

# Applying Stable Isotope Bayesian Ellipses (SIBER) to characterise trophic niches of large cetaceans from North-Western Mediterranean Sea

Marianna Pinzone<sup>1,3,\*</sup>, Loïc N. Michel<sup>1</sup>, Denis Ody<sup>2</sup>, Aurélie Tasciotti<sup>2</sup>, Gilles Lepoint<sup>1</sup> and Krishna Das<sup>1</sup>

<sup>1</sup> Laboratory of Oceanology, Chemistry Institute, B6c, University of Liege, 11 Allée du 6 Août, 4000 Liege, Belgium

<sup>2</sup> WWF-France, 6 Rue des Fabres, 13001 Marseille

<sup>3</sup> German Oceanographic Museum Stralsund (DMM)

\*Corresponding author. Email: [mpinzone@student.ulg.ac.be](mailto:mpinzone@student.ulg.ac.be); [krishna.das@ulg.ac.be](mailto:krishna.das@ulg.ac.be)



**Fig. 1:** Long finned pilot whales (A), sperm whale (B) and fin whale (C) in the Mediterranean Sea

## Introduction:

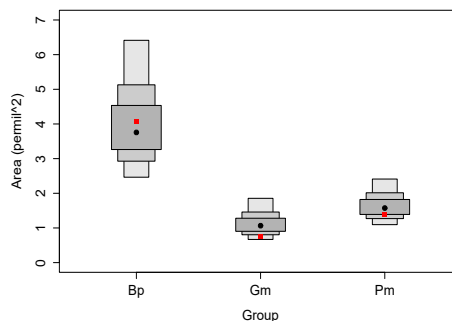
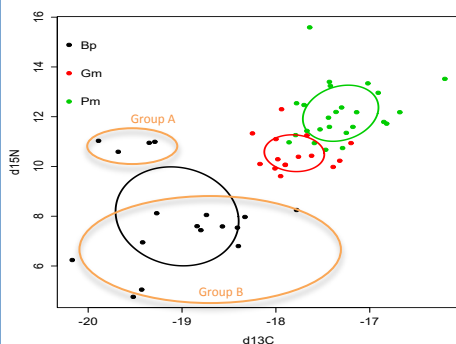
Few is known on the trophic ecology of endangered Mediterranean cetacean populations. Diet composition and feeding preferences are of critical importance to understand a species' ecology; better knowledge of these matters is necessary for efficient conservation.

## Materials & Methods:

We used the SIBER R package to explore isotopic niche parameters as a proxy for trophic niches assessment of 17 fin whales *Balaenoptera physalus*, 15 long-finned pilot whales *Globicephala melas* and 25 sperm whales *Physeter macrocephalus* (**Fig. 1**) sampled through darting between summer 2010 and 2013 in the North-Western Mediterranean Sea.

## Results:

- No niche overlap between odontocetes and fin whales in accordance with the lower trophic level of the latter;
- Limited overlap between odontocetes isotopic niches of the two odontocetes
  - ➡ Resource partitioning between these two species
  - ➡ Differences in hunting periods and depths
  - ➡ Differences in prey availability;
- The isotopic niche of fin whales was larger than the two odontocetes in over 99.80% of  $10^6$  model simulations;



**Fig. 2a:** SIBER isotopic ellipses of finned pilot whales (Gm), sperm whales (Pm) and fin whales (Bp). Every ellipse represents the isotopic/ecological niche of each species. Orange circles separate fin whales in Group A and B, based on  $\delta^{15}\text{N}$  values.

**Fig.2b:** Different estimates of Standard Ellipse Area (SEA). Red points represent corrected SEA.

## NEW PERSPECTIVES ON THE ECOLOGY OF MEDITERRANEAN CEATACEANS:

- **First time to observe** such variability (**Group A and Group B Fig. 2a**) in Mediterranean fin whales.
  - ➡ Exploitation of food items from different trophic levels (krill, small fishes)
  - ➡ Exploitation of food items from other regions (e.g North-East Atlantic);
- Very **narrow isotopic niche of pilot whales: strong contrast with** the generalist feeding behaviour of this species in literature