ADÉLIE PENGUIN CENSUS IN THE 1981–82 AND 1982–83 BREEDING SEASONS NEAR SYOWA STATION, ANTARCTICA

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Abstract: Results of Adélie penguin population census in the 1981–82 and 1982–83 breeding seasons on the Prince Olav Coast and the Sôya Coast, East Antarctica are described. The record of a newly found rookery in Tenmondai Rock on the Prince Olav Coast is also included. The Adélie penguin populations which continuously reduced after the 1970–71 season in the rookeries of Ongulkalven, Mame-zima Island and Rumpa remarkably increased for the two seasons. Although the relation between the fluctuation of Adélie penguin population and the sea-ice condition around the rookeries in the summer is discussed, it is concluded that further studies are required for explaining the relationship.

1. Introduction

As part of biological monitoring programs of the Japanese Antarctic Research Expedition (JARE), the population census of the Adélie penguin (*Pygoscelis adeliae*) was systematically commenced in 1981, in response to the programs of International Survey of Antarctic Seabirds (ISAS) in the framework of the Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS). This national program comprised the assessment of the total population of the Adélie penguin and the monitoring of the yearly fluctuation in the Adélie penguin populations in some selected rookeries on the Prince Olav and the Sôya Coasts. The search of a new rookery on the Prince Olav Coast was also included in the program because the population survey is not always sufficient there.

In this report, the results obtained by the wintering parties of JARE-22 and JARE-23 in the 1981–82 and 1982–83 breeding seasons are described. A new rookery on the Prince Olav Coast is also recorded.

2. Results and Discussion

On January 25, 1981, Kiichi MORIWAKI, geomorphologist of JARE-22, discovered an Adélie penguin rookery in Tenmondai Rock (68°25′S, 41°41′E) on the Prince Olav Coast. He recognized 96 adults and 19 chicks there though he could not count the whole individuals due to the unfavorable configuration. Thirteen Adélie penguin rookeries were already known on the Prince Olav Coast and the Sôya Coast (HOSHIAI *et al.*, 1981). The positions of fourteen rookeries including the new one are shown in Fig. 1 and Table 1.

