However, it also forms part of a complex and as yet poorly understood response to episodic abundance (Kinahan & Kinahan 2003).

ARCHAEOLOGICAL SURVEY

The Awasib-Gorrasis basin complex comprises a series of alluvial fan deposits lying between the foot-slopes of the Chowagas and Awasib Mountains, and the surrounding dunes of the southern Namib. In physiographic terms, this

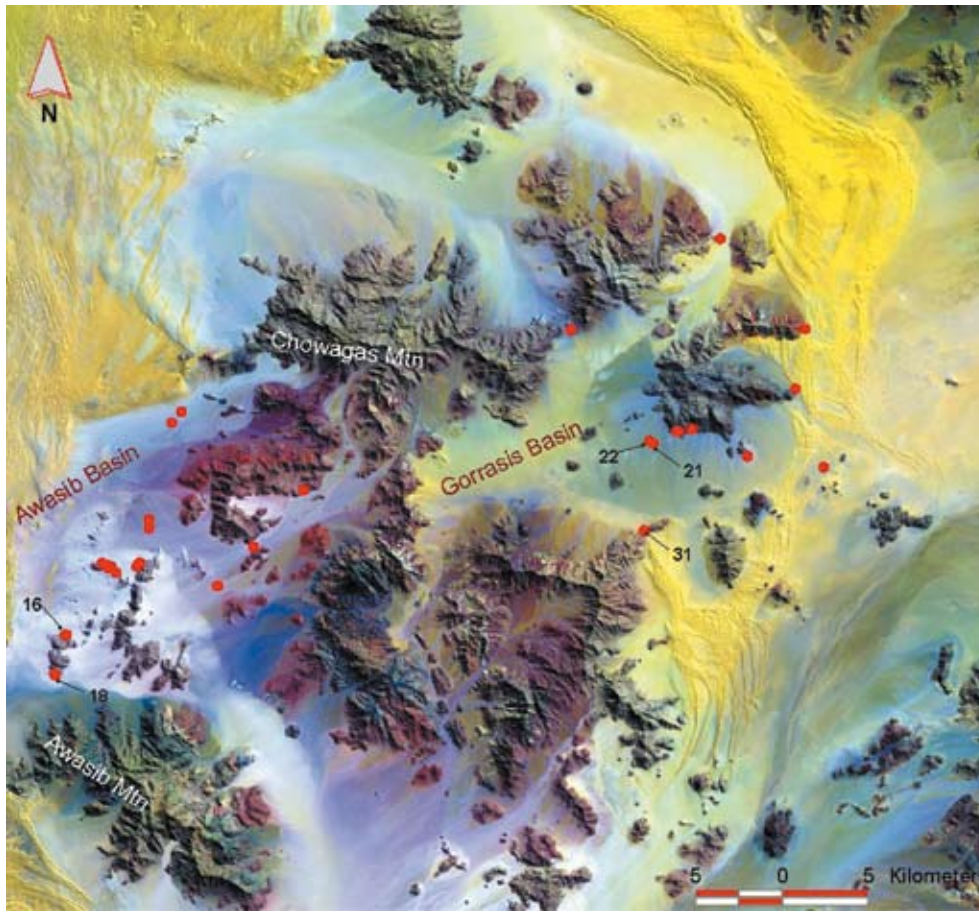

Figure 2. The Awasib-Gorrasis archaeological survey area, showing the distribution of archaeological sites mentioned in the text

landscape forms part of the Namib Plains (Mendelsohn et al. 2002: 14) which separate the Namib erg and the escarpment. Average annual rainfall is less than 100mm, with a coefficient of variation of about 80%. Surface water is limited to a small number of weak and generally unreliable springs. Occasional showers, mainly in summer, clothe the dunes in ephemeral grass and leave shallow pans of water in low-lying areas.

