Cetacean Sightings in the North Atlantic Ocean during a commercial Arctic Cruise, Summer 2006

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ABSTRACT:
Platforms of opportunity have been proven to contribute to the body of knowledge about cetaceans, especially when data is collected by trained personnel following standard procedures. Here, cetacean sightings made during a journey on the North Atlantic Ocean on board a commercial cruise ship are reported. Date, time, species, group size and position were recorded, and photographs were taken opportunistically. Moreover, the responsive behaviour of cetaceans to the presence of the vessel was categorized. 60 sightings were made, comprising nine species from five cetacean families. The behavioural observations showed that a greater proportion of animals showed no obvious response to the vessel. In two cases, the vessel passed within close range of large whales. The information collected resulted in valuable information on the distribution of several species and also may serve as an initial assessment of cetaceans' reactions towards large vessels. A proposal for the development of a standard protocol for cetacean sighting data collected on cruise ships is made.

KEYWORDS: CETACEANS; SIGHTINGS; PLATFORMS OF OPPORTUNITY; CRUISE SHIP; BEHAVIOUR; NORTH ATLANTIC OCEAN

INTRODUCTION

Platforms of opportunity have been proven to contribute to the body of knowledge about cetaceans, especially when data is collected by trained personnel following standard procedures (Robbins & Matilla, 2000; Ritter, 2003; Robbins et al., 2006). Different types of vessels have been used for the collection of data, including whale watching vessels, ferries and cruise liners.

Although cruise ships have served as platforms of opportunity in the past (Williams & Crosbie, 2006), there is still a huge potential for the scientific community to take advantage of the now almost continual presence of cruise ships in areas of special interest, such as the Arctic or Antarctic regions. Here, cetacean sightings made during a journey on the North Atlantic Ocean on board a commercial cruise ship are reported.

METHODS

The German cruise ship "MS Deutschland" was used as a platform of opportunity during its commercial journey across the Northwest Atlantic Ocean from 22 July until 12 August 2006. The voyage started from Hamburg (Germany) and sailed across the North Sea towards Iceland, with a stop in the Outer Hebrides (Scotland). It proceeded to Greenland and ran along the western coast of this island twice: from South to North up to Disko Bay and then back, with several stops on the shore. On the way back to Hamburg, the North Atlantic and North Sea were crossed again, with another stop on the east coast of Scotland. The complete route is shown in Figure 1.

The upper deck was used for the visual search of cetaceans. Observations were therefore made at a height of approx. 22 metres above sea level. Naked eyes, an *APCAT* 30*75 telescope mounted on a professional *Manfrotto* tripod, and 12*50 binoculars were used to scan the sea for marine mammals. Cetaceans were identified to the lowest possible taxa, group size was estimated and the general behaviour was described qualitatively. The seastate (Beaufort scale) was noted, the approximate position of the sightings was derived by linking the time of the sightings with the data given in the log book of the ship. The behaviour of the

animals was grouped into four categories related to their reaction towards the vessel. These sighting categories were 1. *Avoidance*, i.e. swimming away from the vessel's path; 2. *Neutral*, i.e. no obvious reaction was seen; 3. *Proximity*, i.e. there was a small distance between the whales and the vessel and 4. *Interaction*, when the animals were interacting with the vessel e.g. by repeatedly approaching, bowriding, etc. (compare Würsig, 1998; Ritter, 2003). Photographs of cetaceans close to the vessel were taken using a *Pentax* M50 single lens camera equipped with a 300 mm tele lens.

