

Namibia Palaeontology Expedition May - June 2025

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Abstract :- The aim of the field survey by the Namibia Palaeontology Expedition in May-June 2025, was to prospect for fossils in the Miocene deposits in the Sperrgebiet (Phase 1, Fig. 1) and in the Miocene to Pleistocene karstic deposits of the Otavi Mountainland (Phase 2, Fig.1) in order to throw light on their geological and palaeoenvironmental contexts and ages. The work of the expedition, which has been operating since 1991, is authorised by the National Commission on Research, Science and Technology and the National Heritage Council of Namibia.

Keywords :- Palaeontology, Otavi Mountainland, Sperrgebiet, Miocene, Pleistocene, Fossils

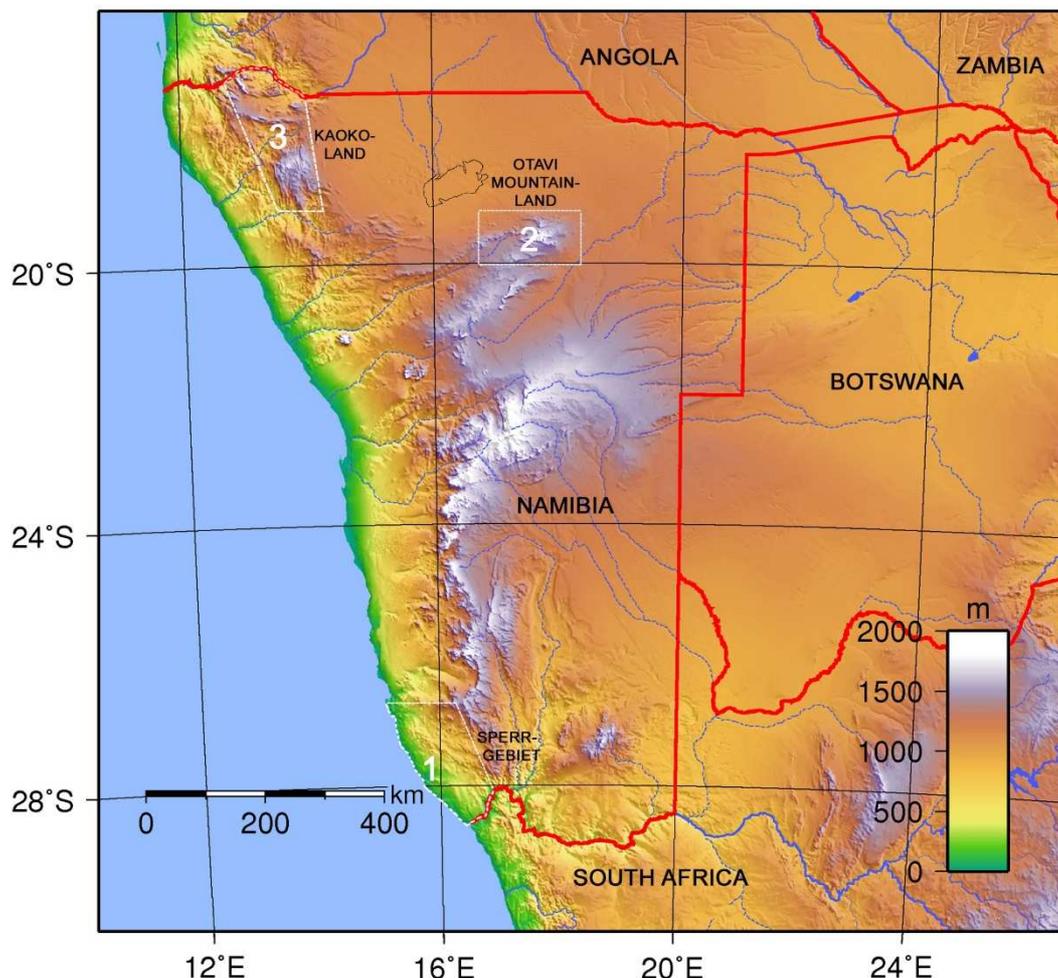


Figure 1. The three main areas in which the Namibia Palaeontology Expedition currently has permits to survey: 1) Sperrgebiet in the southwest, 2) Otavi Mountainland in north central Namibia, and 3) Kaokoland in the north-west

Phase 1: Sperrgebiet

In the Sperrgebiet, detailed prospecting for fossils was carried out at Langental, Neue Anlage, Grillental, Elisabethfeld and Glastal (Fig. 2). At the National Earth Science Museum, Windhoek, the fossil frog remains from the Sperrgebiet were assembled and

photographs were taken of all the material, comprising over a hundred specimens. This was undertaken as a preliminary phase of a detailed study of the collection by A. Lemierre to be carried out in the near future.

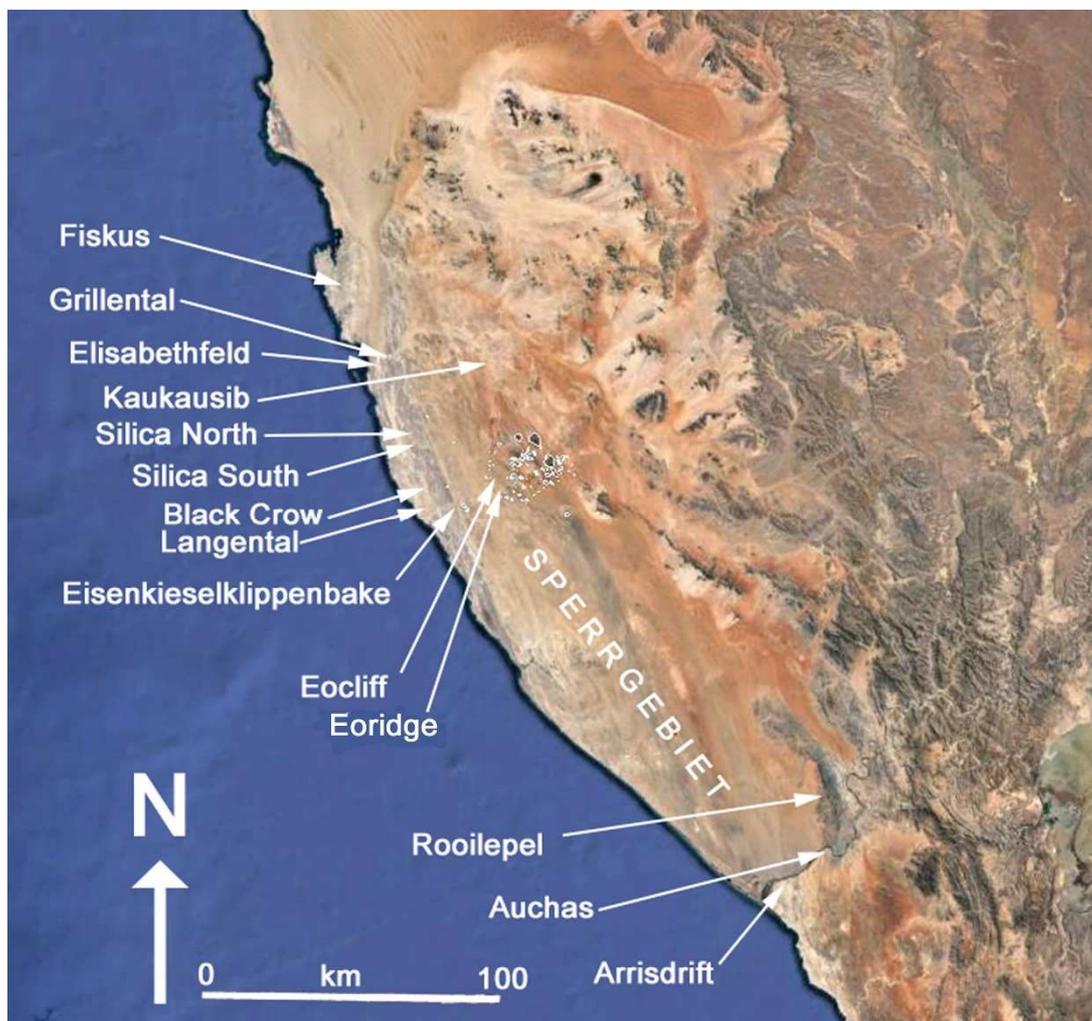


Figure 2. Fossiliferous localities in the Sperrgebiet, Namibia. The 2025 survey focussed on Elisabethfeld, Grillental and Langental as well as Neue Anlage close to Langental and Glastal between Eisenkieselklippenbake and Langental.

Elisabethfeld

Two days of survey at Elisabethfeld resulted in the collection of over 28 fossils among which are a well-preserved pedal phalanx of the extinct miniature ostrich *Struthio coppensi* (Fig. 3) and some associated skeletal remains of the small hypsodont

macroscelidid *Myohyrax oswaldi* (Fig. 4). One of the palates of the latter taxon contains all the cheek teeth, including the tiny canine and anterior premolars, which are relatively poorly represented in previous collections due to their tiny dimensions.

