

Distribution and size of Adélie penguin colonies in Amundsen Bay, Enderby Land, Antarctica

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南極エンダービーランド・アムンゼン湾におけるアデリーペンギンの
集団繁殖地の分布と繁殖数

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要旨: アデリーペンギンの集団繁殖地の分布および繁殖数の調査を、1998年12月23日、エンダービーランド・アムンゼン湾において、ヘリコプターをもちいて行った。これまでに報告されていた1カ所に加え、新たに3カ所の集団繁殖地を発見した。これら4繁殖地でのアデリーペンギンの繁殖数の合計はおよそ9760ペアで、アムンゼン湾の繁殖個体群は東エンダービーランドにおける最大規模の繁殖個体群であることが明らかになった。

Abstract: Adélie penguin colonies were surveyed throughout ice-free areas in Amundsen Bay, Enderby Land, from a helicopter on 23 December 1998. The locality and number of breeding pairs of three newly discovered colonies, in addition to a known colony are described. In total, about 9760 pairs of Adélie penguins breed in the four colonies in this region, comprising one of the largest breeding populations in eastern Enderby Land.

1. Introduction

Adélie penguins (*Pygoscelis adeliae*) are the most widely distributed penguin species in Antarctica (Woehler, 1993). The distribution of the breeding population and the population status of Adélie penguins have received much attention, because their population change is believed to indicate the effects of environmental change (Agnew, 1997; Smith *et al.*, 1999) and the degree of human activities (Woehler *et al.*, 1994), on penguin populations and on organisms that form the diet of penguins. Accordingly, it is essential

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to have more accurate data on the Adélie penguin populations over the coast of Antarctic continent to monitor environmental change.

In the eastern area of Enderby Land, Antarctica, Adélie penguin colonies have been reported at Casey Bay, Mt. Bischoe, Aagaard Island, Proclamation Island and Cape Batterbee (Cooper, 1985; Bassett *et al.*, 1990; Woehler, 1993). Recently, Kato and Ichikawa (1999) reported an Adélie penguin colony on the south-western coast of the Mt. Riiser-Larsen area of Amundsen Bay. However, there has not been a comprehensive search for penguin colonies over the entire area of Amundsen Bay. We carried out a ground survey of the Mt. Riiser-Larsen Coast colony reported by Kato and Ichikawa (1999), followed by a detailed aerial survey in this region in the 1998/99 austral summer. Here we report the distribution and size of four Adélie penguin colonies found in Amundsen Bay.

2. Methods

Prior to the helicopter survey, an Adélie colony and an emperor penguin colony that were previously reported in Kato and Ichikawa (1999) were visited on 22 December 1998. In this colony, breeding pairs were counted from the ground. Most nests were at the incubating stage, and some had hatchlings.

Ice-free areas of the continental coast and islands of the Amundsen Bay region were searched for penguin colonies from a helicopter of the icebreaker "Shirase", on 23 December 1998 (Fig. 1). The helicopter ordinarily flew at 70 knots and an altitude of 1000 feet, dropping to 600–700 feet to take photographs when we found penguin colonies. The number of breeding pairs was counted from the photographs later.

3. Results and discussion

In the Amundsen Bay region, four Adélie penguin colonies were found. The locality and size of each colony is shown in Fig. 1 and Table 1. The Sheelagh Islands colony was observed on a rocky island surrounded by fast sea ice on 23 December 1998. The sea ice around the island disappeared on 23 January 1999, when the icebreaker "Shirase" returned to Amundsen Bay. Penguins nested on nearly all of the available flat space on the island. The Mt. Riiser-Larsen coast colony was located on moraine banks near a glacier (Kato and Ichikawa, 1999). We found an albinistic individual incubating an egg in this colony (Nishikawa *et al.*, 2000). The Mt. Gleadell coast colony was located on the north-western side of Mt. Gleadell, near the seashore. The colony on the coastline at the north of Beaver Island is on the ice-free seashore of small peninsula surrounded by fast sea ice. In total, 9759 pairs of Adélie penguins breed in this region. Woehler (1993) summarized the number of breeding pairs in the eastern Enderby Land area, as 5000 pairs at Mt. Bischoe and Proclamation Island and almost nil on Aagaard Island. Breeding population size is not known for the Casey Bay and Cape Batterbee colonies. So Adélie penguins breeding in Amundsen Bay comprise one of the largest local populations reported in the eastern Enderby Land area.