Archaeological sites are highly visible in this terrain, and likely site localities were easily identified from satellite imagery and vantage points on the ground. Ground survey was carried out by means of extended traverses, either by vehicle using existing tracks, or on foot. The survey area and site distribution map (Figure 2) shows two loose clusters of sites and a small number of outliers. The western, Awasib cluster is separated from the eastern Gorrasis cluster by a narrow mountain pass which serves as a natural route of access. This preliminary

distribution probably reflects the true pattern of occupation in the late Holocene, although further survey would undoubtedly add to the number of sites.

Altogether seven rock shelter sites were located in the course of the field survey. The shelters, generally less than 15m² in floor area, were formed by overhanging boulders on mountain foot-slopes, or among groups of core-stones exposed by erosional lowering of the land surface. The shelter deposits are associated with extensive surface scatters of stone artefact debris and other remains, including grindstones of various sizes. Rock art was noted at only one of the shelters. Three of the four shelters with stratified deposits were investigated, namely Site 16, 18, and 21. The excavation results are summarized in the next section.

Suspected burials, represented by stone cairns, were noted at five sites. The cairns varied from 1.2m to 2.23m in diameter, and occurred both singly and in groups, the largest comprising eight features. These were generally situated close to other archaeological sites, and the largest group of cairns lay within 50m of the rock shelter Site18. Other cairns were situated on what may have been routes across the landscape. Cairn sites were found in both the Awasib and Gorrasis site clusters, but no detailed investigations were carried out during the 2005 field season.

Isolated surface scatters of artefact debris occurred in a variety of situations, including hill foot-slopes and saddles and the near vicinity of temporary springs and pans. On the basis of superficial examination, the scatters were mainly of late Pleistocene and early Holocene age, especially those found near pan deposits, while others appeared to be more recent. More intensive survey would probably reveal a larger number of such sites than the seven located so far, and help to relate the scatters to the larger distribution of other sites.

Dense concentrations of slightly hollowed grinding surfaces were found at three sites, all low outcrops of smoothly weathered syenite. At Site 22, more than one hundred grinding surfaces were noted on a single outcrop with an area of approximately 1 000m². Measurements from a sample of 25 grinding surfaces showed a remarkable consistency in length (mean 653mm s.d. 93mm), with greater variation in width (mean 515mm s.d. 122mm) and gradient (mean 8.3º s.d. 3.4º). The positioning, shape and orientation of the grinding surfaces suggests that they were produced by people seated with legs outstretched, working back and forth on the rock surface between spread thighs. Stone pestles occur in large numbers at these sites and these were most probably used on the grinding surfaces to prepare meal from wild grass seed. Clear indications of digging at harvester ant nests indicate that these were at least one source of seed for grinding, as described elsewhere in the Namib (Kinahan 2001).

Elaborately constructed stone hunting blinds were noted at five sites where

the configuration of the terrain provides favourable possibilities for ambushing antelope. The blinds evidently formed part of a cooperative hunting strategy. The largest site, Site 31, comprised a total of 51 blinds, roughly arrayed in three ranks below the crest of a low hill saddle. Each site was carefully arranged to bring the prey as close as possible to the blinds to increase the certainty of a kill. As such, these ambush sites provide unusual evidence of strategy based on the hunter's knowledge of animal behaviour.

Figures 3 and 4 show the layout of hunting blinds at Site 31 and a general view of it. From the site, or the eminences on either side, there is a commanding view over the Gorrasis basin and in the almost bare landscape large antelope such as oryx are visible to the naked eye at a distance of about 7km. The hunting blinds on this site are intended to ambush animals attempting to cross the hill saddle from the north west, to reach an isolated valley with perennial dune grass. Oryx still use this route, as is evident from their well beaten trails which converge at this point. When approached from the north west, the blinds themselves would be invisible until the saddle had been crossed.

