

Great frigate birds found able to fly for months at a time

July 1 2016, by Bob Yirka



A juvenile frigatebird. Credit: Henri Weimerskirch CEBC CNRS

(Phys.org)—A small team of researchers with members from France, the U.K., Canada and Germany has discovered that the great frigate bird (*Fregata minor*) is able to stay aloft for up to two months at a time. In

their paper published in the journal *Science*, the team describes how they affixed trackers to several of the birds as part of a two-year study, what they found, and even offer some ideas on how the birds manage to sleep. Raymond Huey and Curtis Deutsch, with the University of Washington in Washington State, offer a [Perspective piece](#) on the work done by the team in the same journal issue.

To learn more about the birds, the group managed to capture several specimens during their infrequent and short stays on land—they held on to them just long enough to affix extremely lightweight transmitters that were capable of monitoring GPS positioning, altitude, heart rate and acceleration in any direction. That allowed them to track the movements of a variety of birds and how much energy they were exerting.

In analyzing the data, the researchers discovered that the birds were able to stay in the air so long for two reasons; the first is that they expend very little energy because they rely on updrafts to keep them aloft. The second reason is because when they do eat, they simply swoop down out of the air to catch a fish that has jumped out of the water to avoid a predator from below. They have to be careful though, because they do not have waterproof wings.

In charting their flight patterns, the team found that the birds travel incredible distances—sometimes covering up to 250 miles in a single day. They also found that the birds were able to take advantage of another type of updraft when need be, they would slip under a cumulus cloud and allow themselves to be very quickly pulled upward (up to 5 meters per second), without having to flap their wings a single time. Such sudden elevations could take them as high as 4,000 meters, where the air is extremely thin, and the temperature freezing. From there, they would glide down for hours, until reaching another updraft.

The birds live in the air over the Pacific and Indian Oceans, which

means they are subject to the doldrums, but they have, the team found, discovered a means for handling them as well—they simply hang around on the edges taking advantage of the updrafts in the small clouds that develop around the edges.

The birds are able to glide so well, the team notes, because they have the least amount of body weight distributed over the total area of their wings of any bird. They also suggested the [birds](#) might actually sleep for just minutes at a time as they are carried effortlessly up into clouds.

More information: H. Weimerskirch et al. Frigate birds track atmospheric conditions over months-long transoceanic flights, *Science* (2016). [DOI: 10.1126/science.aaf4374](https://doi.org/10.1126/science.aaf4374)

Abstract

Understanding how animals respond to atmospheric conditions across space is critical for understanding the evolution of flight strategies and long-distance migrations. We studied the three-dimensional movements and energetics of great frigate birds (*Fregata minor*) and showed that they can stay aloft for months during transoceanic flights. To do this, birds track the edge of the doldrums to take advantage of favorable winds and strong convection. Locally, they use a roller-coaster flight, relying on thermals and wind to soar within a 50- to 600-meter altitude band under cumulus clouds and then glide over kilometers at low energy costs. To deal with the local scarcity of clouds and gain longer gliding distances, birds regularly soar inside cumulus clouds to use their strong updraft, and they can reach altitudes of 4000 meters, where freezing conditions occur.

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Citation: Great frigate birds found able to fly for months at a time (2016, July 1) retrieved 10

April 2024 from <https://phys.org/news/2016-07-great-frigate-birds-months.html>

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