

Network of
Marine Mammal Observers
in the south-western
Indian Ocean

NeMMO

IndoCet



The "Network of Marine Mammal Observers" (NeMMO) is a research initiative aimed at enhancing the collection of marine mammal data during opportunistic vessel-based work in the oceanic waters of the western Indian Ocean. The program is being carried out as part of the activities of the IndoCet Consortium, a collective of researchers dedicated to advancing the research and conservation of cetaceans in the southwestern Indian Ocean (www.indocet.org).

I. Objectives

The goal of NeMMO is to significantly increase the quality, quantity and availability of useful data on cetacean populations in the oceanic waters of the south-western Indian Ocean through a network of MMO's working onboard platforms of opportunity. 'Platforms of opportunity' are defined here as oceangoing vessels that are engaged in other work but which offer opportunities for dedicated observers to collect data, in this instance on marine mammals and other megafauna (see Williams, 2003¹), Marine megafauna data for large parts of this region is largely absent or extremely sparse, and in the absence of dedicated resources will likely remain so without creative efforts to collect new information. The network will achieve this goal through the following specific objectives:

1. **Platform Diversification:** NeMMO seeks to leverage platforms of opportunity to collect systematic data on cetaceans. These platforms include commercial vessels, research vessels, and other vessels transiting in offshore waters and Areas beyond National Jurisdictions (ABNJ). By utilizing existing platforms, the program aims to maximize the geographic coverage and frequency of recorded observations, leading to a more comprehensive understanding of the distribution of cetaceans and other marine megafauna.
2. **Data Collection Enhancement:** NeMMO aims to develop of network of experienced MMOs that can embark aboard the identified platforms. Visual surveys consist of 2-3 MMO continuously searching the surface and recording their effort, any cetacean sightings and any other megafauna. Data recorded will include GPS location, species identification, group sizes and behaviors. Data collection protocols will be established to ensure standardized procedures for recording sightings and data entry, to ensure consistency and comparability across surveys. These data will also contribute to the improvement of any dedicated research surveys in future.
3. **Collaboration and centralizing resources:** The project will foster collaboration among researchers, institutions, and stakeholders in the region. The project will also centralize existing data on cetacean distribution into a regional database, to ensure data are standardized, referenced and safely stored in order to be readily available for research and conservation initiatives.

¹ <https://research-repository.st-andrews.ac.uk/handle/10023/2836>

4. Capacity Building: NeMMO will provide training to local researchers and observers, enhancing their skills in cetacean identification and data collection. It is hoped that this capacity-building and consolidation of the IndoCet partnership will contribute both to the long-term sustainability of the NeMMO program, but also more productive collaborations across the region.
5. Data Analysis and Dissemination: The data collected by NeMMO is intended to be used to assess distribution patterns, species habitats, and any interactions with human activities. In the longer term these can help to identify trends in cetacean populations and inform the management of threats in the region.

II. Program Implementation and Methodology

II.1. Platform Identification

Collaborative efforts with partners in the IndoCet Consortium will be developed to identify suitable vessels for deploying marine mammal observers. To date, several partnerships are already in place:

- GLOBICE has established a partnership with Direction de la Mer Océan Indien (DMSOI)/France to embark MMOs onboard the patrol vessel *Osiris II*. Nine surveys have been conducted so far with between one and three observers from the region on each cruise (GLOBICE, MMCO, Cetamada, Ceta'Maore, the Watamu Marine Association, Green Attitude Foundation). These surveys took place as part of research programmes lead by GLOBICE and funded by the European Union (FEDER)
- WCS has developed a partnership with PONANT, a French cruise company, that will allow MMOs onboard vessels operating in the WIO, including *Le Champlain* and *Le Jacques Cartier*, during cruises in the western Indian Ocean. This is being developed as part of the Quieter Western Indian Ocean project (QWIO) funded by FFEM and other partners.

