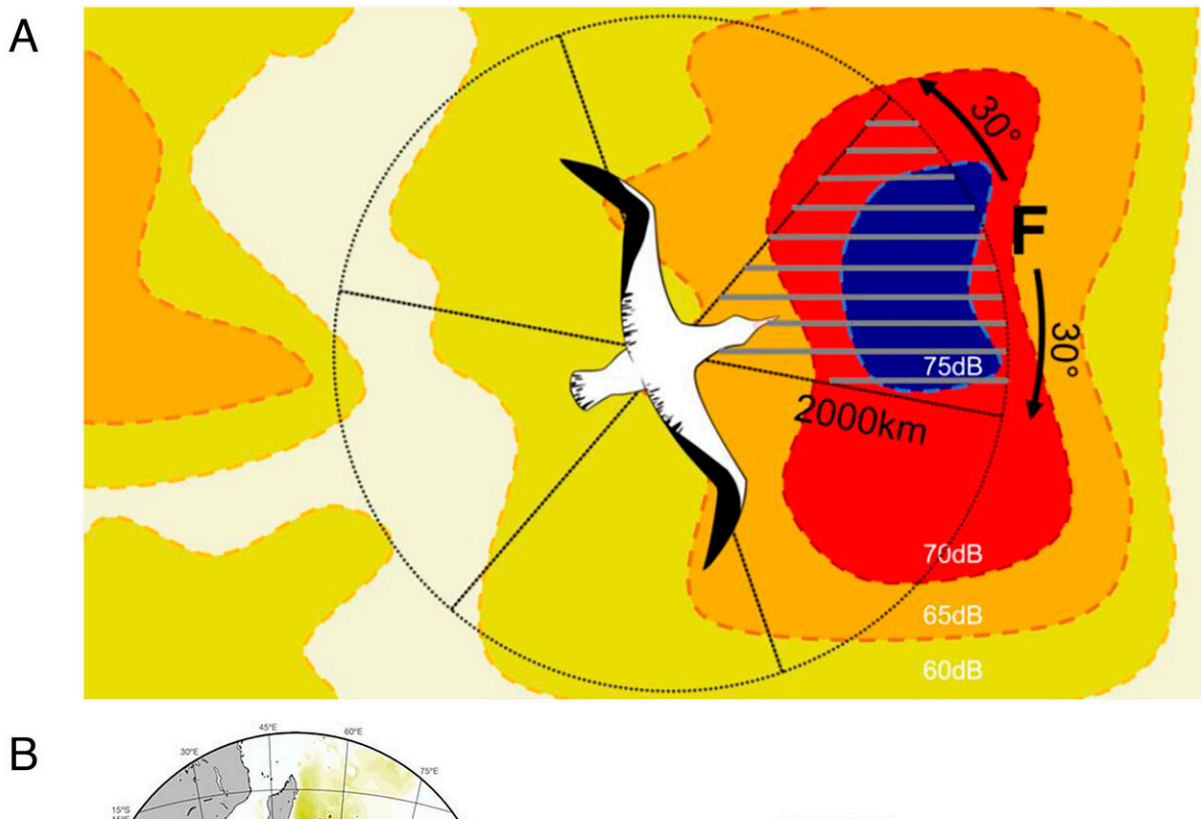


# First evidence that albatrosses use infrasound to navigate long journeys

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(A) Schematic to illustrate the analysis approach. Analysis was performed on sections of GPS tracks identified as flight and lasting for at least 20 km. The bird's bearing at the decision point was calculated, and the area  $30^\circ$  either side of this bearing used to define a  $60^\circ$  "focal" segment (labeled "F"; striped) emanating from the bird's position. Numerically summed sound pressure across a 2,000 km radius in this focal segment was compared to the remaining five unchosen but available segments around the bird. The microbarom soundscape is represented by colored contours indicating sound pressure level (SPL) at

different decibels to show that the "focal" segment contains higher dB SPL. (B) Plot of a static microbarom infrasonic soundscape (0.06 to 1.1 Hz) at 00:00 UTC (2013-02-09) from the perspective of a foraging albatross (i.e., along the bird's trajectory) with zoomed map. SPL (indicated by the color scale) represents the summed SPL that the bird can perceive, accounting for propagation paths and losses. The bird's position is indicated with a black star and the beginning of the track with a black triangle (from the colony on Crozet Island). Credit: *Proceedings of the National Academy of Sciences* (2023). DOI: 10.1073/pnas.2218679120

A new study by the University of Liverpool provides the first evidence that wandering albatrosses, one of the widest-ranging seabirds, may use infrasound to help them navigate long and featureless foraging trips covering thousands of miles.

In a paper published in the journal *Proceedings of the National Academy of Sciences (PNAS)*, researchers from the University's School of Environmental Sciences show that [albatrosses](#) orientate towards areas of "loud" microbarom infrasound when flying on long distance foraging trips. [The paper](#) is titled "Albatross movement suggests sensitivity to infrasound cues at sea."

Infrasound is a form of low-frequency sound that is inaudible to humans but is ubiquitous in the [marine environment](#). Microbaroms are a type of infrasound associated with colliding ocean waves. Such wavy areas are also associated with [strong winds](#), which albatrosses depend on to help them fly efficiently.

The researchers used GPS trackers to determine the flight paths of 89 wandering albatrosses breeding in the Crozet Islands archipelago, Southern Ocean, over the course of their foraging trips to sea, which can last up to a month.

They then compared these flight paths to modeled acoustic maps that the team had developed to represent the distribution of microbarom infrasound.

This revealed that wandering albatrosses orientate towards areas of "loud" microbarom infrasound when departing on bouts of directed flight, suggesting that they may perceive and respond to microbarom infrasound propagated over long distances.

Dr. Natasha Gillies, a seabird ecologist with the University's School of Environmental Sciences who jointly led the study with Dr. Lucía Martín López, said, "How animals navigate and search for resources over large spatial scales exceeding 100s–1,000s km is a fundamental question in ecology.

"For [marine animals](#), such as seabirds, this question is especially intriguing due to the limited availability of visual information, meaning that other cues must be involved in movement.

"It has been proposed that seabirds could use infrasound to help them navigate the huge expanses of featureless ocean environment that they fly over in order to forage.

"Our results offer the first evidence for responsiveness to infrasound in a movement context for a free-ranging animal."

The study forms part of a Human Frontier Science Program grant, which brings together a team of international collaborators (Stellenbosch University, South Africa; University of Florida, U.S.; Royal Netherlands Meteorological Institute, the Netherlands).

This is the first empirical test of their previous proposal that [infrasound](#) could be an important cue for seabird navigation.

Dr. Samantha Patrick, who led the grant, said, "It is only through interdisciplinary science like this, which brings together scientists across diverse fields, that we can achieve such new and exciting insights."

**More information:** Natasha Gillies et al, Albatross movement suggests sensitivity to infrasound cues at sea, *Proceedings of the National Academy of Sciences* (2023). [DOI: 10.1073/pnas.2218679120](https://doi.org/10.1073/pnas.2218679120)

Provided by University of Liverpool

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