



Diving behavior can now tell us how much food Adélie penguins are eating

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Penguins, like most other seabirds, spend most of their time at sea, where they cannot be observed directly. It is therefore very challenging to determine when, where and how much they feed, and therefore which marine areas are important for them to thrive, especially during the Antarctic winter, or for young individuals, which do not come to shore regularly.

In this study, we tested the idea that the recordings of their diving behavior could hold pertinent information about how much food Adélie penguins are actually ingesting. To uncover which specific parameters were related to food intake, we combined two types of advanced technology: an automated scale that weighs and identifies penguins implanted with an RFID tag as they travel to and from the ocean to feed their chicks, and a tiny dive recorder attached to their legs that can record dive depth every second for more than a year.

By coupling information on the penguins' diving behavior and the change in their body mass during a trip at sea, we were able to show that the frequency of a certain type of dives (called "foraging" dives and characterized by their depth >10 m and their "wiggly" shape) best explains the body mass gain of a penguin while at sea. Specifically, every additional foraging dive per hour equated to a penguin gaining an average 170 g of mass, over the course of a 6–60 h trip.

While this study took place in the summer, when breeding adults can easily be observed, weighed and equipped with recording devices, our findings will be very useful to approximate food intake during times of the year or periods of their life cycle when penguins cannot be directly weighed (e.g. in winter, or during the juvenile stage) but can still be equipped with miniaturized dive recorders. This will help us identify new foraging hotspots and critical marine areas for conservation.

Main Points

Quantifying food intake in wild animals is crucial to identify critical areas for conservation, yet it can be very challenging, especially in the marine environment.

The frequency of a specific dive type predicts body mass gain in breeding Adélie penguins during their foraging trips at sea.

Dive recorders now exist in miniaturized versions, weighing only 4 grams while still recording high-resolution data for more than a year.

The number of "foraging" dives per hour can therefore be used to determine foraging hotspots outside of the breeding season and/or for young individuals, and to identify critical areas for conservation.

Lescroël A., Schmidt A., Elrod M., Ainley D.G. & Ballard, G. 2021. [Foraging dive frequency predicts body mass gain in the Adélie penguin](#). *Scientific Reports* 11:22883.