

## The occurrence and dating of elephant tracks in the silt deposits of the lower !Khuiseb River, Namibia

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Well preserved tracks of elephant and other animals are reported from the lower !Khuiseb River in Namibia, and their dating to within the last three centuries by the radiocarbon method, and by the use of archaeological associations is described.

### INTRODUCTION

The savanna highlands of Namibia are drained by several episodic river systems which cut across the Namib Desert to enter the Atlantic Ocean at widely separated intervals. These rivers are remarkable for the fact that their subterranean water supplies maintain linear oases of riparian woodland where little else is available to shelter and sustain animal life. When the rivers flood, there are also standing pools of water which may last for several weeks. Near Khaeros in the lower !Khuiseb River, animal tracks, including those of elephant, are fortuitously preserved on the surface of dried silt deposits. Elephant do not occur in this area today and there are no documented sightings to indicate when last they did. In this paper, the site and its dating are described, and the implications for historical animal distributions in the Namib Desert are addressed.

Among the largest of the rivers flowing west through the Namib (Huntley 1985), the !Khuiseb is further distinguished by the fact that it serves to retard the advance of the southern Namib dune sea, leaving the northern side of the river a landscape of largely barren gravel plains. In years of exceptional rainfall the river may flow several times in succession. Towards the coast dune encroachment is more rapid than inland (Ward & Von Brunn 1985) and having no clearly defined mouth the river course loses itself in a maze of silt deposits from the impoundment of water at the foot of the dunes (Huntley 1985). Brackish and ephemeral springs occur among the dunes, where, a few kilometres from the coastline, archaeological remains indicate that human settlement during the last two millennia relied heavily upon marine foods. Evidently, ante-

lope were also hunted further upstream in the riparian bush along the !Khuiseb, where there is more plentiful browse than among the coastal dunes. Although livestock husbandry was the most important component of the precolonial economy in this area, the shortage of fodder around the main area of settlement in the coastal dunes meant that most of the animals were kept at stockposts some distance inland, along the river (Kinahan 1991). When European mariners sought to reprovision their ships with beef, it was for this reason they had usually to wait several days at anchor in Walvis Bay (e.g. Alexander 1838).

Until the mid-nineteenth century few Europeans penetrated very far up the !Khuiseb, and the records of these recent journeys make little mention of wild animal populations, although by this time the introduction of firearms had noticeably reduced animal numbers over much of central Namibia (e.g. Andersson 1861; Kienitz 1976). Knowledge of precolonial animal distributions is indeed slight (Joubert & Mostert 1975; Shortridge 1934) and it is therefore of particular interest that recognizable tracks are preserved in the !Khuiseb at one locality near Khaeros.

### SITE DESCRIPTION & DATING

The !Khuiseb River near Khaeros is well defined along the northern bank, but the riverbed itself is merely a series of braided streams following the edge of a wide hummock dune-field which forms the opposite bank of the river. South of the !Khuiseb the landscape is dominated by high dune ridges, with the interdune valleys filled by more mobile lesser dunes. Figure 1 shows these basic characteristics of the landscape in relation to a number of archaeological sites and silt exposures on which the animal tracks were found.

