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Is there a population of Minke whale that overwinter among the Antarctic sea-ice?

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SUMMARY

It is well known that Minke whale populations in the Southern Hemisphere congregate in areas of food concentrations in Antarctica during summer. From August 18 to September 29, 1993, I registered 37 sightings with a total 211 Minke whales in Antarctic waters from the R/V «Nathaniel B. Palmer», USA. Therefore, it is important to report and to discuss them.

Key words: IWC, CCAMLR, population, overwinter, sea-ice, Antarctica.

¿Existe una población del Rorcual pequeño que inverna entre el hielo marino antártico?

ANELIO AGUAYO-LOBO[1]

RESUMEN

Es bien conocido que las poblaciones del Rorcual pequeño en el hemisferio sur se congregan en áreas de concentración de alimento en la Antártica durante el verano. Entre el 18 de agosto y el 29 de septiembre de 1993, registré 37 avistamientos con un total de 211 rorcuales pequeños en aguas antárticas, desde el B/I de los EE.UU. «Nathaniel B. Palmer». Por lo tanto, es importante informarlos y discutirlos.

Palabras claves: CBI, CCRVMA, población, invernar, hielo marino, Antártica.

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INTRODUCTION

From August 10 to September 30, 1993, I participated as an observer of marine mammals in the research project «Sea-ice physical-structural characteristics, development and SAR signatures in the Pacific sector of the Southern Ocean», directed by Dr. Martin Jeffries, Geophysical Institute, University of Alaska Fairbanks.

We sailed on board of the Antarctic research vessel «Nathaniel B. Palmer», U.S.A. The study area is shown in Fig. 1, where the track of the ship is indicated.

It is well known that Minke whale population in the Southern Hemisphere congregate in areas of food concentration in Antarctica, during summer (Ohsumi, 1979; Ohsumi *et al.*, 1970; Masaki, 1977) and in the latest years also in fall (Bushuev, 1991). Therefore, to have several winter sightings in Antarctic waters of this species it is important to report and to discuss them.

METHOD

The whale observations were made from the large panoramic bridge of the R/V «Nathaniel B. Palmer», using binoculars Leitz 10 X 50, during the track of the ship in the Bellingshausen and Amundsen Seas, where the ice-stations of Dr. M. Jeffries' research team were made. The whale records were done during the daylight hours, except five of them made at night with the help of ship's lights. Each record has the usual data, such as date, hour, coordinates, number of animals, and remarks.

RESULTS AND DISCUSSION

My winter sightings of Minke whale are shown in Table 1. The total whales counted were 211. The size of the groups varied from 1 to 10 animals, being the most numerous those of 2 (34.1%), 3 (19.1%), 4 (13.3%) and 1 (11.4%) whales (Fig.2).

The only previous published winter sightings of Minke whales in Antarctic waters were informed by Taylor (1957) as unusual ones. He registered in Prince Gustav Channel (63°S. and 57°W.) 100 whales in June 26, 1955; 120 in August 14; 40 in September, and 20 in October, 1955. According to the author, the whole population were entrapped by the freezing of the northern end of the channel in April or May of that year.

Based in that paper, two authors with a different approach have informed that some of Minke whales stay in Antarctic waters in winter season (Ohsumi *et al.*, 1970; Laws, 1977). However, Brown and Lockyer (1984) interpreted Taylor's paper as «presumably this was an accidental occurrence»; and Mitchell (1975) as «in other areas Minke whales sometimes become entrapped in ice fields and may die».

In order to understand the ocurrence of all these winter records of Minke whales among the sea-ice, it seems to me that the best explanation is that these animals found food in those waters. According to Ohsumi *et al.* (1970), and to Oshumi (1979) the principal summer food of Minke whales in Antarctic waters is *Euphausia superba,* with some small quantities of *E. spinifera and Calanus tonsus.* As Bushuev (1991) informed, the main food item of Minke whale in Antarctic Area I is *E. superba,* with small quantities of *Electrona antarctica, Parathemisto gaudichaudi, Pleuragramma antarcticum* and *Cryodraco antarcticus.* Therefore, it will be useful to make some winter food studies on Minke whales in Antarctica in order to know what kind of food this species can find in those latitudes in that season. Taking into account that Minke whale feeds, in addition to *E. superba* other items as Copepods, Amphipods and fin-fishes, I postulate that *Balaenoptera acutorostrata* may find krill and alternative preys during winter in those latitudes.

