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## Abstract

The Alte Kalköfen Bird Observatory, probably the fifth in Africa, was formally opened on 8 February 2025 after a two-year proof-of-concept study. Unlike most bird observatories, the research opportunities it presents are primarily focused on resident and nomadic species rather than on migrants. The Alte Kalköfen Bird Observatory is located in semi-desert, and a key strategy to survive and reproduce in these kinds of arid environments is nomadism. Almost all nomadic bird species are poorly researched; thus one of the key goals of the Alte Kalköfen Bird Observatory is to capitalize on the research opportunities for studying these processes. We aim to gain an understanding of the biology and ecology of nomadic species; this is a missing component which is needed to maintain and develop biodiverse natural habitats for all animals in the district.

## Introduction

The first birds were ringed at the Alte Kalköfen Lodge on 15 January 2023. During the following 3.5 months, 3,440 birds of 56 species were ringed (Earlé 2024b). A proof-of-concept study was done during the next two years; one discovery in this period was of five species outside their known ranges in southern Namibia (Earlé 2024a). Given the large number and variety of birds, it was decided to launch the Alte Kalköfen Bird Observatory officially (Figure 1). This was done on 8 February 2025 (Figure 2), and this paper commemorates the event and aims to put the bird observatory into context.


**Figure 1:** Logo of the Alte Kalköfen Bird Observatory at the Alte Kalköfen Lodge, Sandverhaar farm, southern Namibia. It features the Pririt Batis *Batis pririt*, and the old lime kiln, built 1906, which gives the name to the lodge (and the bird observatory) .

**Figure 2**: The speeches to open the Alte Kalköfen Bird Observatory, southern Namibia, were made in one of the bird hides on 8 February 2025, and were followed by snacks and champagne.

## Location and habitat

The Alte Kalköfen Lodge (26°49'S 17°21'E) is in southern Namibia, 91 km west of Keetmanshoop and 120 km east of Aus (Figure 3). Lüderitz, on the coast, is 246 km away. The lodge itself is 2 km off the B4 national road on a good gravel road. The lodge and bird observatory are situated on the 20,500 ha farm Sandverhaar, which is roughly 22 km east-west and between 10 and 15 km north-south.

The area lies in the ecotone known as Dwarf Shrub Savanna, between the Namib Desert to the west and Kalahari Savanna to the east (Allan et al. 1997, Mendelson et al. 2009, Atlas of Namibia Team 2022). The farm has a wide variety of habitats: sand dunes, sandy grass veld, karoo scrub and dry thorn veld, and a "forest" of camel thorn trees along the usually dry course of the Gurib River (Figures 4 –7). It is a game farm used for observing wildlife rather than for hunting, and apart from the maintenance of several water points (Figure 8), there is minimal management.

There are 14 rain gauges scattered across the farm. Over a six year-period, the median rainfall at these 14 places varied between 20 mm and 58 mm, highlighting the extent of variability in rainfall on a small spatial scale. The median of all the annual rainfall values at the 14 localities was 37 mm, with an inter quartile range of 45 mm. This illustrates the enormous spatial variability in rainfall. The rain gauge at the Sandverhaar farmhouse recorded 8 mm of rain in the driest year (2024) and 175 mm in the wettest year (2022). In addition, the farm is on the interface between the summer-rainfall regime which covers most of Namibia and the winter rainfall section in the southwest. Thus, the seasonality of rainfall is unpredictable. This analysis uses medians rather than means because, in arid zones, means tend to be inflated by observations from a small number of extremely wet years.

