



Where, when and why: modelling the distribution and habitat of deep-diving cetaceans incorporating variables depicting the deep oceanic layers

Auriane Virgili, Valentin Teillard, Ghislain Doremus, Timothy E. Dunn, Sophie Laran, Mark Lewis, Maite Louzao, Jose A. Martínez-Cedeira, Emeline Pettex, Leire Ruiz Sancho, et al.

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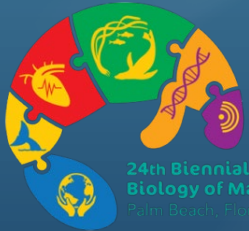
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Where, when and why: modelling the distribution and habitat of deep-diving cetaceans incorporating variables depicting the deep oceanic layers



24th Biennial Conference on the
Biology of Marine Mammals
Palm Beach, Florida - August 1-5, 2022

SMM conference – August 1-5, 2022

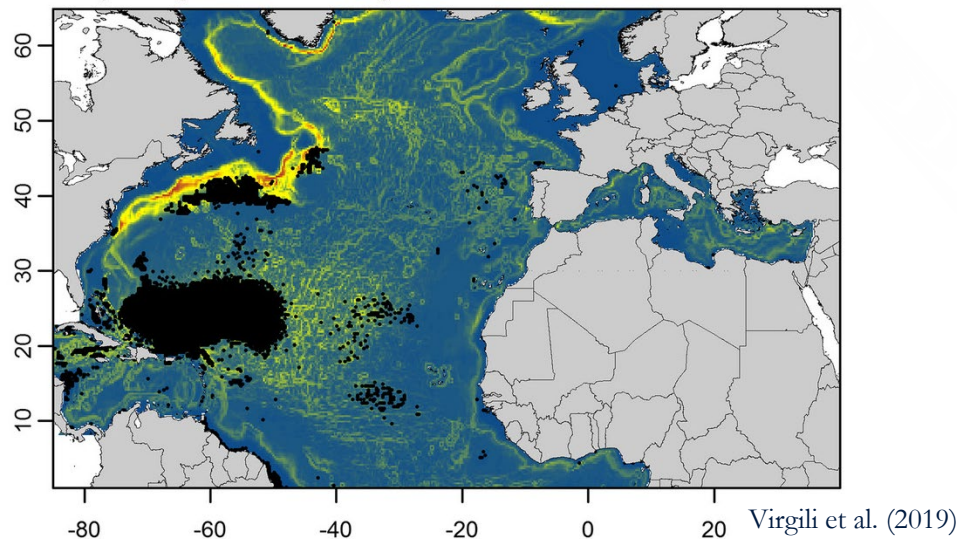
Virgili, A., Teillard, V., Dorémus, G., Dunn, T.E., Laran, S., Lewis, M., Louzao, M., Martínez-Cedeira, J., Pettex, E., Ruiz, L., Saavedra, C., Van Canneyt, O., Vázquez Bonales, J.A., Ridoux, V.





Context

- Species distribution models are commonly used with static and surface dynamic environmental variables to predict top predator distributions





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- Deep-divers spend most of their time in deep waters to feed





Context

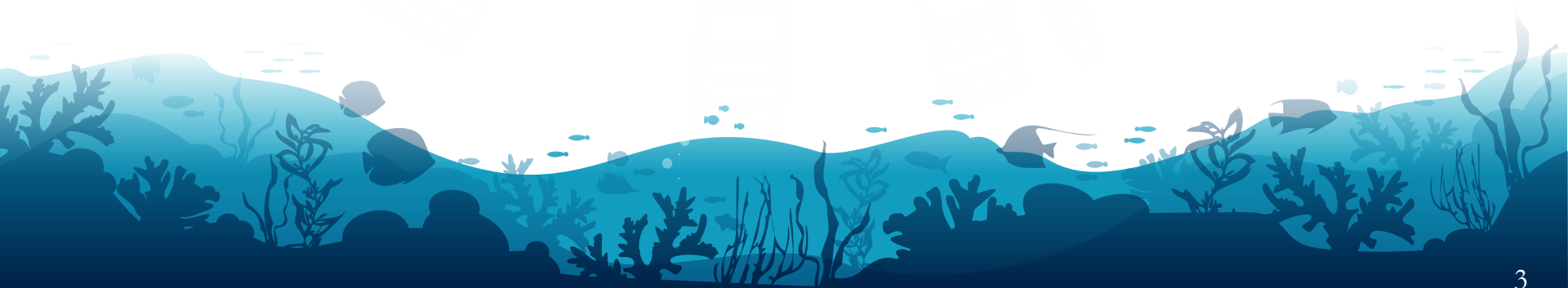
- Species distribution models are commonly used with static and surface dynamic environmental variables to predict top predator distributions
- Deep-divers spend most of their time in deep waters to feed
- The use of surface variables may limit the ability to correctly infer their habitats through habitat models





