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BIOGEOGRAPHY OF TOP PREDATORS ALONG LATITUDINAL TRANSECTS IN THE TEMPERATE AND TROPICAL ATLANTIC OCEAN

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Hydrological parameters influence the distribution of top predators - seabirds and marine mammals. In high latitudes, for example, distinct changes between water masses are often characterized by enhanced biological productivity which leads to accumulations of prey and corresponding high abundances of top predators. For tropical waters, information on distributional patterns of top predators, which may be determined by abiotic and biotic factors, is limited. The present study, thus, aims 1) to provide baseline distributional data for future comparisons, for example with respect to climate change, and 2) to test how water masses and their boundaries affect distributional patterns of seabirds in the eastern temperate and tropical Atlantic Ocean.
During four trans-equatorial expeditions of RV “Polarstern” from 2011 to 2014, data of seabird and marine mammal distributions were acquired. Half-hour transect counts were conducted continuously from the vessel’s bridge without width limitation during daylight and travelling speed of the vessel, while environmental data (e.g. temperature and salinity) were continuously recorded by Polarstern’s navigation system.
In general, abundances of top predators in temperate and tropical regions were low when compared to polar regions. A mixed effects modelling approach on the eight most abundant seabird species revealed differences in their abundances to be related to hydrological zones and seasons. In most cases, the borders between water masses and distributional ranges of seabirds were not very distinct due to gradual changes in surface water properties.
Seabird abundances, therefore, were correlated to water masses but, in contrast to polar waters, not strongly linked to borders between water masses. Further factors, e.g. distance to local production areas (upwelling) and interspecific competition effects, may be similarly important in shaping the seabird’s distributional patterns in the tropical and temperate Atlantic, but were not assessed in the present study. In the context of predicted climatic changes, a further monitoring of avian top predators is essential, particularly in order to gain a better understanding about their distributional patterns and potential changes in abundance and geographical distribution.

Keywords: seabirds, marine mammals, distributional patterns, biogeography, water masses, Atlantic Ocean