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Can isoscapes of mesopelagic fish determine foraging hotspots of marine mammals and birds in the southern Indian Ocean?

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Assessment of marine predator habitat use can reveal geographic hotspots of foraging activity, and when linked with diet information can provide an improved understanding of biological processes and predator dependence on trophic resources. Mesopelagic myctophid fish, as a key trophic link between the mesozooplankton and higher trophic levels (seabirds, penguins and marine mammals), are expected to be a good indicator of biological hotspots in oceanic waters. To explore this idea we developed spatially-resolved isoscapes using Southern Ocean mesopelagic fish populations. Fish were sampled along survey transects from the Antarctic shelf to BANZARE Bank and waters to the west and east of the Kerguelen Plateau during January to February 2016. The wide spatial range aimed to account for variability in the nutrient sources and oceanographic conditions in the southern Kerguelen Plateau region. The mesopelagic distributions were analysed in relation to the spatial distribution of flying seabirds (e.g. petrels) and subsurface feeders (e.g. seals, penguins) based on telemetry data. We investigated multi-species spatial overlap areas and examined the extent to which isotope mapping of prey distributions can be used to identify important oceanic areas for marine predators in the southern Indian Ocean. This integrative approach can provide important insights into the structure and function of Southern Ocean ecosystems, and aid large-scale efforts to identify areas of ecological significance for marine seabirds and mammals.