

Citizen science on the Catalan coast:

A preliminary study to raise awareness on cetacean presence

Núria Marco (a), Sílvia Juncà (a), Joan Giménez (a, b), Alba Martínez (a), Oriol Giral Paradedell (a, c)

(A) Associació Cetàcea, C/ Mas Duran 49 A1 2, 08042, Barcelona, Spain | (B) Centro Oceanográfico de Málaga (COMA), Instituto Español de Oceanografía (IEO-CSIC), Fuengirola, Spain | (C) School of Biological, Earth & Environmental Sciences, University College Cork, Enterprise Centre, Distillery Fields, Cork, Ireland



Introduction

Citizen science is a growing field with great potential gaining supporters day by day. Not only provides valuable scientific data expanding research capacity, but also engages volunteers directly in conservation management, improving science and environmental literacy (Ellwood, 2017).

With this project, **Associació Cetàcea** intended to create a bond within the coastal users in Catalonia and its cetacean biodiversity, generally unknown. The collected data provide an additional contribution on the presence of the **eight cetacean species** along the Catalan coast.



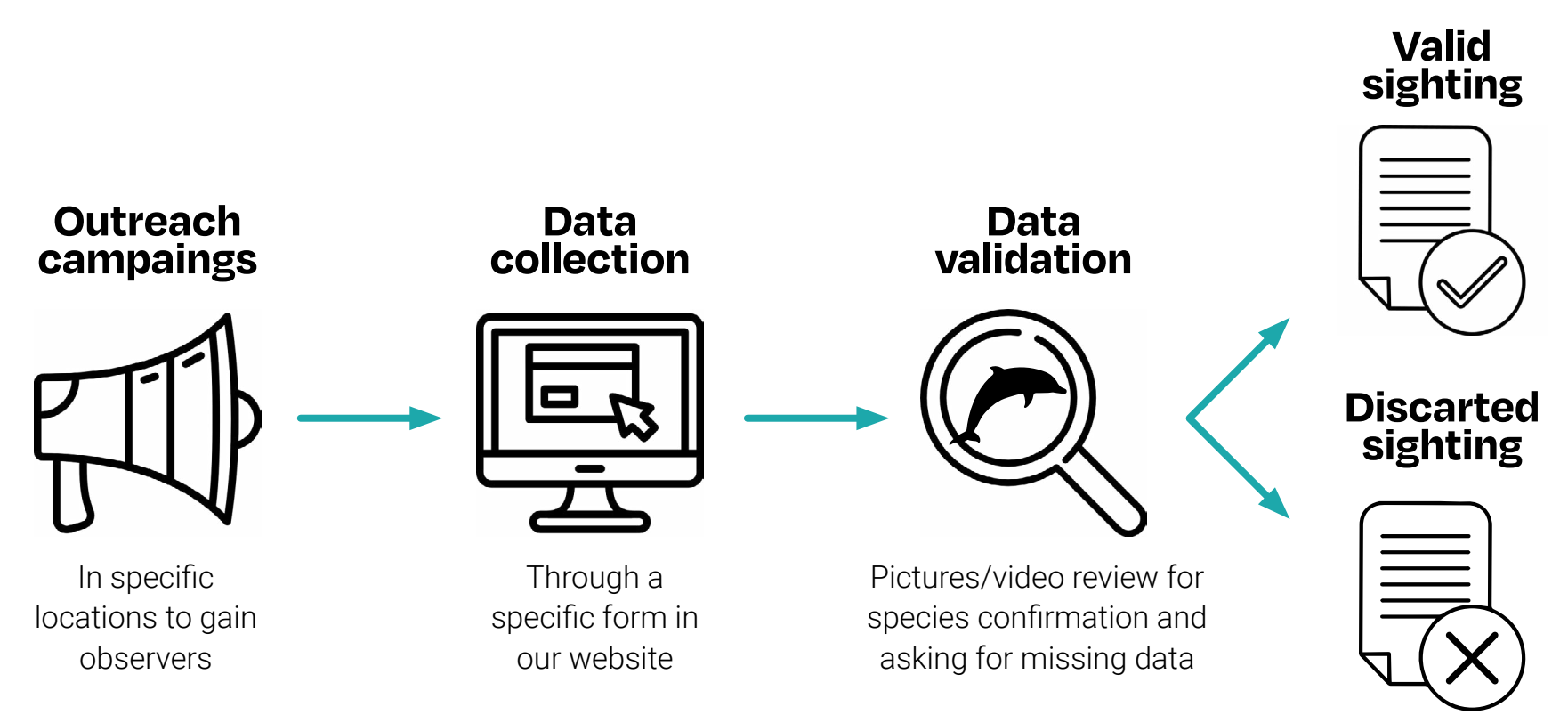
Bottlenose dolphin (*Tursiops truncatus*) | Striped dolphin (*Stenella coeruleoalba*) | Long-finned pilot whale (*Globicephala melas*) | Fin whale (*Balaenoptera physalus*)