Oryx in the Gorrasis basin tend to graze in dispersed groups of up to fifty individuals, only congregating near water. Their habit of moving in extended lines would make ambush difficult if the aim was to bring down more than one animal, as is indicated by the number of blinds at any one site. While this suggests that the antelope were driven toward the ambush in the manner of a battue, oryx generally disperse when panicked. In view of this, it is likely that the animals were gently herded to the desired position as part of a carefully devised strategy. The final moment of ambush would however require that the oryx crossed the saddle over a wide front in order that several could be speared, rather than only the leading animal. To achieve this, the beaters probably increased their speed of approach at an agreed point, perhaps in response to a signal from a suitable vantage point.

The success of this strategy depended on cooperation by fifty or more hunters and beaters, as is clear from the construction and layout of the site. The choice of ambush points is not unlimited, and in the case of Site 31 there is evidence that the hunters made a critical modification to the animals' line of approach in order to improve the effectiveness of their interception. Figure 3 shows an alignment of small cairns on the northern, or approach side, of the blinds. The cairns are less than 0.2m in height and appear to have been used to anchor upright posts forming a visual barrier which would have caused the animals to turn into the saddle. That this placed the northern blinds outside the ambush suggests that the barrier was erected during a later hunt. It must be assumed that ambush sites were used repeatedly and altered as circumstances required.

