

# X MARKS THE SPOT: Cetacean distribution and habitat modelling in the NE Atlantic Ocean

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## STATE OF THE ART

Cetaceans are large, misunderstood creatures of the sea that have always been a part of human history, through whaling, culture and fishing stories, education, economy, and tourism<sup>1</sup>.

Most of them live in this blue boundless environment that is highly understudied and foreign to most people. Thus, their conservation is affected by the limited data on their occurrence and distribution patterns. And the species present in the coastal waters of South-Western Iberian Peninsula are no exception.

AIM. Define cetacean distribution and habitat preferences within the Eastern North Atlantic, in the Algarve waters of Portugal.

## METHODS

Algarve, Portugal 2019-2022

**Study area records:** whale watching companies, citizen science (OBIS, GBIF)

**Model parameters:** Bio-ORACLE (mean SST, mean surface Chl-a, mean depth)

Species Distribution Model<sup>2,3</sup> (RScript)  
Algarve General Linear Model (GLM)  
→ presence/pseudo-absence (x10)

Model goes public

## RESULTS

Out of the 4 species of interest (Figure 1), *Delphinus delphis* presented the most records (n=399), with the highest probability of presence (50%) in the coastal central-western waters of Algarve. *Tursiops truncatus* (n=376) shows habitat preference (50%) in the coastal and offshore central-eastern waters of the study area. Both *Balaenoptera physalus* (n=28) and *Balaenoptera acutorostrata* (n=10) show a high probability of presence (100%) in the coastal and offshore central-western waters of Algarve.