Short-beaked common dolphin (*Delphinus delphis*) | Risso's dolphin (*Grampus griseus*) | Sperm whale (*Physeter macrocephalus*) | Cuvier's beaked whale (*Ziphius cavirostris*)

The present work aims to assess the usefulness of citizen science data for elucidating the distribution patterns of cetaceans along the Catalan coast beyond our current research area.

Materials and Methodology



Common dolphin, originally misidentified as a striped dolphin. | Bottlenose dolphin, originally misidentified as a Risso's dolphin.

Contributions were also obtained by searching local publications about cetaceans in social media or via personal contacts.

In both cases, the data collected from each sighting were: Observer's name, Date and time, Species, Number of individuals, Coordinates & Photos / videos

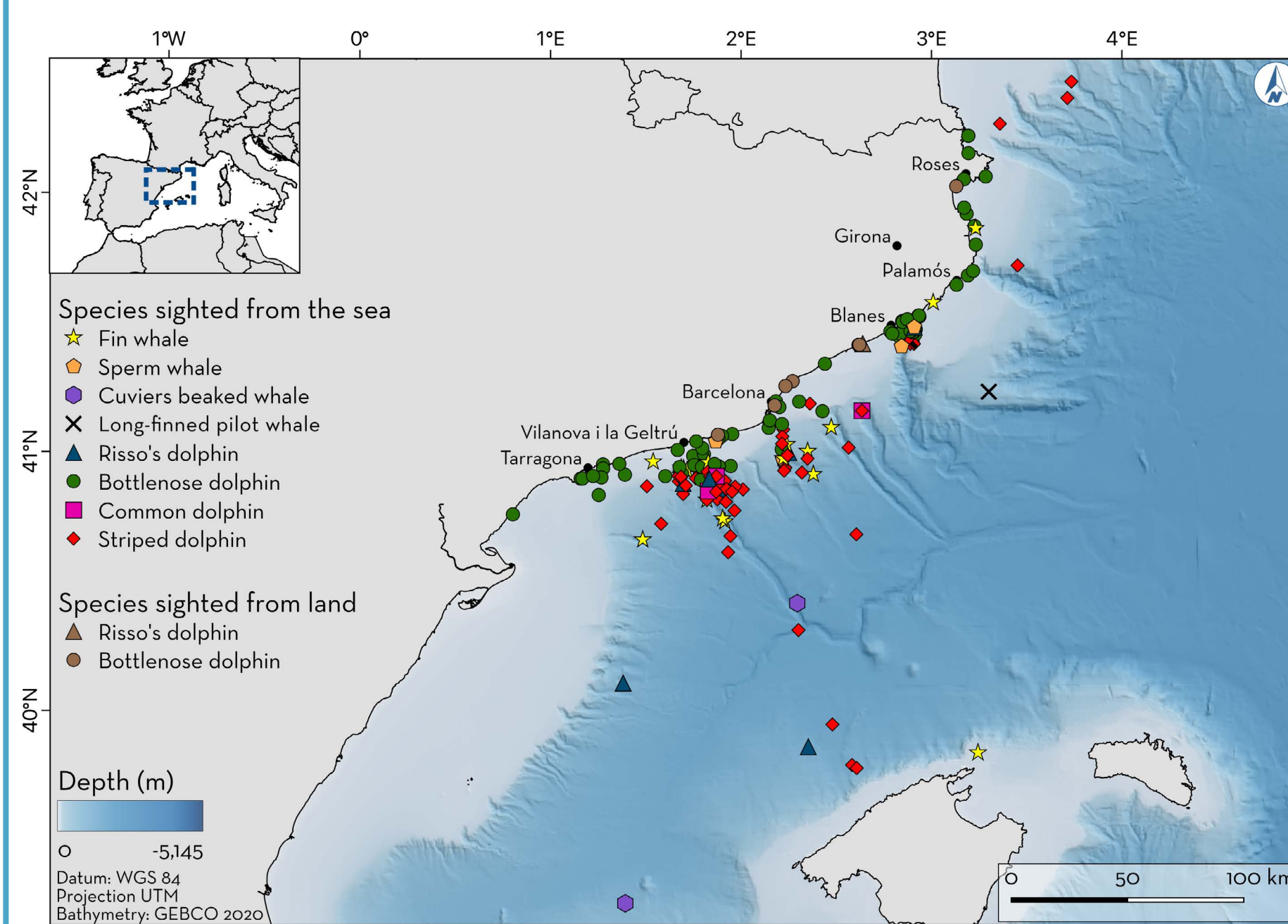


Scan this QR code to access the form for the 'Amics del Mar' project.

Sightings lacking fundamental information such as coordinates, images or having a doubtful source were discarded.

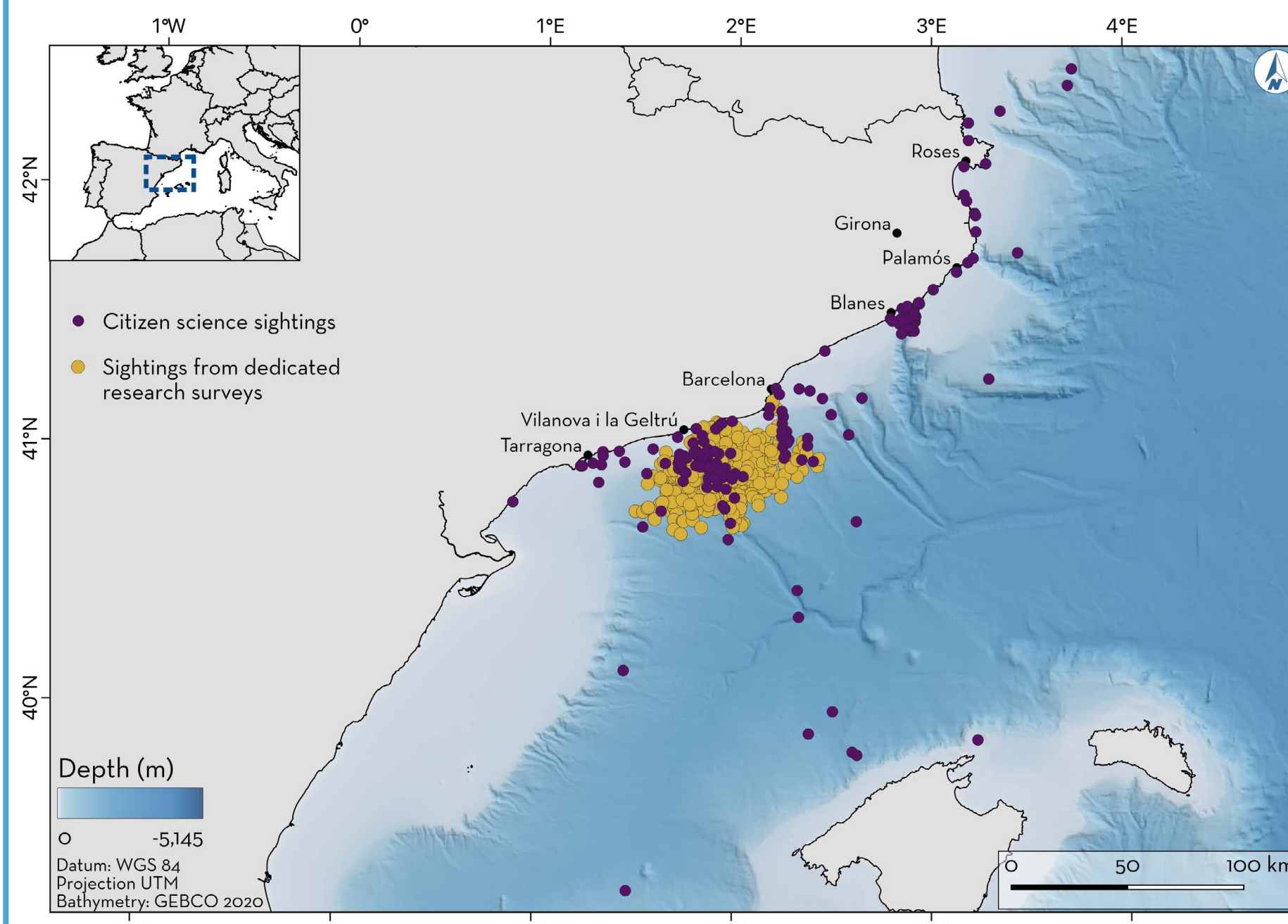
Depth at which sightings occurred was extracted from a bathymetry raster (GEBCO, 2020) using QGIS 3.30.2 for sightings obtained from citizen science and sightings recorded along dedicated boat surveys carried out by Associació Cetàcea off the central Catalan coast between 2017 and 2023. Analysis of variance was used to compare the depth at which each species was sighted in the different projects.

