Fine scale stable isotope analysis of teeth: an in-depth study of Southern Ocean fur seals

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The Southern Ocean is experiencing increasing climate change and commercial exploitation. Monitoring these changes is important for assessing risks to this environment and the species present. An increasingly used and cost effective method is through the monitoring of indicator apex predators such as seals and seabirds. Behavioural and demographic parameters, and diet have been linked to variations in populations of prey. While diet studies originally used traditional scat and stomach content analysis, they have increasingly been informed by indirect methods such as stable isotope analyses (SIA). However, the latter method has further potential to assess current and historical variation in trophic ecology. Temporal and spatial changes in the foraging behaviour of animals, and in their environment, are archived in the stable isotope values of specimens.

Antarctic fur seals, *Arctocephalus gazella* and Subantarctic fur seals, *A. tropicalis* are important apex predator species because of their circumpolar distribution, diverse diet and because they have been intensively studied. Material collected from these two species from six island groups over a period of 40 years by the Mammal Research Institute is accessioned to the Port Elizabeth Museum.

Our incipient project is assessing the historic trophic levels of these seals using fine scale sampling from canines. These data will be informed by comparison to specimens from recently collected natural mortalities. Our specific aims are to assess extrinsic and intrinsic factors influencing the trophic ecology of these species by examining spatial and temporal variations between and within populations across their ranges.