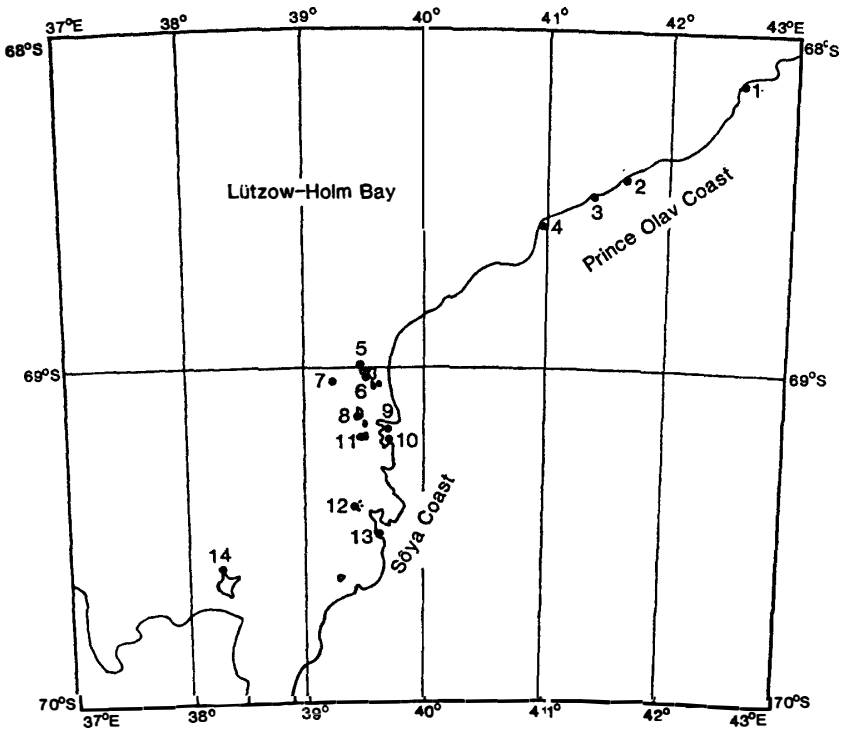

Fig. 1. Geographical map of Adélie penguin rookeries.
1. Cape Hinode, 2. Tenmondai Rock, 3. Akarui Point, 4. Cape Omega, 5. Ongulkalven, 6. Mame-zime Island, 7. Benten Island, 8. Rumpa, 9. Mizukuguri Cove, 10. Hukuro Cove, 11. Ytre-hovdeholmen, 12. Nökkelholmane, 13. Torinosu Cove, 14. Kuzira Point.

The population census in the 1981–82 season consisted of a census by the aerophotography and ground surveys. Oblique aerophotographs were taken from an aircraft, Pilatus Porter PC-6, on November 24, 1981. The counting of penguins was done by Tatsuo SWEDA, one of the authors, in Japan. The results obtained are listed in Table 1. The population sizes of the Adélie penguin observed generally did not differ from those assumed by HOSHIAI *et al.* (1981) though the size of populations in the Cape Hinode and Cape Omega rookeries was larger than that estimated by them. There were no penguins in the Kuzira Point rookery though 12 adults had been recognized there in mid-December 1975. However, it should be reminded that the Adélie penguin population in the region dealt with here has usually begun to decrease in or after mid-November as had been observed by MATSUDA (1964) in the Ongulkalven rookery. It seems difficult to calculate the total individual number of the Adélie penguin from the present data.

Ground surveys were made by the members of JARE-22 in the rookeries of Rumpa, Ongulkalven, Mame-zima Island, Mizukuguri Cove and Torinosu Cove. Hideo HIDAKA counted the number of the Adélie penguin in the Rumpa rookery in the photographs taken on four occasions in the period from early November to late December. Direct count of penguins in the Ongulkalven and Mame-zima rookeries was made by Natsuo SATO in the early half of November. Direct count was also

Table 1. Individual number of Adélie penguin observed in the 1981–82 and 1982–83 breeding seasons.

Name of rookery	Geographical position		Population size assumed by HOSHIAI *et al.* (1981)	Data in 1981		Data in 1982	
				Date	Individ. No.	Date	Individ. No.
1. Cape Hinode	68°08′47″S	42°39′48″E	150±50	*Nov. 24	370	Not observed	
2. Tenmondai Rock	68 25	41 41		Jan. 25	96	Not observed	
3. Akarui Point	68 29	41 23	170±50	*Nov. 24	211	Not observed	
4. Cape Omega	68 34	40 59	250±50	*Nov. 24	503	Not observed	
5. Ongulkalven	69 01	39 26	50 – 150	Nov. 3	35	Nov. 9	94
				〃 10	95	〃 18	122
				〃 12	102	〃 22	108
				* 〃 24	84	〃 23	90
				Dec. 26	30	Dec. 19	26
6. Mame-zima Island	69 01	39 29	30 – 70	Nov. 3	29	Nov. 9	57
				〃 12	70	〃 18	60
				* 〃 24	48	〃 22	58
						〃 23	52
						Dec. 19	21
7. Benten Island	69 02 30	39 15	5±5	*Nov. 24	12	Nov. 18	10
8. Rumpa	69 08 45	39 25 30	1000 – 1500	Nov. 7	1015	Nov. 14	*ca.* 1500
				〃 22	1145		
				* 〃 24	914		
				Dec. 11	577		
				〃 22	503		
9. Mizukuguri Cove	69 11 30	39 38	80±30	Nov. 12	134	Nov. 14	*ca.* 200
				* 〃 24	93	〃 24	147
10. Hukuro Cove	69 12 30	39 39	250 – 400	*Nov. 24	277	Nov. 14	*ca.* 480
						〃 24	300-350
11. Ytrehovdeholmen	69 13	39 26	40±10	*Nov. 24	36	Nov. 14	56
12. Nökkelholmane	69 23 30	39 28	100±30	*Nov. 24	59	Nov. 23	61
13. Torinosu Cove	69 29	39 33 40	70 – 200	Nov. 10	130–140	Nov. 24	105
				* 〃 24	135		
14. Kuzira Point	69 36	38 18	20 – 40	*Nov. 24	0	Not observed	