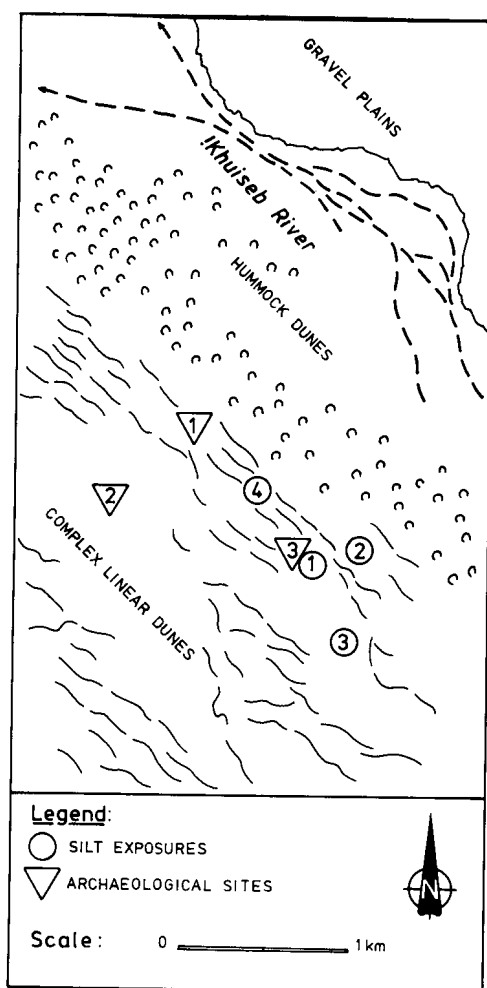


Figure 1. The site locality at Khaeros in the lower !Khuseb River, Namibia.

Silt 1 is the largest of the exposures and also the most remarkable, since it bears the well-preserved tracks of at least four elephant crossing the silt while it was still wet and plastic. The three views in Figure 2 illustrate some important general characteristics of this and other nearby exposures. Figure 2 (a) is a view from a position on a high dune slope overlooking Silt 1 from the north. The silt exposure shows a stratified series of deposits which are all that remain of a basin that would have been formed by dunes on both the near and far side of the main exposure. The dune impoundment is no longer in place and the silt exposure now lies up to 2 m above the sands, except on the

lefthand side where it is being steadily engulfed by a new accumulation of sand. Figure 2 (b) is a view from this encroaching dune and shows the surface cracks which developed as the silt dried out. Clearly visible in the silt are the tracks of an adult elephant proceeding to and from the stump of an *Acacia* tree. Figure 2 (c) shows that the silt was still wet at the time, for the weight of the elephant caused the silt to extrude from the tracks.

Because the outlines of the footprints are unclear, delineation of their size and shape was rather difficult. However they did allow a rough estimation of the age and sex of the individuals comprising the group. This was done by reading the hind foot length off an age—hind foot length plot, using a Von Bertalanffy growth model based on elephants from Etosha National Park (Western et al. 1983, Lindeque and van Jaarsveld in press). Table 1 shows the sex and age of the individuals in the group. The wide age estimates are a result of the range of measurements given for what was seen as the same individual. It is likely that this was a group of adult bull elephants, possibly with one young adult (individual 4). Their age ranges are consistent with those of bachelor groups elsewhere (Lindeque 1988).

Table 1. Sex and age of the individual elephants, as derived from their spoor.

Individual	Sex	Age (yrs)
1	Almost certainly male	19–26
2	Almost certainly male	25–28
3	Almost certainly male	25–33
4	Uncertain; if male	16–20
	If female	20–30+

Less spectacular but plainly recognizable are the tracks of ostrich on Silt 2, zebra on Silt 3 and cattle on Silt 4. The ostrich tracks are of a single adult walking, while the zebra tracks conceivably represent two or more animals milling about on the wet silt. The cattle tracks appear to have been made in a muddier area and this, combined with the slight inclination of the surface and indications that the hooves slipped in the mud, suggest that Silt 4 lay at the edge of a pond. The field relationships of these silts suggest that they are coeval parts of a single deposition event.

Several samples of plant material associated with the Khaeros silts were dated by the radio-carbon method. Due to the known fluctuations



Figure 2 (a). A view of Silt 1 at Khaeros from the north, with the position of the tree stump (b) and elephant tracks (c) arrowed.

in the radiocarbon content of the atmosphere during the past 500 years it is difficult to derive precise dates in this time range and a single radiocarbon date can refer to more than one calendar date. The results of the radiocarbon dating analyses are given in Table 2 together with the most probable calibrated age range ( $\pm 18$ ) in years AD. The first sample (Pta-3658) is from the outer annual growth rings of the dead tree on Silt 1. The tree was probably still growing when the elephant approached it over the silt and then turned away at a sharp angle. How long the tree lived after this visit is undetermined; the dating of  $130 \pm 45$  BP suggests that the tree was alive in about AD 1710, although the calibration also allows a

nineteenth century date. The second sample (Pta-4726) is from the bark of a thick branch found in the silt several metres from the tree. This gives a more reliable date than the previous sample, as the branch was deposited at the same time as the silt. The calibrated age ranges are AD 1654–1675 or AD 1752–1794.