Results



Map 1. Total sightings obtained from citizen science.

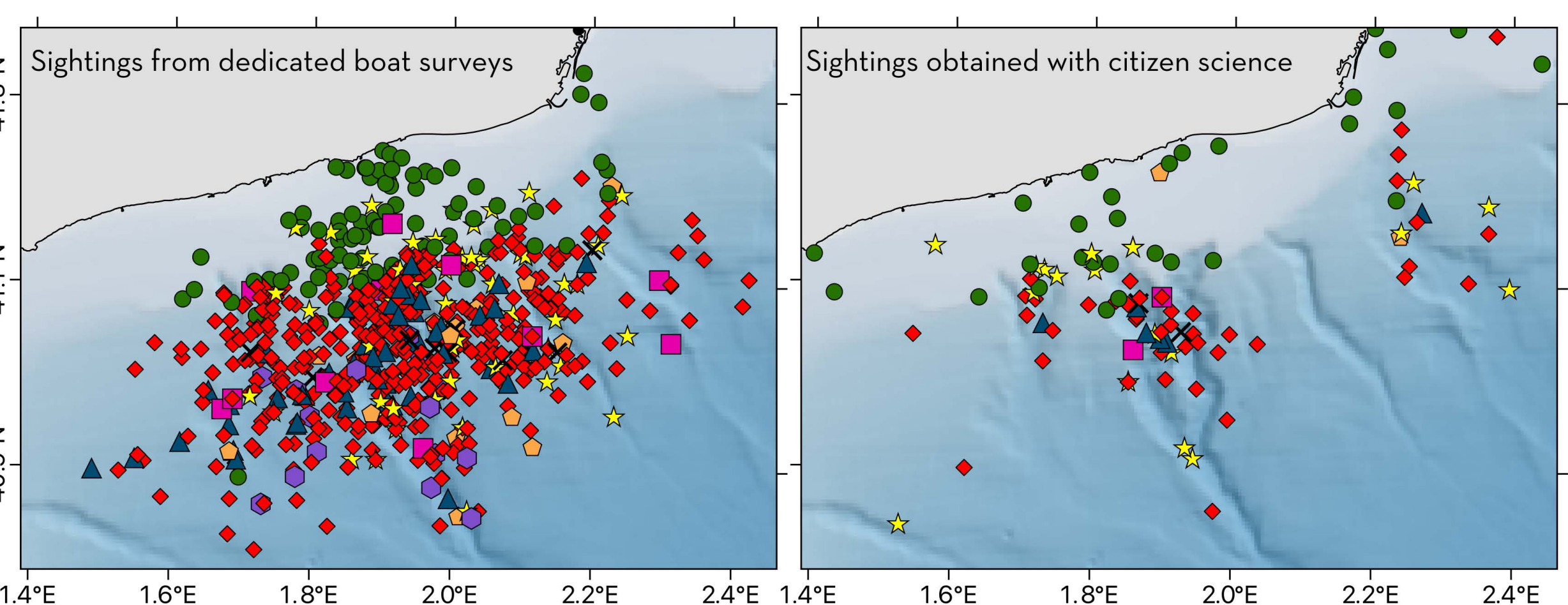
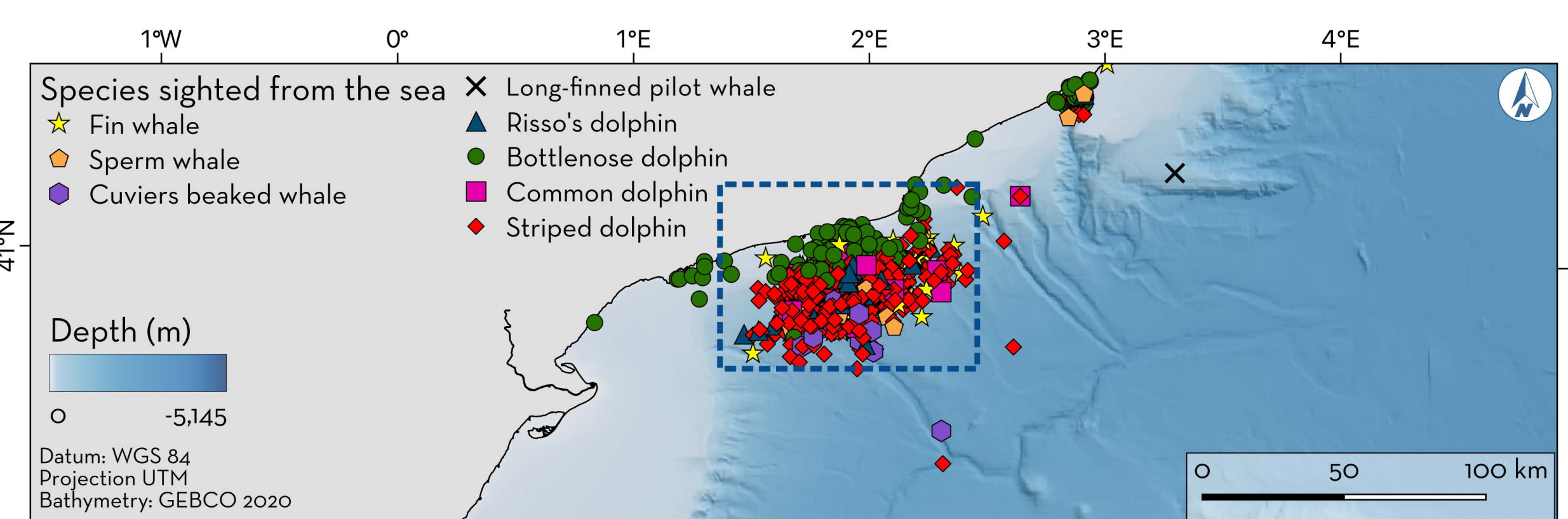
From a total 285 sightings, there were 206 (73%) valid observations finally used for the project. Between 2017 and 2003, 111 sightings (56%) were collected outside Associació Cetàcea's main area of study, thus providing additional information about cetacean presence along the Catalan coast.