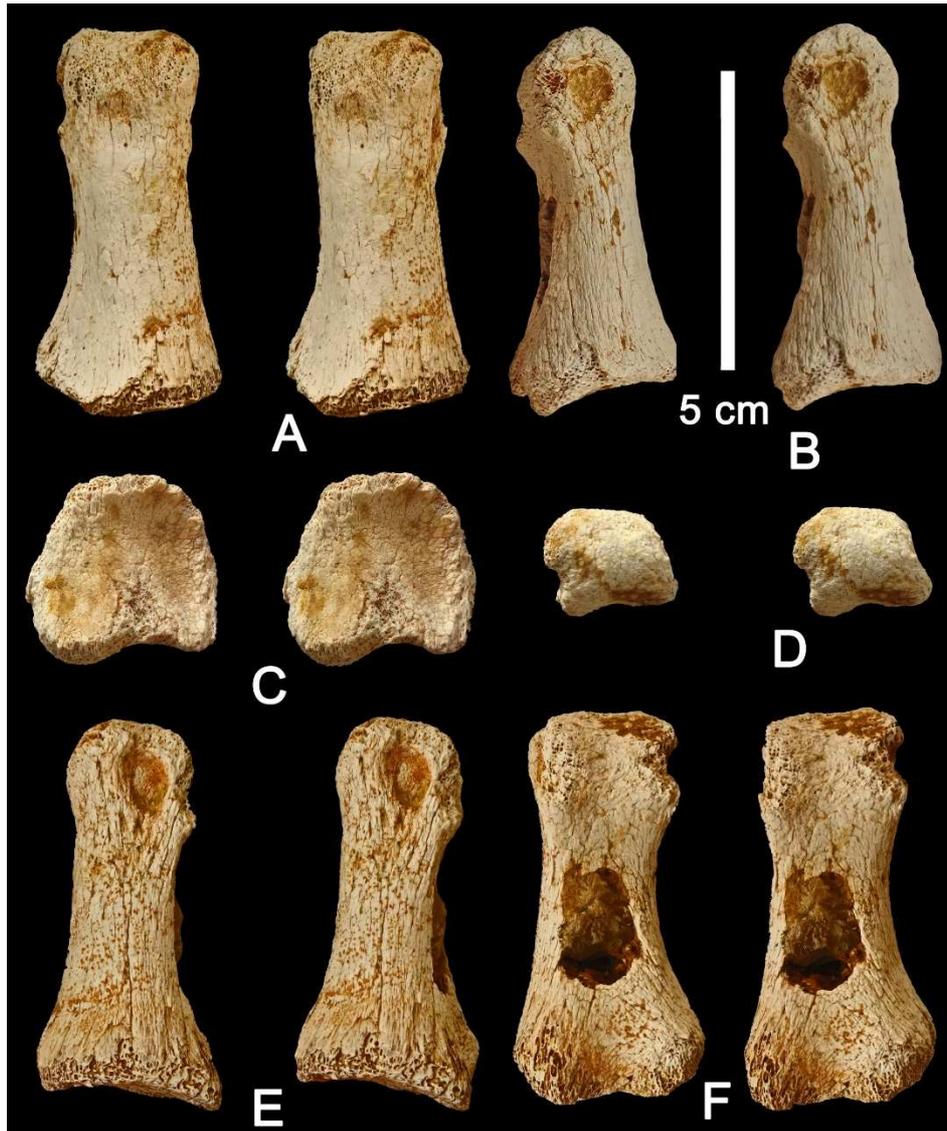


Figure 3. Stereo images of EF 3'25, pedal phalanx of *Struthio coppensi* from Elisabethfeld. A) dorsal view, B) abaxial view, C) proximal view, D) distal view, E) axial view, F) plantar view

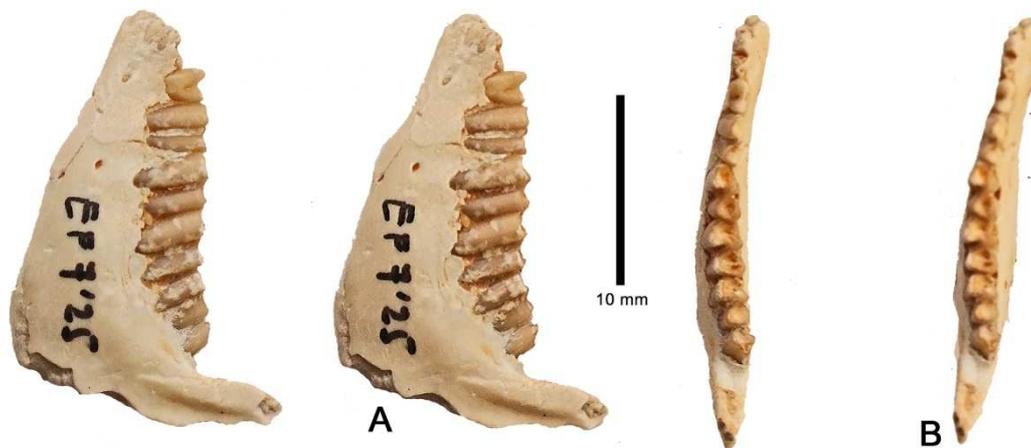


Figure 4. Stereo images of EF 7'25, left mandible of *Myohyrax oswaldi* from the Early Miocene red clays of Elisabethfeld, Namibia. A) buccal view, B) occlusal view.

Grillental

In 2023 and 2024 much of the eastern part of Grillental VI was covered by a large dune (Fig. 5), but by 2025 it had migrated northwards sufficiently far to expose the underlying sediments again (Fig. 6). 128 entries were made in the Grillental faunal catalogue. The specimens collected include the remains of a tiny species of macroscelidid that

is new to science. Excellent samples of *Myohyrax* (Fig. 7) and *Protypotheroides* (Fig. 8) were found as well as abundant rodents (Fig. 9), some frogs, birds and medium-sized mammals (Fig. 10). A tiny carnivoran maxilla was collected at Grillental Borrow Pit, the carnassial measuring 1.4 mm in mesio-distal length (Fig. 11).



Figure 5. Large dune covering the Grillental VI anthracothere site in 2023. Note the tilted slab of sandstone, a local landmark (arrow).



Figure 6. Grillental VI anthracothere site in 2025, the dune that covered it in 2023 having migrated northwards out of the depression. Arrow shows the tilted slab of sandstone below the low cliff, a local landmark.

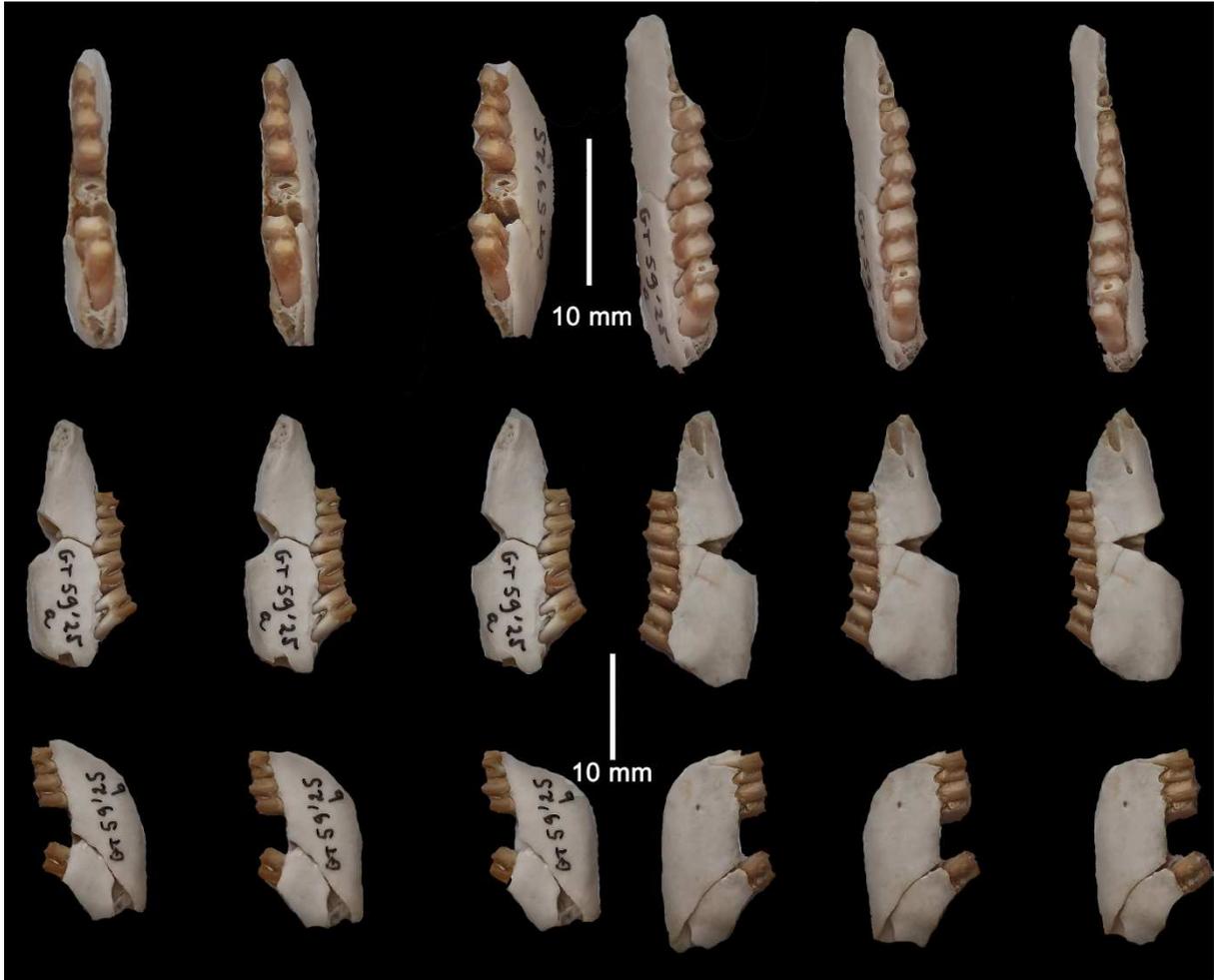


Figure 7. Stereo images of GT 59'25, left and right mandibles of *Myohyrax oswaldi* from the Early Miocene green clays of Grillental VI (Knoll Site); top row - occlusal views of left and right mandibles, Middle row - lingual and buccal views of right mandible, bottom row - lingual and buccal views of left mandible