The calibrated dating of the first two floodline flotsam samples (Pta-4618, Pta-4621) in Table 1 is uninformative, due to their wide spread over 200 years. The third sample (Pta-4619) gives a more satisfactory calibrated age range of AD 1643–1663. Assuming that all these samples date to the same period, when the !Khuiseb floods reached more than a kilometre further southwest than they do today, the most

Table 2. Radiocarbon dates for samples from the Khaeros Silts

Sample	Material	$^{14}\text{C}$ age BP	Calibrated age range AD ( $\pm 18$ )
Pta-3658	outer wood	$130 \pm 45$	1689–1732 or 1812–1930
Pta-4726	bark	$240 \pm 35$	1654–1675 or 1752–1794
Pta-4618	flotsam	$180 \pm 35$	1672–1876
Pta-4621	reed	$170 \pm 35$	1675–1885
Pta-4619	grass	$280 \pm 35$	1643–1663



Figure 2 (b). Elephant tracks at the tree stump on Silt 1, Khaeros, photographed shortly before the dune encroachment visible in Figure 2 (a).

probable calendar calibration for the radiocarbon dates is the second half of the seventeenth century. It is therefore germane to the dating of the silts that the cattle spoor provide a circumstantial link with the archaeological sites shown in Figure 1.

The archaeological sites at Khaeros are all thinly dispersed surface scatters of artefacts and other material covering 5 000 m<sup>2</sup> or less. Remains from Site 1 include three clay pots of the type associated with nomadic pastoral settlement in the Namib. Found with the pots was a small quantity of *Donax serra* shell, a bone linkshaft from a composite arrow, and a number of cattle bones. The Site 2 assemblage was much the same, neither affording any possibility of accurately dating the silts and the occupation of the area. Fortunately, Site 3 yielded, in addition to the pottery and other remains, a small assemblage of glass trade beads such as were widely used by European merchants bartering for cattle on the Namib coast. The assemblage from Site 3 comprised

three opaque pale blue cylindrical beads, one translucent blue cylindrical bead, one red-on-green cylindrical bead, one opaque black barrel bead and one opaque white barrel bead. Comparison of this and other assemblages from the !Khuiseb affords the possibility of independently corroborating the radiocarbon dating of the Khaeros silts.

Large numbers of glass trade beads first appear in the !Khuiseb at ≠Khîsa-//gubus, a large pastoral encampment close to Walvis Bay and dated to the second half of the eighteenth century by the association of a low denomination Hollands coin, or duit. More than two thousand glass beads were recovered from the site, and the assemblage was dominated by opaque blue cylindrical beads like those found at Khaeros. Red-on-green cylindrical beads also formed an important component of the Walvis Bay assemblage. More recent glass bead assemblages often lack these two bead types and are usually characterized by red-on-white barrel beads which are known to have super-

