

## Temperature and bathymetry as determinants of under-yearling and yearling southern elephant seal (*Mirounga leonina*) movements from and to Marion Island

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Juvenile southern elephant seals (*Mirounga leonina*) are forced to embark upon their first foraging trips independently relying on instinctual knowledge. Successful first foraging trips are important because they may determine future survival and breeding success. Uniquely marked under-yearling (n=5) and yearling (n=14) southern elephant seals were instrumented with satellite transmitters from 2001 – 2007. Their movements were analysed and overlaid onto bathymetric (GEBCO) and sea-surface temperature (OISST) maps of the surrounding regions. Both age groups displayed an east to west path of travel with small variance in latitudinal travel (Under-yearlings: Var (Y) = 4.62±3.37; Yearlings: Var (Y) = 4.68±2.84) and high variance in longitudinal travel (Under-yearlings: Var (X) = 16.80±3.84; Yearlings: Var (X) = 84.47±90.10). The seals travel exclusively along the South-West Indian Ridge in a westerly direction, directing their movements over areas of high bathymetric heterogeneity. Sea-surface temperatures encountered by the elephant seals ranged between 14.14°C and 0.82°C. On most occasions extended periods of time were spent in regions of lower temperatures, with higher temperatures being experienced as the animals return to Marion Island. All the under-yearling seals traveled to and from the island along the Andrew Bain fracture zone, seldom passing 25°E. The strong relationships between bathymetric features and dispersal of juvenile elephant seals from Marion Island may be due to the interaction of varied bottom topography with overlying water bodies to generate areas of high turbulence resulting in high primary productivity. The importance of the interaction of the Antarctic Circumpolar Current (ACC) with the Andrew Bain fracture zone to form cyclonic or anti-cyclonic eddies is also highlighted. These eddies may be integral in providing the Prince Edward Islands with nutrient rich Antarctic waters, thus supporting the numerous species that rely on the island as breeding grounds. Elephant seals, juveniles in particular, are ideal platforms to monitor the water bodies around Marion Island and may be instrumental in long term monitoring of the oceanscape around Marion Island.