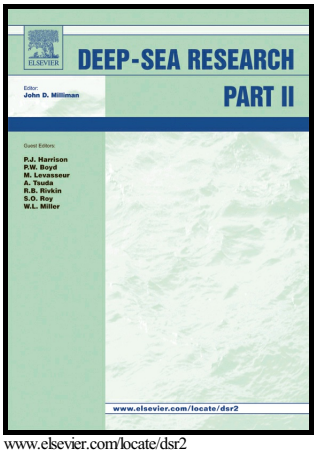

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PII: S0967-0645(16)30004-2
DOI: http://dx.doi.org/10.1016/j.dsr2.2016.01.004
Reference: DSRII3995

To appear in: *Deep-Sea Research Part II*

Received date: 31 March 2015
Revised date: 26 January 2016
Accepted date: 28 January 2016

Cite this article as: Hugo E. Parra, Christopher K. Pham, Gui M. Menezes Alexandra Rosa, Fernando Tempera and Telmo Morato, Predictive modelling o deep-sea fish distribution in the Azores, *Deep-Sea Research Part I* http://dx.doi.org/10.1016/j.dsr2.2016.01.004

Predictive modelling of deep-sea fish distribution in the Azores

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Abstract

Understanding the link between fish and their habitat is essential for an ecosystem approach to fisheries management. However, determining such relationship is challenging, especially for deep-sea species. In this study, we applied Generalized additive models (GAMs) to relate presence-absence and relative abundance data of eight economically important fish species to environmental variables (depth, slope, aspect, substrate type, bottom temperature, salinity and oxygen saturation). We combined 13 years of catch data collected from systematic longline surveys performed across the region. Overall, presence-absence GAMs performed better than abundance models and predictions made for the observed data successfully predicted the occurrence of the eight deep-sea fish species. Depth was the most influential predictor of all fish species occurrence and abundance distributions, whereas other factors were found to be significant for some species but did not show such a clear influence. Our results predicted that despite the extensive Azores EEZ, the habitats available for deep-sea fish are highly limited and patchy, restricted to seamounts slopes and summits, offshore banks and islands slopes. Despite some identified limitations, our GAMs provide an improved knowledge of the spatial distribution of these commercially important fish species in the region.

Key-words: deep-sea fish; general additive modelling; Azores; distribution maps