Objective

Combining static and dynamic variables integrated over different depth classes of the water column to model the distribution of deep-diving cetaceans

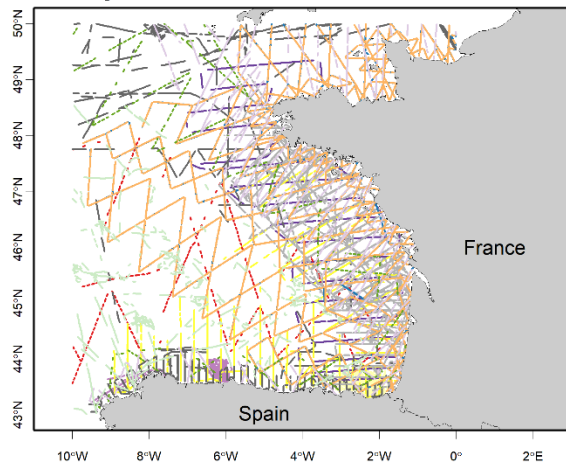


Methods

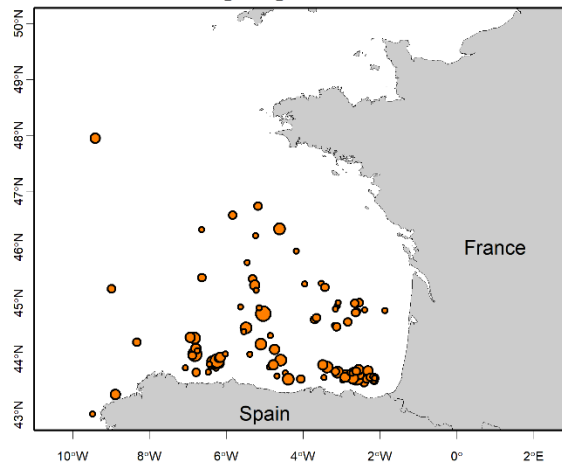
❖ Effort and sighting data



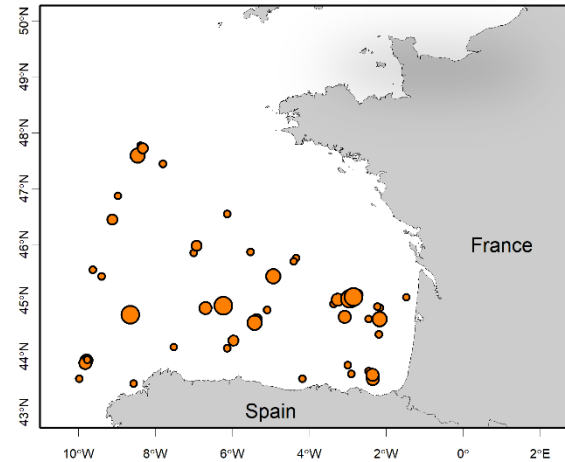
a/ Study area



b/ Beaked whale sightings



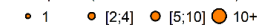
c/ Sperm whale sightings



Survey groups



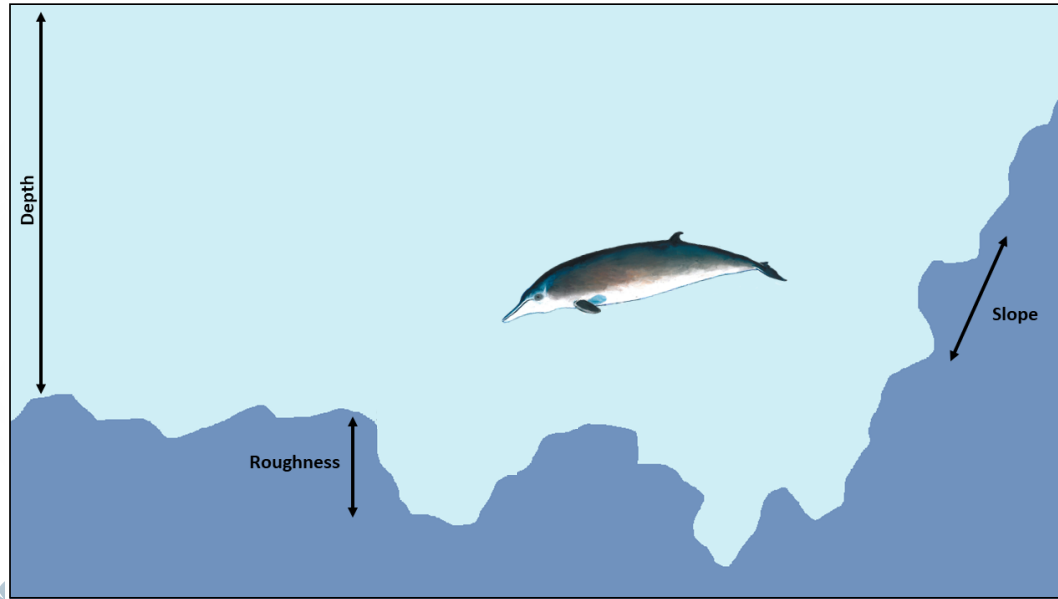
Group size (number of individuals)