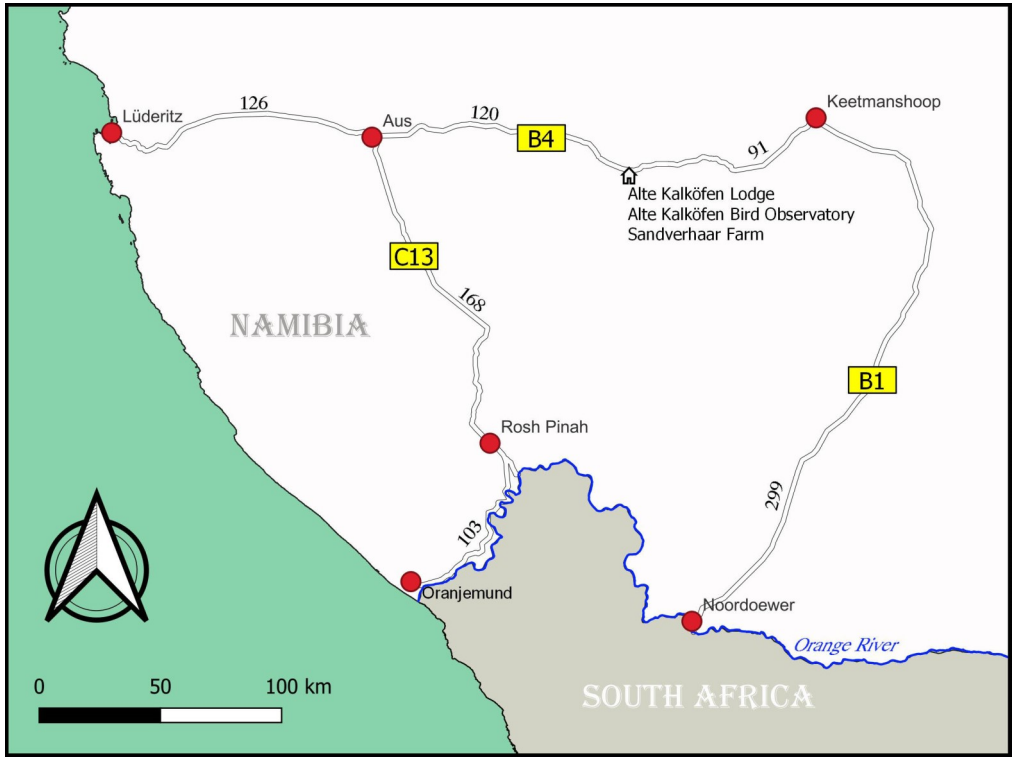


**Figure 3:** The Alte Kalköfen Bird Observatory, is based at the Alte Kalköfen Lodge on Sandverhaar farm, between Keetmanshoop and Aus, southern Namibia. Route codes and distances (km) between towns are shown. The distance from Cape Town to Alte Kalköfen Lodge via Oranjemund is 1,170 km and via Noordoewer and Keetmanshoop is 1,080 km.

## Birds around the Alte Kalköfen Bird Observatory

There is limited availability of surface water at Sandverhaar, but even less on most of the neighbouring farms, many of which are unoccupied. In this arid environment, the bird community contains a large proportion of nomadic species. These occur on passage, visiting the waterpoints at Sandverhaar briefly. Knowledge of

nomadism in this part of southern Namibia is weak. As noted above, five unexpected species were recorded at the Alte Kalköfen Bird Observatory at Sandverhaar (Figure 9) (Earlé 2024a).

In addition to nomadic species, the ecotone surrounding the bird observatory also hosts both long-distance and intra-African migrant birds, observed on passage through the area. Besides nomadic bird species, both long distance migratory birds to Eurasia and intra-African migrants also occur at Sandverhaar, observed on passage through the area. Small numbers of birds of migratory species spend the southern summer on the farm.

**Figure 4:** This habitat, known as Dwarf Shrub Savanna, is the ecotone between the Namib Desert to the west and the various categories of savanna to the east. The drainage line of Gurib River flows from left to right through the photo. These drainage lines are used by nomadic birds on passage. The Alte Kalköfen Lodge lies immediately beyond the trees near the right edge of the photo. The photograph was taken from a viewpoint close to the Sandverhaar farmhouse.

**Figure 5:** At c. 1000 years, this Camel Thorn *Vachellia erioloba* (Afrikaans Kameeldoring) tree in the Gurib River is believed to be the oldest tree on the Sandverhaar farm. Notice the two people standing at the base of the trunk.