The colony at the mouth of the Bay is large compared to colonies in the inner part. This might be related to the long persistence of fast sea ice in the inner part, because the

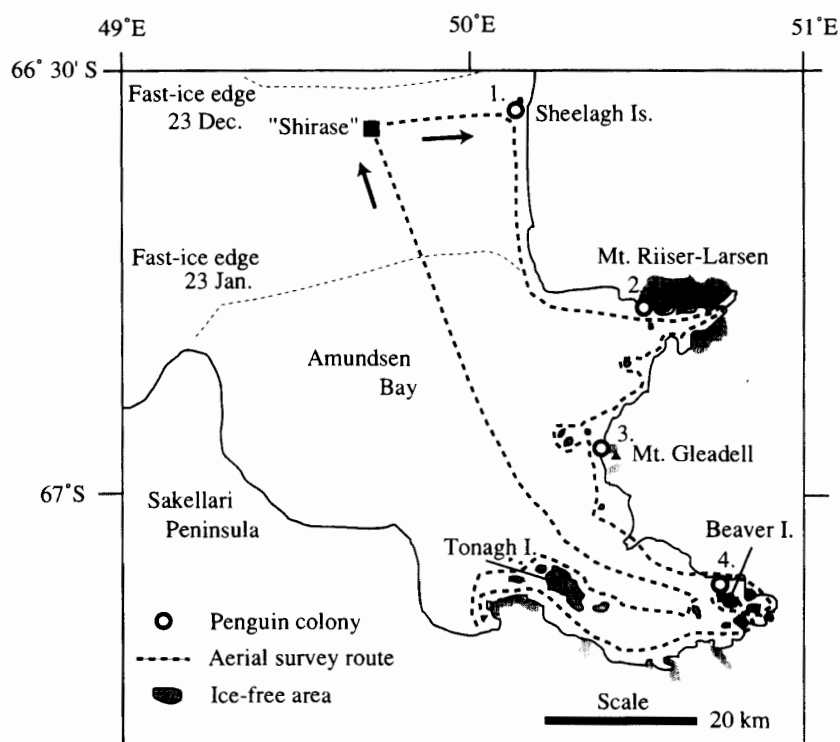


Fig. 1. Adélie penguin colony sites and the aerial survey route in Amundsen Bay, Enderby Land.

Table 1. Colony localities and number of breeding pairs of Adélie penguins in Amundsen Bay, Enderby Land, in 1998/1999.

Colony	Geographical position		Number of breeding pairs
1. Sheelagh Islands	66° 32'S	50° 11'E	5760
2. Mt. Riiser-Larsen coast	66 47	50 33	1873
3. Mt. Gleadell coast	66 56	50 25	1384
4. Coastline at the north of Beaver Island	67 05	50 42	742

presence of sea ice near the breeding colonies negatively affects the breeding success of Adélie penguins (Ainley *et al.*, 1983; Watanuki *et al.*, 1993).

Kato and Ichikawa (1999) reported the number of breeding pairs of the Mt. Riiser-Larsen Coast colony as 877 pairs on 17 December 1996, which is less than half of our counts (1873 pairs). However, there was little difference in the extent of the area of this colony between 1996/97 and 1998/1999. The area occupied by penguins is related to the number of nests (Woehler and Riddle, 1998). So it is unlikely that all of the increase of counts reflects a real increase of breeding number in the later survey. The nest count by Kato and Ichikawa (1999) was based on photographs taken from the ground. Some of the nests located between moraine banks might be missed, as the elevation is not enough to cover the entire colony (A. Kato, personal communication). As our count method was

direct ground count walking through the colony, part, at least, of the increase in number is attributable to the improved method.

At the Mt. Riiser-Larsen Coast colony, in addition to Adélie penguins, we found 130 emperor penguin chicks forming a crèche, they were probably hatched at the nearby colony reported in Kato and Ichikawa (1999).

During the aerial survey, 524 Weddell seals were also counted from a window on one side of the helicopter.

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