



Influence of benthic topography on minke whale (*Balaenoptera acutorostrata*) presence in the south coast of Portugal

Luke A. Ainsworth^(1,2), Miguel P. Martins^(2,3), Simon N. Ingram⁽¹⁾, André Cid⁽²⁾, Guilherme Estrela⁽²⁾, Alicia Quirin⁽²⁾, Francisco O. Borges^(2,4), Joana Castro^(2,4)



(1) School of Biological and Marine Sciences, University of Plymouth, Plymouth, UK

(2) AIMM – Marine Environment Research Association, Lisboa, Portugal

(3) Faculdade de Ciências da Universidade de Lisboa, Lisboa, Portugal

(4) MARE – Marine and Environmental Sciences Centre/ARNET – Aquatic Research Network, Laboratório Marítimo da Guia, Faculdade de Ciências, Universidade de Lisboa, Portugal, Cascais, Portugal



Luke A. Ainsworth
lukeainsworth@btinternet.com

Introduction

The minke whale (*Balaenoptera acutorostrata*) (**Fig. 1**) is a cosmopolitan species, which is present in every ocean¹. Despite being the most abundant baleen whale in mainland Portuguese waters, the species faces vulnerability due to its discrete nature and limited studies. Consequently, relatively little is known about the species in this region, particularly concerning habitat preferences². **In this study we investigate how benthic topography may influence the presence of minke whales in the south coast of Portugal.**

Methodology

Dedicated and opportunistic boat surveys were conducted to collect presence-absence data of minke whales, from February to December (2010-2021). The environmental variables tested were sst, chl-a, depth and slope, with depth data obtained from ETOPO₂. Generalised additive models (GAMs, mgcv package) were implemented in R. A backward stepwise selection process was carried out to iteratively remove variables from the full model.

