

## Wintering habitat of Weddell seals along the continental shelf off Enderby Land, East Antarctica

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Weddell seals (*Leptonychotes weddellii*) inhabit the southernmost part of the Southern Ocean where land-fast ice covers the sea surface. Due to their high diving ability Weddell seals deployed with tracking devices can provide a unique opportunity to collect environmental data in the coastal waters of Antarctica during autumn and winter, when conventional oceanographic observations are difficult. Although winter tracking data have been collected and reported elsewhere across the Antarctic circumpolar regions (Weddell Sea, Antarctic Peninsula Region, Ross Sea, Adelie Land and Prytz Bay) until now, no studies have investigated the Lützow-Holm Bay region, where large inter-annual variations in sea ice extent were observed. This study aims at characterizing the wintering habitat of Weddell seals using oceanographic data collected via bio-logging. To achieve this, we deployed conductivity-temperature-depth satellite relay data loggers (CTD-SRDL) on 7 Weddell seals near Syowa Station (69.0°S 39.6°E) from late March to early April 2017. Among them, 3 were adult females, 1 was a sub-adult male and 2 were adult males. An additional deployment on a sub-adult male was conducted in late September 2017. The deployment duration was  $166.0 \pm 97.2$  days (mean  $\pm$  SD,  $n = 7$  seals deployed during autumn). Between March and May, breakup events of land-fast ice were observed in Lützow-Holm Bay. The averaged distance travelled by the seals from the deployment location was  $321.9 \pm 201.5$  km (range, 99.9 - 633.1 km). Most of the seals showed eastward movement, and remained in areas where the bottom depth was less than 1000 m, suggesting the seals preferred the continental shelf off Enderby Land. The total number of profiles covered by the seals was 1,302 (a total of 17,245 CTD data). During autumn and winter, high temperature ( $\geq -1.0^\circ\text{C}$ ) and high salinity ( $\geq 34.4\text{‰}$ ) water were observed at the deepest points of some dives in the Lützow-Holm Bay and on the edge of the continental shelf east of Syowa Station, which possibly originated from Modified Circumpolar Deep Water (MCDW). In addition, a subsurface temperature maximum (at maximum  $\geq -1.0^\circ\text{C}$ ) was observed in the 50- 400 m layer during autumn and winter across a wide range of the continental shelf off Enderby Land. The seals dived to depths of  $162.8 \pm 96.2$  m (maximum: 632 m), with a relatively high proportion of benthic dives (in that  $64.6 \pm 21.5\%$  of all dives). We will explore further the diving behaviour and habitat use of the seals in relation to the sea ice characteristics and water masses. Overall, the Weddell seals from Syowa Station showed long distance migration through the winter and provided valuable oceanographic data off Enderby Land where winter sea ice extends over the continental shelf.