Figure 8. Stereo images of GT 16'25, left mandible of *Protypotheroides beetzi* from Grillental VI. A) buccal view, B) occlusal views, C) lingual view

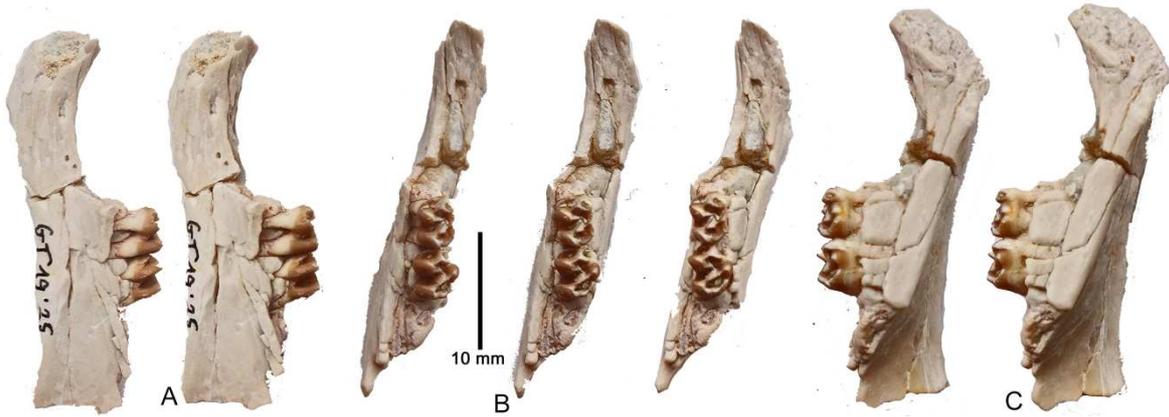


Figure 9. Stereo images of GT 19'25, left mandible of *Diamantomys luederitzi* from Grillental VI. A) buccal view, B) occlusal views, C) lingual view

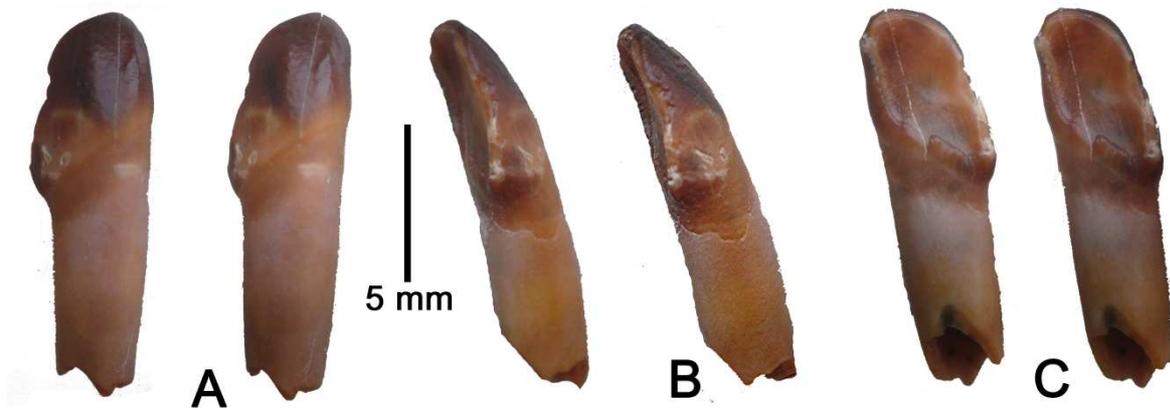


Figure 10. Stereo images of GT 91'25, left I1/ of *Diamantohyus africanus* from Grillental Carrière. A) labial view, B) distal view, C) lingual view

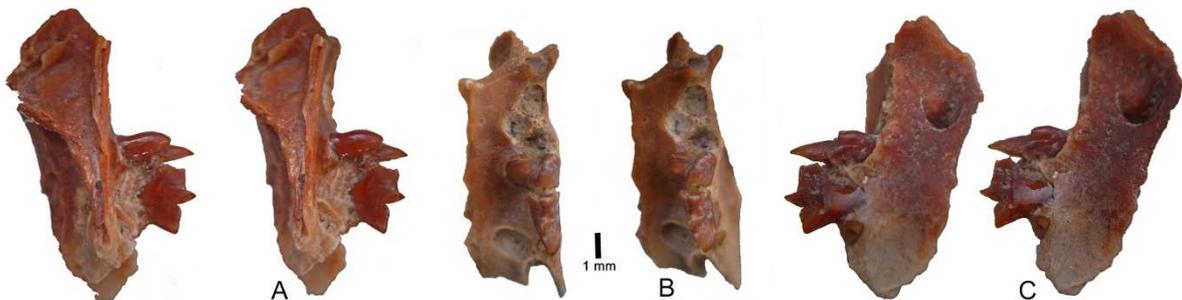


Figure 11. Stereo images of GT 98'25, left maxilla with P4/ of a minuscule carnivoran from Grillental Borrow Pit. A) lingual view, B) occlusal view, C) buccal view

An interesting find at Grillental VI was that of a talus of a small tragulid, which reveals that the species concerned is *Afrotragulus parvus* (Fig. 12). Previously, the small tragulid remains from Grillental were attributed to *Afrotragulus moruorotensis*, but it is now considered to be more likely that the

taxon concerned is *Afrotragulus parvus* which is slightly larger than *A. moruorotensis*. *A. parvus* is well represented in Early Miocene localities in Kenya and Uganda, dating from ca 18-17 Ma. *Afrotragulus moruorotensis*, in contrast, is known in East Africa only from localities younger than 17 Ma.

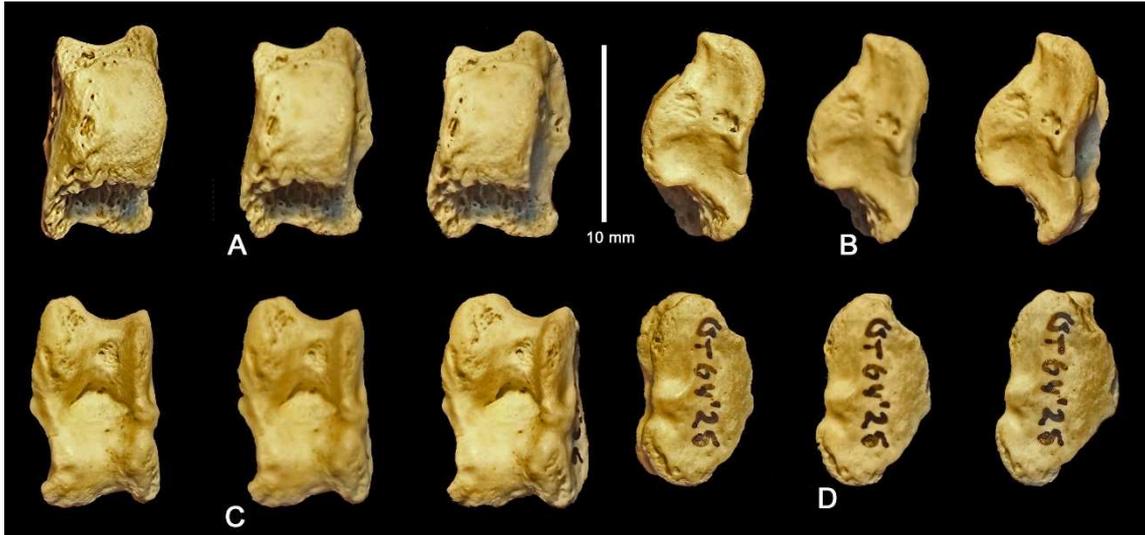


Figure 12. Stereo images of GT 64'25, right talus of *Afrotragulus parvus* from GT VI. A) caudal views, B) lateral views, C) cranial views, D) medial views

The rains in 2023 and 2024 flooded the depressions at Grillental, depositing clays and silts in their floors, thereby obscuring much of the fossiliferous deposits. Nevertheless, many fossils were collected from GT VI, especially from the knoll site. In the eastern branch of the valley at GT VI, the rains exposed a series of large footprints most of which had hitherto

been obscured under a thin layer of aeolian sand (Figs 13-15). Mapping of the footprints reveals that they were likely made by a graviportal mammal, probably a proboscidean such as *Eozygodon* or *Progomphotherium*, both of which are known to occur in the Early Miocene deposits of the Sperrgebiet.

