

CETA: a new cetacean observation program in East Antarctica

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ABSTRACT

The CETA program (Distribution des cétacés en Terre Adélie) was launched by the French Polar Institute (IPEV) in 2009 to carry out a first pilot study on cetacean distribution off Adélie Land (IWC Area V). An opportunistic survey conducted in January 2010 allowed the collection of 38 sightings on the continental shelf off the Adélie Land coastline, totalising a minimum of 84 individuals. True blue whales (*Balaenoptera musculus*) and humpback whales (*Megaptera novaeangliae*) were identified for the first time in the Adélie Land region. Sightings of antarctic minke whale (*Balaenoptera bonaerensis*) and killer whale (*Orcinus orca*) type A and C confirmed the presence of both species in this area. Photo-ID were realised on three blue whales and two humpback whales. One of the two humpback was previously photo-ID in Hervey Bay, East Australia in 2002. A biopsy was collected on one humpback whale. The presence of great whales (8 individuals of blue and humpback whales) in the Adélie Depression raised the issue of the importance of this area for such endangered species. The second year of this pilot study will be conducted in January 2011, after which data will be combined to evaluate relative abundance of cetaceans in the region. This work is a part of the Southern Ocean Research Partnerships (SORP) on non-lethal whale research.

INTRODUCTION

Few information is available on the migratory routes of humpback whales and the connection between feeding and breeding ground. Research projects have been carried on off Adélie Land (IWC Area V, 65-66°S and 140-145°E) for many decades but no dedicated program has ever been conducted on cetaceans in this area. Therefore until recently few data were available with only 24 observations collected in 1997, 1998, 2004 and 2008, principally killer whales, some minke and fin whales and a pod of humpback whale. The CETA project (IPEV1014) was launched in January 2010 in order to document the distribution and relative abundance of cetaceans off Adélie Land. The aim of this two-year pilot study is to assess distribution patterns and relative abundance of minke, fin, blue, humpback and killer whales, and to attempt collecting photo-ID and biopsy samples on target species defined as blue, right, and humpback whale.

MATERIALS AND METHODS

Field work

The cruise departed Hobart in Tasmania the 31th of December and returned on the 28th of January 2010. Transits between Australia and Antarctica lasted 12 days. The oceanographic survey departed the French research station of Dumont D'Urville (DDU) on the 10th of January and returned to DDU the 22nd before heading back to Hobart. The CETA project was conducted from the R/V Astrolabe used as a platform of opportunity during an oceanographic survey that included two other IPEV research programs (ALBION : Adélie Land Bottom Water Formation and Ice Ocean Interaction; and ICOTA: Coastal Ichthyology in Adélie Land) conducted on a yearly basis off Adélie Land. Sampling design is therefore neither regular nor random ; it was dictated by the stations sampled during those two oceanographic programs and by the weather conditions (Figure 1).

Two dedicated trained observers (CG and HP) searched for cetacean on 180° in front of the boat. Observation was carried out during the whole journey weather depending. Data collection was mainly conducted from the

bridge (height: 11.70m) and from the lower bridge (height: 10.60m). Linear transect method was used when possible i.e. when the boat was cruising at 10 to 12 knots between the oceanographic sampling stations or during the transits from Australia to Antarctica and back. Observation was also collected during plankton sampling when the speed of the boat was only 2 to 5 knots and at fixed stations during hydrographic instrumentation deployment. When target species were encountered during transit, attempts were made to approach them for photo-ID and biopsy collection following standard IDCR/SOWER methods. Photo-Ids were collected using digital SLR CANON 40D and 50D with 100-200 x1.4 and 400mm lenses. Biopsy was realised using a veterinarian riffle paxarms with small darts (Krützen et al., 2002). Sampling effort amounted to 115h53 of which 80h were conducted on the continental shelf off Adelie land area (Figure 1).

