

# キングペンギンの遊泳速度に見られる日周変化

塩見こずえ<sup>1</sup>、佐藤克文<sup>2</sup>、Yves Handrich<sup>3,4</sup>、Charles-André Bost<sup>5</sup>

<sup>1</sup> 国立極地研究所

<sup>2</sup> 東京大学大気海洋研究所

<sup>3</sup> *Université de Strasbourg, IPHC*

<sup>4</sup> *CNRS*

<sup>5</sup> *Centre d'Etudes Biologiques de Chizé, CEBC-CNRS*

## **Diel shifts of swim speeds in king penguins: low swimming speed at night for prey searching and efficient travelling**

Kozue Shiomi<sup>1</sup>, Katsufumi Sato<sup>2</sup>, Yves Handrich<sup>3,4</sup>, and Charles-André Bost<sup>5</sup>

<sup>1</sup> *National Institute of Polar Research*

<sup>2</sup> *Atmosphere and Ocean Research Institute, University of Tokyo*

<sup>3</sup> *Université de Strasbourg, IPHC*

<sup>4</sup> *CNRS*

<sup>5</sup> *Centre d'Etudes Biologiques de Chizé, CEBC-CNRS*

For animals moving in fluid, one of the parameters to be optimized is speed. According to previous studies on some flying insects and birds, not only energetic cost of transport and prey distribution but also ambient light intensity can affect moving speeds. To date, however, very few studies of diving animals have tackled the issue of the adjustments of swim speeds associated with the diel cycle. In this study, we examined diel patterns of swimming behaviours in free-ranging king penguins through a bio-logging approach. Comparison of nocturnal and diurnal shallow dives elucidated that their swim speeds shifted between night and day. While diurnal swim speeds were consistent with the expected value achieving the minimum cost of transport, king penguins swam slower at night. Straight dive paths and previous insights indicated both diurnal and nocturnal shallow dives mainly aimed for horizontal transit to their main foraging areas or breeding colony. However, king penguins also appeared to forage at night because of diel vertical migration of fish to shallow water. To find fish in the dark, slower speeds should be beneficial with temporal summation effect in vision. Our study indicated that king penguins adjusted their swim speeds to compromise the minimum cost of transport with prey detection ability.