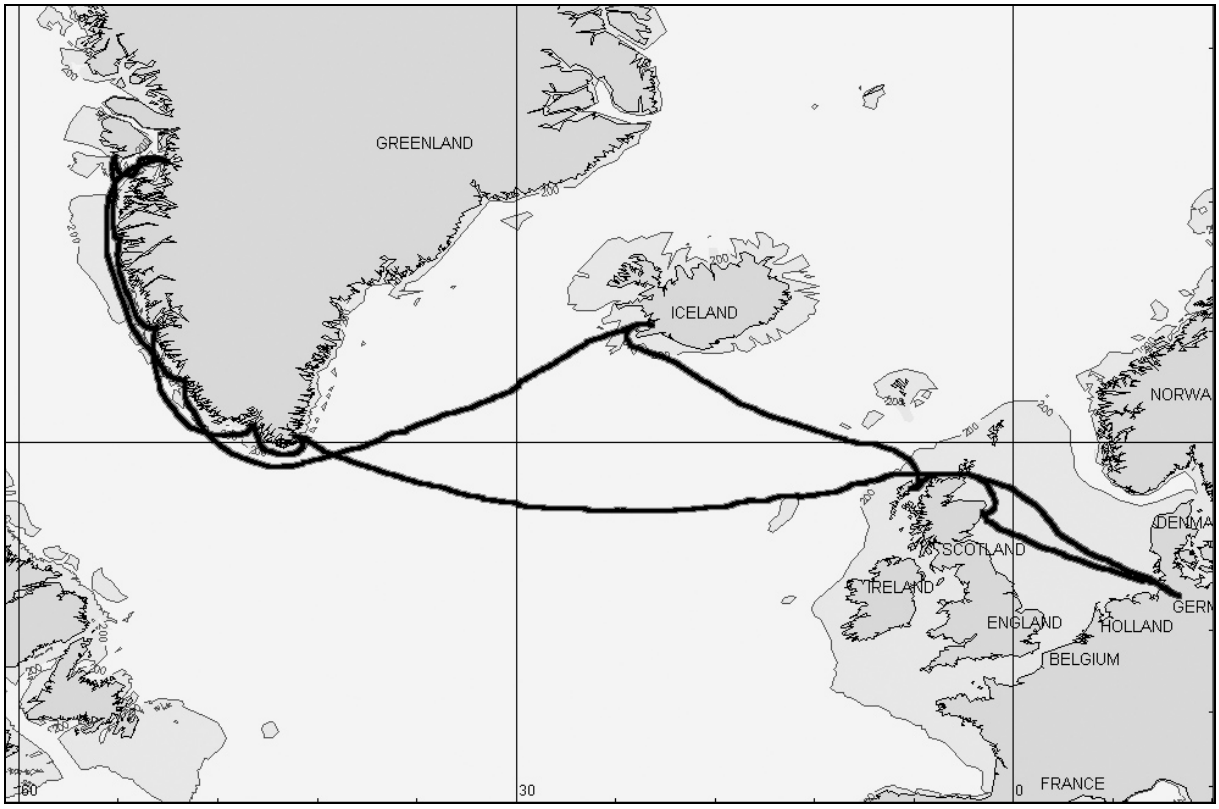


Figure 1: Travel route of the cruise ship *MS Deutschland* during its Arctic voyage from 22 July until 12 August 2006.

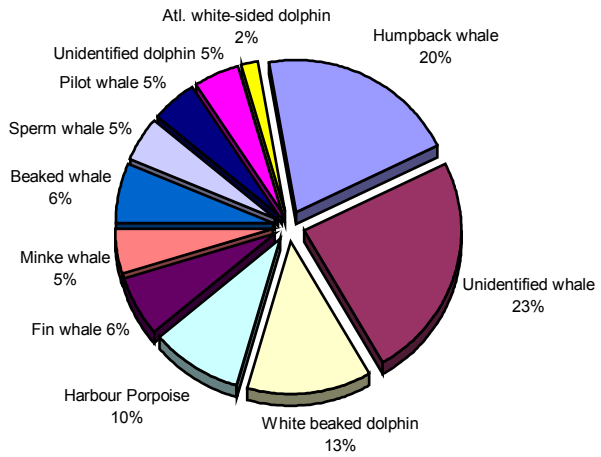
RESULTS

The cruise ship travelled a total of 5,479 nm (10,147 km). Sighting effort totalled 47 h and 25 min. During sighting effort, the vessel passed through approximately 800 nm (1,481 km). Observations took place at sea states from 0 to 4 Beaufort, however most sightings were made during sea states of Beaufort 0-3, usually with good visibility. 63 sightings were made, comprising nine species from five cetacean families, resultiung in an average of one sighting every 45 minutes of sighting effort. Sightings typically were of short duration, as most of them were made during regular travel speed (15-20 knots) and no attempt was made to approach whales.

The most frequent species sighted was the humpback whale (*Megaptera novaaengliae*, 13 sightings, 21%), followed by the white-beaked dolphin (*Lagenorhynchus albirostris*, 8 sightings, 13%) and the harbour porpoise (*Phocoena phocoena*, 6 sightings, 10%). Other species sighted were the fin whale (*Balaenoptera physalus*, 4 sightings, 6%), minke whale (*B. acutorostrata*, 3 sightings, 5%), sperm whale (*Physeter macrocephalus*, 3 sightings, 5%), pilot whales (*Globicephala melas*, 3 sightings, 5%) and the Atlantic white-sided dolphin (*Lagenorhynchus acutus*, 1 sighting, 2%). Beaked whales (*Ziphius sp.*) were seen four times (6% of sightings). During 15 sightings the species could not be determined (15 sightings, 24% for baleen whales, and 3 sightings, 5% for dolphins). Sighting data are listed in Table 1, their

relative frequency is shown in Figure 2. Group size ranged from 1-100, and an estimated total of 276 animals were seen.

