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Cetacean sightings, mixed-species assemblages and the easternmost record of *Indopacetus pacificus* from the northern Indian ocean

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Abstract

A visual survey of cetaceans was carried out during a voyage from Singapore to Sri Lanka, through the Straits of Malacca, Andaman Sea and across the Bay of Bengal in the northern Indian Ocean in November/December 2012. Forty sightings of 11 cetacean species were recorded in 19 days of observation. Two mixed-species associations of interest were recorded. One of these contained four species of odontocetes in association with each other. The second group was of *Indopacetus pacificus* in association with *Globicephala macrorhynchus* and this while being the easternmost live sighting of *I. pacificus* in the northern Indian Ocean is also the first such mixed group in the Bay of Bengal.

Keywords: Bay of Bengal, Northern Indian Ocean, Cetaceans, Mixed-species assemblages, *Indopacetus pacificus*

Introduction

There have been few offshore cetacean surveys in Asia and there is a particular dearth of knowledge from the Bay of Bengal area of the northern Indian Ocean. While some countries around the rim of the Indian Ocean have carried out surveys in coastal waters, dedicated offshore cetacean surveys have rarely been undertaken in this area. Therefore, almost all of the knowledge about marine mammal diversity and distribution has come from observations in coastal waters (Alling, 1986; Anderson, 2005; Broker & Ilankoon, 2008; Ilankoon, 2008; Smith et al., 2008; Smith & Tun, 2008; Ilankoon, 2009; Ilankoon & Perera, 2009; Minton et al., 2010; Mansur et al., 2011; Clark et al., 2012; de Vos et al., 2012) and records of dead and stranded animals (Leatherwood & Reeves 1989; Chantrapornsy et al., 1996; Ilankoon, 2006, Ilankoon, 2012a). While dedicated cetacean surveys have been sparse throughout the northern Indian Ocean region (Ballance and Pitman 1998; De Boer, 2000) the only offshore records in the Bay of Bengal have

come from observations using platforms of opportunity (Leatherwood et al., 1984; Afsal et al., 2008).

Between 20 November and 12 December 2012, a visual survey for cetaceans was carried out onboard sailing vessel *Mir* while transiting from Singapore to Sri Lanka. The journey began in the Straits of Malacca and continued across the Andaman Sea and Bay of Bengal to Galle, Sri Lanka (Fig. 1). The route was chosen specifically to cross through the Ten Degree Channel (10° N Latitude) instead of the more direct route through the Great Channel (6° N Latitude). It is an unusually deep passage that has strong tides and currents coursing through several 1000 m depth contours running parallel to each other through the channel. Previously no cetacean surveys with published results have taken place in this passage area.

Materials and methods

The vessel *Mir*, a 113' two-masted ketch with a cruising speed of 3–6 knots was used as the dedicated platform for this survey. One primary observer, stationed on the bow scanning 180° ahead kept a constant watch during daylight hours. The primary observer was assisted by the helmsman who was positioned just off-centre on the port side of the vessel aft of mid-ship. All sightings were

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Fig. 1 Survey track and cetacean sighting locations

recorded in passing mode while the vessel maintained its preplanned course and no attempts were made to approach any of the cetaceans sighted.

For each sighting, the date, time, GPS location, species, number of individuals, behaviour and other pertinent information such as group composition, associated organisms and sea state were recorded. Animals were photographed opportunistically to aid identification but as all observations were in passing mode this was possible only when animals approached the vessel. Here we report all cetaceans sighted over the 19 days of observation and discuss some of the significant sightings including mixed-species groups, in terms of expanding knowledge on the cetaceans in the northern Indian Ocean and particularly in the offshore areas of the Bay of Bengal.

Results

The survey commenced at 0800 on 22 November in the Straits of Malacca (3°7'30"N; 100°41'33"E) once *Mir* was outside of the main shipping lane and was completed when reaching the approach to Galle Harbour in Sri

Lanka (5°53'48"N; 80°29'6"E) at 0800 on 12 December 2012 (Fig. 1). An estimated distance of 1,660 nm was travelled, with good sighting conditions on all survey days except on 30 November when squalls and an opposing easterly current greater than 4 knots was prevalent just west of the Ten Degree Channel and the Andaman Islands.

