

Sightings of dwarf minke whales in the Southern Hemisphere during the SOWER cruises

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ABSTRACT

This paper examines sightings of dwarf minke whales during the SOWER cruises. A total of 12 sightings were made between 1994/95 and 2003/04, across a relatively wide latitude (37°S–62°S) but limited longitude, between IWC Management Area III (0–70°E) and V (130°E–170°W), with no sightings in Area I (0–60°W) or II (60°W–120°W). Despite this low number of sightings, most were close to the Antarctic Convergence at 58°S–65°S. There may be some seasonality in their southbound migration.

KEYWORDS: ANTARCTIC; DISTRIBUTION; DWARF MINKE WHALE; SOUTHERN HEMISPHERE; SURVEY-VESSEL

INTRODUCTION

Before 1985, several reports suggested the existence of a diminutive or dwarf form of minke whale in the Southern Hemisphere (Baker, 1983; Best, 1982; Gaskin, 1976; Kasuya and Ichihara, 1965; Singarajah, 1984; Wada and Numachi, 1979). Best (1985) subsequently documented two morphological forms of minke whales based on material collected from the Antarctic and South African coast. He described differences in shoulder/flipper colouration, baleen shape and several other morphological features. Several later studies examined the morphology and genetics of dwarf minke whales, both in the Antarctic (Kato and Fujise, 2000) and other parts of the Southern Hemisphere (Arnold *et al.*, 1987; Arnold *et al.*, 2005). Pastene *et al.* (1994) and (2007) summarised and reviewed these studies. There are now considered to be two species of minke whale: the Antarctic minke whale (*Balaenoptera bonaerensis*) and the common minke whale (*B. acutorostrata*) (Committee on Taxonomy, 2023). The dwarf minke whale is recognised as an unnamed subspecies of the common minke whale.⁴ The dwarf form was recorded separately in SOWER sighting records, including some cruises under the IDCR programme, from the 1993/94 season onwards. This paper examines these sightings.

RESULTS

Biological features of dwarf minke whales in the Antarctic

This paper summarises some biological features of dwarf minke whales based on catch data (n = 16) from the Indian/Pacific region of the Antarctic during the austral summer (Kato and Fujise, 2000) and further studies with additional colleagues (Kato *et al.*, 2021). Dwarf minke whales were caught between 58°23'S–65°04'S in the Indian/Pacific Ocean region. This probably represents the southernmost margins of the summer feeding migration as most dwarf minke whales are found much further north.

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⁴ There are two further subspecies: the North Atlantic common minke whale (*B. a. acutorostrata*) and the North Pacific common minke whale (*B. a. scammony*).



Fig. 1. The external features of a landed dwarf minke whale showing the distinctive white shoulder/flipper patch. (Photo H. Kato)

The three characteristic features of dwarf minke whales are: (a) dark throat patch; (b) white shoulder/flipper patch; and (c) thorax blaze (Figure 1). While the white shoulder patch was found in all these individuals, there was considerable variation in the colour pattern. Skeletal observations confirmed previous findings of the characteristic skull vertex, the straight antero-lateral margin of the supraoccipital and the flattened condylar region (Arnold *et al.*, 1987). The vertebral formula was $C\ 7 + D\ 10-11 + L\ 11-14 + Ca\ 18-20 = 47-50$ with a mode of 49. There were 10–12 ribs (mode 11), while the sternum was uniquely Y-shaped (Arnold *et al.*, 1987; Kato and Fujise, 2000). From this limited sample size ($n = 13$), the mean body length for female physical maturity was estimated to be 7m. All mature females examined were pregnant ($n = 8$), but it is unclear whether this represents the majority of dwarf minke whales found further north. Conception appears to occur between mid-June and early August. Females appear to attain sexual maturity at 6–6.5m and between 7–10 years. Stomach contents analysis indicated that dwarf minke whales north of 60°S mainly feed on lantern fish (*Myctophidae*).