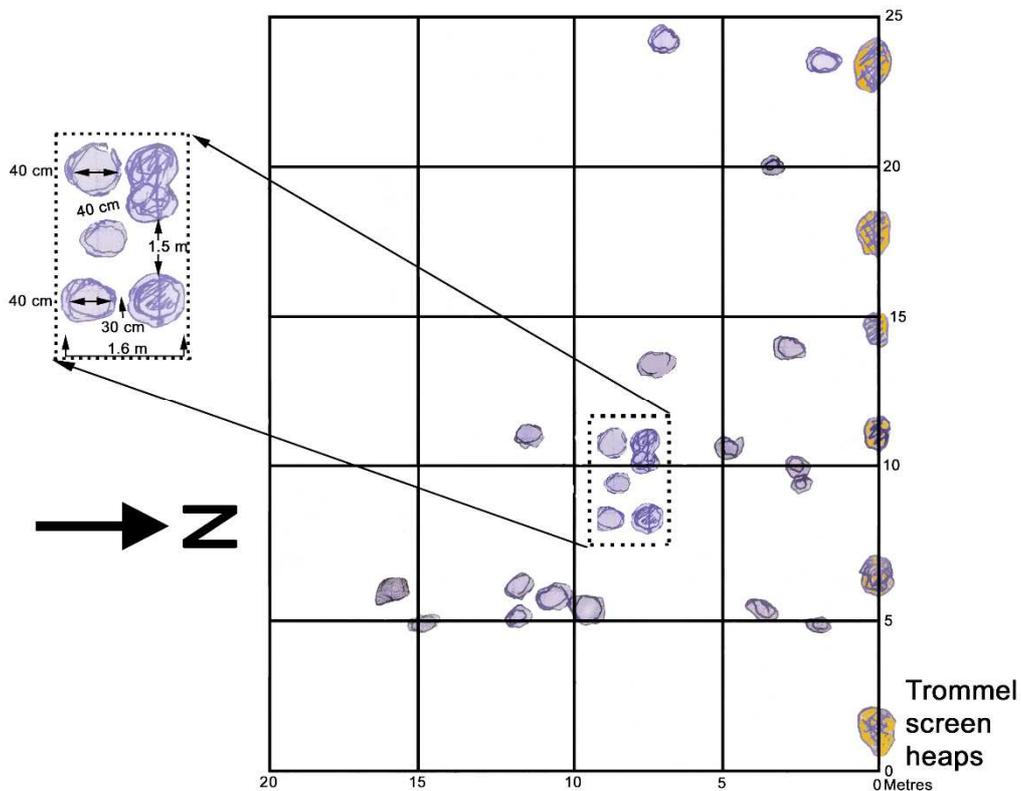


Figure 13. Field sketch map of 23 footprints of a large graviportal mammal, most likely a proboscidean, at Grillental VI, northern Sperrgebiet. The feet of this individual were ca 40 cm in diameter, and the distance between the front and hind feet was ca 1.5 metres.



Figure 14. Overview of the proboscidean footprints at Grillental VI. Note the lines of small trommel screen heaps (right of image) evidence of prospecting activities during the 1920's (view westwards).



Figure 15. Close-up view of some of the proboscidean footprints at Grillental VI. Note the raised margins of the prints where the soft sediment squigged upwards round the foot of the track maker. The feet of this individual were ca 40 cm in diameter. The small track close to the main print (bottom of figure) is a demi-print, made when the animal rested the anterior part of its hind foot on the surface close to the front foot, but without putting its full weight on it.

Close examination of the coarse grits that overlie the green silts and clays of Grillental (Figs 16, 17), indicate that they were transported and deposited by highly energetic flood events. The presence of a tooth of the white

rhino (*Ceratotherium*) in the grits indicates a latest Miocene or Plio-Pleistocene age for these deposits. Until now, these grits have remained without a precise name and were not correlated to any other rock units in the Sperr-

gebiet. Herein they are called the GT Grits. It is possible that they represent the lateral equivalents of the Gemsboktal Conglomerates which are widespread in the Central Sperrgebiet, between the Klinghardt Mountains and the coast. The Gemsboktal unit comprises widespread but generally thin layers of coarse conglomerate forming hamadas on the relatively planar inner Namib. At Kalkrücken, there is an aeolianite bed (the Terrassenfeld Aeolianite) intercalated between the two main horizons of Gemsboktal Conglomerate. The

GT Grits in contrast, are interpreted to represent the downstream equivalents of the hamada deposits where the finer fractions transported by flash floods were eventually confined to valleys such as the Grillental, where they rapidly accumulated as thick masses of trough-cross-bedded grits. The scale of the trough cross-bedding and the coarseness of the grits indicates that the flash floods were highly energetic. The sand, silt and clay fractions transported by the floods were probably deposited in the Atlantic Ocean.



Figure 16. Trough cross-bedded coarse grits at Grillental 1



Figure 17. Trough cross-bedded coarse grits exposed at locality GT 1, that overlie Early Miocene green silts and clays. The scale of the troughs and the cross-bedding indicate transport by highly energetic floodwaters which were overloaded with sediment (height of cliff: ca. 2 m).

Similar deposits form today in arid areas such as the sub-Atlas zones of the Maghreb when sporadic but violent storms occur in hilly or mountainous areas. Conglomeratic hamadas accumulate in the flatter ground at the edges of the mountains, often as overbank flood debris, and the grits, sand and finer fractions are carried downstream where they eventually end up in valleys closer to the coast or in inland water bodies such as ephemeral lakes.

The stratigraphic correlation between the Gemsboktal Conglomerates on the one

hand, and the GT Grits on the other, provides food for thought concerning Latest Miocene to Plio-Pleistocene climatic conditions in the Sperrgebiet, and it potentially throws light on the geomorphological development of parts of the drainage system of the region (Fig. 18). It is possible that clasts such as agates and diamonds that were present in the drainages prior to flood events, could have been flushed out into the ocean by these vigorous palaeo-flood events.

