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Use of long-term observation datasets from fishing vessels to model the distribution of sperm whales (Physeter macrocephalus) across the Southern Ocean.

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The ecology of sperm whales (*Physeter macrocephalus*) found in high latitudes has remained poorly investigated due to remoteness and limited data access. These areas are believed to be major feeding grounds for adult males, which were heavily exploited during the whaling period. In this study, we used extensive long-term observation datasets collected from fishing vessels in multiple areas of the Southern Ocean to model sperm whale distribution and habitat. From 2003 to 2016, over 26,000 sightings were recorded in offshore waters of southern Chile, the Falkland Islands, South Georgia, Marion and Prince Edward Islands, Crozet Islands, Kerguelen Islands and Heard and McDonald Islands. As these sightings all occurred during depredation events (i.e. whales feeding off fishing gear), fishing operation variables were accounted for in the models predicting the occurrence of sperm whales from oceanographic and environmental drivers. In all areas, male sperm whales were preferentially distributed on steep bathymetric slopes and areas of high Patagonian toothfish (*Dissostichus eleginoides*) concentrations, with the highest probability of occurrence in Spring and Summer months. However, the effects of some environmental variables also varied between areas, suggesting local specialization in feeding habits between distinct populations. Together, these results bring new insights to the natural areas of importance for sperm whales, which are determinant in monitoring the recovery of post-whaling populations, and developing depredation mitigation measures, both locally and more broadly across the Southern Ocean.