Identification keys used during surveys

The guidelines for identifying minke whales have changed over the years (Figure 2). From 1997/98 onwards (Figure 3), the guidelines were as follows (IWC, 2000):

Record the common or scientific name (such as ‘minke’ or ‘fin’) for positively identified species; a positively identified species is one for which the diagnostic features have been observed. Where this is not the case, but the observer has seen enough to be reasonably sure of the species identity, then record the qualification ‘like’ (e.g., use ‘like minke’ if a clear view of the body was not obtained but the observer believes the sighting was probably a minke whale).

The final categorisation was made by the cruise leader or senior scientist on board. For all codes, the distance at which a determination could be made depended on a range of factors, such as sighting conditions, direction and behaviour of the individual(s).

Like minke (code 39)

The cue observed is usually the whale blow. In most cases, there is either no observation of the body or the view obtained is insufficient to observe the diagnostic features. Characteristics of the blow (small, ‘baleen-whale type’) indicate it is a probably a minke whale.

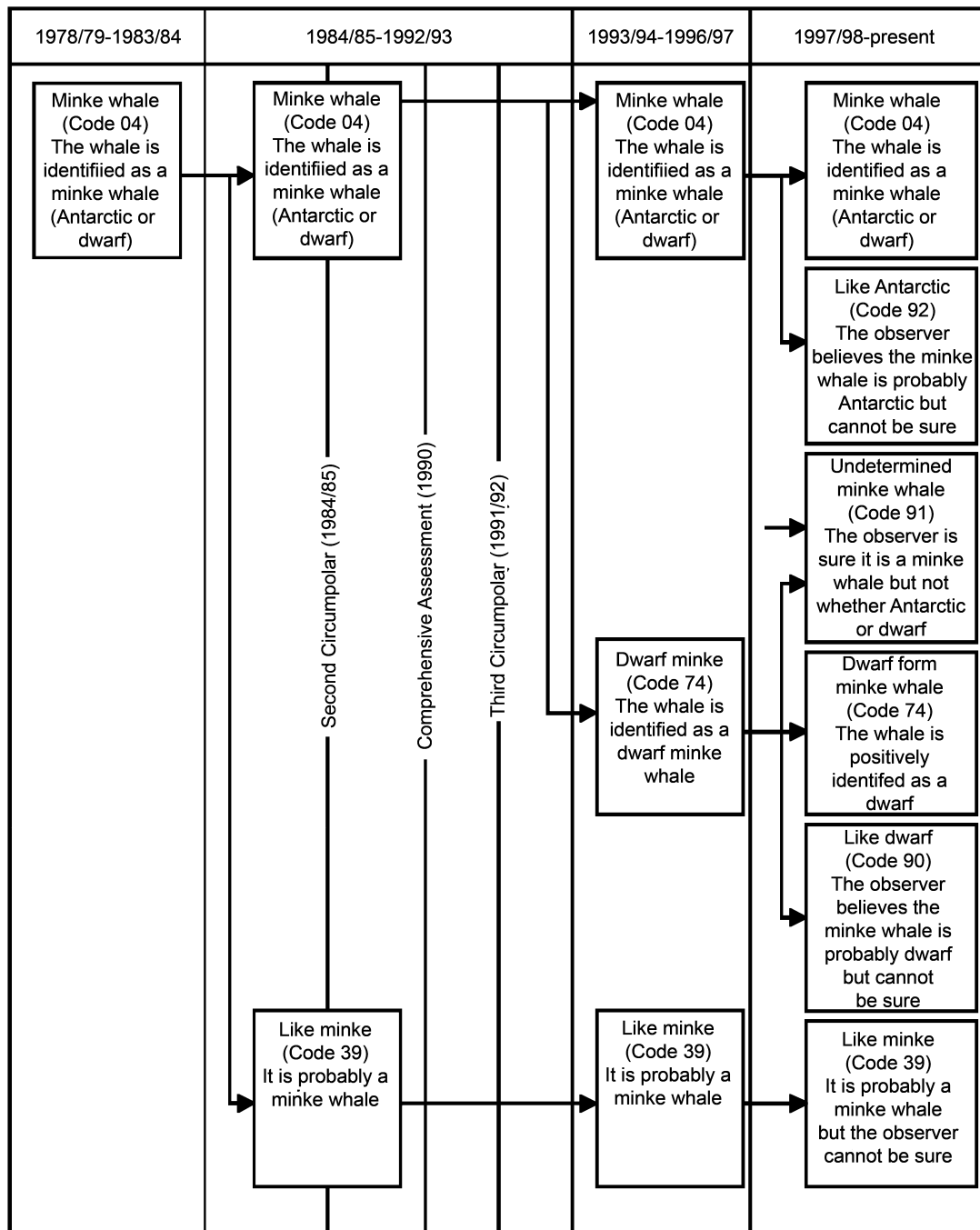


Fig. 2. Overview of the species codes in the SOWER surveys for Antarctic minke and dwarf form minke whales from 1978/79 to 2009/10 (Matsuoka *et al.*, 2003).

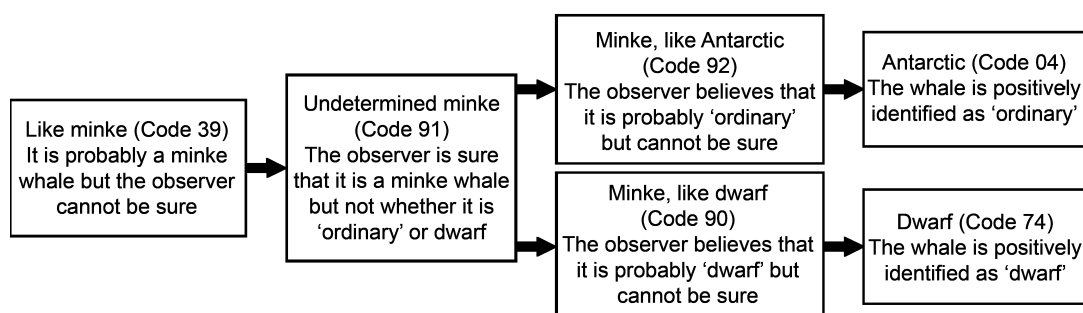


Fig. 3. Dwarf minke (code 74) identification based on IWC general sighting guidelines (IWC, 2000)

Undetermined minke (code 91)

The sighting is positively identified as a minke whale by observing the diagnostic features of the body shape (shape of dorsal fin and head). Colouration of the body is not clearly visible and it cannot be determined whether the individual(s) is 'Antarctic' or 'dwarf'.