Cetacean surveys have also been conducted as part of research surveys conducted in the region and have contributed to the NeMMO database. These include:

- Resilience program (April-May 2022), onboard the *Marion Dufresne*, led by the CMR Nelson Mandela University, in partnership with GLOBICE. The cruise departed Reunion Island on the 19 April 2022, transiting south of Madagascar and up into the Mozambique Channel. The ship then travelled south to the KwaZulu Natal coast of South Africa, before transiting back to Reunion Island and docking on the 22 May 2022.
- Monaco Exploration (Nov. 2022), onboard the *Agulhas II*, led by GLOBICE, covering the Mascarene Plateau, from Seychelles to Mauritius, with a primarily focus on Saya de Malha Bank from 1/11/2022 to 22/11/2022 (data yet to be included).
- MayObs (Sept 2023), on board the *Marion Dufresne*, led by BRGM (Bureau de Recherches Géologiques et Minières) in partnership with GLOBICE.
- Saya de Malha Exploration, led by Greepeace, on board the *MY Arctic Sunrise*, in March 2021.
- Programme Mad-Ridge and Walter Shoals lead by IRD (Institut de Recherche et Développement), in partnership with CetaMada (data to be included).

To date (September 2023), 1,077 cetacean sightings of 22 different species have been recorded (Figure 1).

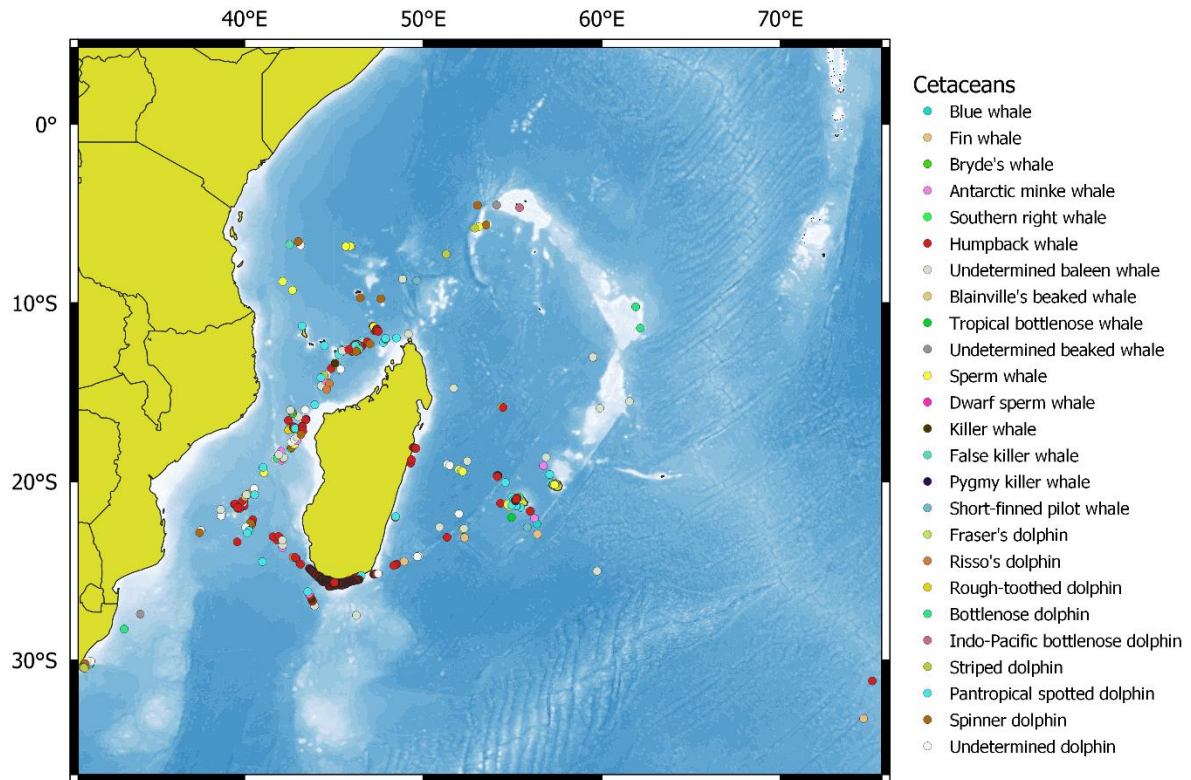


Figure 1: Cetacean sightings made between July 2021 and September 2023 during NeMMO opportunistic surveys.

