

MARINE RECORD

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# First records of dwarf sperm whale (*Kogia sima*) from the Union of the Comoros

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## Abstract

The world distribution of dwarf and pygmy sperm whales (Cetacea: Kogiidae) [*Kogia* spp.] is poorly known, and derived mostly from records of stranded animals. At sea, both species are elusive and difficult to identify. We photo-documented the presence of dwarf sperm whale (*Kogia sima*) in the waters of the Union of the Comoros. All three occurrences were sightings of apparently healthy animals from 2011 to 2013 in and near Itsandra Bay, off the island of Grande Comore. We discuss the importance of the Mozambique Channel and the Agulhas Current Large Marine Ecosystem for the species in the Western Indian Ocean.

**Keywords:** Dwarf sperm whale, *Kogia sima*, Union of the Comoros, Mozambique channel, Indian ocean

## Introduction

Dwarf sperm whales (*Kogia sima*) inhabit the warm temperate and tropical waters of the Atlantic, Pacific and Indian Oceans (Rice 1998), primarily from 24°N to 40°S (Wade & Gerrodette 1993), although some records are from beyond these limits and as far north as the Faroe Islands (Bloch & Mikkelsen 2009) and along the west coast of Canada (Nagorsen & Stewart 1983). Within their range, they occur seaward from the continental slope to deep open ocean waters (Willis & Baird 1998; Baird 2005). There is some diet-based evidence that they use waters over the continental shelf, and that juveniles occupy shallower waters inshore of adults (Ross 1979b; Plön 2004). Unfortunately, our understanding of the distribution of this species is derived mainly from stranding events (Cardona-Maldonado & Mignucci-Giannoni 1999), because sightings at sea are rare, due to their pelagic distribution, small size (adults reach up to 2.7 m in length), elusive habits, and the need for calm surface conditions for detection (Willis & Baird 1998; Baird 2005). Dwarf sperm whales take long and presumably deep dives, and when at the surface often remain motionless, keeping a low profile, rarely engaging in active behaviors (Baird 2005). Moreover, this species'

morphological similarity to its congener, the pygmy sperm whale (*K. breviceps*), makes at sea identification difficult (Willis & Baird 1998; Baird 2005). From the Indian Ocean area, reports of sightings of dwarf sperm whales have been made from the waters north of the Seychelles to Oman and Sri Lanka, (Balance & Pitman 1998), Thailand, Indonesia and Western Australia (Willis & Baird 1998). Only a few sightings have come from the Western Indian Ocean: two off Mayotte Island (Kiszka et al. 2007; Kiszka et al. 2010), and records from Madagascar and the Seychelles are cited by Kiszka et al. (2008). Here, we provide the first evidence of the occurrence of dwarf sperm whales in the waters of the Union of the Comoros and discuss the relevance of the Mozambique Channel as an important area for the species.

## Material and methods

Between April 2011 and September 2013, small (<7 m) motorboat-based surveys were undertaken off the western coast of Grande Comore Island (Ngazidja). During this time period, 4234 km were surveyed on 135 trips spanning 337 h of effort (Fig. 1).

The average speed during the surveys was approximately 13 km/h (7 kn), at 3–9 km from shore. Observers on board were equipped with 7×50 binoculars, a digital camera with image-stabilizing zoom lenses (50–200 mm/50–300 mm). Transects and sightings were recorded with a digital GPS unit (Garmin 62-S with an accuracy of +/- 5 m) and plotted on a NOAA