Map 2. Location of the sightings obtained from citizen science compared to the location of sightings obtained from dedicated boat surveys.

Conclusions and Discussion

- » Discarded sightings due to lacking information were significant for some species. More emphasis on the importance of collecting complete data could be done to maximize valid data.
- » Half of the sightings received were located outside the study area where dedicated boat surveys are carried out, representing a useful complementary tool.
- » Striped and bottlenose dolphins and sperm whales were sighted in significantly shallower waters in the citizen science project compared to the dedicated boat surveys. This difference may be due to sampling differences.
- » Bottlenose dolphin was the most sighted species, which contrasts with data obtained from dedicated boat surveys. This is probably because recreational sailing tends to favour coastal areas, where the species is more present (Giral Paradedell et al., 2023).
- » Sightings were not distributed homogeneously, with most sightings occurring in areas close to important ports such as Tarragona, Vilanova i la Geltrú, Barcelona and Blanes and to underwater canyons.
- » Despite its limitations, citizen science data can be valuable for species conservation efforts. Spreading this knowledge about distribution, seasonal movements and main behaviour of cetacean species is a must in order to make steps towards their full protection.



Map 3: Total sightings obtained from both projects.

- » Down-left: Sightings obtained from dedicated boat surveys.
- » Down-right: Detail of sightings obtained from citizen science in the Central Catalan Coast.

Depth at which species were recorded showed significant differences for striped dolphin ($H(2) = 7.056, p < 0.01$), bottlenose dolphin ($H(2) = 4.485, p < 0.01$), sperm whale ($F(1, 17) = [6.438], p = 0.02$), and Cuvier's beaked whale ($F(1, 15) = [4.776], p = 0.04$), being sighted in deeper waters along the dedicated boat surveys.