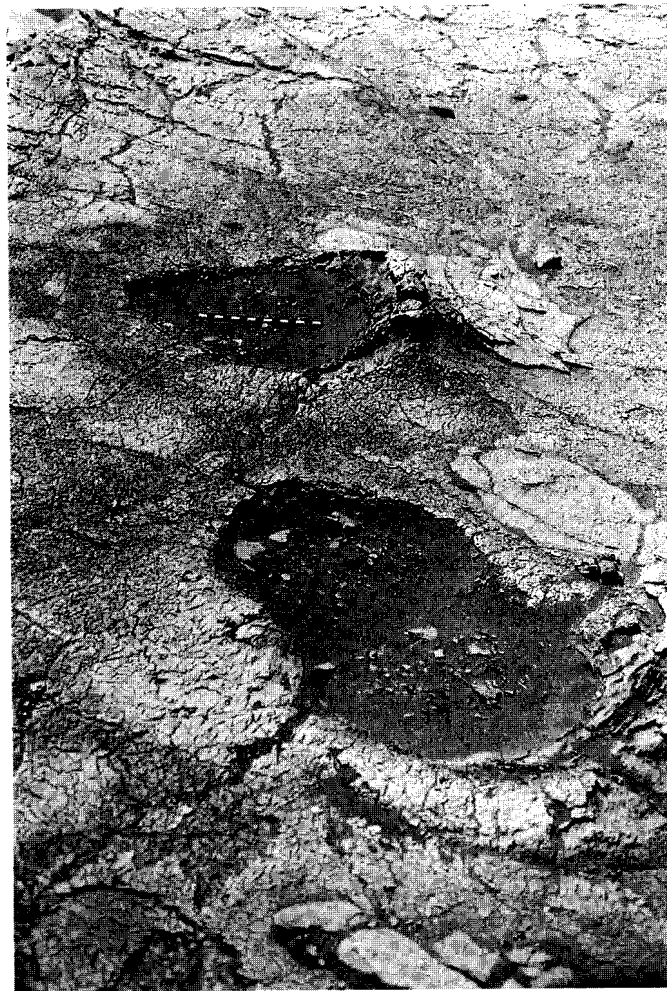


Figure 2 (c). Elephant tracks showing extrusion on Silt 1, Khaeros.

seded the red-on-greens in the coastal trade during the nineteenth century (Sprague 1985: 94). The recent assemblages are further characterized by mould-pressed beads, an innovation of the late nineteenth century (Sprague 1985: 95). The affinities of the Khaeros assemblage with that from ≠Khisa-//gubus point to a late eighteenth century occupation of the site, while the absence of more recent bead types argues against occupation in the nineteenth century. In all likelihood these sites were established at Khaeros during the same flooding event which attracted the elephant to the lower !Khuseb.

#### HISTORICAL RECORDS OF ELEPHANT IN THE !KHUISEB RIVER

The first explorer to venture a substantial distance into the Namib from the coast, and who recorded elephant from the area, was Pieter Pienaar in 1793. His ship, the *Meermin*, anchored at Walvis Bay to gather information from a few fishermen seen on the shore (Franken 1938). Pienaar undertook a 12-day expedition inland, walking over the coastal dunes and northwards till he reached the Swakop River, and then upriver for an unstated distance. The journal of the *Meermin's* captain, Duminy, records Pienaar describing the river-

bed as abounding with game such as rhino, a certain number of elephant, and other animals (Franken 1938). At Walvis Bay, one of the crew on shore killed a rhino, while another was able to barter a small elephant tusk from the local inhabitants, for the price of a little tobacco. The origin of the tusk is not stated.

There are only scattered references to the natural history of Walvis Bay and the Namib desert during the first forty years of the nineteenth century. The missionary Heinrich Schmelen travelled from Namaland to Walvis Bay via the !Khuseb River in 1824 and 1825 (Vedder 1966: 185), but his journals are concerned with evangelical matters rather than observations on the natural history (Schmelen 1824). It was in 1837 that James Alexander undertook a trip overland from Cape Town to Walvis Bay, travelling in the latter part through Ababies (present-day Solitaire), the Desert of Tans (the plains immediately west of Tans Mtn, or Gamsberg), and along the !Khuseb riverbed to the coast (Alexander 1838). He reported no game in the river except the remains of a dead rhino. His account tells of Damaras that came on hunting expeditions for elephant, but in the Swakop River. The first and only mention in all the literature of elephant in the lower !Khuseb is a description of life in the riverbed by a "Boschman" at Scheppmansdorf, (present-day Rooibank), which mentions elephants, lions and rhinos (Alexander 1838: 116).

