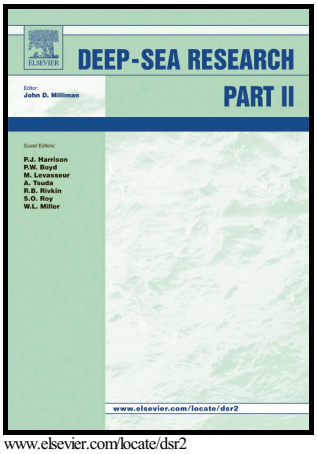

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Distribution, abundance and habitat use of deep diving cetaceans in the North-East Atlantic

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ABSTRACT
In spite of their oceanic habitat, deep diving cetacean species have been found to be affected by anthropogenic activities, with potential population impacts of high intensity sounds generated by naval research and oil prospecting receiving the most attention. Improving the knowledge of the distribution and abundance of this poorly known group is an essential prerequisite to inform mitigation strategies seeking to minimize their spatial and temporal overlap with human activities. We provide for the first time abundance estimates for five deep diving cetacean species (sperm whale, long-finned pilot whale, northern bottlenose whale, Cuvier's beaked whale and Sowerby's beaked whale) using data from three dedicated cetacean sighting surveys that covered the oceanic and shelf waters of the North-East Atlantic. Density surface modelling was used to obtain model-based estimates of abundance and to explore the physical and biological characteristics of the habitat used by these species. Distribution of all species was found to be significantly related to depth, distance from the 2000m depth contour, the contour index (a measure of variability in the seabed) and sea surface temperature. Predicted distribution maps also suggest that there is little spatial overlap between these species. Our results represent the best abundance estimates for deep-diving whales in the North-East Atlantic, predict areas of high density during summer and constitute important baseline information to guide future risk assessments of human activities on these species, evaluate potential spatial and temporal trends and inform EU Directives and future conservation efforts.

Keywords: design-based abundance, model-based abundance, beaked whales, sperm whales, pilot whales, distribution, deep divers, habitat models

1. Introduction

Effective marine mammal conservation and management requires information on the abundance and distribution of species. Reliable abundance estimates are a crucial prerequisite to assess the impact that accidental or deliberate removals have on a population (Wade, 1998) or to evaluate