

A little known colony of Emperor penguins on the coast of the eastern Weddell Sea

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*A little known breeding colony of Emperor penguins *Aptenodytes forsteri* on the fast ice of the Drescher Inlet, Vestkapp Ice Shelf (72°52'S, 19°25'W) in the eastern Weddell Sea was surveyed, and movements of individuals within and the spatial extent of the colony are reported.*

*'n Sensusopname was gemaak van die onbekende broeiplek van Keiserpikkewyne *Aptenodytes forsteri* op die vaste ys van die Drescher-inham, Vestkapp-ysbank (72°52'S, 19°25'W) in die oostelike Weddellsee. Daar word verslag oor bewegings binne die kolonie en oor die kolonie se verspreiding gedoen.*

Introduction

Since Emperor penguins (*Aptenodytes forsteri*) reproduce on fast ice during winter and spring and have one of the southernmost breeding distributions of any bird, colonies have seldom been visited at times when the colony sites and num-

bers of breeding pairs can best be assessed. Hence, estimates of their abundance have relied largely on incomplete and biased censuses. Only colonies near Showa, Mawson, Dumont D'Urville and McMurdo stations have been reliably surveyed in the past (Wilson 1983). Particularly in the eastern Weddell Sea comprehensive data on the distribution and abundance of this important predator are missing. Here, due to environmental and logistical constraints imposed on ship operations in heavy sea ice, our present knowledge of the avifauna originates entirely from summer cruises of research and supply vessels into this remote and hostile pack ice region.

Along this coast from Gould Bay to Atka Bay (Fig. 1) five breeding colonies of Emperor penguins have been reported, although not all of them have been properly described. Those farthest to the southwest are at Gould Bay (77°30'S, 48°30'W) and Halley Bay (75°40'S, 27°14'W) (Watson *et al.* 1971, Wilson 1983). A third one is at Stancomb-Wills Promontory (74°00'S, 22°50'W), though claimed to be no longer

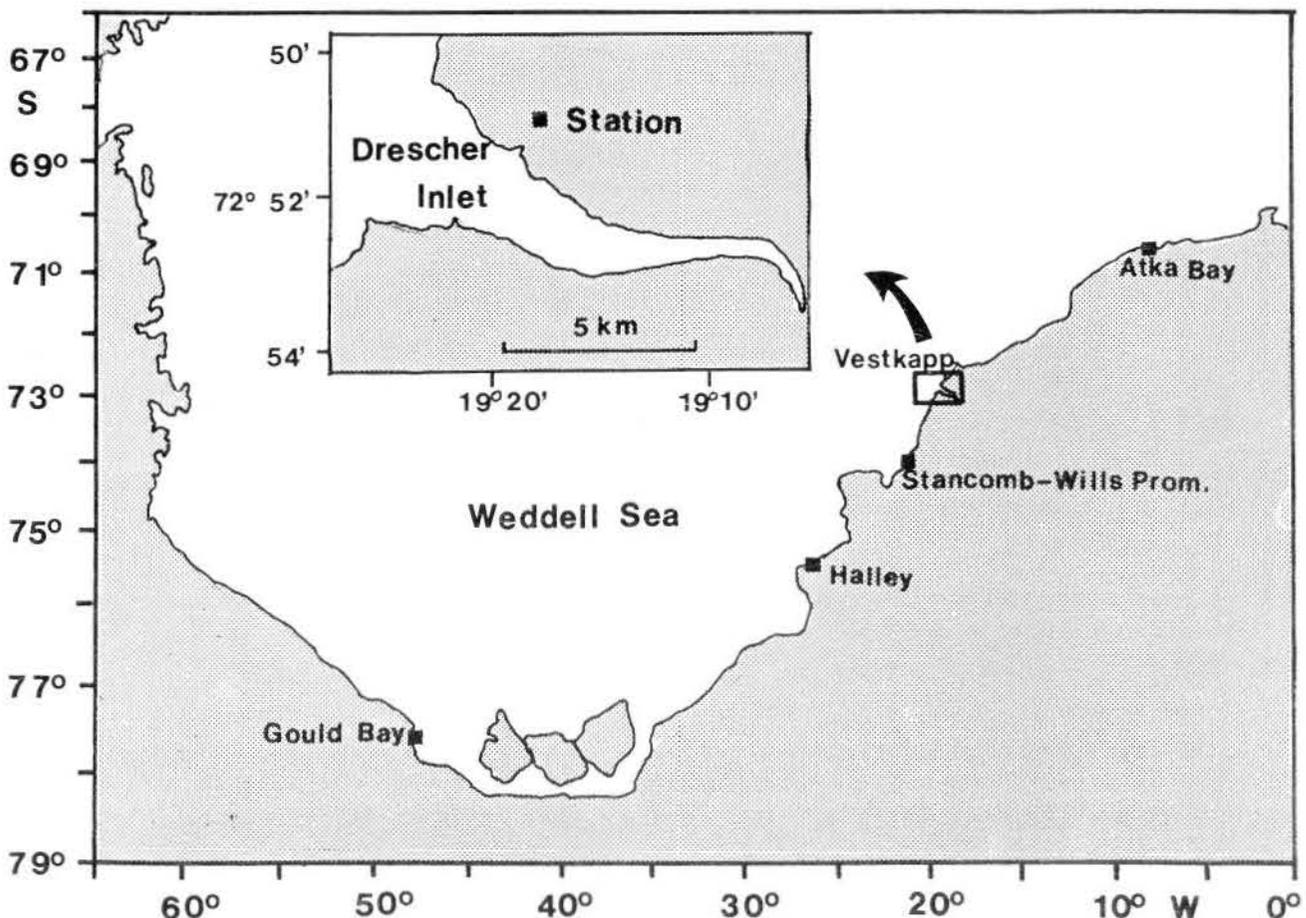


Fig. 1. Map of the Weddell Sea with the locations of the five Emperor penguin colonies reported to date between Gould Bay and Atka Bay; and the Drescher Inlet with the position of the newly-established West German research station (inset).

extant by Wilson (1983), and Atka Bay (70°33'S, 08°00'W) in the northeast also has a colony (Drescher 1982).