* Aerial observation.

Table 2. Yearly fluctuation of individual number of Adélie penguin in three rookeries.

Breeding season	Ongulkalven		Mame-zime		Rumpa	
	Date	Individ. No.	Date	Individ. No.	Date	Individ. No.
1961–62	Nov.	110				
66–67	Nov. 16	103				
67–68					Nov. 17	960
68–69						
69–70						
70–71	Nov. 14	156	Dec. 5	63		
71–72	Nov. 13	113				
72–73	Nov. 15	88	Nov. 18	62		
73–74						
74–75	Nov. 17	73				
75–76	Nov. 17	50	Nov. 30	21		
76–77						
77–78	Nov. 11	48	Nov. 28	21		
78–79	Nov. 21	46	Dec. 3	15		
79–80						
80–81	Nov. 16	43	Nov. 16	24	Nov. 27	473
81–82	Nov. 12	102	Nov. 12	70	Nov. 22	1145
82–83	Nov. 18	122	Nov. 18	60	Nov. 14	1534

made in the Mizukuguri Cove and Torinosu Cove rookeries by Yohsio YOSHIDA in mid-November. Data of these surveys are also included in Table 1.

The population census of the 1982–83 season was done only by the ground survey because JARE-23 did not have the aircraft. As the surveys covered nine rookeries on the Sôya Coast, it was impossible to assess the total population of the Adélie penguin on the two coasts. Surveys were mostly concentrated in mid-November when the Adélie penguin population seemed to become maximum. The temporal change of populations in the Ongulkalven and the Mame-zima rookeries was studied between early November and mid-December. Data obtained in the 1982–83 season are shown in Table 1. The population sizes on the Sôya Coast in this breeding season agreed with those assumed by HOSHIAI *et al.* (1981), though the population sizes in the Mizukuguri Cove and Hukuro Cove rookeries were larger than those estimated by them.

HOSHIAI *et al.* (1981) reported that the Adélie penguin populations in the Ongulkalven and the Mame-zima rookeries decreased to one-third of the maximum populations observed in the 1970–71 season during the period of 1970–71 to 1980–81 seasons and a similar tendency in the population of the Rumpa rookery was observed (Table 2). A possible relation between the reduction in the Adélie penguin population after the 1970–71 season and the harsh condition of the sea-ice in the breeding seasons during this period was suggested by HOSHIAI *et al.* (1981).

While, the present results show that the Adélie penguin populations in the above three rookeries markedly increased in the seasons of 1981–82 and 1982–83. In the 1979–80 summer, deterioration of the sea-ice was remarkable and the sea-ice around the rookeries broke up and drifted away in mid-March 1980. Successively, in the

1980–81 summer, deterioration of the sea-ice progressed and the water around the rookeries became open in January 1981. On the contrary, the sea-ice was fast and persisted through the 1981–82 summer. In the 1982–83 breeding season, remarkable deterioration of the sea-ice began in late December 1982. KUSUNOKI (1979) examined the fluctuation of the extent of ice field north of Syowa Station (69°00′S, 39°35′E) between 1957 and 1979 and he pointed out a ten year cycle in the ice conditions in the summer. However, this cycle in the ice conditions does not agree with the cycle of fluctuation in the Adélie penguin population. Further information is needed to explain the relation between the fluctuation of Adélie penguin population and the ice condition.

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