On the other hand, since the sightings show adults and juveniles whales, (Table 1) it seems that some family groups remain in Antarctica, while the principal populations are breeding in lower latitudes. However, according to Brown and Lockyer (1984) there is no agreement among authors on the winter distribution of this species and there is a small definite information on the existence of separate stocks of Minke whales in the Southern Hemisphere. Moreover, the taxonomic status of the various forms of Minke whales in both hemispheres is still unclear, despite studies on colour pattern, morphometrics, osteology and electrophoretic patterns (Arnold *et al.*, 1987), and on mitochondrial DNA differentiation (Pastene *et al.*, 1993).

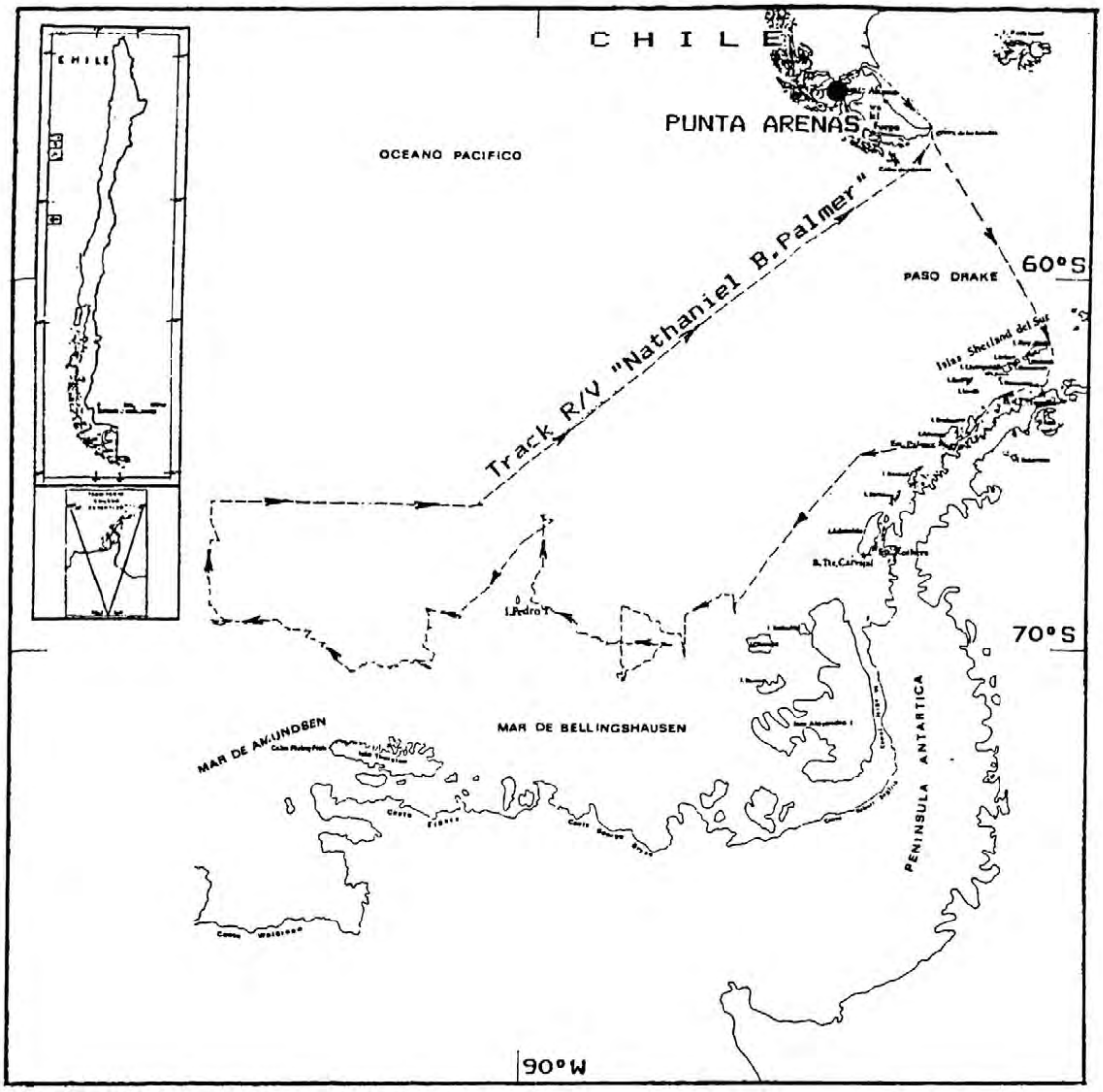

Fig. 1. Study area and the track of R/V «Nathaniel B. Palmer», along the Bellingshausen and Amundsen seas, where the sightings of Minke whale among the sea-ice were made, during winter of 1993.

Therefore, it is possible to asume that the growth of the southern stocks of Minke whales, during the latest 30 years has become of such a size that some family groups have begun to occupy all possible areas with sufficient food, the year round in Antarctic waters, including the leads, cracks and pools of the sea-ice. Consequently, it is possible to postulate