**Figure 6:** The dry sandy bed of the Gurib River.

Thus, the Sandverhaar farm is a 'magnet' in the landscape for birds. By February 2025, the number of species recorded was 112, and this count is growing steadily. Many of these species are represented by a small number of records; the number of species a short-term visitor can realistically expect to see is of the order of 20.

At the lodge and at the Sandverhaar farmhouse there are well-watered gardens which are regularly visited by birds. In particular, at the Alte Kalköfen Lodge, the garden has lawns, trees and shrubs (Figure 10) and is an "oasis" in a semi-desert environment. A few species have more-or-less become residents here.

There are groves of date palms (Figure 11) and pomegranates. When the fruit ripens, the birds congregate at these groves.

## Bird observatories

Starting at various times during the 20th century, bird observatories have made a huge contribution to ornithology, especially towards understanding bird migration (Dunn 2016). Over the decades, they have proved to be an effective means to build focused links between academic researchers, farmers, landowners and other members of the public, especially learners and citizen scientists.

Most bird observatories are located in the northern hemisphere, at places where there are concentrations of migrant bird species. They have thus traditionally had a focus on migration. In fact, many operate only during the migration seasons in spring and autumn. Long-

**Figure 7:** View across the Gurib River, showing the "forest" of Camel Thorn trees.

**Figure 8:** These watering points represent the limits of management on Sandverhaar farm. Solar power is used to pump water to the surface. The design minimizes the risk of drowning.

**Figure 9:** The African Cuckoo *Cuculus gularis* is a summer visitor to northern Namibia, with occasional records to localities c. 200 km to the north of the Alte Kalköfen Bird Observatory (Earlé 2024a). This immature occurred at the lodge from 19 to 24 May 2024, and is probably an example of reverse migration. It is one of five species unexpectedly recorded here (Earlé 2024a).

**Figure 10:** Part of the garden at the Alte Kalköfen Lodge, where a small number of bird species have become resident. This is effectively an "oasis" or an "island" in an arid environment.

established bird observatories have generated invaluable long-term datasets, and it was primarily bird observatory data that alerted us to the fact that northward migrations were trending earlier in the northern spring than they did previously (Mills 2005, Remisiewicz & Underhill 2020, 2022). Dunn (2016) maintained that, in addition to the existing knowledge generated by bird observatories, there still remained a gold mine of information in the data sets collected consistently through time. This has yet to be harnessed.

Unlike most of the others, the Alte Kalköfen Bird Observatory is not located at a concentration point for migrants. However, the norms and standards adopted at existing bird observatories represent a starting point for this initiative. The concept of "bird observatory" needs to be adapted and extended to capitalise on a different set of opportunities which are available here and at many other places. Thus, one of the goals of this paper is to design a set of strategies for a "general" bird observatory, in such a way that there are a wide range of potential research and conservation projects, and not a primary focus on migratory birds.

The research objectives of bird observatories which are not on migration routes need to be devised and implemented. For a bird observatory at a locality in southern Africa, these objectives would need to be based on the bird community in the area. In broad terms

**Figure 11:** This isolated grove of date palms attracts birds during the fruiting season and is a good mist-netting site during this period.

this community could be subdivided into three categories: resident, nomadic and migrant (both Palearctic and intra-Africa) species. For resident species, three obvious research investigations relate to the study of moult, the estimation of survival, and the development of ageing and sexing guides. For nomadic species, patterns of occurrence in relation to rainfall events represent a research opportunity. For migrants, patterns of occurrence in relation to seasonal calendar are the obvious project. Inevitably, most research projects cannot focus solely on the birds; for many the study will need to include fieldwork on the contexts the birds inhabit: food availability (seeds, fruit, prey), predators, temperature, rainfall, and other factors. The overarching objective of the bird observatory should be to generate information which guides the conservation and management processes for birds, other animals and habitat as a whole.