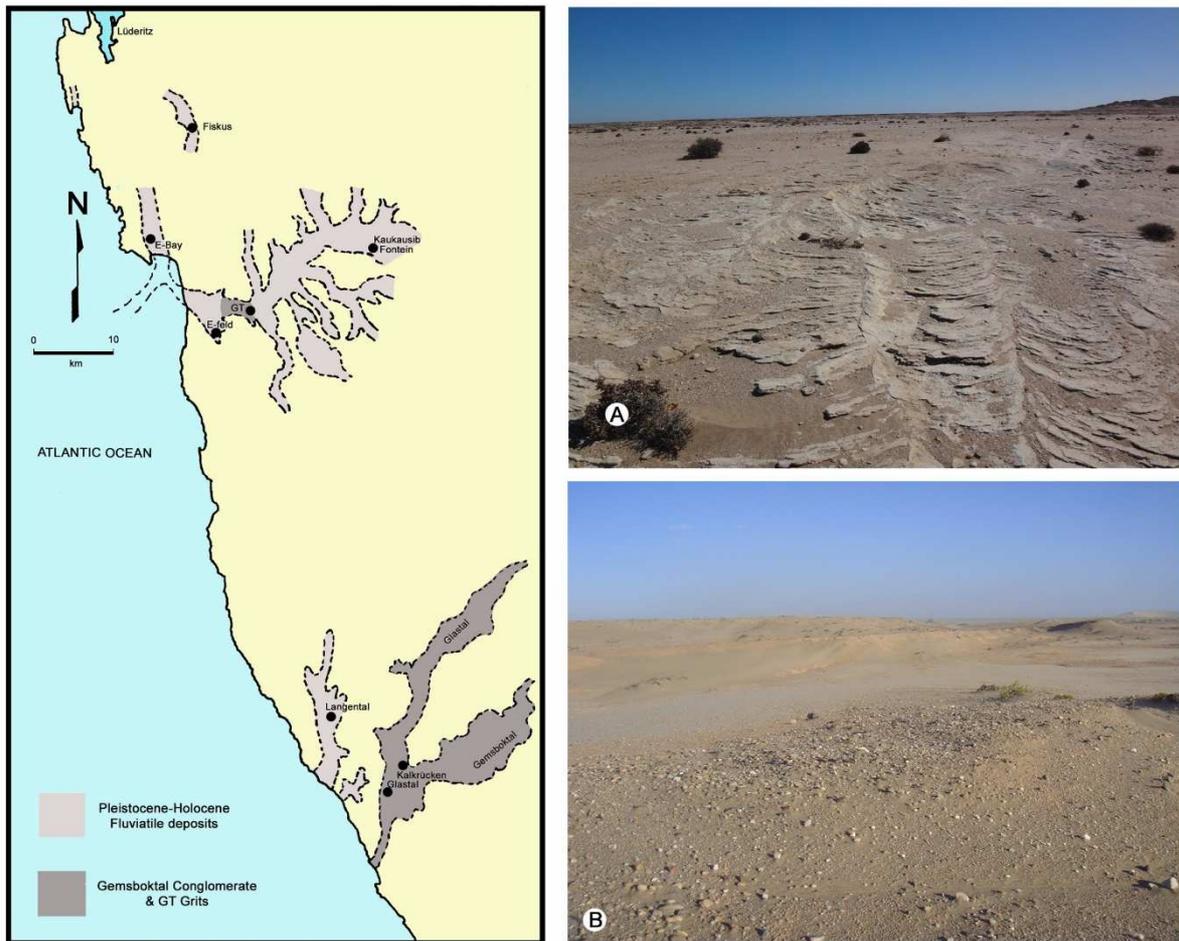


Figure 18. Distribution of the Gemsboktal Conglomerates and GT Grits (dark grey) and Pleistocene to Recent fluvial deposits (light-grey) in the Sperrgebiet. A) Late Miocene to Plio-Pleistocene GT Grits at Grillental 1, B) Two layers of Gemsboktal Conglomerate at Kalkrücken, with the late Miocene Terrassenfeld Aeolianite intercalated between them

Langental

It rained at Langental during the 2025 survey, and it was noted that, in addition to surface drainage of the waters that eroded and transported quantities of silt and clay, there was also underground drainage via micropipes (Fig. 19). In the latter situation small

cracks in the Early Miocene sediment were slightly enlarged by water flowing into them gently. The cracks at the surface continue underground, and much of the water in the depressions drained away via these subterranean channels. The important point to

note is that these cracks are large enough that small fossils and lithic clasts can fall into them. By this means fossils and even recent bones can be reworked locally into deposits

older than their original depositional context. Diamonds and agates can also fall into the cracks and thus be reburied after lying on the surface for extended periods of time.



Figure 19. Erosion and transportation of fine-grained sediment at Langental Miocene Site following light but prolonged rainfall on the 20th May, 2025. Top row: surface flow features, lower row: emptying of depressions via drainage into micro-pipes with subterranean flowage

47 entries were made in the Langental faunal catalogue. Informative specimens of the burrowing rodent *Bathyergoides* (Figs 20, 21), the large macroscelidid *Protypotheroides*, and

the dassie *Prohyrax* (Fig. 22) were collected, as well as the usual crop of ruminants (Fig. 23), sanitheres, a species of frog, a chelonian and other microfauna.

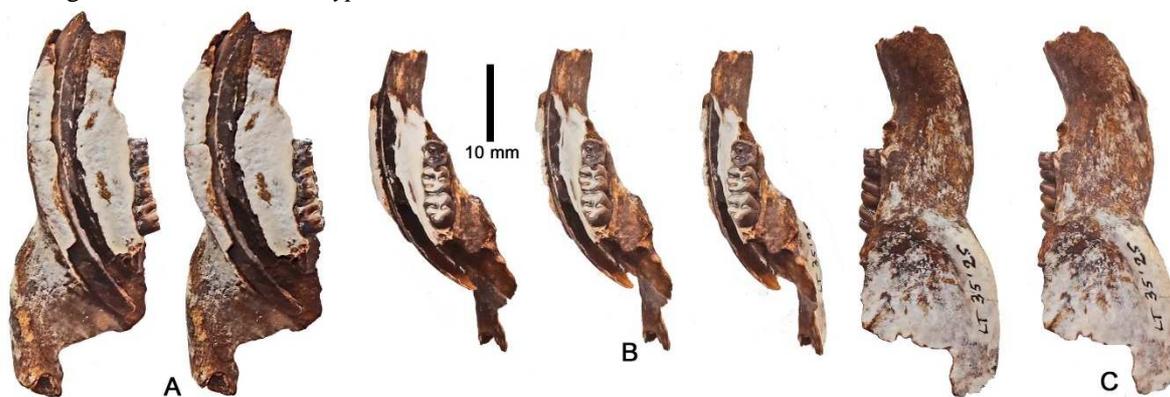


Figure 20. Stereo images of LT 35'25, right mandible of *Bathyergoides neotertiarius* from Langental. A) lingual view, B) occlusal views, C) buccal view

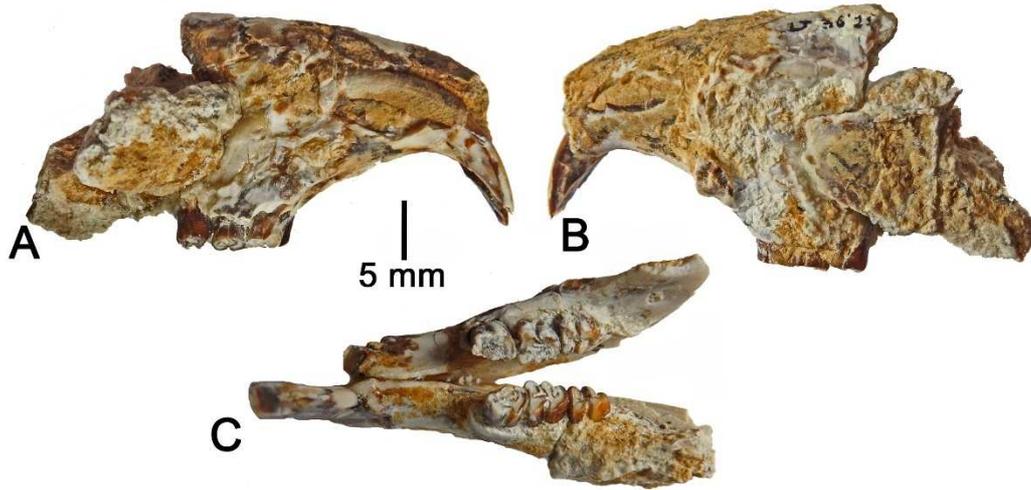


Figure 21. LT 36'25, skull of *Bathyergoides neotertiarius* from Langental. A-B) right and left lateral views of cranium, C) dorsal view of mandible

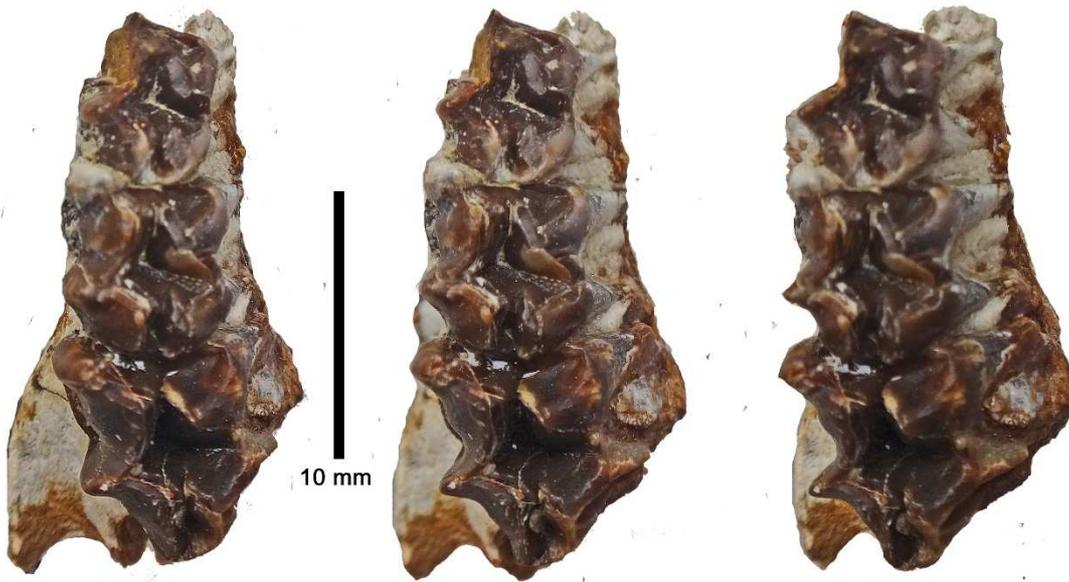


Figure 22. Stereo occlusal images of LT 1'25, right maxilla of *Prohyrax tertiarius* from Langental

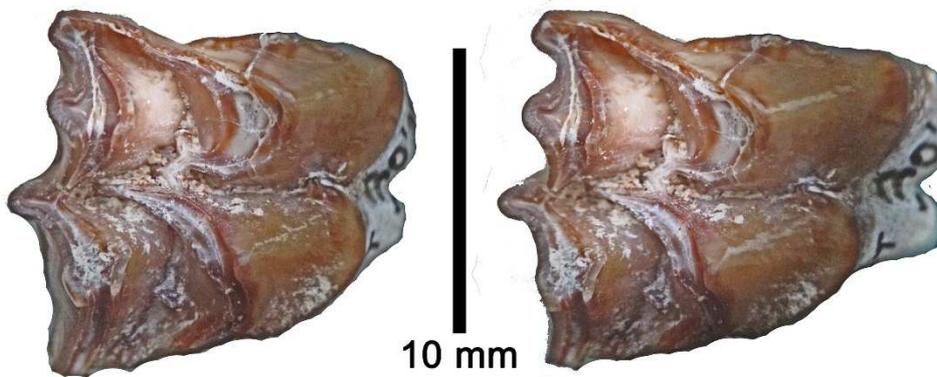


Figure 23. Stereo occlusal view of LT 30'25, right upper molar of a pecoran ruminant from Langental

In addition to arranging and studying the Langental fossils at the National Earth Science Museum, Windhoek, work was started on the cleaning of a fossil anthracothere neurocranium (LT 147'09) that was collected in 2009. The specimen is enclosed in hard siltstone which is best removed using a micro-engraver. The time available for this cleaning was limited, so only one side of the skull was partly prepared and consolidated, the fossil having been slightly crushed and twisted prior

to fossilisation. Nevertheless, the specimen yields precious information about the identity of the species, hitherto represented at Langental by two small enamel fragments of upper molars. It is now clear that the species concerned is *Rusingameryx aequatorialis* (Fig. 24), which is known mainly from Early Miocene deposits in Kenya and Uganda (20-16.5 Ma). The following images are of the partly cleaned fossil.

