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How does ocean seasonality drive habitat preferences of highly mobile top predators? Part II: the eastern North-Atlantic

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How does ocean seasonality drive habitat preferences of highly mobile top predators? Part II: the eastern North-Atlantic.

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Abstract

Marine ecosystems are characterized by strong heterogeneity and variability, both spatially and temporally. In particular, seasonal variations may lead to severe constraints for predators which have to cope with these variations, for example through migration to avoid unfavourable seasons, or adaptation to local modification of the ecosystem. In the Bay of Biscay and English Channel, ecosystem seasonality is well marked, especially over the shelf. Cetaceans and seabird communities within the Bay of Biscay, Celtic Sea and English Channel were studied during aerial surveys conducted in winter 2011-2012 and summer 2012, following a strip-transect methodology deployed from the coast to oceanic waters. We explored seasonal variations of habitat preferences of four cetacean and six seabird groups through Generalized Additive Models, using physiographic variables and weekly- and monthly-averaged oceanographic predictors for both seasons. Our results provided the first overview at such a large scale of the variation of habitat preferences in response to the seasonality of the ocean by seabirds in that region, at such a large scale. Habitat models resulted in explained deviances from 13 to 55%. Predators answered the seasonality of their environment in different ways. Long-finned pilot whales and Risso's dolphins were the only studied group exhibiting no habitat variations between seasons, targeting the shelf break throughout the year. The other groups modulated their habitat preferences between seasons to optimise the compromise between the ocean seasonal variations and their own constraints: common and striped dolphins, bottlenose dolphins and harbour porpoises for cetaceans; northern gannets,