Figure 2: **Relative Frequency of Cetacean Sightings During a Commercial Arctic Cruise (22 July - 12 August 2006, N=63)**



During 36 sightings, the cetaceans' responsive behaviour was categorized. Most of the animals did not obviously react to the presence of the vessel: the *neutral* (n=26) category accounted for 72% of sightings, whereas *avoidance* was observed in nine cases (25 %). *Proximity* was recorded once, and no *interaction* was documented. After pooling the species into three categories (larger whales, dolphins and beaked whales), differences in the responses of the animals became apparent: not suprisingly, beaked whales uniformly avoided the vessel, although sample size was small (n=2). Large whales (n=21) showed *avoidance* during 9%, behaved *neutrally* in 86% and showed *proximity* once (5% of sightings). Sperm (n=3) and fin whales (n=3) exclusively showed no response, and humpback whales (n=10) likewise in 90% of sightings. In contrast, dolphins (n=13, including pilot whales) avoided vessels during 39% and showed no response during 61% of sightings.
The only *proximity* encounter was recorded when the ship was anchored off Disko Island (sighting no. 51, see Table 1): seven humpback whales were seen, and one of them briefly approached within a few metres of the vessel.

During two sightings (No. 11 and 29, see Table 1), large whales were detected in or close to the path of the vessel so that a collision initially appeared possible. A fin whale was passed at an approximate distance of 50 metres, while it was constantly swimming the same direction perpendicular to the ship's path. A sperm whale that did not avoid the vessel was passed at close range (within 100 m). Both whales behaved neutrally, despite the vessel's proximity.

DISCUSSION

The nine or more species identified during this study represent 21% of the species known for the North Atlantic Ocean (compare Carwardine, 1995). The identification of species often failed due to the fact that the cruise ship did not alter direction or stop in order to approach cetaceans. On the other hand, this made it possible to document behaviours without further (potential) disturbance to the animals. Some interesting data about the distribution of several whale species was collected. For example, sperm and pilot whales were seen at or close to the outer limit of their distribution range (compare Carwardine, 1995). However, it has to be acknowledged that the location of the sightings remained relatively inaccurate due to the fact

that no position was taken directly during the sightings, e.g. via a handheld GPS. Although sample size was relatively small, repeated sampling during randomised surveys, such as those from cruise ships, may even be suitable for the calculation of abundance estimates (Williams et al., 2006).

Photographs taken during this study could not be used to identify individual animals, primarily because the distance between the observer and the cetaceans was too great. Nevertheless, several scenarios can be imagined, where photo-identification would have been possible. During one sighting, a humpback whale approached the vessel, but could not be photographed. The close distance, however, would have allowed close-up images. Similarly, a boat trip organised in conjunction with the cruise, resulted in close-up video footage of humpback whales made by a passenger. Elsewhere, expedition-style cruises, where rigid hull inflatables (Zodiacs) are used and approaches to whales are regularly made (Parissa Yazdi, *pers. comm.*), could support photo-ID efforts. Allen et al. (2006) list a great number of "opportunistic sources" for ID photographs (including cruise ships) that contributed to the *Antarctic Humpback Whale Catalogue* (AHWC), Williams & Crosbie (2006) describe similar efforts for the *Antarctic Killer Whale Identification Catalogue* (AKWIC).

The behaviour of the animals in relation to the vessel were mostly *neutral* or *avoiding*. Neutral behaviour may be a result of the relatively great distance between the animals and the vessel (although for this reason the behaviour was not categorised when cetaceans were sighted in a great distance). Avoidance either may be a consequence of the typically reserved behaviour of some species, e.g. beaked whales, or the cetaceans' active movement away from the vessel so as to minimise acoustic and/or physical disturbance. By categorising the cetacean's behaviour, the frequency of different behavioural reactions could be quantified. This type of data can help to assess (potential) high-risk areas for ship strikes, as well as to identify species/stocks especially vulnerable to collisions with vessels, issues which are discussed within the IWC *Ship Strike Working Group* (IWC, 2006). This is underlined by the fact that there were two situations when whales were passed at close range, during this study.

Platforms of opportunity have been repeatedly proven to be of use for scientific observations of cetaceans (Ritter, 2003; Robbins et al., 2006). Cruise liners so far have predominantly been utilised for cetacean observations in the Southern hemisphere, predominantly around the Antarctic Peninsula (Allen et al., 2006; Williams & Crosbie, 2006), where cruise ship tourism has been growing for many years (Conservation International, 2006). In the North Atlantic however, although several operators offer expedition-style cruises, the number of studies is scarce. The ship time provided by cruise operators constitutes a cost-effective way to collect data, either by researchers or trained personnel, which otherwise is often hard to achieve. Furthermore, these ships can be used for the training of observers and practicing survey protocols (see Williams & Crosbie, 2006). This study therefore is considered to be a first step and also may serve as an encouragement for other, researchers and tour operators alike.