**Figure 12:** This individually colour-ringed Familiar Chat *Oenanthe familiaris* was ringed on 12 March.2023 in the campsite at the Alte Kalköfen Lodge. The mate is also ringed and this bird is believed to be the female. It was seen several times at waterholes at the lodge in January and February 2025; this observation was made at the opening of the Alte Kalköfen Bird Observatory on 8 February. It had a nest in one of the empty pots in the lithoparium but the three chicks were taken by a domestic cat when four days old on 18 February. Projects like this, in which individual birds can be recognized, are valuable for studying reproductive behaviour.

One of the core values of many existing bird observatories is tightly disciplined standardization of fieldwork methods. They generally aim to operate over the same periods each year, with measures of fieldwork effort kept consistent. A major advantage for observatories which focus on migrant (and probably also nomadic) species is that

the birds are on passage and nets can remain stationary week after week.

For resident species, it will probably be necessary to develop a regular rotation of fieldwork between a network of sites. The location of the Alte Kalköfen Lodge as a small “oasis” in an arid landscape creates a further set of research opportunities; with limited numbers of birds of each resident species it is possible to accept the challenge of individually marking all resident birds of a species (Figure 12). Unmarked individuals which arrive are then part of the nomadic population of the species (Figure 13).

Figure 13: Unringed African Red-eyed Bulbul *Pycnonotus nigricans* drinking at a waterhole at the Alte Kalköfen Lodge. Once all the resident bulbuls have been ringed, this would be a nomadic individual. Notice the extensive wear on the feathers. This is likely to be a young bird because of the scalloped tips to some of the feathers on the back. Developing ageing guides is a priority.

## The Alte Kalköfen Bird Observatory as a component of a network of bird observatories

The Alte Kalköfen Bird Observatory is probably the fifth bird observatory in Africa. Others that we are aware of are in Morocco, The Gambia, Nigeria and Kenya (Table 1).

It is planned to establish a network of long-term bird monitoring sites in southern Africa. These will support research projects by having field sites with infrastructure, established protocols and affordable accommodation. We are wanting to establish a broad set of opportunities for researchers, postgraduate students, landowners and citizen scientists to interact and jointly support conservation-based research.

We recognise that our research is taking place under dynamic circumstances. Climate change and land-use change have accelerated in the last 30 years, and are likely to accelerate further, putting increased pressure on ecosystems, wildlife, and humans (Simmons et al. 2004). Biodiversity has declined globally in recent decades, and this is potentially catastrophic. It will require good science to understand how humans are affecting nature – through cities, farming, human geography, conservation practices, natural resource use, and industrial development – and to understand how changes in nature are impacting humans. Good science depends on good data. Long-term datasets require a quality of scientific monitoring based on robust standardised protocols, conducted year-on-year.

Because of the unique location of the Alte Kalköfen Bird Observatory at Sandverhaar, it is an ideal location for the long-term study of bird populations and movement of birds in an arid environment. The temporal and spatial variability in rainfall impacts biodiversity; vegetation responds rapidly to rainfall events, which may happen only a few times per decade. The impact of these sporadic rainfall events is massive. After sufficient rain, grasses and shrubs grow rapidly and provide food for herbivores and generate an increase in food availability. The increase in vegetation also creates sheltered micro-habitats for many species. There are major impacts on the mobile

**Table 1**: Bird observatories in Africa

| Bird observatory | Place (coordinates) | Start year | Focus | More information (website, blogs, publications) |
|---|---|---|---|---|
| Yasmina Oasis | Morocco 31°13'N, 3°59'W | 2015 | Palearctic migrants | Aispuro et al. 2023 https://yasminaprimavera.wordpress.com/ |
| Kartong Bird Observatory | Southwestern extremity of The Gambia 13°05'N 16°45'W | 1996, official start 2010 | Palearctic and intra-African migrants and residents | https://www.kartongbirdobservatory.com/ |
| APLORI | Jos, Nigeria 9°53'N 8°59'E | 2001 | Palearctic migrants and residents | Ishonga & Omotoriogun 2022 https://www.aplori.org/research/monitoring-constant-effort-scheme-ces |
| Ngulia Lodge | Tsavo West National Park, Kenya 3°00′S, 38°13′E | 1969 | Palearctic migrants | Pearson et al. 2014 |
| Alte Kalköfen Bird Observatory | Between Keetmanshoop and Aus, Namibia 26°49'S, 17°21'E | 2023, official start 2025 | Nomads and residents | Earlé 2024a, 2024b https://thebdi.org/2024/09/12/alte-kalkofen-bird-observatory/ https://thebdi.org/2024/09/12/bird-ringing-at-alte-kalkofen-bird-observatory-january-to-april-2023/ |