Methods

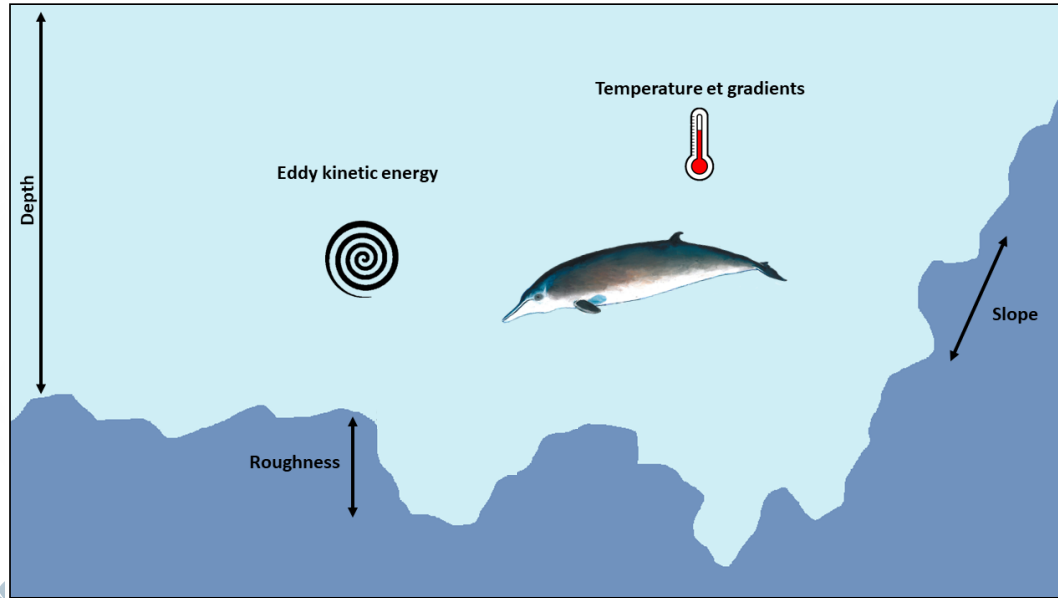
❖ Environmental variables





Methods

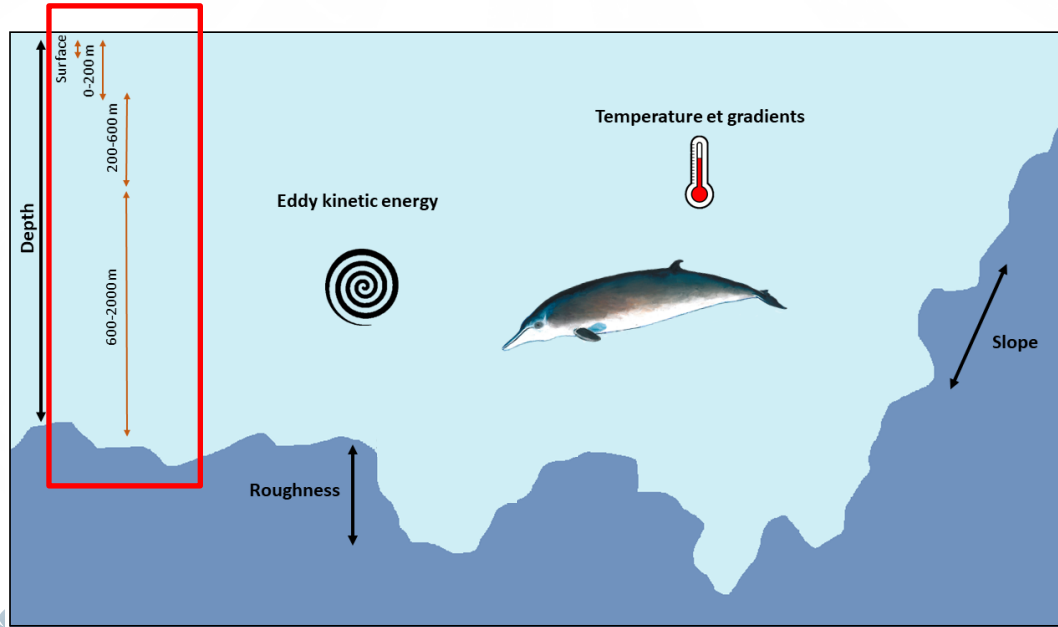
❖ Environmental variables





Methods

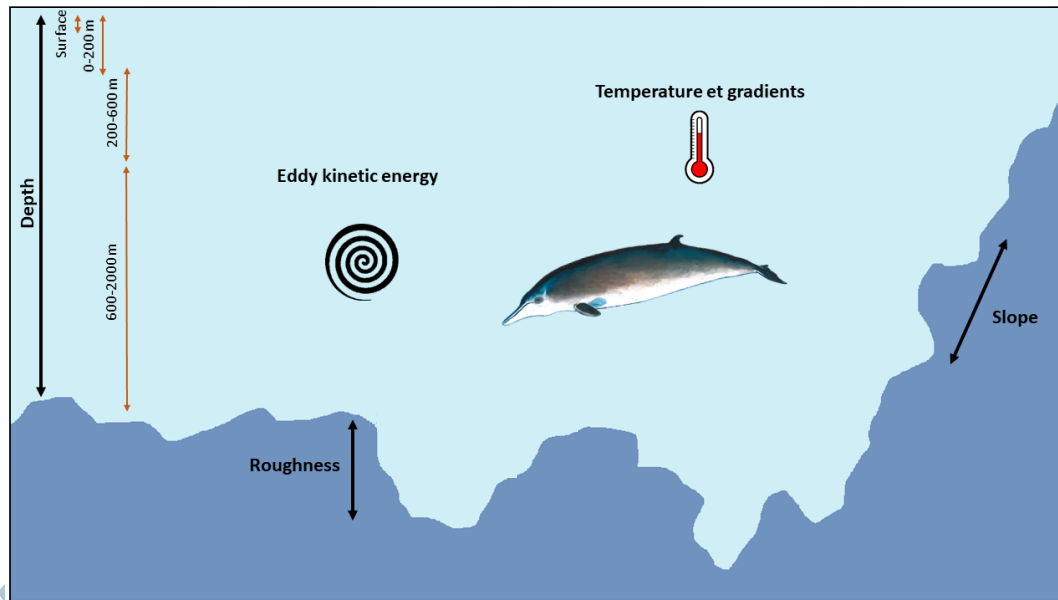