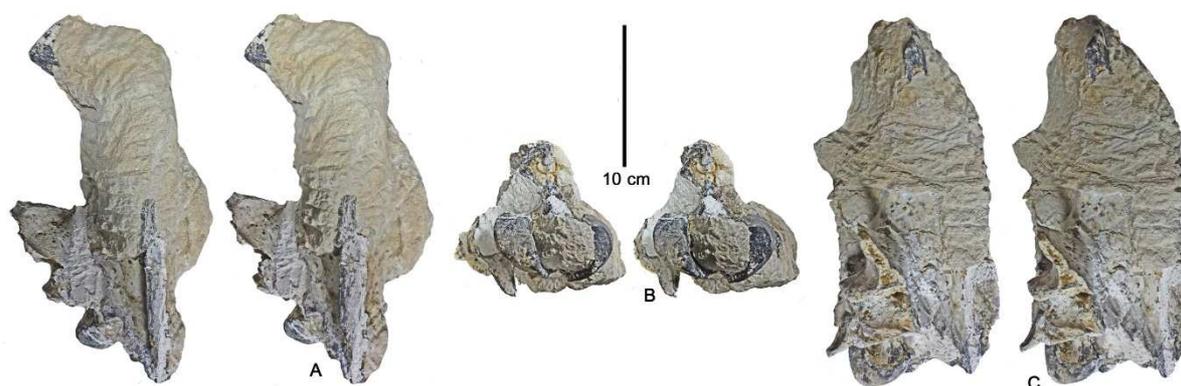


Figure 24. Stereo images of LT 147'09, partly prepared neurocranium of *Rusingameryx aequatorialis* from Langental. A) dorsal view, B) distal view, C) left lateral view

Glastal

A brief survey of the Early Miocene deposits at Glastal yielded a single specimen of the land snail *Dorcasia*, a genus that today is a denizen of summer rainfall, steppic to savannah areas of Namibia.

Neue Anlage

An hour was spent looking for fossils at Neue Anlage, a site that used to be known as

the Langental Shark Site. Over 100 shark teeth were collected, along with crab claws, bivalve shells (oysters) and fragments of coral. A poorly preserved mammal tooth was also found, but it is unidentifiable, although it shows some features of sirenians. Further searches are recommended as there could be additional mammalian specimens in the deposits.

Phase 2: Otavi Mountainland (Project Geo-Pal Namibia)

In 2025, the Otavi Mountainland survey was focussed on the sites Kombat E-900, Harasib 3a and Gross Otavi situated in the southern part of the area between the mining towns of Kombat and Tsumeb (Fig. 25).

Harasib 3a

One day was devoted to investigating the Harasib 3a karst breccias (Figs 26, 27). Thirty-five blocks of fossiliferous breccia were

collected, containing rodents (Fig. 28) and other microfauna. These blocks require digestion in acid in order to liberate the fossils.

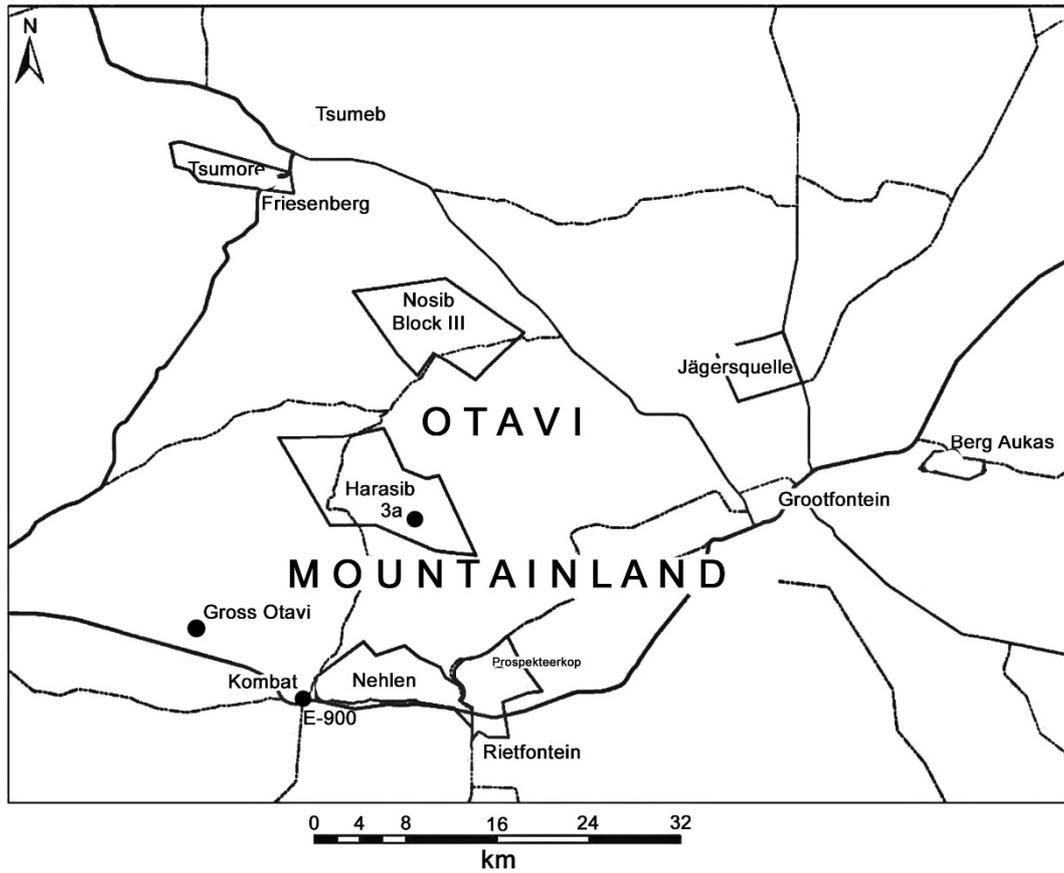


Figure 25. Fossiliferous localities in karst breccias of the Otavi Mountainland, Namibia



Figure 26. The glory hole at Harasib 3a, from which the bright red fossiliferous breccia was extracted during mining operations



Figure 27. Examining breccia blocks in the mine dumps at Harasib 3a, Otavi Mountains, Namibia



Figure 28. Small rodent palate *in situ* in a block of breccia from Harasib 3a, Otavi Mountains, Namibia

While studying the old collections from Harasib, a colobine incisor (Fig. 29) was noticed in a small box labelled 'non-rodent'. This specimen is compatible in dimensions with the other colobine teeth from the site

attributed to the basal Late Miocene genus *Microcolobus*, known mainly from Vallesian equivalent deposits (ca 11-10 Ma) at Ngerngerwa and Nakali, in the Gregory Rift Valley, Kenya.