In addition to evidence of human occupation, the Awasib-Gorrasis basin com-

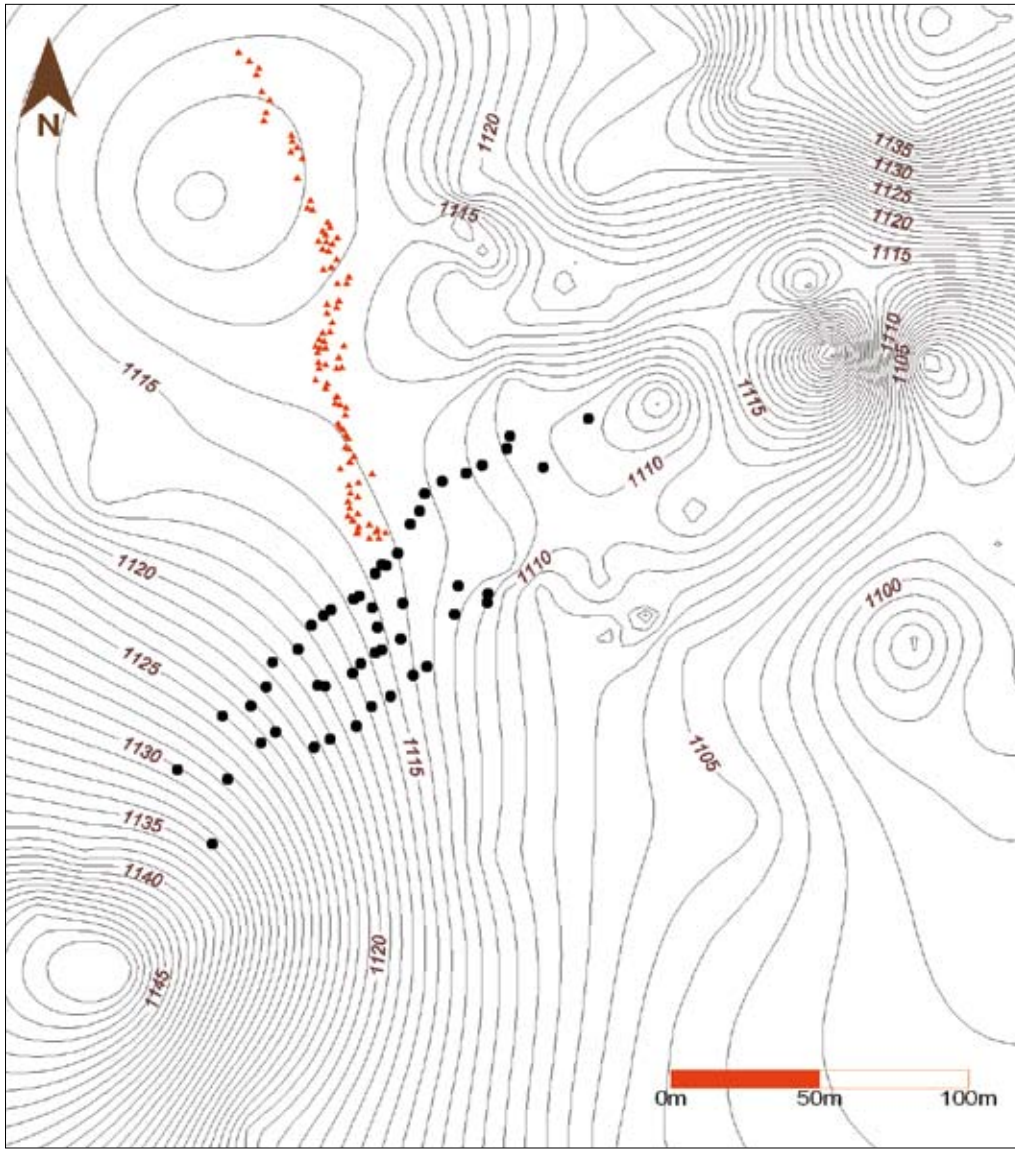

Figure 3. Hunting blinds at Site 31; site plan

plex showed indications of possible climatic amelioration, or at least, events of above average rainfall, in the recent past. The most notable example is provided by the occurrence of camelthorn *Acacia erioloba*, in small, sparse stands of trees showing considerable variation in trunk diameter and, by implication, age. Trunk diameter measurements and heartwood samples were obtained from four stands of camelthorn trees considered representative of tree cover in the vicinity of the two site clusters.

Figure 4. Hunting blinds at Site 31; general view

Two camelthorn stands at Awasib had mean trunk diameters of 0.46m (s.d. 0.18m) and 0.4m (s.d. 0.34m) respectively. Two stands at Gorrasis had mean trunk diameters of 0.65m (s.d. 0.35m) and 0.58m (s.d. 0.22m) respectively. The smaller mean diameter of the Awasib specimens probably reflects the lower availability of water in the western cluster. The fact that no seedlings were noted in any of the stands suggests that conditions have not been suitable for germination and early growth during the last decade. Radiocarbon dates for the heartwood samples are presented below and indicate that the trees sampled range in age from 200-700 years.

EXCAVATION RESULTS

Two rock shelters in the Awasib cluster, namely Site 16 and Site 18 were selected for trial excavation. The smaller of the two sites, Site 16, lies within a group of overhanging boulders on the northern foot-slope of a large syenite outcrop.

The archaeological deposit at the site comprised a number of shallow accumulations beneath low overhangs. Much of the deposit had been eroded by

Figure 5. Camelthorn Acacia erioloba at Site 32

the rainfall runoff from the outcrop, producing dense concentrations of artefact debris and other archaeological material on the lower parts of the foot slope. The Site 16 deposit, excavated over 1.5m² and to bedrock at 0.2m, was composed mainly of fine red windblown sand with an admixture of wood ash, charcoal and !nara melon *Acanthsicyos horrida* seed coats, as well as coarse fragments of bedrock. The deposit appeared to represent a single occupation.

The second excavation site in the Awasib cluster, Site 18, lies on the southern side of the same outcrop. The site is a small, south-facing rock shelter with a well protected deposit, partially enclosed by large boulders. Excavated over 2m² and to bedrock at 0.46m, the deposit consisted of superficial windblown sand, with a non-archaeological surface litter (Unit 4) of bone fragments and antelope dung, overlying a sealed occupation unit. Unit 3 consisted of dark brown (Munsell 5YR 3/4) stained windblown sand with fine ashy lenses and localized concentrations of organic material, mainly wood shavings and !nara melon seed cases. Beneath this, a lighter-coloured sandy unit (Unit 2, Munsell 5YR 5/4) extended to a maximum depth of 0.3m, grading into a coarse-textured unit (Unit 1) of the same colour, consisting largely of weathered rock from the overhang itself. Units 1 and 2 were archaeologically sterile.