❖ Environmental variables





Methods

❖ Models



Sightings

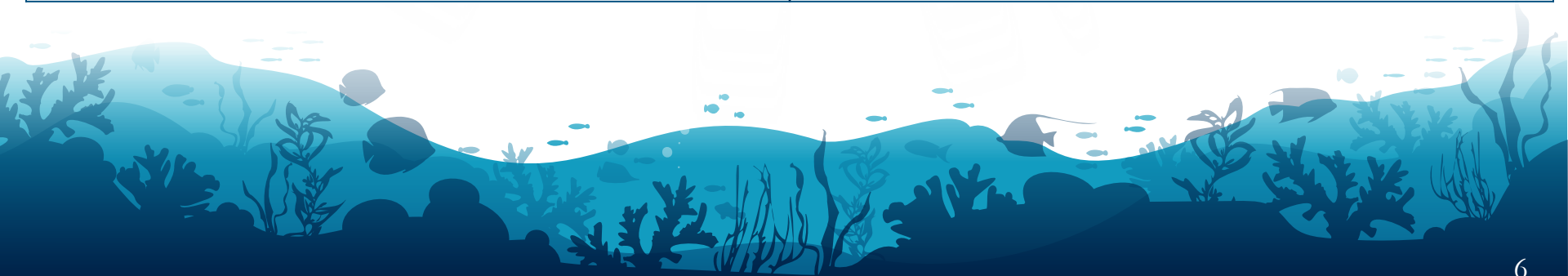


GAMs



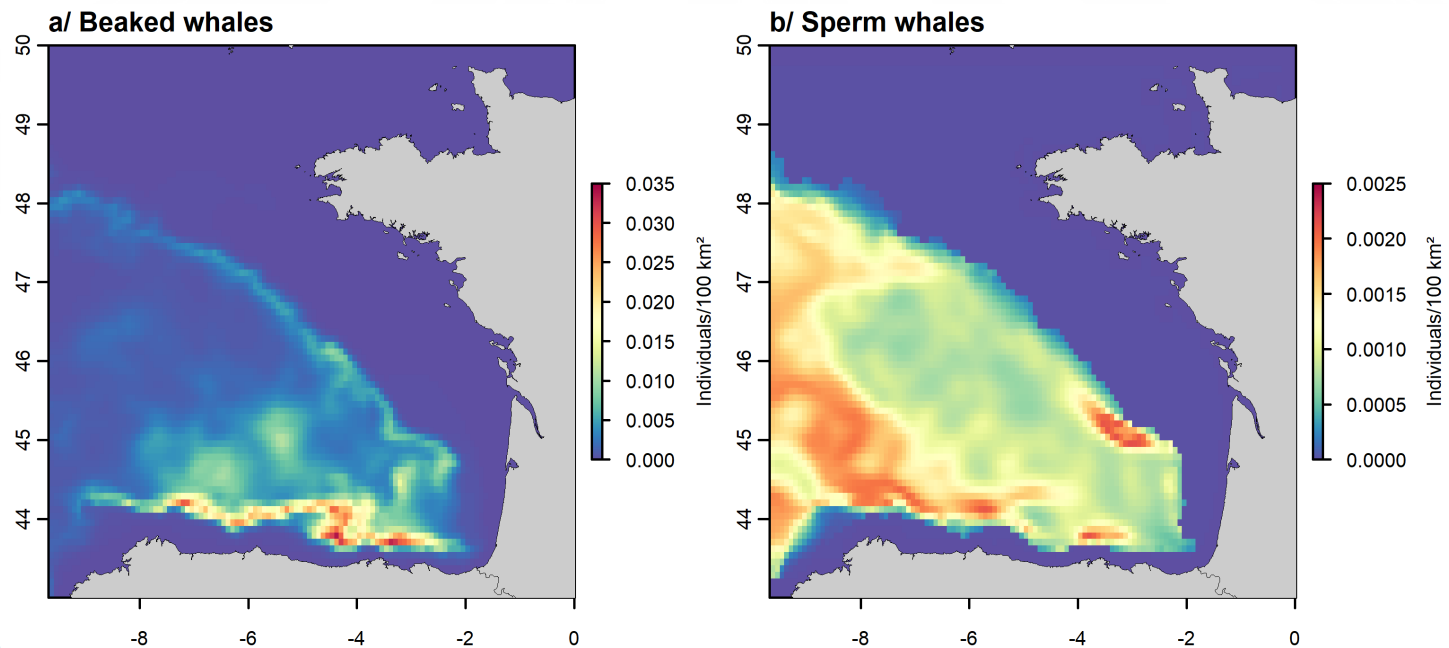
Results

Beaked whales		Sperm whales	
Mean Temperature _{surface}	86 %	Mean Eddy Kinetic Energy _{200-600m}	40 %
Standard deviation Temperature _{0-200m}	70 %	Standard deviation Gradients of T _{surface}	19 %
Roughness	38 %	Mean Temperature _{surface}	16 %
Depth	28 %	Mean Temperature _{200-600m}	16 %



