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Tracking for change – a long-term seal movement study to assess Southern Ocean ecosystem shifts

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Antarctic fur seals (*Arctocephalus gazella*) are an abundant, migratory and widely distributed pelagic marine predator. Our understanding of the factors that influence their habitat choices at sea and the ways in which these are now changing, is limited. In 2008 we began a circumpolar study aimed at quantifying the extent and variability of winter foraging strategies of female Antarctic fur seals from key, breeding sites: South Georgia, the Antarctic Peninsula and Marion Island. We also aimed to assess whether alterations in winter migratory behaviour associated with climate change (e.g. projected poleward movements of fronts) could be detected. Miniature, light sensing recorders (GLS) mounted on flipper tags were deployed at all sites in 2008 to 2010, and at Marion Island for the last ten years. While the majority of females complete one winter migration, 30-35% of seals from Marion and Bird Islands displayed central place foraging behaviour, conducting multiple long-range trips. These commuting females traversed over 22 degrees of latitude (sub-polar to temperate regions). Productive spring months (Sept/Oct) prior to breeding, correlated with highest levels of area restricted search behaviour for these females. Concurrent analyses of the isotopic signature of fur seal whiskers reveal the temporal and regional diversity in diet for this wide-ranging species. The previously undocumented winter foraging habitats and diet revealed by this study provide an important context for the management of these highly migratory predators in what is one of the world's most rapidly changing oceanic regions.