Both rock shelters, Site 16 and Site 18 contained well preserved organic material, and bulk samples were retained from both sites for flotation analysis in the second phase of the project. The sites also yielded diverse items of European origin, including bottle glass, scrap iron and a wooden barrel stave. These items have still to be analysed in detail, but on the basis of superficial inspection they may represent mid-19th century trading contact with vessels plying the Atlantic coast, most likely at the time of the 1840's guano "rage" (J.H.A. Kinahan 1992).

Figure 6. Rock shelter Site 21; view from north

Only one rock shelter was excavated in the Gorrasis site cluster, namely Site 21. The site lies on the northern side of an isolated syenite core stone outcrop which forms a prominent landmark within the Gorrasis basin. The area within the shelter exceeds 25m² , and has a level floor of coarse gravel derived from the weathering of the overhanging boulders. There are a number of small concentrations of archaeological material among the boulders, as well as a general scatter of stone artefact debris spread over a radius of about 50m. The shelter was excavated over 3.5m² to a maximum depth of 0.45m on weathered bedrock, slightly less than 15% of the available deposit.

The surface layer (Unit 4) at Site 21 contained archaeological material apparently derived from the layer beneath (Unit 3), a reddish ashy sand unit (Munsell 2.5YR 4/3) comparable in texture to the occupation layers at Site 16 and Site 18. As with the other sites, this unit contained significant concentrations of stone artefact debris, as well as an assemblage of formal microlithic tools, faunal remains and other materials, including well preserved plant remains. The plant material included !nara melon seed cases, as well as the seed cases of tsamma melon *Citrillus lanatus*. Bulk samples from this and other concentrations of organic material were retained for flotation analysis in the second phase of the project.

At Site 21, the reddish ashy sand of Unit 3 overlay an earlier occupation (Unit 2) represented by a grey ashy sand layer (Munsell 2.5YR 6/2) containing large roof spalls. This unit reached a maximum depth of 0.36m, marked by a hearth

lined with stone and associated with a concentration of antelope bone and the skeleton of an infant. These materials were clearly stratified and represented an earlier occupation event. Beneath the grey ashy layer of Unit 2 was an archaeologically sterile accumulation (Unit 1) of hydrolized syenite resting on solid bedrock 0.55m below surface.

DATING

Table 1 presents radiocarbon dates for the rock shelter, Site 21. The dates indicate a hiatus of approximately 6 000 years following the mid-Holocene occupation. The late Holocene dates appear to represent a series of discrete events, although this was not visible in the stratigraphy of the deposit. It is also possible that the site was occupied more recently than the youngest date which is derived from the least disturbed context in the upper part of the deposit.

The oldest date from Site 21 is derived from a hearth resting directly on undisturbed regolith, and is therefore taken to represent the earliest occupation of