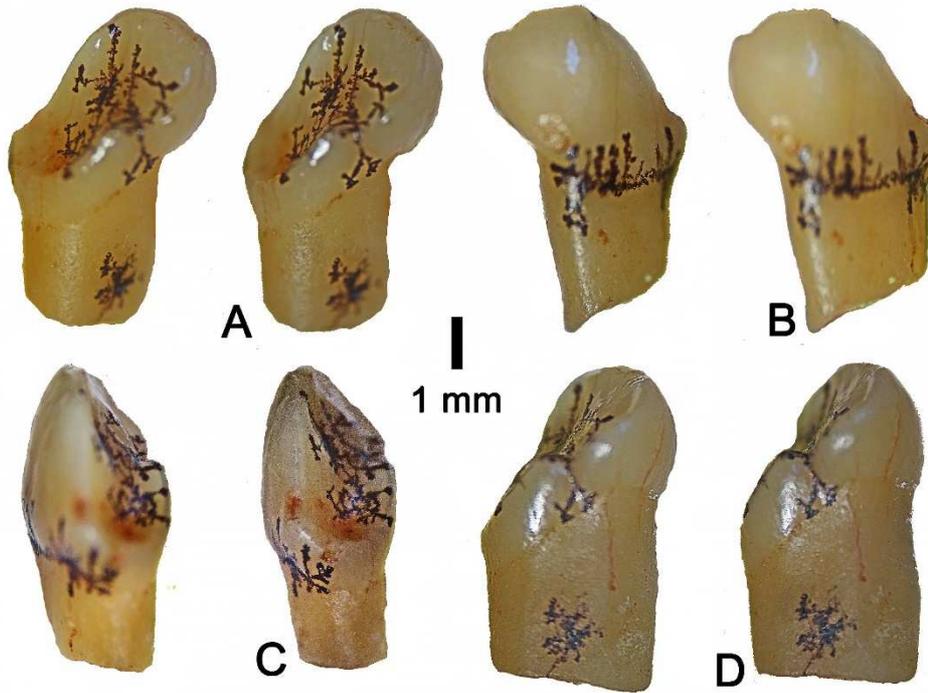


Figure 29. Stereo images of HA 1'25, right upper lateral incisor of *Microcolobus* sp. from the basal Late Miocene breccias at Harasib 3a, Otavi Mountainland, Namibia. A) lingual view, B) labial view, C) distal view, D) mesial view

Gross Otavi

A survey of the mineral prospecting pits at Gross Otavi revealed the presence of abun-

dant *in situ* epikarst breccia in fissures, and loose blocks of breccia in the dumps (Fig. 30), but no fossils were observed.



Figure 30. The mineral prospecting pits at Gross Otavi, Northern Namibia. The brown tones are epikarst breccia deposits, often containing descloizite, copper oxides and copper carbonates, but lacking in fossils.

Kombat E-900

Screening of the decalcified fissure filling at Kombat E-900 was continued (Figs 31, 32), with 55 sacks treated. The fractions greater than 2 mm were picked through on site and at the lodge. The faunal catalogue runs to 171 entries, and includes abundant ruminants,

hyracoids, macroselidids, lagomorphs and rodents, as well as a few birds, snakes and lizards (Figs 33-38). Among the mammals, the presence of the extinct springbok, *Antidorcas bondi*, suggests a Pleistocene age for the infilling. Substantial quantities of infilling remain to be treated at the site.



Figure 31. Dry screening of the sediment infilling at the Kombat E-900 'A' fissure. The dark-brown infilling is richly fossiliferous, yielding abundant bones and teeth that are impregnated with copper salts, which give them a blue to green interior colouration.



Figure 32. Wet screening of fossiliferous sedimentary infilling from Kombat E-900 'A' on Farm Felsenquell

Fractions of the Kombat sediments coarser than 2 mm were picked through and yielded over 150 specimens. The fractions finer than 2 mm remain to be examined in

detail, but they will undoubtedly yield abundant specimens of micromammals and other vertebrates.

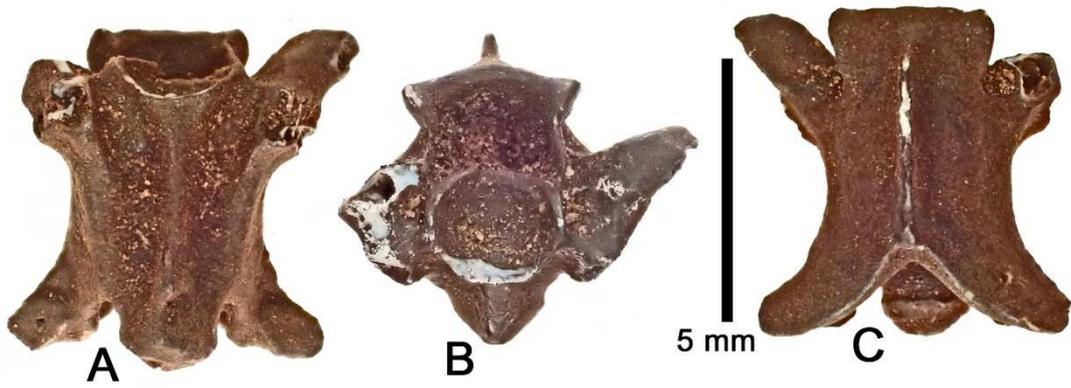


Figure 33. KOM 128'25, vertebra of a small lacertilian from Kombat E-900 'A' fissure. A) ventral view, B) cranial view, C) dorsal view

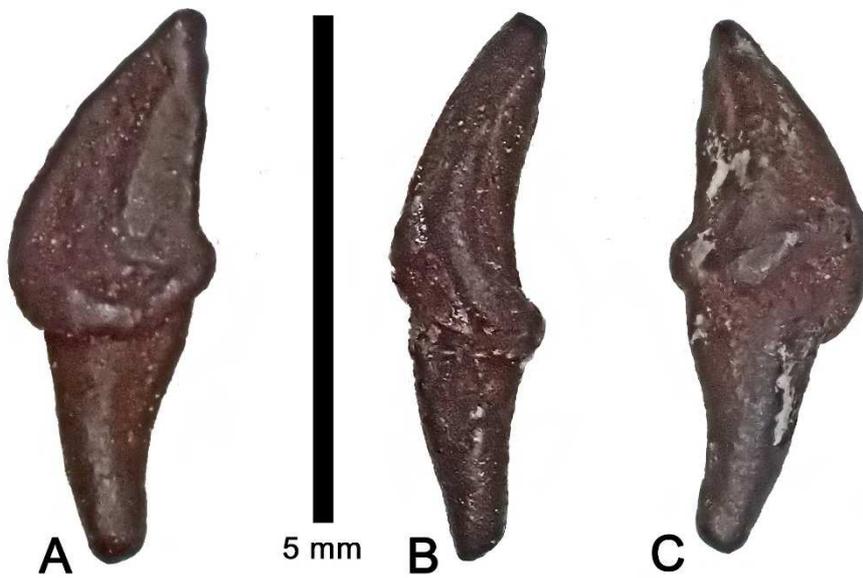


Figure 34. KOM 91'25, chiropteran canine from Kombat E-900 'A' fissure

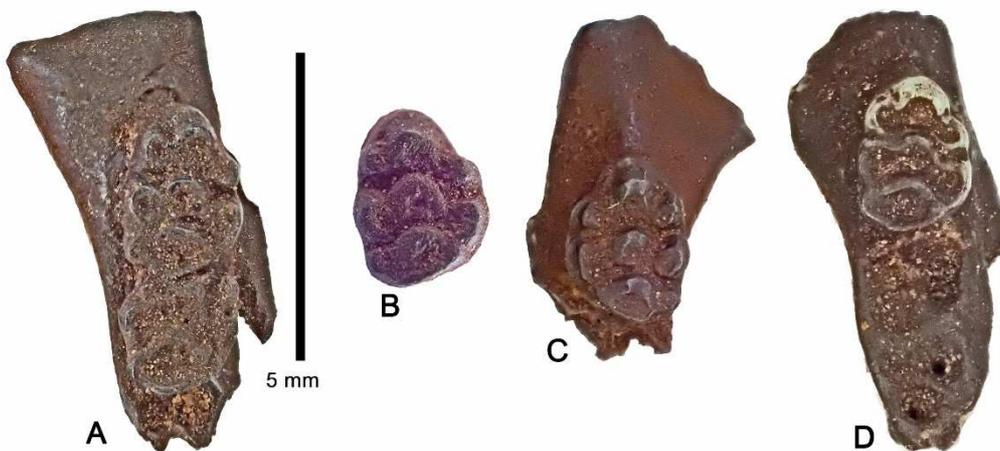


Figure 35. Occlusal views of upper dentognathic remains of *Micaelamys* sp. from Kombat E-900 'A' fissure. A) KOM 104'25, left maxilla with M1/ and M2/, B) KOM 114'25, left M1/, C) KOM 132'25, right maxilla with M1/, D) KOM 59'25, left maxilla with M1/

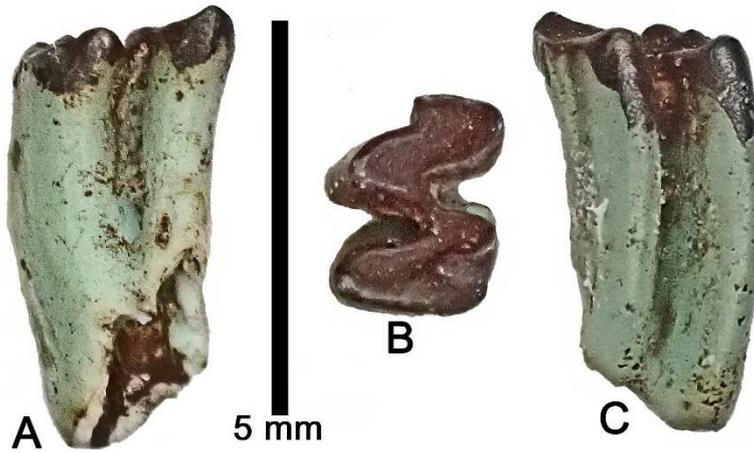


Figure 36. KOM 138'25, left p/4 of *Petromus* sp. from Kombat E-900. A) lingual view, B) occlusal view, C) labial view