A fifth one, discovered in 1985 in the Drescher Inlet (Hempel 1985), is described here. The establishment of a field station during the Winter Weddell Sea Project (WWSP) with RV *Polarstern* in spring 1986 in its immediate vicinity provided the opportunity for a survey of this colony. Breeding birds and their chicks were counted and movements within and the spatial extent of the colony were investigated. A study of their food and feeding biology has also been made (Klages in press).

Methods

An aerial census took place on 14 October and a ground count on 24 October 1986. The penguins were directly counted by two persons on the ground according to the method outlined by Budd (1962) as "count en masse". Adults and chicks were assessed separately by each person. Figures given in Table 1 are averages based upon consensus

Table 1
Ground counts of Emperor penguins on 24 October 1986 at Drescher Inlet, eastern Weddell Sea

Subcolony	Adults	Chicks
A	470	270
B	3 890	3 830
C	2 535	2 560
D	540	0
E	90	0
Total	7 525	6 660

between the two observers following discussion of any difficulties encountered during the counts. Aerial photographs (colour transparencies) were made from a helicopter at an oblique angle while flying past the colony using a 35 mm camera equipped with a 80–200 mm zoom lens. The photographs were evaluated by projecting them onto large sheets of paper and marking all the adult birds with a pen. The limited resolution of the photographs did not permit counting of chicks. Between 20 October and 22 November 1986 the colony was visited almost daily, and the behaviour of the penguins in relation to the formation of subcolonies recorded. Distances on the ice were measured by driving a Skidoo equipped with an odometer.

Results

Locality

The Emperor penguin colony described here for the first time in detail is situated on the fast ice of the Drescher Inlet (72°52'S, 19°25'W), at the Vestkapp Ice Shelf, eastern Weddell Sea (Fig. 1). The funnel shaped inlet is about 6 km wide across the mouth and about 20 km long. The first 12 km are orientated east-west, thereafter it narrows down to less than 1 km and bends to the south. During winter it is completely covered by thick and stable ice while in summer large parts become ice-free. Even under conditions of maximum ice cover the penguins have relatively easy access to the open sea at the mouth of the inlet because of the presence of a pronounced polynya along the coast.

Census

Counts from the aerial photographs indicated that 6 970 adult Emperor penguins were present in the colony on 14 October 1986, distributed into eight distinct subcolonies. The direct census (ground count) yielded totals of 6 660 chicks and 7 525 adults on 24 October (Table 1). By this date the colony had changed into a different formation and was now structured into five subcolonies. Almost all chicks were still guarded by a parent, and crèche formation was about to begin. Subcolonies A, B and C consisted of chicks and adults whereas subcolonies D and E situated at the far end of the inlet contained only adults. No penguins in immature plumage were seen.

Subcolonies and movements

Faecal stains, dead eggs, and carcasses indicated that the penguins utilized nearly the entire area of the inlet as breeding ground during the breeding season (from approximately April onwards); only a small strip about 3 km wide at the mouth remained unoccupied. Ice conditions are not stable here and the sea ice is likely to break up during gales or when icebergs drift past. Signs of the presence of penguins were found as far as 12 km from the mouth of the inlet.

At any given time the colony was split up into several subcolonies of variable size and configuration consisting of between <100 and 8 000 birds. These were never stable units but changed their composition very frequently within days. Subcolonies were up to 4 000 m apart. The areas covered by them varied between 700 to 10 000 m² depending on the number of birds and weather conditions. On cold days or those with snow drift the penguins huddled closer together and adjacent subcolonies united, whereas on sunny days they spread out. As the season advanced the whole colony moved closer to the open sea.

Adults returning from foraging trips invariably headed to the subcolony nearest to the edge of the sea ice in order to call and search for their chicks. If they failed to get a positive response they moved on to the next subcolony and repeated their calls until eventually they had found their offspring. Adults receiving no reply at all gathered in the back of the inlet and, after a resting period, returned to the sea.

Discussion

Since Emperor penguins raise their young without a nest or preferred standing place within a colony they can move freely to more favourable places if necessary (Le Maho 1977). Regulation of the micro-climate within a subcolony according to prevailing weather conditions, and the habit of eating snow to supplement their water intake (Le Maho 1977) are the most likely explanations why subcolonies form and frequently move to new places with fresh and clean snow. This mobility demands that each time a parent returns from a foraging trip it has to search for its chick and guarding partner among all the other birds. Division of the colony into subunits facilitates this search.

Despite a ten-day lapse between the aerial census and the ground count the results of the two censuses match well. The remaining difference in the numbers of adults may have been caused by the oblique angle at which the photographs were taken because in some cases birds standing in dense aggregations were hidden from view by those standing in front. The observed ratio of adults to chicks of 1:1 during the ground count in subcolonies B and C is consistent with one adult per pair remaining with their offspring while the part-

ner is feeding at sea. Additional adults may be accounted for by both members of the same breeding pairs being present at change-over. Others, like those birds that gathered at back of the inlet (subcolonies D and E) are most probably unsuccessful breeders which lost their young recently; some others may have missed their chicks on their way through the subcolonies.

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