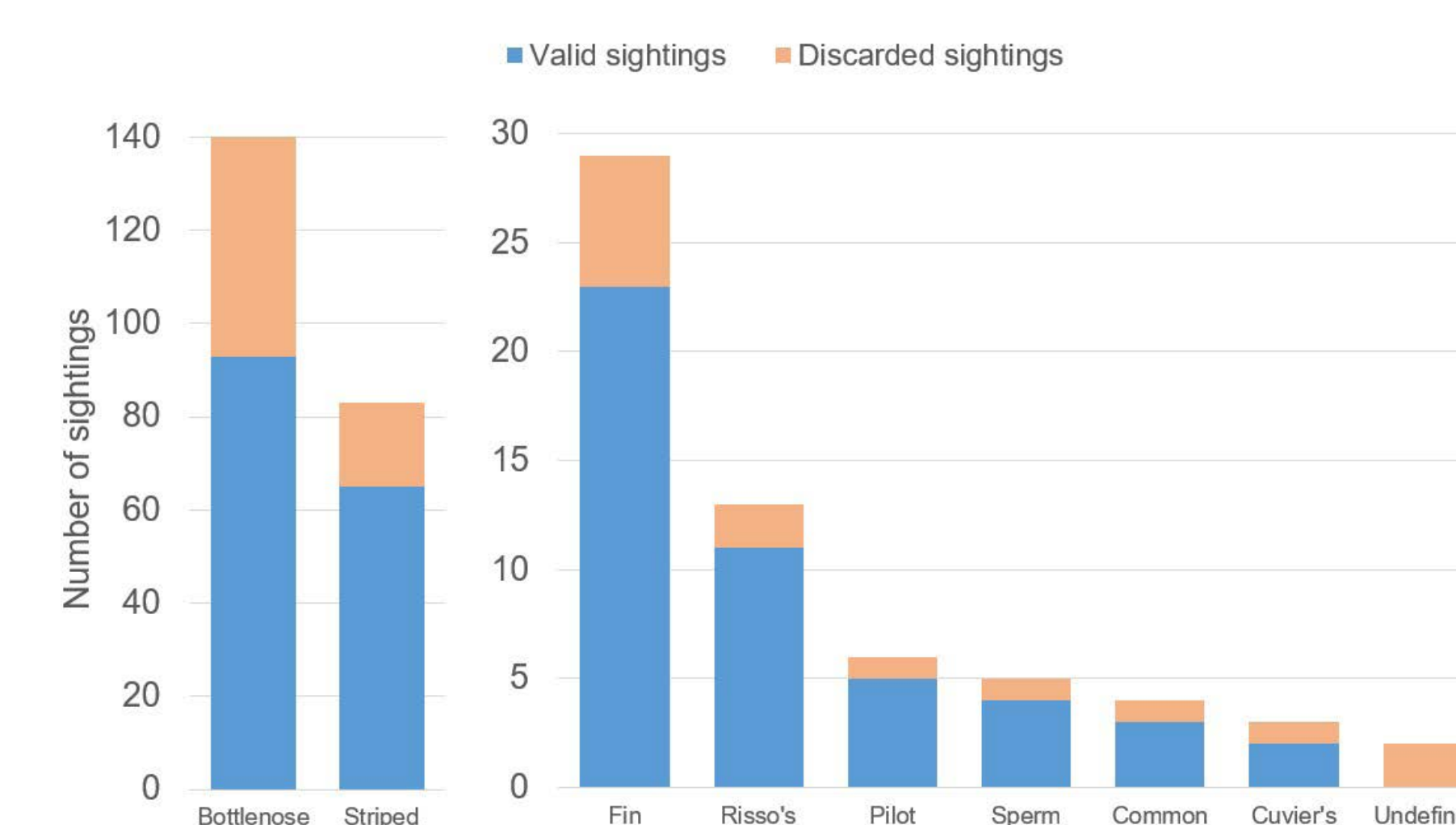


Figure 1: Valid and discarded sightings obtained from citizen science



Room for improvement

- To improve results in the future, several actions could be done:
- » Increase collaboration with specific collectives with regular access to sailing, such as yacht clubs, scuba diving centers or tourism agencies.
 - » Carry out specific formation about how to properly collect sightings data.
 - » Compare good quality dorsal fin pictures provided by observers with our photo-identification catalogue to find possible matches.

Acknowledgements

We would like to thank all the people that contributed with their sightings to this project and all the volunteers at Associació Cetàcea who made this work possible.

References

- » Ellwood et al., 2017 doi:10.1016/j.biocon.2016.10.014
- » Giral Paradedell et al., 2023 doi: 10.1016/j.marenvres.2023.106166