Minke, like Antarctic (code 92) or like dwarf (code 90)

The sighting is positively identified as a minke whale based on diagnostic features of the body shape. Colour pattern of the body (especially on the shoulders – with white patches on the dwarf form) is not viewed in sufficient detail to positively discriminate between the two forms, but the observer believes it is probably either 'Antarctic' or 'dwarf' based on colouration.

Antarctic minke (code 04) and dwarf minke (code 74)

The sighting is positively identified as a minke whale based on diagnostic features of the body shape. Colour pattern of the body is viewed in sufficient detail for the observer to positively discriminate between the two forms.

Sightings of dwarf minke whales during SOWER cruises

Relevant sighting information was assembled by extracting all sightings between 1993/94 and 2009/10 with codes 74 or 90 from the IWC-DESS database (Burt and Strindberg, in prep). In fact, there were only sightings for code 74 (confirmed dwarf minke whales). In principle, it would be possible to check the data sheets for the period up to 1992/93 for all sightings with code 04 to see if 'dwarf' was added in a comment field, but this was not done due to the scale of the task and the small number of comments expected. The total number of sightings was small (Table 1). It should be noted that: (a) the emphasis on recording 'dwarf' or 'like dwarf' minke whales did not occur until 1993/94 – all recorded sightings were from 1994/95 onwards; and (b) the ability to identify 'form' depended on weather conditions and distance from the vessel. The challenge of quantifying effort and the low number of sightings precludes attempts to estimate the abundance of dwarf minke whales in the surveyed areas or provide a quantitative examination of distribution.