Forty cetacean sightings were recorded over the survey period and all sightings were of odontocetes. Species were positively identified in 36 of the 40 sightings due to good sighting conditions and experienced observers while four sightings were recorded as unidentified species. A total of 11 species were positively identified including long-snouted spinner dolphin (*Stenella longirostris* Gray, 1828), pantropical spotted dolphin (*Stenella attenuata* Gray, 1846), striped dolphin (*Stenella coeruleoalba* Meyen, 1833), common bottlenose dolphin (*Tursiops truncatus* Montagu, 1821), Indo-Pacific bottlenose dolphin (*Tursiops aduncus* Ehrenberg, 1833), common dolphin (*Delphinus capensis* Gray, 1828), Irrawaddy dolphin (*Orcaella brevirostris*

Gray, 1866), rough-toothed dolphin (*Steno bredanensis* Lesson, 1828), short-finned pilot whale (*Globicephala macrorhynchus* Gray, 1846), Longman's beaked whale (*Indopacetus pacificus* Longman, 1926) and sperm whale (*Physeter macrocephalus* Linnaeus, 1758) (Table 1).

Stenella longirostris was the most frequently observed species encountered in 21 of the 40 sightings (Table 1). The only large whale sighting, of *P. macrocephalus* was in deep water (>1000 m) in the Ten Degree Channel off the Andaman Islands. Two mixed-species assemblages were recorded among the sightings and both occurred in the Bay of Bengal. The first of these occurred at location 11° 21' 83" N; 90° 55' 14" E at 1414 on 5 December 2012 and this group of over 100 animals included four species: *S. longirostris*, *S. coeruleoalba*, *S. attenuata* and *T. truncatus*. This entire group was moving fast in a southerly direction and flying fish (*Hirundichthys* spp.) were also observed leaping among the dolphins. The second mixed-species assemblage occurred at location 09° 59' 57" N; 88° 01' 18" E at 0825 on 7 December 2012 and comprised of the two species *I. pacificus* and *G. macrorhynchus* in a small group totalling 9–12 animals. When first sighted, three animals of the species *I. pacificus* appeared to be surfacing after a deep dive as they surfaced at a steep angle, with visible blows, which aided species identification along with their bulbous melon, large size and falcate pointed dorsal fin (Dalebout et al., 2003). They were soon followed by 6–9 *G. macrorhynchus* that surfaced beside them, after which they all swam away steadily in a southeasterly direction as one group. Although this group was photographed the animals were moving away, against the light, resulting in low quality photographs, not fit for publication.

Table 1 Cetacean sightings by species and location number as shown in Fig. 1

Species	No. of sightings	Sighting numbers as in Fig. 1
<i>Stenella longirostris</i>	21	3, 4, 5, 6, 8, 9, 11, 12, 13, 14, 16, 19, 25, 26, 27, 30, 32, 34, 35, 38, 39, 40
<i>Stenella coeruleoalba</i>	2	27, 37
<i>Stenella attenuata</i>	3	27, 31, 37
<i>Tursiops aduncus</i>	6	1, 7, 18, 22, 23, 24
<i>Tursiops truncatus</i>	2	27, 29
<i>Steno bredanensis</i>	1	17
<i>Orcaella brevirostris</i>	1	2
<i>Delphinus capensis</i>	1	36
<i>Globicephala macrorhynchus</i>	1	33
<i>Indopacetus pacificus</i>	1	33
<i>Physeter macrocephalus</i>	1	21
Unidentified delphinids	4	10, 15, 20, 28

Discussion

This is the first reported cetacean survey conducted across the Andaman Sea and Bay of Bengal, thus it is not possible to make a comparison with previous studies. While all 11 species recorded have been previously reported from northern Indian Ocean waters (Alling, 1986; Leatherwood and Reeves, 1989; Ballance and Pitman, 1998; Balance et al., 2001; Ilangakoon 2002, Anderson, 2005) some factors of interest that further our knowledge were noted during the sightings of the present survey and particularly so with the mixed-species groups.