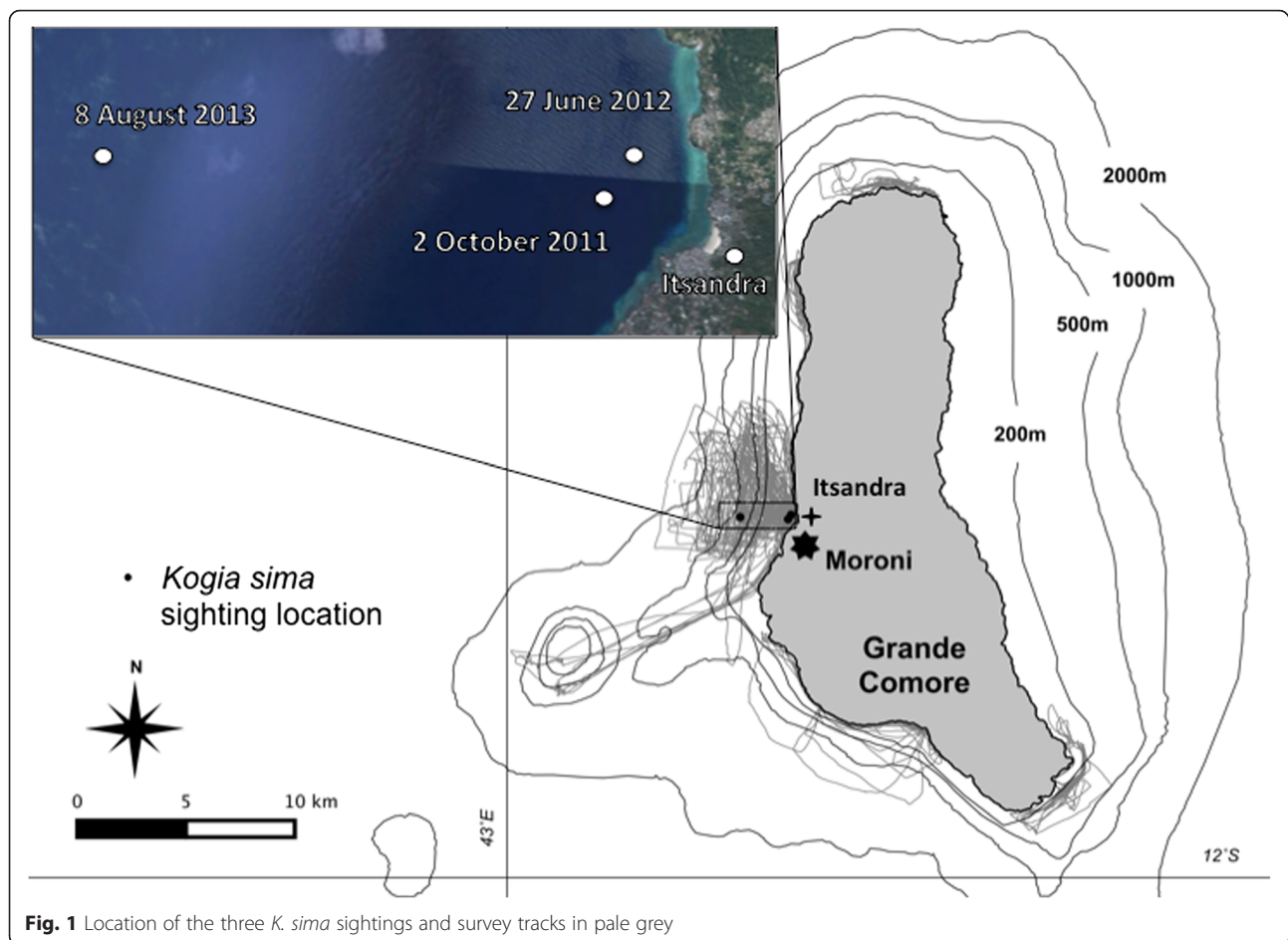
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bathymetric map available at <http://maps.ngdc.noaa.gov/viewers/wcs-client/>. Observations were made in good weather conditions ( $\leq 3$  Beaufort scale,  $\leq 3$  Douglas sea scale), and visibility of  $\geq 2$  km (following Evans and Hammond 2004). The majority (65 %) of surveys were made in Beaufort 0–1 conditions, 25 % in Beaufort 2, and 10 % in Beaufort 3.

#### Identification

All the animals seen or photographed during the three sightings were quickly recognized as belonging to the genus based on the following characteristics: head ending abruptly with a vertical forehead, a flat back between the end of the head and dorsal fin, falcate dorsal fin with the trailing edge right at the surface of the water, and none of the tailstock visible (Fig. 2). During all three sightings, specific dwarf sperm whale characteristics were observed. The dwarf sperm whale is smaller than the pygmy sperm whale (Leatherwood et al. 1998), but its dorsal fin is larger and more erect (Caldwell & Caldwell 1989; Duguy 1987; Jefferson et al. 2008). The dwarf sperm whale's dorsal fin is situated

midway along the dorsal line, unlike the pygmy sperm whale's fin, which is closer to the tail (Baird 2005). When lying at the surface, because of these differences in body length and fin position, the dwarf sperm whale's back appears relatively flat anterior to the fin, as compared to the more rounded or slightly domed back of the pygmy sperm whale (Jefferson et al. 2008).



## Results

During the entire study, three sightings of dwarf sperm whales occurred, resulting in a mean sighting frequency (sightings per hour of effort) of 0.009 and a mean encounter rate (sightings per monitored km) of 0.001. For all three sightings, proximity to the animals enabled the observers to recognize *K. sima*'s specific characteristics, and during the first and third sightings, photographs documented their morphology, confirming the species identity.

### First sighting

On 2 October 2011 at 06:08, two dwarf sperm whales were observed 30 m from the boat in sunny conditions, moderate cloud coverage (30 %), calm seas (Beaufort  $\leq$  1), and light wind (Douglas 0–1). The location was just outside the harbour of Itsandra Bay, approximately 600 m off the coast (11°40.157'S, 43°14.852'E), at a depth of 32 m (Fig. 1). The sighting was of two animals, the larger estimated to exceed 2 m in length, and presumed to be an adult accompanied by a smaller animal, either a sub-adult or a small adult. When sighted, the two animals were floating and breathing noiselessly about 5 m away from each other. Approximately 2 min after the initial sighting, both animals made two short dives, disappearing from view and resurfacing, and then disappeared after the third dive. Both animals were photographed (Figs. 2 and 3).