now, that these whales have learnt to live in the edges of Antarctic sea-ice, synchronizing their movements with ice formation and desintegration. If so, we would have found from the ecological point of view, the Antarctic counterpart to the Arctic bowhead whales population.

Table 1.

SIGHTINGS OF *BALAENOPTERA ACUTOROSTRATA* AMONG THE ANTARCTIC SEA-ICE, DURING AUGUST AND SEPTEMBER, 1993.

Nr.	Date	Time	Position	Whales	Remarks
1	18-08	1620 1728	70° 01' S 79° 59' W	2 1 2 2 2 3 3 (15)	Adults & juveniles the smallest of about 4-5 m, sighted in cracks and pools in the sea-ice during an ice-station in an area of about 8 km^2.
2	19-08	0905 0934	69° 28' S 84° 00' W	2 2 1 2 2 (9)	Sailing in a lead. Adults & juveniles the smallest of about 5 m.
3	19-08	1030	69° 38' S 83° 59' W	1	Sailing in a lead. About 9 m.
4	19-08	1255 1345	69° 48' S 84° 00' W	4 2 2 2 4 (14)	Adults & juveniles sighted in cracks and pools in the sea-ice during an ice-station in an area of about 6 km^2.
5	20-08	0935 0940	70° 30' S 83° 52' W	2 4 3 (9)	Sailing in a lead. Adults & juveniles.
6	20-08	1040 1230	70° 34' S 83° 55' W	2 2 4 3 3 2 4 2 1 3 3 1 2 (32)	Adults & juveniles, the smallest of about 4 m. in cracks, pools & a lead, in an area of about 10 $km.^2$, during an ice-station.
7	20-08	1600 1700	70° 32' S 83° 55' W	2 3 (5)	Sailing in a lead, all adults.