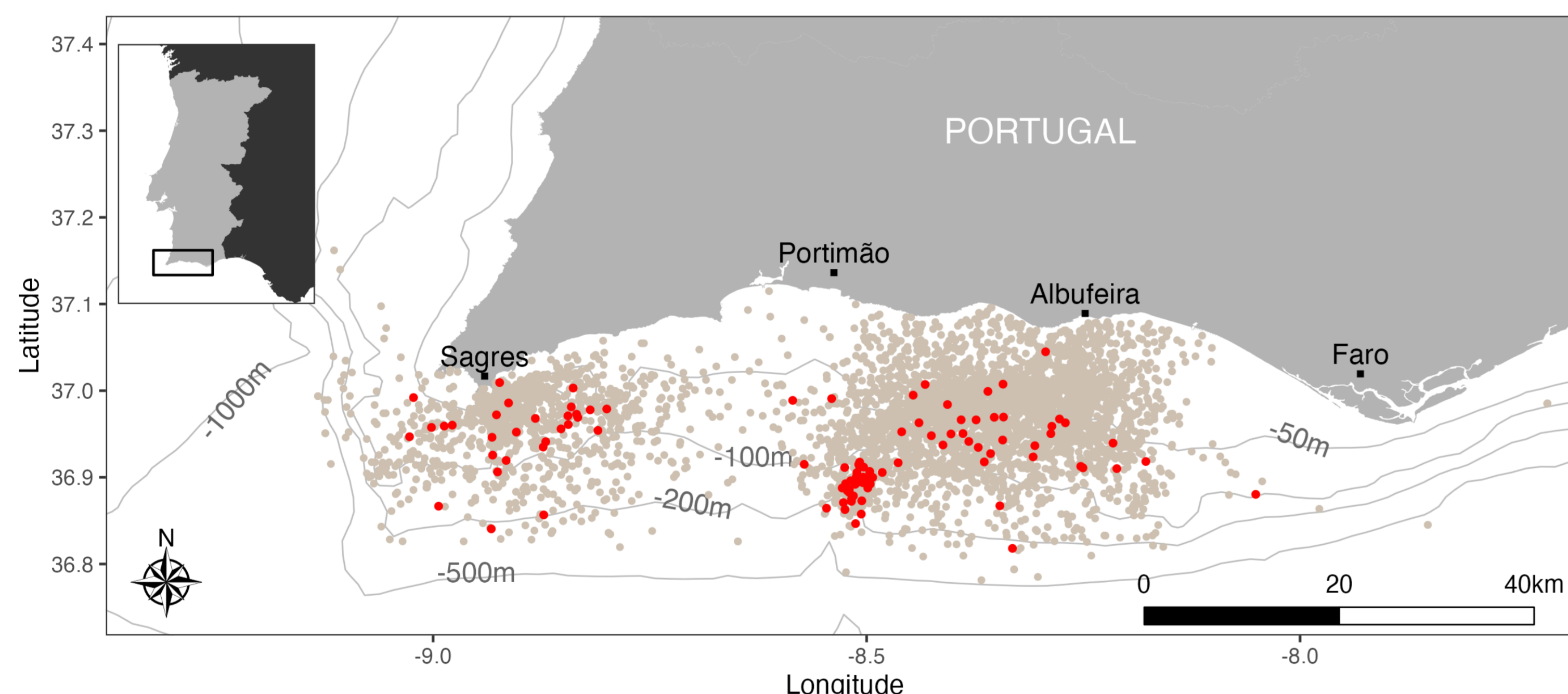


Fig. 2 – Sightings of minke whales (n = 102, red – presence data) and other cetacean species (n = 4,462, grey – absence data) in southern Portugal.

Discussion and Conclusion

Our results align with previous research regarding the depth preference of minke whales³. The topographic features (i.e. continental shelf, slope and Portimão canyon) may partially explain the preference for this depth range, as this influences prey aggregation, suggesting that this region might be used by this species as a feeding ground. **Thus, southern Portugal seems to support the occurrence and sustenance of minke whales, highlighting the importance of topographic features for their presence in this region.**

More info here!



References

- (1) Ballance, L.T. (2009) Cetacean Ecology, Encyclopedia of Marine Mammals (Second Edition), pp.196-201.
- (2) Correia, A.M., Sousa-Guedes, D., Gil, Á., Valente, R., Rosso, M., Sousa-Pinto, I., Sillero, N. & Pierce, G.J. (2021) Predicting Cetacean Distributions in the Eastern North Atlantic to Support Marine Management. *Frontiers in Marine Science*, 8.
- (3) Ingram, S.N., Walshe, L., Johnston, D. & Rogan, E. (2007) Habitat partitioning and the influence of benthic topography and oceanography on the distribution of fin and minke whales in the Bay of Fundy, Canada. *J. Mar. Biol. Ass.* 87 (1), pp. 149-156.



Fig. 1 – Adult minke whale in southern Portugal © AIMM.

Results

Between 2010 and 2021 a total of 102 sightings of minke whales were recorded, with 36% of occurrences observed in the Portimão canyon (**Fig. 2**). Sightings mostly consisted of solitary individuals, although groups of up to 3 whales were occasionally observed. Sighting numbers peaked during August and September (48% of all sightings). The best performing model only included depth (2.52 d.f., $p < 0.001$). The presence of minke whales was significantly influenced by depth, with the highest occurrence probability in waters 100-300 m (**Fig. 3**).