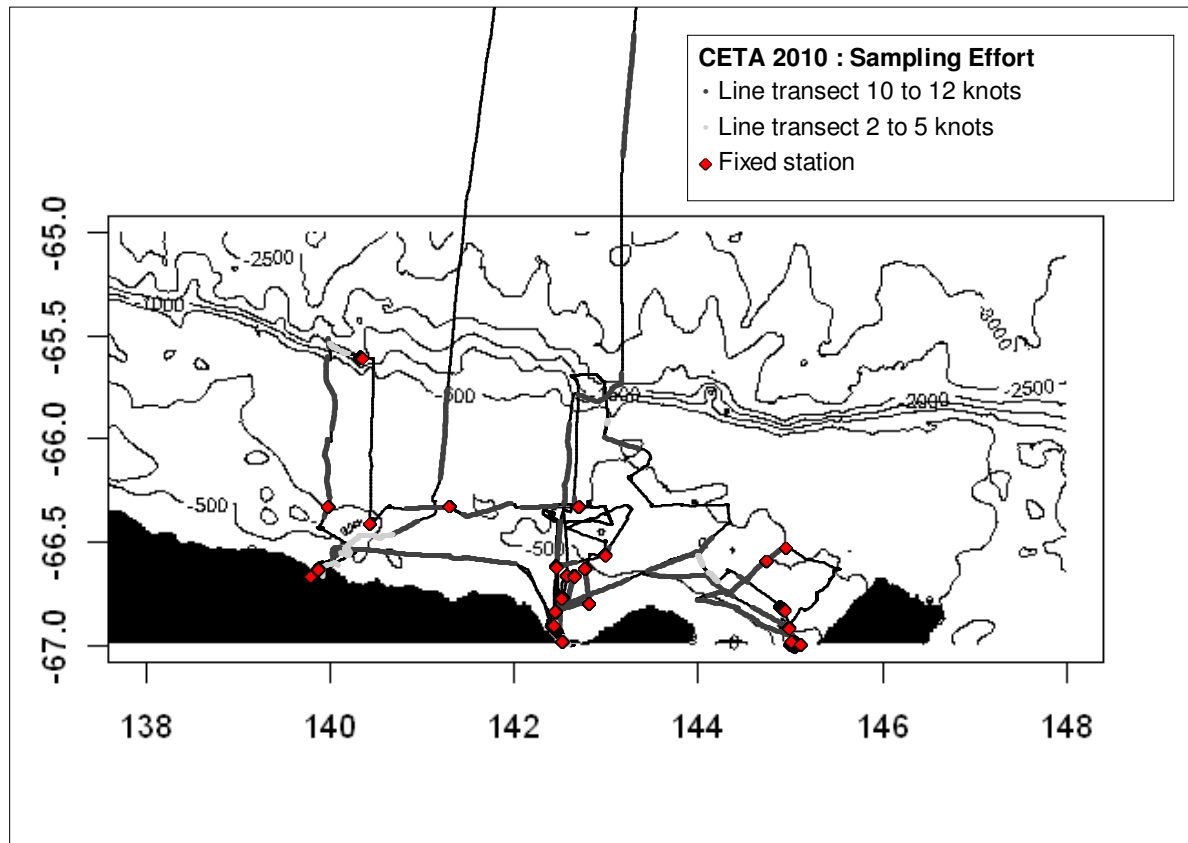


Figure 1. CETA 2010: sampling effort.

Data availability and analysis

Photo-ID of humpback whales were compared with the Oceania catalog collected between 1999 and 2006 by the South Pacific Whale Research Consortium and maintained at Auckland University and with the East Australia catalog (Hervey Bay and Byron Bay 1999-2004) as identified in Garrigue et al., (in press). These photos have also been added to the Antarctic Whale Expedition (AWE) humpback whale photo-identification catalog that will be posted on the website of the Australian Antarctic Division in order to make them available for researchers to match. Photo-IDs of blue whales were forwarded to Dr Paula Olson in order to be compared to the Antarctic blue whale catalog and to the Southern Hemisphere catalog during a workshop that will be held next July in Australia. Photo-IDs of killer whales will be sent to Dr Ribert Pitman for comparison.

Skin samples will be provided to the Australian Antarctic Division for analysis. They will be then compared with existing genotyping catalogs of the Southern Pacific Ocean.

RESULTS

A total of 55 sightings was collected during CETA representing a minimum of 145 individuals. Seventeen sightings totalising 61 individuals were collected en route between Tasmania and Antarctic and 38 eight sightings with a minimum of 84 individuals collected off Adelie Land.