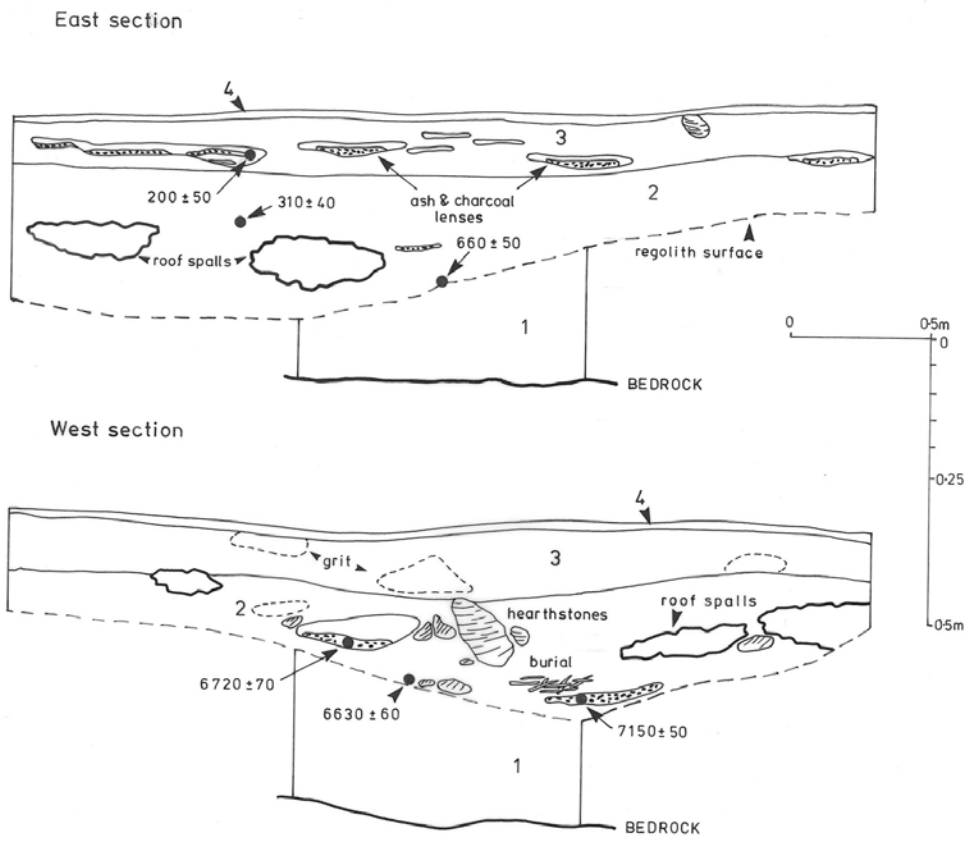

Figure 7. Rock shelter Site 21: stratigraphic profiles

the site. The hearth was a small circle of loose stone situated close to the entrance of the site, and appears to have been used more than once. However, it is not clear whether the hearth was last used as a formal burial place for the infant whose skeleton was found there, since the remains were mixed with a quantity of animal bone apparently discarded at the hearth.

Table 1. Radiocarbon dates for Site 21

Layer	Sample No	Cal. years BP
Unit 3	Beta-207921	200 ± 50
Unit 2	Beta-207920	310 ± 40
Unit 2	Beta-213465	660 ± 50
Bottom of Unit 2	Beta-213466	6630 ± 60
Bottom of Unit 2	Beta-207918	6720 ± 70
Top of Unit 1	Beta-207919	7150 ± 50

Table 2. Radiocarbon dates for *Acacia erioloba* heartwood specimens

Site No	Sample No	Cal. years BP
QRS 42/16	Beta-207926	140 ± 40
QRS 42/6	Beta-207925	260 ± 40
QRS 42/34	Beta-207924	430 ± 40
QRS 42/32	Beta-207923	640 ± 40

Comparison of the Table 1 dates with the dates for *Acacia erioloba* heartwood samples presented in Table 2, suggests that occupation of Site 21 coincided with tree germination events, or periods of relatively high rainfall. Successful germination of camelthorn requires higher rainfall than is indicated by the average figures for this area. Furthermore, the survival of seedlings depends on successive above average years for the young tree to become established (Strohbach, pers. comm.). This means that the heartwood dates probably represent short periods of successive high rainfall years rather than a series of individual high rainfall years. The coincidence of dating evidence indicates that human occupation was closely related to rainfall conditions and that such proxy evidence as provided by the heartwood dates is relevant to the archaeological sequence.

DISCUSSION

The archaeological survey and excavation results from the 2005 field season in the Awasib-Gorrasis basin complex confirm the mid-Holocene occupation hiatus noted in previous research, and indicate a pattern of occupation during the last 700 years, coincident with periods of above average rainfall. The sequence

and spatial distribution of archaeological sites suggests that the rock shelters were occupied at the same time that the hunting blinds, grinding hollows and other sites were in use, thus providing the possibility of combining archaeological and environmental evidence in an integrated model of late Holocene human occupation in the southern Namib.

