

## **Homing ability of Adélie penguins investigated by combination of displacement experiments and bio-logging**

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Adélie penguins (*Pygoscelis adeliae*) exclusively living in Antarctica commute between the sea for foraging and the land for breeding. For these movements, they must navigate through various environments: underwater, on sea ice, and on land, which is a unique situation among animals. Recent developments in animal-borne data loggers have enabled us to record movement paths and activities of free-ranging animals. To combine the bio-logging technologies with a traditional approach in homing studies, i.e. displacement experiment, may help obtain further information about movement patterns and mechanisms in penguins. In this presentation, we will report the results of displacement experiments conducted for the first time in 50 years for Adélie penguins. Two chick-rearing birds were caught at their nests, and a data logger with GPS and accelerometer was deployed on their backs. They were artificially displaced and released at about 1 km from the breeding colony. From the release point, their options to return to the nest were either walking over land or swimming at sea. The birds successfully returned to the colony 6.0 h and 8.1 h after release, taking 44 min and 41 min from the onset of homeward movement, respectively. Both individuals took what appeared to be the straightest and shortest course crossing overland. They spent most of the homing phase (51.2% and 66.2%) walking, and entering the water from the same place only in the last stretch homewards. The results of our study demonstrate the homing ability of Adélie penguins from a distant place behind a hill, and also the potential of positional and acceleration data for researching the navigation of penguins that travel by both swimming and walking.