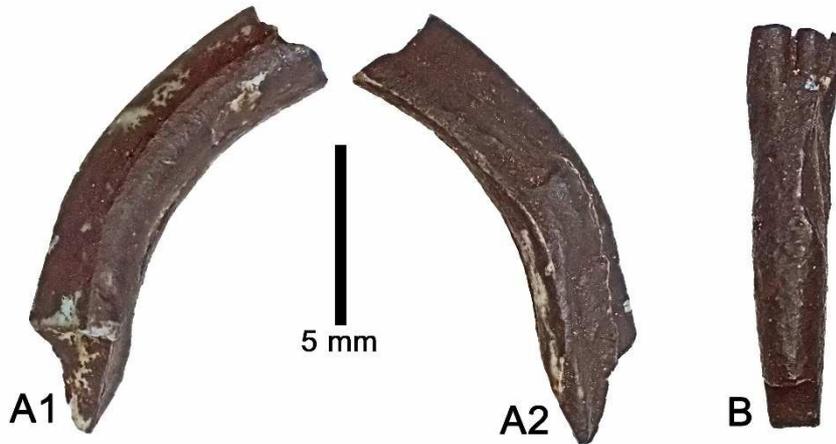


Figure 37. Incisors of *Procavia capensis welwitschii* from Kombat E-900 'A' fissure. A and B) KOM 60'25, mesial and distal views of male right I1/, B) KOM 61'25, lingual view of right i/1

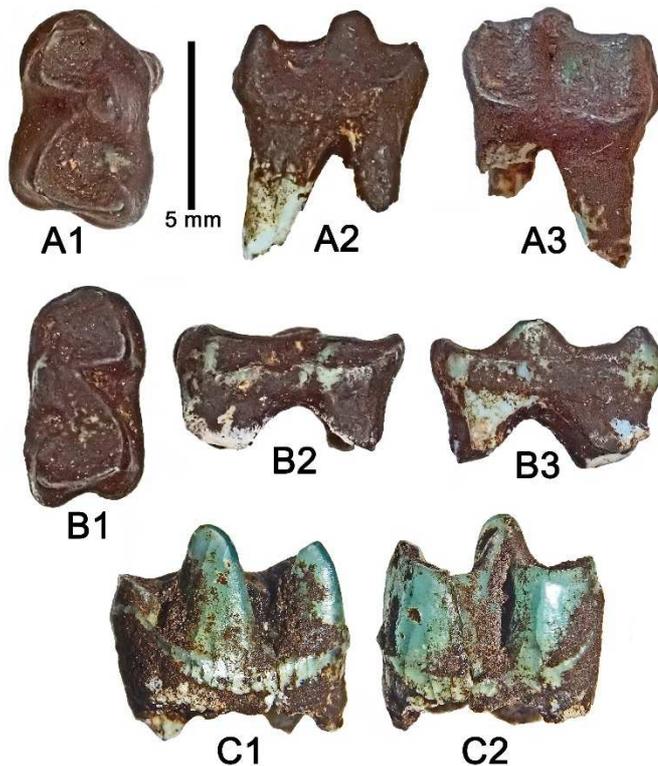


Figure 38. Lower cheek teeth of *Procavia capensis welwitschii* from Kombat E-900 'A' fissure. A) KOM 137'25, left p/4, A1 - occlusal view, A2 - lingual view, A3 - buccal view, B) KOM 56'25, right p/3, B1 - occlusal view, B2 - buccal view, B3 - lingual view, C) KOM 22'25, right m/1, C1 - lingual view, C2 - buccal view

The southern wall of the E-900 fissure consists of dolomite coated with a thin layer of calcified breccia. The latter deposit contains a few fossils (ruminant talus, bone flakes) *in situ* in the breccia. Of interest is the presence of root casts, especially one long, thick root cast which indicates that the fissure had a tree

growing at its surface, with roots penetrating deeply into the fissure (Fig. 39). Although the plant species is not identifiable, it is noted that the root casts are similar in dimensions to those of fig trees (*Ficus*) and other large plants such as Moringa, that today grow on the edges of fissures in the Otavi Mountains.

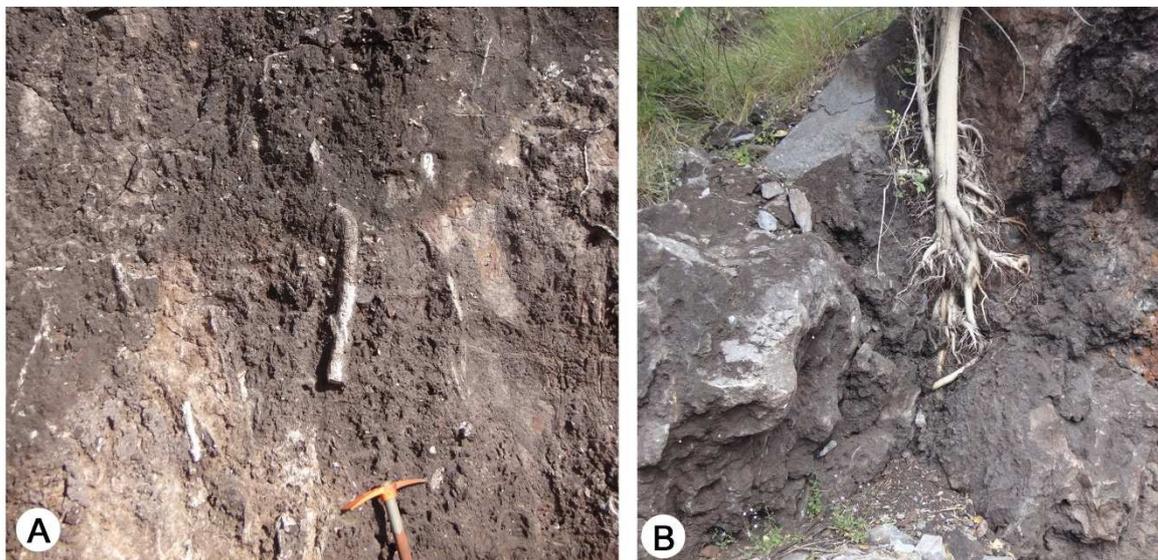


Figure 39. A) fossil root casts in the wall of the Kombat E-900 ‘A’ fissure (pick for scale), B) Moringa tree growing in a fissure close to the E-900 fossil occurrence with tap roots of similar diameter to the fossil in ‘A’

Discussion and conclusions

Both phases of the 2025 palaeontological field survey in Namibia were productive, with numerous fossils collected from the Sperrgebiet and the Otavi Mountains.

In the Sperrgebiet, in addition to the usual crop of taxa, some new occurrences were found, including jaws and post-cranial elements of a tiny macroselidid that is new to science, and some footprints of proboscideans in the Early Miocene deposits of Grillental. Associated skeletal remains of *Myohyrax oswaldi* were found at Grillental and Elisabethfeld, a finding that removes doubt about which postcranial elements go with which cranio-dental ones.

Examination of the coarse fluvatile grits that occur widely in the Grillental in the Northern Sperrgebiet, led to the conclusion that they probably accumulated at the same time as the Gemsboktal Conglomerates, which are widespread in the Central Sperrgebiet between the Klinghardt Mountains and the coast. As such the grits and the conglomerates likely

represent different facies of the same overall geological processes related to sporadic but violent rainstorms during the late Neogene that occurred in the hinterland which, at the time, was generally arid to hyperarid. The conglomerates are the proximal facies that accumulated on the relatively flat ground near the foot of the escarpment and mountains of the Inner Namib, often as overbank deposits, whereas the grits were transported by highly turbulent waters (flash floods) and were deposited further downstream within valleys traversing the Inner Namib and the Trough Namib. As such they are characterised by large-scale trough-crossbedding. The even finer facies (sand, silt, clay) were probably flushed out into the Atlantic Ocean. Even though the two units are poorly fossiliferous, they have yielded a few palaeontological remains (a tooth of the white rhinoceros, *Ceratotherium*, and eggshell fragments of *Diamantornis laini*) indicative of deposition sometime during the latest Miocene to Plio-Pleistocene periods.

The sediment infilling at Kombat E-900 'A' fissure in the Otavi Region, yielded abundant remains of ruminants and small mammals, including jaws and teeth of a species of lagomorph, probably *Pronolagus*. The presence of the extinct springbok *Antidorcas bondi* in the deposits, suggests that they are of Pleistocene age. Several dentognathic remains of the small dassie *Procavia capensis welwitschii* were collected, along with remains of a bat and some insectivores.

While examining fossils from Harasib 3a that are curated at the National Earth Science Museum of the Geological Survey of

Namibia, an upper incisor of a small colobine monkey was recognised in a box labelled 'non-rodent'. This brings to five the quantity of teeth of *Microcolobus* recovered from the site. Breccia blocks from the same site contain abundant remains of basal Late Miocene rodents and macroselidids, suggesting an age of ca 11-10 Ma for the breccias.

A survey of rock outcrops at Gross Otavi revealed the presence of abundant epikarst breccias associated with fissures and shallow caverns, but no fossils were observed in them.

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Recent Publications by members of the NPE

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