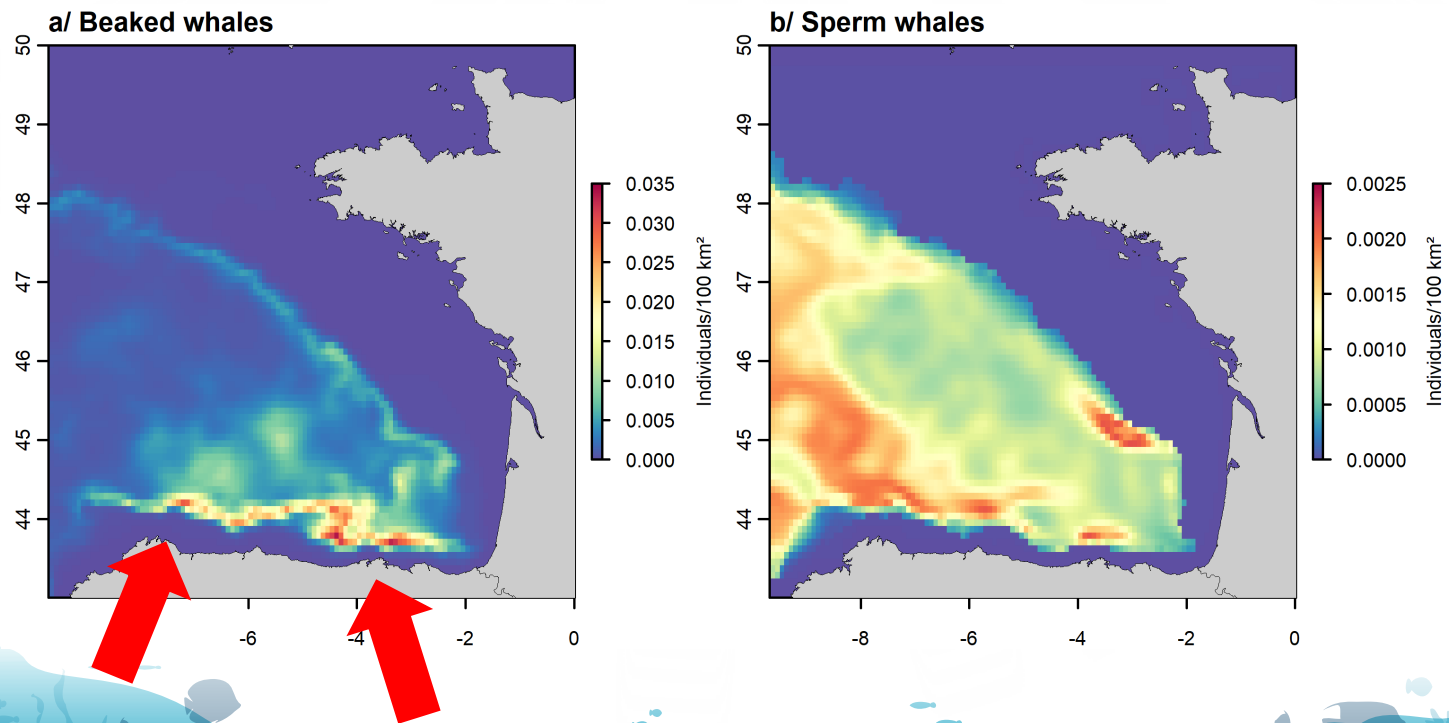


Results



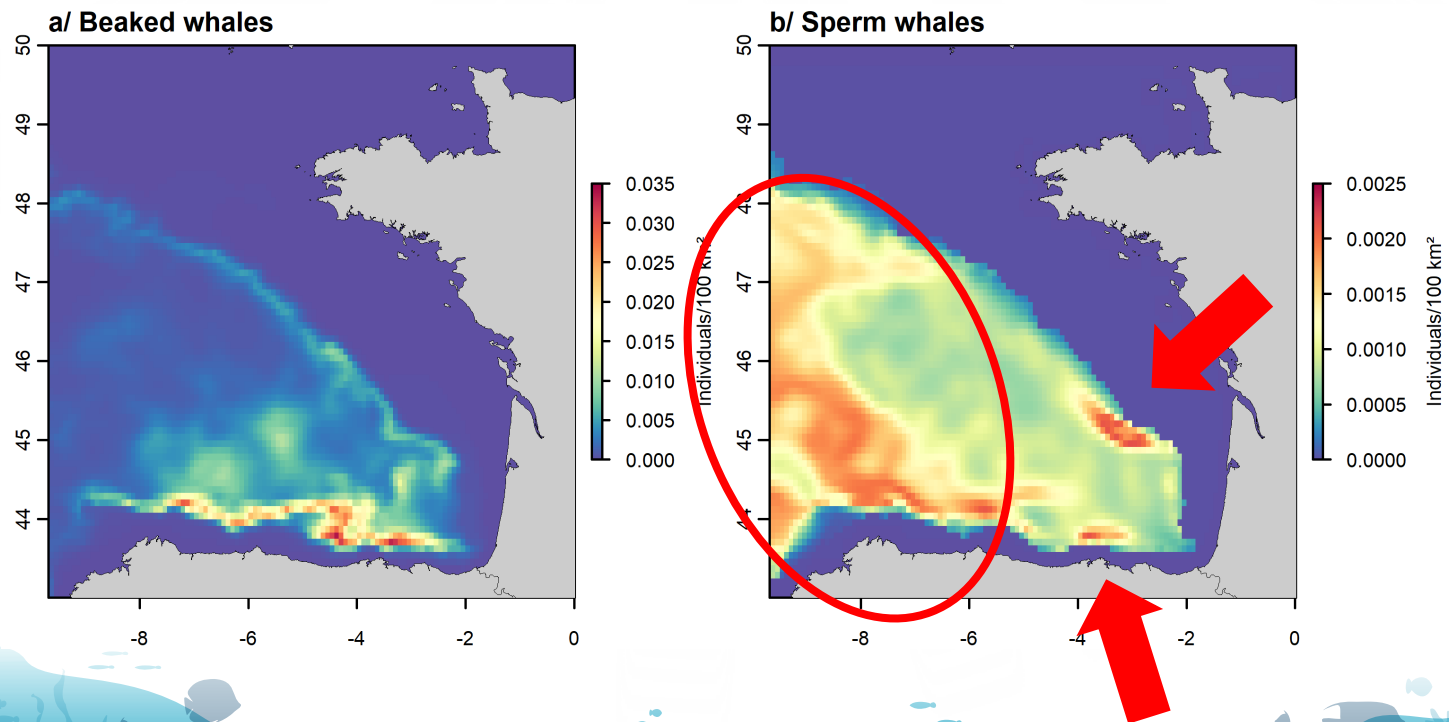


Results



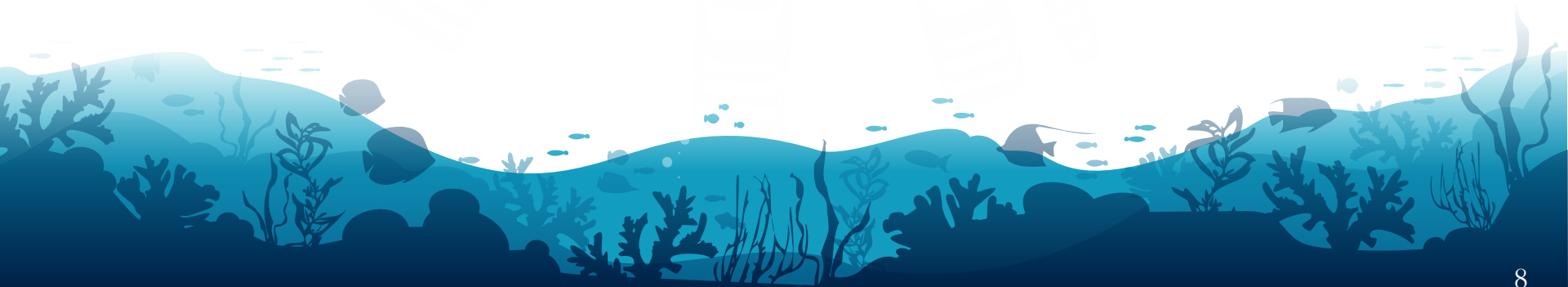


Results



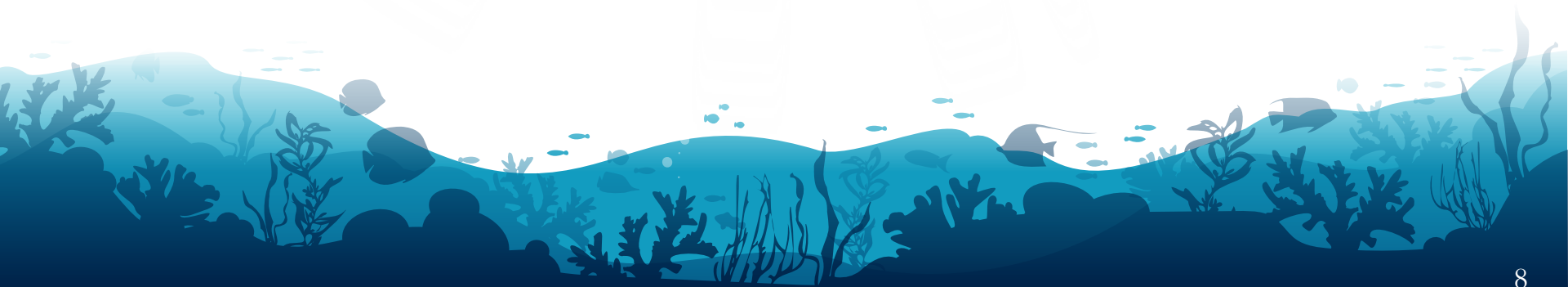
Take home message

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Take home message

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- ❖ But different variables were selected in the models
 - Static and surface to subsurface dynamic variables for beaked whale
 - Surface and deep-water variables for sperm whale



Take home message

- ❖ Highest densities of both taxa predicted near the continental slope, canyons and in the abyssal plain
- ❖ But different variables were selected in the models
 - Static and surface to subsurface dynamic variables for beaked whale
 - Surface and deep-water variables for sperm whale
- ❖ Increasing the use of deep-water variables should be considered to improve knowledge of habitats used by species





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Thank you for your attention!

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