Of the 15 sightings, 10 were made in transit (i.e., north of 60°S). The southernmost sighting was in Area V (2 January 2003) at about 62°S. Most ($n = 7$) of the sightings were made in Area V with six in Area III and one in Areas IV and VI. School size was either one ($n = 12$) or two ($n = 3$). These were found in sea surface temperatures (SSTs) that ranged between 0.5–20°C. Figure 4 might be considered to suggest some latitudinal movements between months, with those in higher latitudes (50°S to the Antarctic boundary around 60°S) occurring in mid-summer (December to February), while those in middle to lower latitudes or off the coasts of either Australia

Table 1
Primary and off-effort sightings of dwarf minke whales recorded during SOWER cruises.

Season	Date	Area	Stratum	Latitude	Longitude	School size	SST
1996/97	24 February 1997	III	Transit	37°24.37'S	17°02.61'E	1	20
2002/03	18 December 2002	III	Transit*	45°16.00'S	149°03.72'E	2	?
2002/03	18 December 2002	V	Transit	45°18.45'S	149°03.53'E	2	13.2
2002/03	18 December 2002	V	Transit	45°18.45'S	149°02.38'E	1	13.1
1997/98	11 January 1998	III	Transit	50°11.50'S	13°23.25'E	1	2.6
1996/97	7 January 1997	V	Transit	51°07.51'S	154°13.57'E	1	10.2
1996/97	7 January 1997	V	Transit	51°07.51'S	154°16.49'E	2 (1 calf)	9.7
2002/03	23 December 2002	V	Transit	56°23.56'S	167°24.48'E	1	8
2005/06	7 January 2006	III	Transit*	56°33.86'S	11°09.23'E	1	?
2001/02	24 December 2001	V	Transit	58°24.58'S	136°34.34'E	1	1.8
1999/00	23 January 2000	IV	WN	61°23.61'S	83°40.41'E	1	0.6
1995/96	5 February 1996	VI	EN	61°05.61'S	154°00.50'W	1	0.5
1994/95	10 February 1995	III	EN	61°10.61'S	66°33.88'E	1	1.2
1994/95	10 February 1995	III	EN*	61°19.93'S	66°16.23'E	1	1.5
2002/03	2 January 2003	V	WS	62°02.62'S	134°52.75'E	1	1.3

? = not known. * = off-effort.