Eight species have been identified during the entire survey, four of them on the continental shelf of Adelie Land and six during the transits between Hobart and Antarctica (Table 1). Bottlenose and common dolphins were encountered close to Hobart on the first and the last day of the cruise. Long finned pilot whales and sperm whales were observed during the first part of the journey from Hobart. Killer whales were observed during the transit between Hobart and Antarctic and over the slope and the continental shelf of Adelie Land. Both type A and C were observed on the continental shelf (B.Pittman pers.com.). Concerning mysticetes, blue, antarctic minke and the humpback whale were sighted on the continental shelf of Adelie Land. Some unidentified Balaenopteridae were also encountered there. Few opportunistic sightings have been collected by the scientists working at the scientific antarctic French Antarctic base of Dumont D'Urville including orcas, minke whales and one pod of humpback whales located at 63°S. The locations of all sightings made on the continental shelf of Adelie Land during CETA 2010 are presented in figure 2.

Table 2. List of species encountered during CETA 2010.

Taxon	Location
Balaenopteridae	
<i>Balaenoptera musculus</i> Linnaeus 1758	Adelie Land
<i>Balaenoptera bonaerensis</i> Burmeister, 1867	Transit and Adelie Land
<i>Megaptera novaeangliae</i> Borowski, 1781	Adelie Land
Physeteridae	
<i>Physeter macrocephalus</i> Linnaeus, 1758	Transit
Delphinidae	
<i>Orcinus orca</i> Linnaeus, 1758	Transit and Adelie Land
<i>Globicephala melas</i> Traill, 1809	Transit
<i>Delphinus delphis</i> Linnaeus, 1758	Transit
<i>Tursiops truncatus</i> Montagu, 1821	Transit

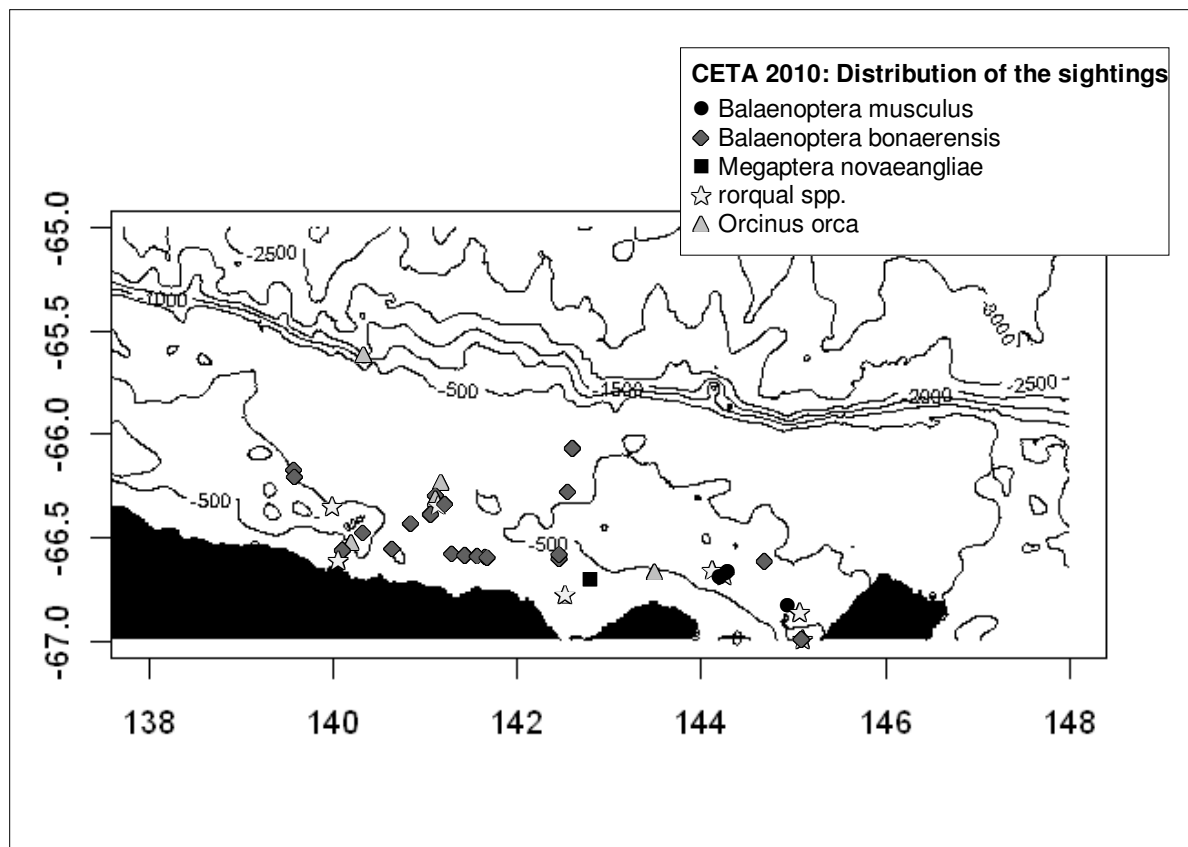


Figure 2. CETA 2010: Sighting locations.