components of biodiversity, for example, insects and birds. Not only does species richness increase, but also the numbers of individuals of most species. In contrast to the rapid response to rainfall events, the process of desiccation is gradual and there is a long and slow decrease in biodiversity, potentially over a period of years. The species occurring in these arid habitats are adapted to these variable conditions. One key strategy to survive and reproduce here is nomadism (Mendelsohn et. al. 2009). The Alte Kalköfen Bird Observatory provides excellent facilities for studying these processes. Almost all of these bird species are poorly researched; most have never featured in a full-length scientific paper. The specific objective of the Alte Kalköfen Bird Observatory will thus be to study the nomadic behaviour of a variety of species. This is achieved mainly through bird ringing. The aim is to gain an understanding of the biology and ecology of the birds as part of maintaining and developing biodiverse natural habitats for all animals in the region.

In southern Africa, citizen-science projects – bird atlasing (Brookes et al. 2022), bird ringing, surveys of waterbirds and large terrestrial birds – continue to generate most of the long-term bird monitoring data. Establishing long-term monitoring stations in South Africa will improve these existing monitoring data by providing greater continuity.

## Practicalities

The bird observatory is based at the Alte Kalköfen Lodge, which provides the most accessible accommodation between Keetmanshoop and the coast. The lodge offers an array of accommodation options: chalets, self-catering cottages and camping (Figure 14). The restaurant overlooks a waterhole and has panoramic views of the surrounding landscape (Figure 15). Namibia's largest collection of *Lithops* plants ("flowering stones") is housed in the "Cole Lithoparium".

**Figure 14**: Alte Kalköfen Lodge offers an array of accommodation options: chalets, self-catering cottage and camping. The building on the left is one of the two self-catering cottages; with some of the 10 chalets beyond it. The camping site is about 100 m to the right of this photograph.

It is possible to experience the bird observatory as a day visitor to the Alte Kalköfen Lodge. However, because the early mornings and the late afternoons are the best times for birding, especially during the hot summer months, it is advisable to stay at the lodge for a night, and preferably at least two nights. Ringing is mostly done early in the day (Figure 16).

Atlasers are encouraged to make checklists for the Namibian Bird Atlas using the standard SABAP2 protocol (Brooks et al 2022). The lodge falls within pentad 2645_1720. At the end of 2024, the pentad had 14 full protocol cards with 86 species in total. Neighbouring pentads are poorly covered.

Ringers are welcome to bring their own bird ringing equipment. All bird ringing is done using rings from the South African Bird Ringing Unit (SAFRING) at the University of Cape Town (Underhill & Oatley 1994). Bird ringers need Namibian bird ringing permits and SAFRING authority cards. SAFRING is the custodian of data.

**Figure 15:** View from the restaurant at the Alte Kalköfen Lodge. A herd of Gemsbok *Oryx gazella* visits the waterhole regularly.

The Alte Kalköfen Bird Observatory encourages both professional ornithologists and citizen scientists to consider the bird observatory as a research site for scientific studies of birds (and other animals) and their environment, especially for projects with a focus on nomadic species. Potentially, bird ringing at the observatory can be carried out throughout the year; there are ringing sites around the Alte Kalköfen Lodge complex itself and at various other locations on the farm, e.g. along dry riverbeds, waterholes, and date and pomegranate groves.

The Alte Kalköfen Bird Observatory is affiliated to the Biodiversity and Development Institute (BDI) (https://thebdi.org). The BDI includes ringing events at the bird observatory in its programme, listed on its website. In addition to this, information is available by email (birdobservatory@altekalkofenlodge.com).

**Figure 16:** Early morning mist-netting in the in the bed of the Gurib River

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