CETACEAN DISTRIBUTION IN RELATION TO ENVIRONMENTAL PARAMETERS IN THE INDIAN EEZ

K.S.S.M. YOUSUF, B. ANOOP, V. AFSAL, R. JEYABASKARAN, E. VIVEKANANDAN AND M. RAJAGOPALAN
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE, PBOX 1603, KOCHI -18.

Introduction

- Cetacean distribution is largely influenced by different oceanographic and physiographic variables (Hincks et al., 2007) and prey availability (Lundin et al., 2002).
- These variables vary between regions and hence there is a need to study their role in influencing cetacean distribution.

Understanding habitat characteristics of cetaceans is crucial to understand the ecology and community structure of cetacean species and serve as key components for marine conservation efforts.

- Historical stranding, bycatch and sightings records document occurrence of 26 species of marine mammals in the Indian sea (Karanam, 2002), but not understanding of ecology of these cetaceans in Indian waters remain poor.
- The present study is the first effort to comprehend the distribution of five cetacean species with oceanographic parameters in the Indian EEZ and contiguous seas.

Methodology

- Shipboard opportunistic visual surveys (passing mode) were conducted from 35 cruises of R/VN Suvarna Sagar (over two legs: TL 2-3, the three years and four months from October 2003 to February 2007).
- Cetacean sightings surveys were carried out by single trained observer in every cruise by roaming with naked eye and interrupted with a Nikon 10x50 close-up CFWF hand-held binocular with visual range of 4km. Sightings were recorded on suitably marked charts on the surface.
- A Nikon F90 camera fitted with 35mm 70-300mm lens was employed to capture photographs of cetaceans in the form of shots, ditch, flipper, upper body and fluke.

- Data on the distribution of cetaceans were collected along with relevant environmental variables.
- Simrad Q300 GPS navigator was used to record geographical position of animal sightings.
- Cetaceans were identified to the lowest taxonomic level possible based on descriptions in FAO Identification Charts (Phillips et al., 1993).
- Variations, namely in two physiographic variables (depth and distance from the shore) and two oceanographic variables (sea temperature and surface salinity) were considered.
- EMC25 SUB splash underwater shipboard sensors unit provided SST and salinity data.
- For recording the maximum depth at which the animal was sighted, Simrad EK 40 echo sounder of frequency 38kHz was employed.
- Distance between the sighting and nearest shore was calculated using Ocean Map software and software version 13.8.
- Inter-quartile deviation was performed for five species P. microsaeca, S. longirostris, T. aduncus, D. delphis and S. attenuatus for which adequate sightings along with data of oceanographic parameters were available.

Important Highlights

- The cetaceans were widely distributed from 0.05 km to 914 km from the nearest shore. In eastern Arabian Sea, distribution of cetaceans from the nearest shore ranged from 51 to 581 km, whereas it ranged from 2km to 968 km in Bay of Bengal.
- Most of the sightings of B. acutirostris were in oceanic water on continental slope of > 500m depth, but considerable sightings were found in inshore shallow water.
- P. microsaeca occurred commonly in deep oceanic continental slope water at depth varied from 348 km to 363 km. Its occurrence ranged up to 279 km from the shore but predominant occurrence was < 200km.
- P. longirostris, G. acutirostris and G. griseus were found on slopes. The occurrence of P. longirostris was < 300km, closer than that of G. acutirostris and G. griseus.
- Sightings of T. aduncus, D. delphis and S. attenuatus ranged from 20 km to 74 km with average observation within 158 km. Spinners delphis and S. attenuatus occurred both in shelf and slope but generally occurred on slope water (> 300 km).
- T. aduncus showed coastal preference mainly in shelf water and also over slope regions (> 500m depth) and most of the sightings occurred between 275 km and 325 km. The SST ranged from 27 to 37 km.
- D. delphis was found in coastal waters with five occurrences in deep oceanic waters and most of the sightings were within 108 km distance. Occurrence of D. delphis ranged from shelf to water slope with predominant sightings on shelf but break. The depth range of the sightings was 23 km-510m and average depth was 70m.
- S. attenuatus was commonly found in nearshore waters with average distance of 21 km (SD = 50). The occurrence of S. attenuatus was confined to shallow waters, generally at depth < 100m.
- The surface salinity in survey area varied from 27 to 38 with a mean of 33.5 ± 1.5. The SST range from 24.5°C to 34.0°C with the mean of 28.4°C (SD = 1.2).
- The cetacean occurred in the water with relatively narrow range of SST and SSS, similar to those reported for the coastal Gulf of Mexico (Frits et al., 1983) and eastern tropical Pacific (Alv and Pursey, 1985; Pursey and Ogando, 1986)

- All the cetacean species except S. attenuatus were encountered in water with mean surface temperature of 28°C and mean surface salinity of 33ppt.
- However, oceanic species differ in their preference for SST and surface salinity. B. acutirostris, T. aduncus, D. delphis and S. attenuatus occurred with SST range 21-29°C.
- The coastal species such as T. aduncus and D. delphis were recorded relatively in waters with wide variation in SST and salinity. Rough-toothed dolphins were sighted in areas of low surface temperature and surface salinity.

References


