



A fur seal joins the feeding frenzy.

# Fish & ships: A bird's eye view

IN December 2019, PhD student Amanda Kuepfer conducted a pilot-study involving the attachment of miniature video-cameras to black-browed albatrosses, in order to study their foraging behaviour:

STUDYING seabirds at sea, and learning about their foraging behaviours, presents logistical challenges. Historically, this has typically involved direct observations from boats. However, boat-based research has its limitations. For example, it fails to determine the extent to which individual birds seen foraging at the vessel are also searching for natural prey, the origin of the scavengers, their sex or reproductive status. In consequence, this greatly limits efforts to determine the seabird's at-sea distribution, and the true extent of seabird-fisheries interactions.

Biologging devices such as GPS and immersion loggers, in combination with spatial information of fishing vessels from VMS or AIS, have greatly enhanced our understanding of seabird distribution and interactions with fisheries. However, these methods rely on accurate vessel location data, which is not always available in international waters.

Diet studies, either through di-

rect analysis of prey remains in the stomach or faeces, or through elemental analysis such as stable isotopes, have again proven very helpful to the study of seabird foraging behaviour, and the extent to which they may be feeding on natural prey or on fishery waste. However, it is not always possible to differentiate between fish that is discarded or which has been obtained naturally. Many squid species, for example, travel up and down in the water-column, and so can be targeted by vessels, as well as naturally by seabirds. Other prey, such as jellyfish, are quickly digested, and hence their importance can be underestimated in certain types of dietary analyses.

Over the past decade, the study of seabirds at sea has been increasingly revolutionised by the development of miniature bird-borne cameras, which present an ideal complementary approach to the methods mentioned above. Used in combination with bird-borne GPS loggers, they allow us to reliably ground-truth behaviours such as active foraging, assess the relative frequency of consumption of different prey species, or determine the extent to which foraging happens in the presence or absence of vessels. Moreover, they provide direct observation of



A black-browed albatross carrying a miniature camera on the back

natural foraging behaviour, which can be difficult for scavengers like the black-browed albatross.

As part of my study focusing on seabird-fisheries interaction and the foraging behaviour of black-browed albatross, funded through the FIG Environmental Studies Budget and by Fortuna Ltd., a team of assistants and I deployed miniature cameras on nine black-browed albatrosses breeding on New Island during the early chick-rearing period in December. The study was licensed by Falkland Islands Government and granted permission by the New Island Conservation Trust. The cameras, which weigh less than 30g each, were attached with special tape on the back or on the tail feathers. A long-term demographic study colony on New Island, run by supervisor Dr. Paulo Catry from ISPA Instituto Universitário (Lisbon), presents a unique opportunity for such work, as we know the sex of the birds as well as their breeding history. This allowed us to choose the fittest and most suitable birds, and avoid potentially vulnerable individuals, such as first-time breeders.

With only four cameras to hand, the main purpose of the study was to identify the suitability of this method and the specific device for our study species. Unfortunately, the batteries of the cameras did not last quite as long as hoped, due to the much reduced temperatures here in the Falklands, compared to their testing area in Australia. However, we still managed to obtain a total of 26 hours of footage from the birds, and capture some very exciting behaviour.

The vast majority of the foot-

age is of birds in flight, which is interesting data in its own right, as it highlights the behaviour of these birds during the majority of their foraging trips. A total of six feeding events were captured, all in the absence of vessels. On all occasions, they were feeding in the company of others, including black-browed albatrosses, skuas, giant petrels, terns, greater shearwaters, and even a sooty albatross. On one occasion, they were also joined by a fur seal. The natural feeding association with pinnipeds is interesting, as it may explain how albatrosses end up consuming bits of penguin skin and feathers or benthic prey like octopus. In the one feeding event, a large group of black-brows are seen diving for a bait-ball, most probably sprat (*Sprattus fuegensis*), whilst on another occasion, they are seen feeding on a large jellyfish.

The BBC's Animals with Cameras team has shown a great interest in this project, and are hoping to join us next December. This would present an incredible opportunity, with the availability of a much increased number of cameras fitted with useful features such as saltwater switch to allow focusing the battery life on feeding events. The COVID-19 crisis may have thrown a bit of a spanner into these plans, but we're keeping our fingers crossed.

*Amanda Kuepfer is a PhD intern with SAERI and the Falkland Islands Government Fisheries Department, with affiliations to the University of Exeter and ISPA Instituto Universitário (Lisbon).*

A black-browed albatross captured feeding on a jellyfish.