On the 14th of January five pods of blue whales totalising six individuals were encountered in two hours time in the Adelie depression where bottom reaches 800m. All pods were singletons except one that included two adults.

This last pod was approached and photo-ID were collected. Another photo-ID was also collected on a single animal.

On the 16th of January a pod of two adult humpback whales was encountered. One skin sample was collected and Photo-ID were realised on both individuals. These two photo-ID were then compared to 994 photos from the breeding grounds of Oceania representing the Oceania catalog 1999-2006 and to 1803 photos of the east Australian migratory corridor collected in Hervey Bay and Byron Bay between 1999 and 2005. A match was found between whale #MnoCETA10-002 observed by 143.5°E and 66.7°S and a whale previously identified in Hervey Bay in 2002 #HB2002-1937 during the southern migration (Figures 3 and 4).

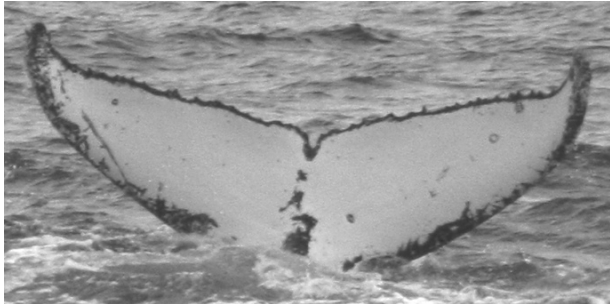


Figure 3. Fluke photo-ID taken during CETA2010 on the 16th of January 2010 (#MnoCETA10-002).

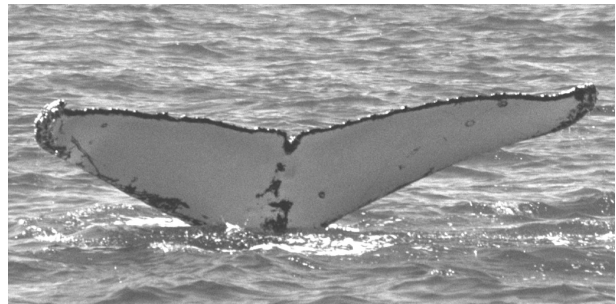


Figure 4. Fluke photo-ID taken in Hervey Bay on the 20th of September 2002 (#HN202-1937).

DISCUSSION

The opportunistic sampling effort conducted in an area situated between 150°E and 140°E by CETA program as part of the Southern Ocean Research Partnership (SORP), extended the recent sampling effort of the Antarctic Whale Expedition which covered 150°W to 150°E.

The CETA program allowed us to confirm the presence of some species already reported off Adelie Land such as killer and minke whales as well as to report other species for the first in this area blue and humpback whales. This first year of the pilot study brought some interesting new information on the distribution of the large whales in East Antarctica. The encounter of six true blue whales in a short time period and two humpback whales within a specific location of the continental shelf: the Adelie depression, suggests this habitat might be of potential interest of this area for great whales.

The continental slope was poorly surveyed during the cruise because of poor weather and bad visibility conditions. Therefore no sightings was collected there.

The photographic match between the migratory corridor of the east Australian coast (24.5°S) and the Antarctic management Area V was the second photographic evidence of humpback whale migratory movements between these areas. It confirms the connection between whales observed during the southern migration in the area of Hervey Bay and the Area V. The first connection established by photo-ID in the late 1980's was between Platypus bay located inside Hervey Bay and the eastern limit of Area V (170°5W) (Kaufman et al., 1990). The movement documented in this paper is between Hervey Bay and the western limit of Area V (143.5°E). Previous connections between East Australia and Antarctica Area V (130°E – 170°W) have been demonstrated using the so-called “Discovery” marks (Chittleborough, 1959, 1965; Dawbin, 1959 and 1964). More recently genetic comparison brought information on whale movement between east Australia (where about) and Antarctica (Anderson et al., 2010).

The second year of this pilot study will be conducted in January February 2011. New sightings will be combined to the present data in an attempt to determine relative abundance (e.g. density) following the method of Willams et al. (2006) for data collected on platforms of opportunity. The developpement of a more important research project will depend of the results of this two-year pilot study.

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