

アデリーペンギンの一年間の採餌行動

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Foraging behaviour of Adélie penguins over the annual cycle

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Studying the linkages between marine environment and the foraging behaviour of top predators throughout a year is essential to better understand the ecological responses of these top predators to environmental changes. This has been challenging until recently, but advances in animal-borne biologging technologies now allow us to study the foraging behaviour of Antarctic penguins over their complete annual cycle. Here, we report an overview of Adélie penguins' foraging behaviour monitored 1) in detail during summer breeding season using GPS, video or accelerometry loggers, and 2) throughout Antarctic winter using geolocation and depth data loggers. The field study was conducted at Hukuro Cove colony (69.2° S, 39.6°E), Lutzow-Holm Bay, in East Antarctica, during three austral summers of December 2010 – February 2013, under JARE 52 – 54. Fast sea-ice remained in the Lutzow-Holm Bay throughout the summer season during our study, but the fast ice was most loose with more small open waters (i.e. leads) in January 2013. During chick-rearing period, penguins foraged at leads or tidal cracks along the coast within fast ice area. The foraging range did not vary significantly among the three seasons (2.6 – 2.8 km from the colony, on average), but the foraging trip duration was the shortest in 2013 (23.5, 20.2, and 16.1 h for 2011-2013). Prey availability under the fast ice may explain the annual differences in trip duration despite the same foraging distance. Shorter trip duration in 2013 would have resulted in higher chick growth rates and breeding success. After the breeding season, penguins moved over large distances northwest from Lutzow-Holm Bay (up to 1840 km from the colony on average) before coming back to the colony in early November. The northward movement (mean northernmost latitude: 57.5° S) generally corresponded with the seasonal extension of pack-ice boundary up to September. Penguins dived mostly during daytime across winter months, and they dived deeper during winter than during the breeding period. We discuss how inter-annual and seasonal changes in sea-ice conditions appear to affect the foraging behaviour and distribution of Adélie penguins during both summer and winter periods.