The presence of 19th century European trade items at the Awasib sites shows that the movement of hunter-gatherers in this area extended as far as the Atlantic coast. It is likely that the Awasib-Gorrasis basin complex was exploited both from the coast and from the escarpment when conditions allowed, and that it formed part of a much wider area of movement than the survey area. For the moment, direct evidence of coastal movement is limited to the last one hundred and fifty years. The suspected burials located during the 2005 field season may shed more light on this issue by a combination of radiocarbon dating and light isotope analysis of human remains. The next field season will include further investigation of selected burials, as well as 19th century trade assemblages as a means to date episodes of contact (cf. J.H.A. Kinahan 2000).

No direct dates are available for the hunting blinds and grinding hollows, although these were probably used at the same time as the rock shelter sites. One radiocarbon sample from a wooden post in a barrier cairn at the hunting blinds site QRS 42/31 contained a higher percentage of modern carbon than the reference standard, and is therefore rejected. The absence of organic material in reliable association with the hunting blinds is an obstacle to radiocarbon dating and the alternative of Optically Stimulated Luminescence (OSL) dating will be explored in the coming field season. Nearly all of the hunting blinds in the Awasib-Gorrasis basin complex are at least partially filled by drift sand and OSL dating will be used to try and establish the age of the fill, on the assumption that the blinds would have been clear of sand when they were last used.

The expected dating of the blinds would be within the range of the late Holocene occupation of Site 21, with a possible correlation of dates from rock shelter occupation events and episodes of climatic amelioration represented by Acacia erioloba trees. The Awasib-Gorrasis tree dates are comparable to dates reported by Vogel (2003) from Sossus and Tsondab Vleis, about 50km to the north. These dates, from a sample of twelve trees, suggest that the oldest trees became established during the Medieval Warm Period in the 11th and 12th centuries AD, and began to die off when the more arid conditions of the Little Ice Age set in during the 14th century AD. Vogel considers that younger specimens represent a brief climatic amelioration during the 17th century.

The productivity of the Awasib-Gorrasis environment is determined by the availability of water, and it is to be expected that the limits of its hunting and gathering potential were set by the occurrence of above average rainfall during periods of climatic amelioration. Rainfall determines the availability of pasture

and the movements of oryx; when pasture and water are exhausted the oryx move inland, following well established routes. Since this movement is strongest at the beginning of the dry season, it is likely that the hunting blinds were most efficiently employed at the same time.

Several further considerations reinforce this argument, the most important being that hunter-gatherer groups would have been obliged to aggregate when the number of water sources diminished at the start of the dry season. Successful cooperative hunting requires considerable manpower, so dry season aggregation might have been driven both by diminishing water, on the one hand, and by improved hunting prospects, on the other. Furthermore, reliance on grass seed would have been highest at this time, so it is unsurprising that seed grinding hollows occur in their greatest concentration at the most reliable waterhole, QRS 42/22. Likewise, the start of the dry season is also the peak fruiting period for both of the melon species represented by significant accumulations of discarded seed coats in the excavated rock shelter deposits.

Investigations elsewhere in the Namib have established a functional relationship between pottery and the exploitation of wild grass seed and !nara melons (Kinahan 2001). Efficient exploitation of these resources is hardly possible without pottery, a technological innovation that only became widespread in the Namib during the second millennium AD with the rise of nomadic pastoralism. In the survey area, pottery occurs in the late Holocene rock shelter assemblages, as well as on some of the surface sites and in association with some of the suspected burial cairns. It is therefore of interest that no indications of livestock-keeping were found in the survey area, and that the archaeological evidence is of a complex hunting and gathering subsistence strategy.

The evidence adduced in the 2005 field season points to a specialized hunting and gathering technology employed to maximize subsistence opportunities in this highly episodic environment. Pottery was a key element of this technology, and the importance of grass seed and melon exploitation in the archaeological evidence raises the possibility that late Holocene occupation of the Awasib-Gorrasis basin complex depended on a combination of technological advantage and ecological opportunity. Further research in this area will explore the relationship between these elements in more detail, and attempt to specify the limits of the ecological niche occupied by hunter-gatherers in this part of the southern Namib Desert.

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