With the investigations described here, the use of a commercial, non-expedition cruise ship on a regular commercial trip was proven to be helpful for the collection of data on cetaceans. It is therefore recommended to incorporate systematic efforts into more commercial operations. For this purpose, standardised ways of data collection for cruise liners would be favourable. A standard? set of data to be commonly recorded and entered into existing databases can evidently add to the knowledge on cetacean abundance and distribution. Moreover, photo-ID efforts during commercial cruises may be helpful to identify individuals and/or their ranges.
It is thus proposed to establish a way to standardise data collection on cetacean sightings from commercial cruise ships. Williams & Crosbie (2006) illustrate several such ways as a result of a fruitful co-operation with the *International Association of Antarctic Tour Operators*

(IAATO), an industry based organisation which demonstrated a remarkable willingness to co-operate with cetacean researchers. With this in mind, the IAATO probably is the ideal body to distribute such standard procedures to its members.

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Table 1: Sightings made from the cruise ship *MS Deutschland* between 22 July and 12 August 06. (GS=Group size)

No.	Date	Time	Species	GS	Behaviour
1	24.07.2006	07:46	Harbour Porpoise	2	Avoidance
2	25.07.2006	08:58	Unidentified Dolphin	2-3	Avoidance
3		11:29	White Beaked Dolphin	2	Avoidance
4		12:05	Unidentified Dolphin		
5		12:09	Pilot whale	5	Neutral
6		12:17	Pilot whale	10	Neutral
7		12:39	Sperm whale	1	Neutral
8		12:51	Beaked whale	2	
9		14:20	White Beaked Dolphin	10	Neutral
10		15:13	Atl. Whitesided dolphin	10	Neutral
11		15:30	Sperm whale	1	Neutral
12		15:50	Beaked whale	4	Avoidance
13		16:26	Beaked whale	1	
14		16:38	Beaked whale	3	Avoidance
15	26.07.2006	06:38	Harbour porpoise	2	Neutral
16		06:56	Harbour porpoise		
17		08:01	White beaked dolphin	5-6	Neutral

18		08:05	Minke whale	1	Avoidance
19		08:15	Humpback whale	3	Neutral
20		08:26	Minke whale	1	Neutral
21		08:27	White Beaked Dolphin	3-5	
22		09:01	Unidentified whale	2-3	
23		09:16	White Beaked Dolphin	3	
24	27.07.2006	19:00	Minke whale	1-2	
25		19:51	White Beaked Dolphin	3-5	Neutral
26	29.07.2006	10:04	Fin whale	1	Neutral
27		10:09	Unidentified whale	1	Neutral
28		10:16	Unidentified whale	3-5	
29		10:35	Unidentified whale	1	
30		10:45	Fin whale	2	
31		10:48	White Beaked Dolphin	5+	
32		11:57	Unidentified whale	2-3	Neutral
33		12:28	Unidentified whale	2-3	
34		12:37	Unidentified whale	3+	
35		12:41	Unidentified whale	1	
36		17:07	White Beaked Dolphin	5	
37		17:18	Unidentified Dolphin	5	Avoidance
38		17:35	Unidentified whale	1	
39		18:50	Pilot whale	100+	Neutral
40	30.07.2006	15:10	Humpback whale	5	
41		15:58	Unidentified whale	1	
42		16:30	Fin whale	1	Neutral
43		16:42	Unidentified whale	1	
44	01.08.2006	05:01	Fin whale	1	Neutral
45	02.08.2006	07:41	Unidentified whale	1	
46		09:10	Humpback whale	2	Neutral
47		12:12	Humpback whale	4	Neutral
48		13:21	Humpback whale	6	Neutral
49		14:05	Sperm whale	1	Neutral
50		14:29	Humpback whale	2	Neutral
51		17:30	Humpback whale	7	Proximity
52		22:03	Humpback whale	2-3	
53		22:52	Unidentified whale	4	
54	03.08.2006	16:43	Humpback whale	2	Avoidance
55		16:56	Harbour Porpoise	2	Avoidance
56		17:23	Harbour porpoise	1	
57		18:04	Unidentified whale	1	
58		18:07	Humpback whale	2-3	Neutral
59	04.08.2006	06:40	Harbour porpoise	1	
60		06:47	Unidentified whale	1	
61		16:52	Humpback whale	1	Neutral
62	05.08.2006	11:02	Humpback whale	1	Neutral
63		11:38	Humpback whale	2	Neutral