The missionaries Hahn and Kleinschmidt reported in 1842 that rhino were still common in the upper !Khuseb and Swakop valleys, but that elephant had to be hunted several days journey to the northeast of Windhoek (Kienitz 1976: 208). The route from the interior to Walvis Bay was properly established in 1843 by Jonker Afrikaner, for trade between Windhoek and the coast (Vedder 1966: 224). The road followed the !Khuseb beyond Rooibank, then crossed the Tinkas Flats to follow the Swakop River inland. It was used by the Afrikaners, missionaries and the occasional hunter, but there are no records of the wildlife en route. By 1850, when Charles Andersson made his first exploratory trip into the hinterland from Walvis Bay, the large game had all but been exterminated by a hunter, Hans Larsen, operating from Otjimbingwe (Andersson 1956: 57). Larsen said that elephant could still be found in the Swakop River close to its mouth, but Andersson's first sighting of elephant was in the Omatako River. Andersson

wrote in 1858 that the areas of Damaraland in which he travelled, between the Omaruru and Omatako Rivers, were "everywhere quite void of elephants, though celebrated as their habitual abode" (Andersson 1861: 95).

To our knowledge there are only a few other records of elephant in this area. A geological paper (Wilmer 1889) cites the existence of elephant and rhino tracks in dried silts near Walvis Bay, that may be the same as those described in this article. Another set of tracks found near Rooibank by Mr L. Blom were lost in the 1976 flood. An elephant tusk in the Swakopmund Museum was found near Swartbank in 1951 by Constable J. D. Robbertz (H. K. F. Kolberg, pers. comm.). In 1970, an elephant skeleton was discovered at Rooikop approximately 1 km east of the coastal dunes outside Walvis Bay, in association with stone tools and other indications of butchery (J. E. W. Dixon, M. J. Penrith, pers. comms). Bone from this skeleton gave a date of  $210 \pm 45$  BP (Pta-4386) which calibrates to the range of AD 1660-1689 or AD 1732-1812, suggesting a similar age to that of the tracks in the Khaeros silts.

## DISCUSSION

Most of the explorers mentioned above were avid hunters, and entered any sightings or evidence of big game in their journals, so it can be safely assumed that where no mention is made of these animals, they had not been seen. The literature indicates that elephant have always been extremely rare in the lower !Khuseb River, even before the arrival of the first European explorers.

The westward-flowing rivers in the Namib Desert provide longitudinal oases that are suitable habitat for elephant as long as they contain standing water (de Villiers 1981). In Kaokoland, elephant have been recorded to travel 100 km without water, to dig gorras in sandy riverbeds for shallow water, and to drink about every four days (Viljoen 1980). In addition, bachelor groups are known to turn up more readily in strange localities, to show less fidelity to a particular range, and to explore more widely than family groups (Lindeque 1988).

Such records show that elephant could easily wander from the Swakop River, where they were reportedly fairly common, to the !Khuseb River, a distance of 30 km, and that they could survive there during wet periods.

Alternatively, they could have been part of a breeding population of elephant that occurred upstream in the !Khuseb catchment, that moved toward the coast with the flood, as do present-day populations in the Hoanib River in Kaokoland. It is not surprising, therefore, to find elephant tracks in an interdune valley, in a silt bed that was obviously deposited in a year of exceptional rain.

While it is actually more surprising that elephant were not recorded in this area by any of the early explorers and hunters, the introduction of rifles and a rapidly growing demand for ivory meant that the possibility of elephant straying into the lower reaches of the !Khuseb was eliminated forever by the mid-nineteenth century. However, our evidence does not indicate that elephant were once common in the lower !Khuseb, and it is possible that the tracks in the silts at Khaeros are the record of a rare visit from more established populations to the north or east.

The difficulties of accurately dating the Khaeros elephant tracks are evident from the array of potential radiocarbon ages and their calibrations. Without further independent corroborating dates for the occurrence of floods in the !Khuseb River it is therefore difficult to select the most likely age for the elephant tracks. For this reason, the circumstantial link between the spoor and the archaeological sites is important and informative. Assuming that the cattle tracks were left when the archaeological sites were established as temporary stockposts, a likely date is that suggested by the glass trade beads, which point to a late eighteenth century occupation of the Khaeros sites in a year of exceptional flooding.

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