### Second sighting

The second sighting occurred on 27 June 2012 at 10:32. The location was 720 m off the coast (11°40.157'S, 43°14.852'E), in water 39 m deep (Fig. 1). Similar to the first sighting, the location was just outside of Itsandra Bay in sunny conditions, moderate cloud coverage (30 %), calm seas (Beaufort 1), and a light breeze (Douglas 1–2). The second sighting was also of two animals. We were underway when one animal surfaced 5 m in front of our boat; we stopped the boat immediately and the animal

dived. Then two animals surfaced almost 20 m ahead, and were identified as *Kogia*. One dived immediately and disappeared, leaving no opportunity to identify it to species level, while the other remained on the surface, floating quietly, allowing time to identify it as a *K. sima* due to the characteristic profile and dorsal fin shape. It subsequently dived and was not resighted.

### Third sighting

The third sighting occurred on 8 August 2013 at 06:22, 6 km off the coast of Itsandra Bay (11° 40.121'S, 43° 12.739' E), in sunny conditions with low cloud coverage (10 %), calm seas (Beaufort 1) and a light breeze (Douglas 1–2). The water depth for the third sighting was 729 m, much deeper than for the first two sightings (Fig. 1). Both animals were photographed, and observed to be clearly different in size. As with the first sighting, we presume the animals were an adult accompanied by a sub-adult, or a smaller adult. Upon sighting the two animals, we stopped the boat. The two animals dived immediately and surfaced nearly 35 m from the boat, then floated quietly about 3–5 m away from each other for 4 min, and made two short dives. After a third dive they were not seen again (Fig. 4).

## Discussion

The presence and distribution of the dwarf sperm whale in the Western Indian Ocean is poorly known. Our observations are interesting for several reasons. The sightings represent the first occurrences of dwarf sperm whales from the Union of the Comoros and establish new records for this area. Also, two of the three sightings came from Itsandra Bay and occurred in unusually shallow waters for this species, very close to shore and near a busy harbour entrance. Finally, the species was seen three times over three years in the same general area, in June, August, and October, suggesting a possible regular presence for the species in the waters around the



**Fig. 3** Close up of one *K. sima* on 2 October 2011, photo by M. Bonato



**Fig. 4** Two *K. sima* on 8 August 2013

Comoros. The third sighting came from deep waters outside of Itsandra Bay, but still relatively close to shore. Since our study area lies within the Agulhas Current Large Marine Ecosystem (Heileman et al. 2006), where upwelling and a productive ecosystem (Bakun et al. 1998; Lutjeharms 2006; Heileman et al. 2006) lead to a year-round consistent abundance and distribution of possible prey, we can reasonably suspect that the aggregation of prey on the continental slope (Dunphy-Daly & Heithaus 2008) could attract *K. sima*. Dwarf sperm whales feed primarily on cephalopods and to a lesser extent on crustaceans and fishes, based on stomach contents of stranded animals (Ross 1979a; Cardona-Maldonado & Mignucci-Giannoni 1999). Although the diets of both species of *Kogia* may partially overlap (Plön et al. 1999), the relative contribution of prey types indicates that dwarf sperm whales have a preference for smaller squids and use shallower, warmer and more in-shore waters than pygmy sperm whales (Ross 1979a; Candela 1987; Klages et al. 1989; Auriolos et al. 1993; Plön et al. 1999). Our observations also suggest that the Mozambique Channel, and particularly the Comoros Archipelago, with its narrow continental shelf and deep coastal waters, could be one of the few locations in the world close to shore, like the Bahamas, the Gulf of California, and the Kona coast off the Island of Hawaii, suitable for the study of dwarf sperm whales, one of the least known pelagic cetaceans. We found no records in the literature of apparently healthy dwarf sperm whales occurring in waters between 30–40 m deep, where two of our three sightings occurred. The only other instance where sightings of dwarf sperm whales occurred on the continental shelf in relatively shallow waters (94 m) was around the Bahamas (MacLeod et al. 2004). A very narrow, steep continental shelf bordering a deep abyssal trench may explain the occurrence of the dwarf sperm whales we observed, as well the record in the Bahamas. While it is appealing to think that the three occurrences of this species over different seasons are the result of a local year-round resident population near Itsandra Bay, more surveys are needed to confirm this conjecture. In any case, the presence of dwarf sperm whales should be taken into account as part of the cetacean fauna of the Union of the Comoros when developing marine conservation plans for the area.

#### Abbreviations

"Not Applicable".

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#### Availability of data and material

"Not Applicable".

#### Authors' contributions

MB and AA carried out the field activity and the data collection. MB wrote the first draft of the manuscript, AA, MW and CG reviewed the manuscript and were involved in its critical revision before submission. All authors read and approved the final manuscript.

#### Competing interests

I confirm that I have read Biomed Central's Guidance on competing interest and all the Authors declare that they have no competing interest.

#### Consent for publication

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#### Ethics approval and consent to participate

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