Identifying areas of ecological importance through marine predator habitat modelling around the Prince Edward Islands, Southern Indian Ocean

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Marine ecosystems are rapidly changing worldwide and marine predators – as high trophic level species – can be used as bellwethers of such change. However, their trophic level also makes them particularly vulnerable to ecosystem change. Understanding their biogeography is therefore valuable for conservation and management of marine top predators in their own right, as well as for the broader ecosystem. Seabirds, seals and cetaceans have been studied at the Prince Edward Islands, Southern Indian Ocean, since the 1960s, but mainly on a species-by-species basis. By considering multiple species, broader inferences can be made, particularly about community-level habitat use. We use existing data and a multi-species approach to identify important environmental predictors of marine predator distribution around the Prince Edward Islands and to model suitable habitat. We collated data from more than 600 platform transmitter terminal (PTT) as well as global positing system (GPS) tag deployments on 18 species (five albatrosses, five petrels, four penguins, three seals and one cetacean), resulting in an unprecedented multi-species tracking data set for the Southern Indian Ocean. Remote-sensed environmental variables along real tracks were compared to those along a set of simulated tracks using boosted regression trees and generalised additive models, giving a description of habitat use relative to availability. Transformed prediction maps facilitated comparison among species. We highlight areas of spatial overlap and identify important common environmental drivers of distribution.