8	21-08	1300 1305	70° 29' S 83° 30' W	1 1 2 (4)	Sailing in a lead, all adults.
9	21-08	1540 1547	70° 20' S 83° 30' W	1 2 (3)	Sailing in a lead, all adults.
10	21-08	1705 1710	70° 18' S 83° 16' W	2	In a lead. Adult and juvenile of about 5 m.
11	22-08	1300 1310	69° 45' S 81° 05' W	1	In a crack, during an ice-station.
12	22-08	1822	69° 57' S 81° 55' W	2	In a lead, both adults of about 9 m.
13	23-08	0930	69° 42' S 82° 34' W	3	In a lead. Two adults and one juvenile of about 4 m.
14	23-08	1035	69° 44' S 82° 58' W	2	In a lead. Adult and juvenile of about 4m.
15	23-08	2200	69° 41' S 83° 40' W	1	An adult in a lead.
16	25-08	1005 1020	69° 30' S 86° 46' W	2 3 3 4 2 1 2 8 5 (30)	Sailing in a lead. Adults & two juveniles of about 4 & 5 m, respectively.
17	25-08	1030 1040	69° 29' S 86° 52' W	6 6 2 5 10 5 4 (38)	Sailing in a lead. Adults & five juveniles whose length were 4 and 5 m., approx.
18	25-08	1100 1115	69° 28' S 86° 54' W	3 2 1 (6)	In a lead, all were adults showing a spyhoping behaviour.
19	25-08	1530 1535	69° 26' S 86° 53' W	1 2 (3)	All adults sighted in a lead nearby an ice-station.
20	25-08	1700	69° 25' S 86° 53' W	1	In a lead, during a CTD sation. An adult with a white band on both flippers.

21	25-08	2130	69° 25' S 86° 50' W	3 2 1 (6)	In a lead. All adults.
22	27-08	1030	67° 58' S 88° 59' W	1	In a lead. It was possible to see the white band on the flippers.
23	27-08	1142	67° 59' S 88° 59' W	2	In a lead. Adult about 10 m., and juvenile of about 5 m.
24	29-08	0600 0610	66° 50' S 88° 50' W	3	In a pool made by the ship. All adults.
25	31-08	0100	67° 40' S 90° 50' W	1	One adult in a lead.
26	31-08	1440	68° 44' S 93° 09' W	1	One adult in a crack.
27	31-08	1725	68° 56' S 93° 47' W	1	One adult in a lead.
28	02-09	0955	69° 04' S 96° 07' W	1	One adult of about 10 m., in a pool made by the ship, during CTD station.
29	06-09	1520	70° 19' S 96° 18' W	2	Two adults in a lead.
30	08-09	2320	70° 16' S 100° 09' W	1	One adult in a lead.
31	10-09	0715	70° 26' S 100° 57' W	2	Two adults in a pool made by the ship.
32	12-09	1607	70° 06' S 101° 57' W	2	Two adults in a lead.
33	15-09	1850	69° 24' S 105° 29' W	1	One adult in a lead.
34	15-09	1935	69° 20' S 105° 42' W	2	Two adults in a lead.
35	15-09	1950	69° 20' S 105° 49' W	2	Two adults in a lead.
36	22-09	1435	68° 06' S 110° 02' W	1	One adult in a crack.
37	28-09	1600	57° 19' S 69° 06' W	1	One adult in open waters of the Drake Passage.
Total				211	Minke whales