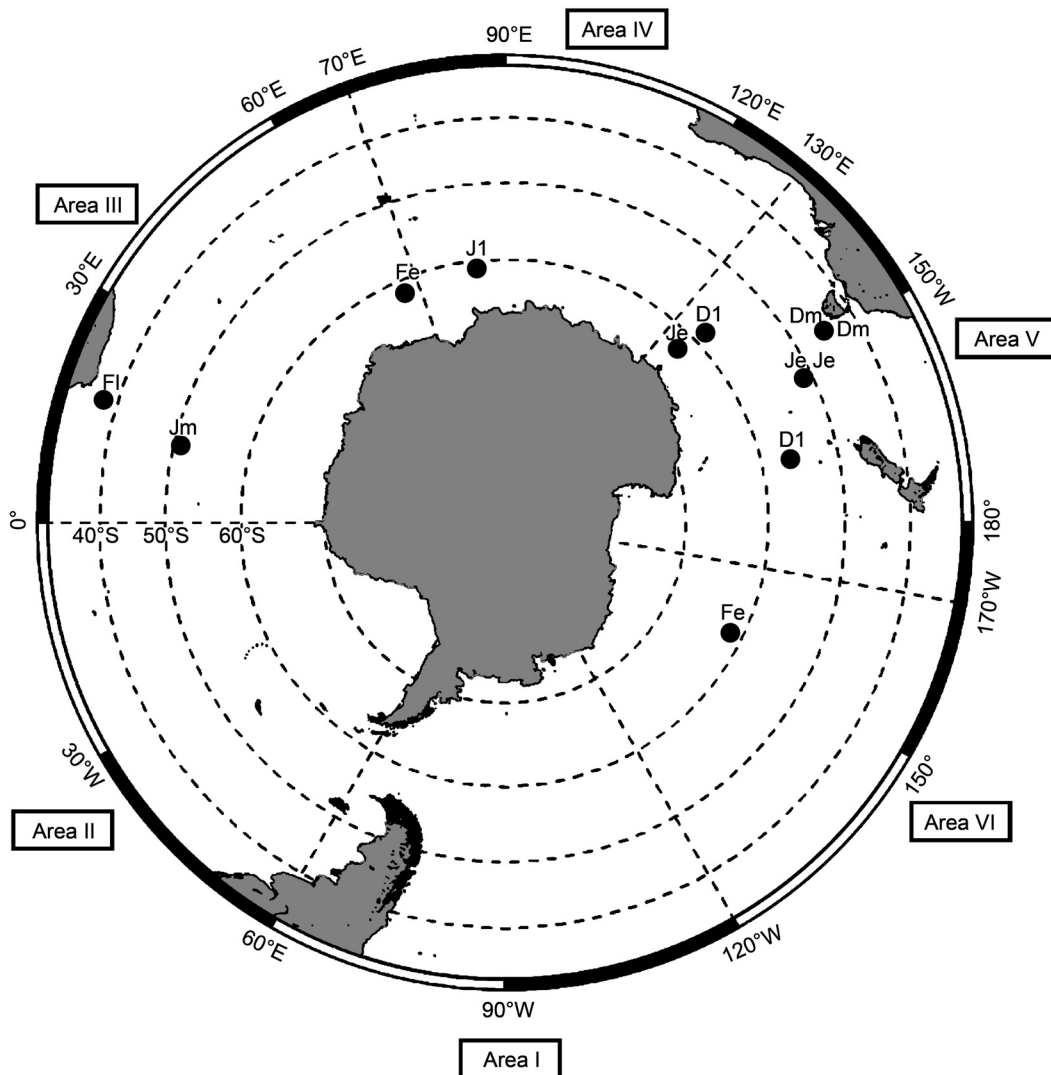


Fig. 4. Dwarf minke whale sightings. Timings shown by month (initial capital letter) and 10-day period (shown with a subsequent 'e' for early, 'm' for middle or 'l' for late).

or South Africa were recorded in the winter months. Interpretation of the data is affected by the uneven allocation of searching effort (lower effort in lower latitudes and higher south of 60°S) and the low sample size. However, even taking these issues into account, sightings data from the SOWER cruises indicate that dwarf minke whales do not penetrate south of the Antarctic Convergence.

DISCUSSION

Despite the small number of dwarf minke whale sightings recorded during the SOWER cruises, these data indicate their occasional presence in the transit area north of 60°S. In passing-mode, it was not possible to distinguish between the dwarf and Antarctic forms, which means dwarf minke whales are likely to be underrepresented in the transit zone (37°S–62°S), except in rare cases where the target was close enough to permit positive identification. The same problem has also been encountered on Japan's Research Programme in the Antarctic (JARPA) cruises (Kato and Fujise, 2000).

Arnold (1997) and Arnold *et al.* (2005) suggest that a large proportion of dwarf minke whales remain throughout the summer in low to mid latitudes, even though they can be found further south, as far as the Antarctic Convergence. More sightings data, combined with photo-identification, should help to clarify this situation.

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