

Podcast interview: Henri Weimerskirch

PNAS: Welcome to Science Sessions. I'm Paul Gabrielsen. Albatrosses patrol the oceans of the Southern Hemisphere, sometimes spending years at sea and covering nearly 10,000 miles before landing. In all that time, they observe and sometimes follow the comings and goings of fishing vessels – some operating illegally. Henri Weimerskirch, of the French National Center for Scientific Research or CNRS, has been studying albatrosses for 40 years. In a recent PNAS article, Weimerskirch and his colleagues report that albatrosses carrying GPS and radar dataloggers, which were developed to study the behavior of juvenile birds, could pick up the radar signals of fishing boats. This made the birds sentinels of the sea, and provided a much more complete picture of illegal fishing in the Southern Ocean than had been known before. Weimerskirch tells how the study came to be.

Weimerskirch: The story started a few years ago when I was entrusted to track juvenile wandering albatrosses and I wanted to have an idea whether they came close to fishing boats because fishing, especially longline fishing, is a major problem for this species. When they're at sea they are very attracted by vessels, and especially by fishing vessels because they are attracted by the discards or the bait that are put in the water through the lines. And we wanted to develop new loggers that record the presence of a boat nearby the bird. We realized that in fact the birds were encountering several boats that were not supposed to be in the area, especially in the economic zone around the breeding grounds. So that's from where the idea for this kind of study started.

PNAS: Weimerskirch describes the dataloggers used in the study.

Weimerskirch: We started with the first type of loggers that record the emission, the radar emission of boats. This means that we develop a miniature antenna that receives the radar emission. We also have GPS for the accurate location and we also have an Argos antenna, so that we can recover the information very quickly after the vessel has been located by the albatross. We have tried to miniaturize it to the minimum, so at the moment the logger weighs between 45 and 60 grams so that we can put it, it's not a problem for a large albatross which weighs between 10 and 12 kilograms.

PNAS: Commercial boats use an Automatic Identification System, or AIS, to self-identify to other boats. Some of the radar signals that the albatrosses' dataloggers detected contained AIS information. That indicated a legitimate commercial vessel. Radar signals without AIS data suggested a possible illicit fishing operation. More than a third of the detected vessels in international waters were not broadcasting AIS signals, while the proportion varied between 15% and 100% in the waters around island nations. Weimerskirch says the study revealed as much about albatrosses as it did about boats.

Weimerskirch: One part I was very interested is the part of the young albatrosses. These young albatrosses are leaving the island for the first time, they are completely naïve and they go at sea to search for food and they will stay at sea for several years, up to 10 years, continuously at sea. And the question was: Were the individual, these young birds, attracted by a vessel like their parents or like adults are very attracted? So the

first result, and we were, I was quite surprised of it, the young birds were much less or even not attracted at all when they encountered the vessel. Where an adult is within 30 kilometers and sees a vessel, he will immediately change his route and go to the vessel. This attractivity to the vessel built up with age.

PNAS: Weimerskirch says that other researchers and fishery services are beginning to use the dataloggers and data from the albatross sentries.

Weimerskirch: The study has attracted quite a lot of attention. The same kind of our logger are just now being used in New Zealand by the fishery service there because there is a problem of an endangered species of albatross there where there is a high mortality and they want to know where the mortality occurred and whether it's due to fisheries. And we will also use our loggers on the South African Marion Island where we detected in our study that there were, all the fishing boats around this island were illegal fishing boats. The loggers are also being used just now from South Georgia by British researchers.

I think this will bring quite a lot of discussion, especially in the RFMO, the regional fishing management organization, which are international organization especially the one managing tuna fishing in the southern Indian Ocean and in the South Atlantic because there is quite a lot of discussion about the amount of fishing there and also whether all countries are indeed declared when they are fishing.

PNAS: Albatrosses may not be the only animals suited for an ocean sentinel role.

Weimerskirch: There are British researcher that I entrusted by our loggers to use them on sea turtles. I think we have to modify the loggers so they can be on diving animals but it's not a big problem because sea turtles are quite large. Here is a reasonable good potential of future studies using the logger and the approach of this concept of using animals as sentinels in the oceans.

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