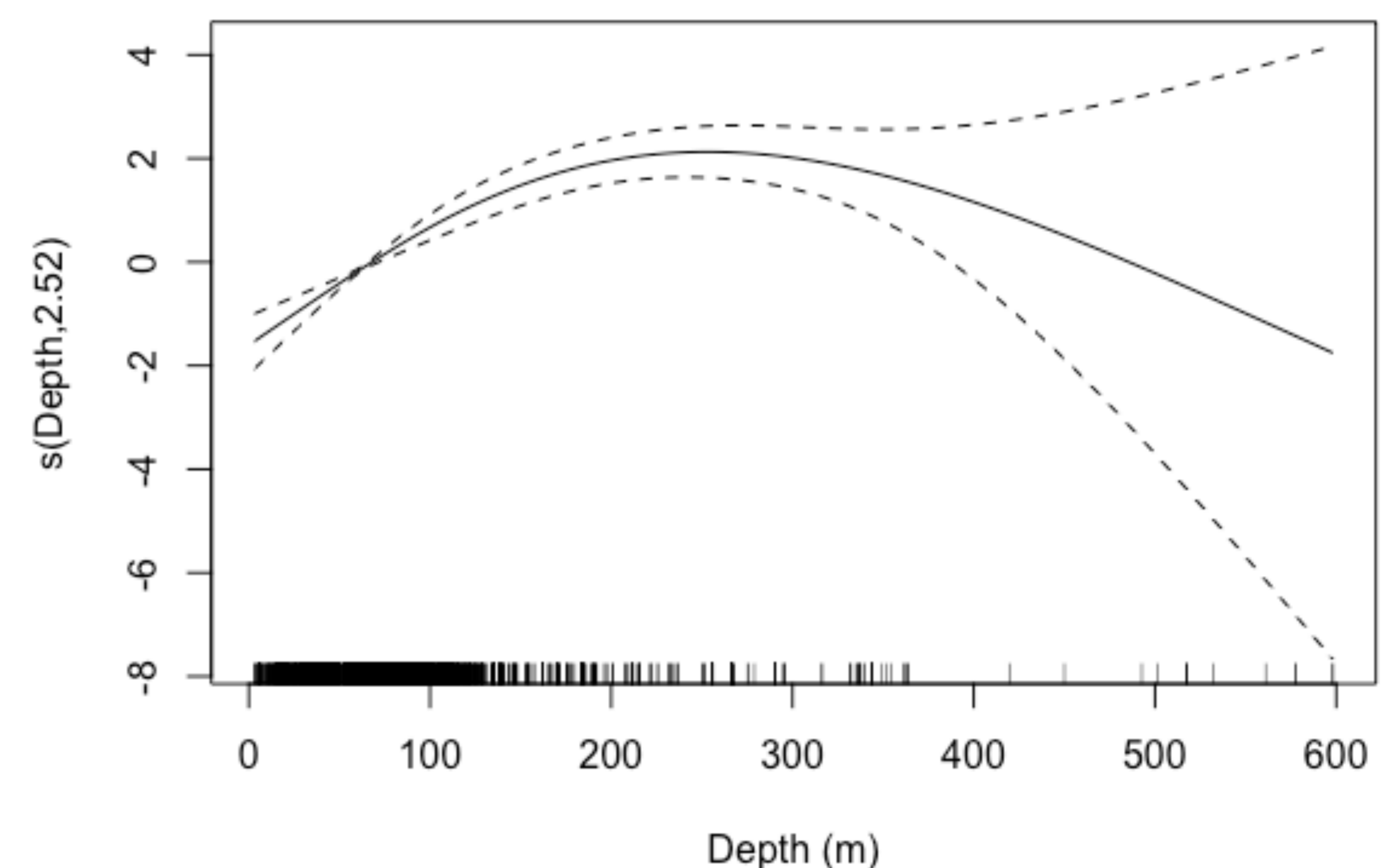


Fig. 3 – Smoothed fit of depth on the occurrence probability of minke whales in the south coast of Portugal. Dotted lines around the smooths represent 95% confidence intervals. Degrees of freedom are shown in parentheses on the y-axis label. Rug plot at the bottom of the GAM shows the actual data.

Acknowledgements

The authors would like to thank AIMM's volunteers and interns who supported with the data collection. We also thank the whale watching companies Sea Xplorer Sagres, Dream Wave Algarve, Algar Experience, All Boat, Cape Cruiser, Dolphins Driven, Ocean Eye, Ocean Quest, Sabino Boat Tours, Xride, Discover Tours and Algarve Charters for providing a platform of opportunity for data collection.