Both mixed-species assemblages sighted during the present survey were of significance due to their composition and the species involved. The first was of interest due to four species being in association with each other in a single group. Mixed-species associations involving delphinids including *Stenella* species, *Tursiops* species and *Globicephala* species are not unusual and they have been reported from several areas of the world's oceans (Querouil et al., 2008; Rossi-Santos et al., 2009) including areas around the Maldives Islands and Sri Lanka in the tropical Indian Ocean (Ballance & Pitman 1998; Anderson, 2005; Ilangakoon, 2012b). However, most such sightings contained two or three species at most while the present sighting included four species with three *Stenella* species and one *Tursiops* species. The most likely explanation for this association is foraging advantage as previously suggested for similar associations in the Azores and Sri Lanka (Querouil et al., 2008; Ilangakoon, 2012b). This is further substantiated by flying fish being observed with this group. However, it has also been suggested that predation risk can drive sympatric cetacean species to form temporary mixed-species aggregations (Kiszka et al., 2015). Since this sighting was in the deep open waters of the Bay of Bengal this is another possibility to be considered.

The second mixed-species group observed in the present survey is significant firstly as it contained *I. pacificus*, a species that is not commonly sighted anywhere and there is a relative paucity of information on this species in a worldwide context. Sighting records of *I. pacificus* in the northern Indian Ocean are mostly from the western Indian Ocean (Anderson et al., 2006) and this is only the second live sighting to be documented east of Sri Lanka. The only other reported sighting was southeast of Sri Lanka at location 06°18'N; 85° 50' E (Afsal et al., 2009) while the present sighting was in the central Bay of Bengal at location 09° 59' N; 88° 01' E. Therefore, this sighting was over 250 nm northeast of the sighting reported by Afsal et al. (2009), making it the easternmost sighting of this species recorded in the northern Indian Ocean to-date. Secondly, it has been reported that this species occasionally associates with *G. macrorhynchus* (Reeves et al., 2002) but only one such

instance of association has been previously recorded in the northern Indian Ocean (Anderson, 2005) in the waters off the Maldive Islands. Therefore the present sighting is important in that it expands our knowledge on the range and behaviour of this little-studied species in the northern Indian Ocean.

The sighting of two *P. macrocephalus* near the Andaman Islands is also noteworthy as there are few recent records of this species from the area. The previously documented sightings of this species from this area are old records from American whaling log books prior to 1920 (Townsend, 1935) and opportunistic observations by British and Dutch merchant seamen (Brown, 1957; Morzer-Bruyns, 1971; de Silva, 1987), that mention sperm whales from the vicinity of the Andaman and Nicobar Islands. Although cetacean stranding and sighting records in Indian waters have been documented in the interim period (Sathasivam, 2004) no sperm whale sightings or strandings have been reported from the area around the Andaman Islands from the 1950's until the present sighting. It is not clear if this dearth of records is due to a lack of dedicated cetacean surveys in the area or because the species is rare in these waters. However, it is also worth mentioning that at the time this sighting was made a French-Indian seismic survey vessel was active in the area and seismic blasts were audible on the hydrophone deployed to attempt recording sperm whale clicks. The sighting was brief as the two whales fluked high and dived rapidly. This behaviour may have been an indication of disturbance due to the proximity of seismic blasts as has been observed elsewhere (Mate et al., 1994).

Of the eight sightings of *Tursiops* spp. observed during the survey, six were of *T. aduncus* in the shallow waters of the Andaman Sea while two were of *T. truncatus* in the deeper waters of the Bay of Bengal beyond the Andaman Islands. Although *T. aduncus* has been commonly reported in coastal waters of southeast Asian countries adjoining the Andaman Sea (Thailand, Myanmar) and in the Swatch of No-Ground off Bangladesh in the northern most regions of the Bay of Bengal, *T. truncatus* predominates around Sri Lanka on the western side of the Bay of Bengal. The present sightings were of interest however, because the clear demarcation of area of occurrence noted in this survey has not been documented before. This observation needs to be treated with caution due to the small number of sightings however, it is a point of interest for future surveys in this area to verify.

The present survey is only a starting point to fill the gaps in knowledge about cetacean occurrence and distribution in the offshore waters of the northeast Indian Ocean, particularly the Bay of Bengal. The data presented here indicates that a lot more work needs to be done in this area in order to gain a proper understanding of the importance of these waters as cetacean habitat

and it is therefore suggested that more systematic surveys are undertaken in the future.

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Authors' contributions

AA and AI conceived the study and participated in the on-board research. AI prepared the manuscript with input from AA. Both authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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