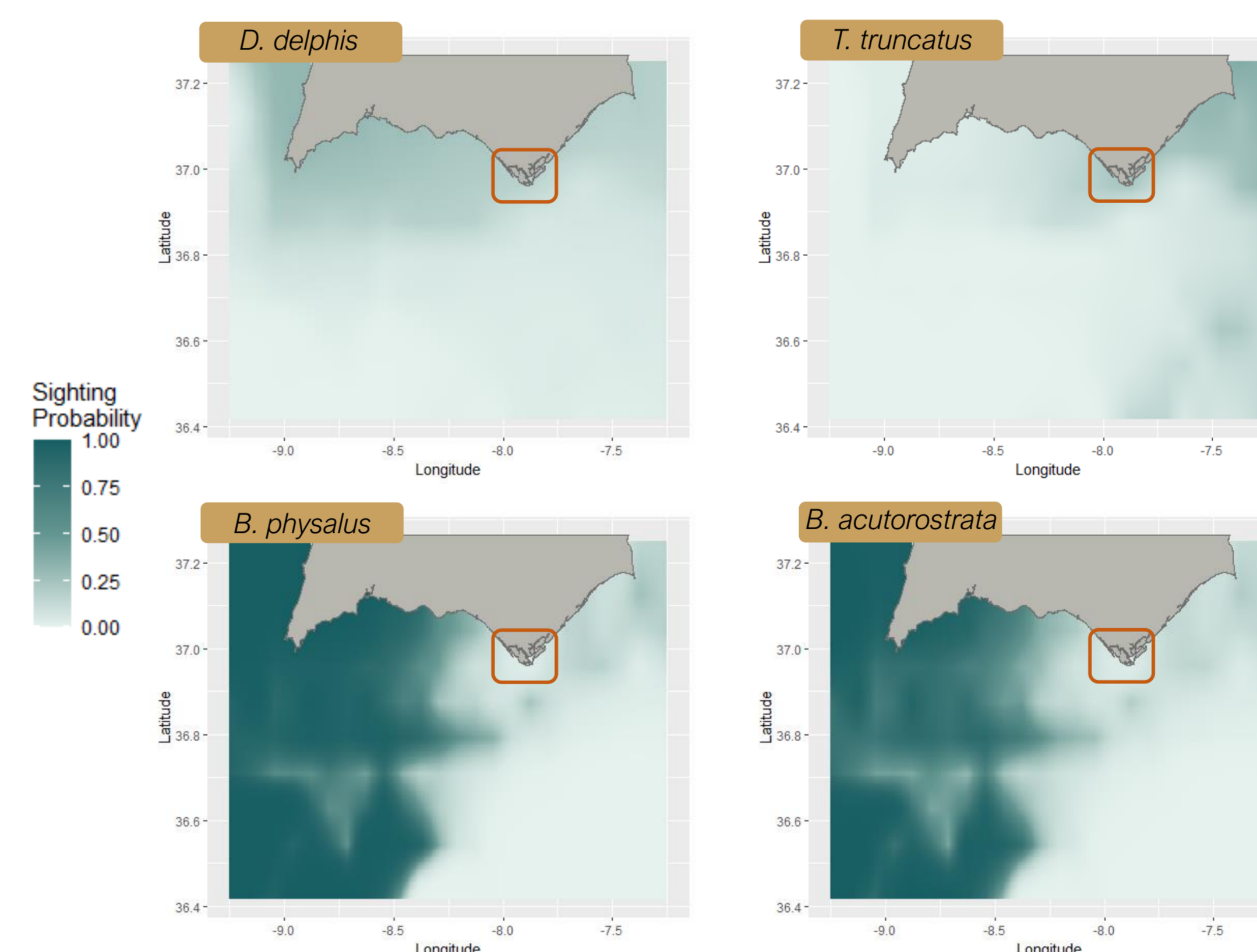


Figure 1 | GLM models showing the probability of the presence of *D. delphis*, *T. truncatus*, *B. Physalus*, and *B. acutorostrata* in the Algarve waters of Portugal.

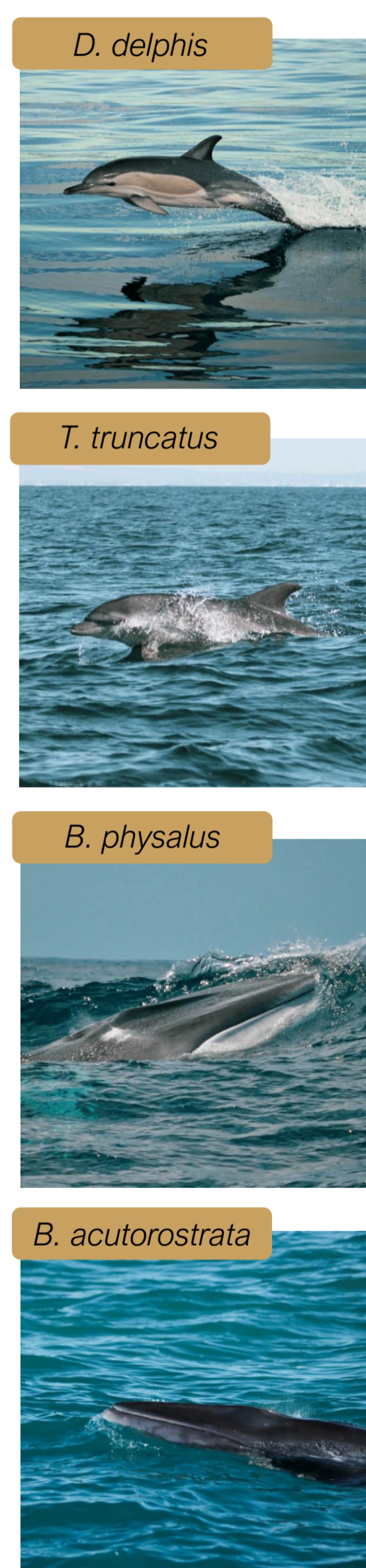


Figure 2 | Species of interest

## DISCUSSION

- *D. delphis* habitat preference coincides with Portugal's continental shelf, as previously reported<sup>4</sup>.
- *T. truncatus* high preference for coastal waters is consistent with previous studies, while its offshore distribution of could be a result of the distribution of mesopelagic fish, cephalopods, and planktonic crustaceans<sup>5</sup>.
- The high habitat suitability in the western waters of Algarve for both baleen whales is likely influenced by the very limited records, restricted to the coastal area. Furthermore, they are influenced by Chl-a concentration<sup>5,6</sup> which changes seasonally, but the models are built with a yearly average of Chl-a, which affects the habitat suitability of the species.

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**References:** <sup>1</sup> Brito & Sousa. (2011). The environmental history of cetaceans in Portugal: ten centuries of whale and dolphin records. PLoS One, 6(9), e23951. | <sup>2</sup> Vignali et al. (2022). SDMtune: An R package to tune and evaluate species distribution models. Ecology and Evolution, 10(20), 11488–11506. | <sup>3</sup> Vignali et al. (2022). SDMtune: Species Distribution Model Selection. R package version 1.2.0. | <sup>4</sup> Correia et al. (2019). Distribution and habitat modelling of common dolphins (*Delphinus delphis*) in the eastern North Atlantic. Journal of the Marine Biological Association of the United Kingdom, 99(6), 1443–1457. | <sup>5</sup> Pennino et al. (2017). Habitat modeling for cetacean management: Spatial distribution in the southern Pelagos Sanctuary (Mediterranean Sea). Deep Sea Research Part II: Topical Studies in Oceanography, 141, 203–211. | <sup>6</sup> Correia et al. (2015). Cetacean occurrence and spatial distribution: Habitat modelling for offshore waters in the Portuguese EEZ (NE Atlantic). Journal of Marine Systems, 143, 73–85.