II.2. Data Collection

Systematic cetacean surveys are conducted by ideally three MMOs, allowing continuous monitoring of the ocean surface by two observers (working 2-hour shifts). A standard visual survey methodology is typically applied, which consists of continuous monitoring at the front and on each side of the boat to detect the presence of cetaceans (or other marine megafauna) at the surface. The vessels track is recorded using a GPS, and survey 'effort' is recorded using effort codes that clearly define whether observers are actively searching, or focused on one particular observation or if the sighting is opportunistic (reported off effort). As far as possible, visual search start at sunrise and end at sunset. A record of weather conditions along the track is also maintained. Sighting conditions are rated on a scale of 1-5, based on an assessment of environmental factors that may hinder animal detection, mainly wind speed, wave and swell height and available light, as follow:

- 1: Null (wind > 4 Beaufort, waves or nighttime hours),
- 2: Poor (wind >3 Beaufort, many white caps or low light),
- 3: Average (wind at 2-3 Beaufort, with some white caps or moderate swell),
- 4: Good (wind ≤2 Beaufort, calm sea, no swell),
- 5: Excellent (flat sea).

Survey effort is maintained during daylight hours, with MMOs searching the water surface with the naked-eye, binoculars being used only to confirm sightings, species identification and to collect

sighting data (see below). Whenever possible, photographs are systematically taken to confirm species identification. The following sightings data is recorded using a standardised datasheet:

- GPS position (latitude/longitude)
- Species
- Group size estimate
- Presence of juveniles
- Group activity (surface resting, foraging, breeding, travelling, undetermined)
- Group formation (tight, grouped, subgroups, dispersed, undetermined)
- Number of boats
- Radial distance between the animals and the vessel (when possible using reticular binoculars)
- Bearing angle of the animals in relation to the ship's heading.
- The location of the observer who made the above measurements.

These last two parameters allow computation of the perpendicular distance (x) of the animals to the vessel's track and therefore to estimate the width of the area being surveyed on either side of the vessel). Prior to each survey the height above the sea surface and distance from the central navigation axis of each observation post also needs to be recorded.

Monitoring of avifauna, other megafauna and marine debris is carried out in conjunction with cetacean monitoring. All data (waypoints, tracks, datasheets and pictures) is systematically downloaded and saved into a standardised spreadsheet at the end of each day

To ensure standardized information is being recorded for sightings and data entry, datasheets are used and a training session is planned before each survey to equip marine mammal observers with the necessary skills for accurate cetacean species identification, behavior observation, and standardized data recording.

III. Data dissemination and data ownership

The data are centralized into a GIS database, maintained by GLOBICE and archived into the SIMM-OI platform hosted by IFREMER. This serves as a secure and reliable repository for long-term storage of cetacean observation data (<https://sextant.ifremer.fr/>). The intention is to make this data available for visualization on the IndoCet website, with information regarding data access, reference and usage. If available, a DOI can be provided. Each datapoint is linked to a metadata document that provides any relevant background information on the dataset as provided by the data owner. This will include the name of the research program, MMO's names and their affiliation, the vessel name, funders, contact details of data owners, any data restrictions, and other relevant information.

Data can be access either via a request to Indocet (info@indocet.org), or directly via the data owner. Data access and usage is defined by the data owner, and described for each dataset in the metadata file.

IV. Contact

We invite researchers and/or organisations interested in contributing to this regional effort to contact us at info@indocet.org. Collaborators can (for instance) contribute data, help harmonize protocols, provide space on vessel surveys for MMOs, or take part in surveys as MMO's.

V. Partners

