

## HOW CORY'S SHEARWATERS AREA RESTRICTED SEARCH CHANGES ACROSS A MARINE PRODUCTIVITY GRADIENT

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Foraging movements for central-place foragers such as Cory's shearwaters *Calonectris diomedea* during the breeding period may be divided into two different strategies: commuting and looping. A seabird commutes when he leaves the colony following a specific flight direction until it reaches a particular area of interest, decreasing its velocity and increasing its turning rate (using previous knowledge about the productivity of that area). Looping motion occurs when a bird forages not targeting a particular patch, behaving like it was searching for food on unknown areas. Moreover, Cory's shearwaters exhibited a dual foraging strategy, altering between short trips (ST, less than four days) and long trips (LT, more than five days). We tracked 54 birds, performing 78 foraging trips, in three different breeding areas of the North Atlantic, with contrasting ecological conditions: Corvo (Azores), Selvagens (Madeira) and Berlengas (Portuguese continental shelf). We used miniaturized and accurate GPS-loggers to understand the foraging strategy of different populations of Cory's shearwaters in terms of temporal and spatial dynamics of its foraging areas. We used First Passage Time analysis to obtain Areas of Restricted Search (ARS), and related those areas with remotely-sensed data on sea-surface temperature (SST), bathymetry and chlorophyll-*a* concentration (CHL-*a*). Almost all birds (95%) exhibited ARS behaviour. During LT, populations from Corvo and Selvagens used a search effort at mean values of  $97 \pm 6.5$  km and  $77 \pm 5.1$  km and another nested ARSs at  $28 \pm 3.2$  km and  $15 \pm 1.2$  km, respectively for Corvo and Selvagens. During ST, search effort of the three different populations was single scaled at  $8 \pm 0.9$  km;  $11 \pm 2.2$  km; and  $15 \pm 3.2$  km, respectively for Berlengas, Corvo and Selvagens. For birds breeding and foraging in a typical oceanic environment (Corvo), ARS plots were mostly associated with: seamounts (LT), a frontal area northwards Azores (LT), and bathymetry (ST). For adults breeding in the continental shelf (Berlengas) areas of restricted searches overlapped with both cold and shallow waters, and with high chlorophyll concentration (only ST performed). Lastly, Selvagens birds (an oceanic habitat with close access to NW African coast), presented ARS related with shallow waters and high chlorophyll concentration (for LT) and shallow waters (for ST). Our results demonstrate that Cory's shearwaters do have a scale dependent foraging behaviour when performing short and long trips, reflecting the hierarchical spatial distribution of different physical and biological variables, and most likely representing the spatial arrangement and Ideal Free Distribution of their prey.