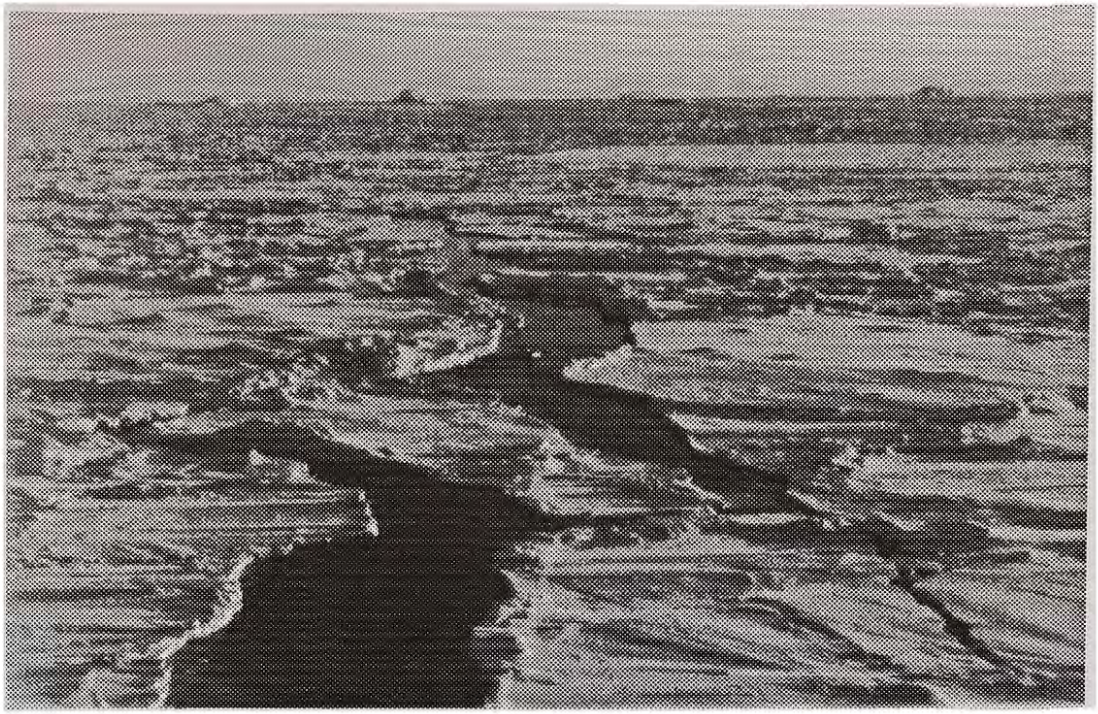

Fig. 2. A Minke whale in a crack of the Antarctic sea-ice, August, 1993. (Photo: A. Aguayo-Lobo).

In order to be sure whether these whales form a separate Antarctic population in the Southern Ocean, it would be necessary to perform more winter cruises not only in the ice edge but in the pack-ice itself in the Pacific as well as in the Atlantic and Indian Ocean Sector of the Antarctica, having in mind that scientists of the International Whaling Commission (IWC), and the colleagues of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) have considered this whale as an important key species of the Antarctic Sea Ice Zone.

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REFERENCES

ARNOLD, P., H. MARSH AND G. HEINSOHN, 1987. The occurence of two forms of minke whales in the east Australian waters with a description of external characters and skeleton of the diminutive or dwarf form. Sci. Rep. Whales Res. Inst., Tokyo, 38:1-46.

BROWN, S.G. AND C.H. LOCKYER, 1984. Whales. pp. 717-781. *In*: R.M. Laws (ed.) Antarctic Ecology. Vol. 2. Academic Press.

BUSHUEV, S. G., 1991. Distribution and feeding of minke whales in Antarctic Area I. Rep. Int. Whal. Commn., 41:303-312.

LAWS, R.M., 1977. The significance of vertebrates in the Antarctic marine ecosystem. Pp.: 411-438. *In*: G.A. Llanos (ed.) Adaptations within antarctic ecosystem. Smithsonian Intitution, Washington, D.C.

MASAKI, Y., 1977. Japanese pelagic whaling and whale sighting in Antarctic, 1975-76. Rep. Int. Whal. Commn., 27:148-155.

MITCHELL, E., (ed.) 1975. Review of Biology and fisheries for smaller cetaceans. J. Fish. Res. Board Can., *32* (7): 889-983.

OHSUMI, S., 1979. On feeding habits of the minke whale in the Antarctic. Rep. Int. Whal. Commn., 29:473-476.

OHSUMI, S., Y. MASAKI AND A. KAWAMURA, 1970. Stock of the Antarctic minke whale. Sci. Rep. Whales Res. Inst., Tokyo, 22:75-125.

PASTENE, L., T. KOBAYASHI, Y. FUJISE AND K. NUMACHI, 1993. Mitochondrial DNA Differentiation in Antarctic Minke whales. Rep. Int. Whal. Commn., 43:349-355.

TAYLOR, R.J.F., 1957. An unusual record of three species of whales being restricted to pools in Antarctic sea-ice. Proc. Zool. Soc. London, 129:325-331.

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