

DESCRIPTION FOR THE GENERAL PUBLIC

Understanding trophic relationships in dynamic marine ecosystems requires the analysis of diet of the involved species under different conditions such as different prey availabilities and different life-history stages. In this study, foraging ecology of two sympatric seabirds, Wilson's storm petrel *Oceanites oceanicus*, and black-bellied storm petrel *Fregetta tropica*, breeding in maritime Antarctic will be investigated. Both species are small pelagic *Procellariiformes* from family *Hydrobatidae*. Both species breed during austral summer with breeding season from December to March. They lay single-egg clutches. Incubation lasts 38-44 days, chick rearing period up to 71 days. Intense parental care is shared between sexes during incubation and chick rearing. Both storm petrel species forage on crustaceans (krill, amphipods) and fish. They spend most of their time foraging at sea, and come ashore only for breeding. Thus, it is possible to study them only during the breeding period, and most of knowledge of food and feeding ecology is restricted to this period when it is possible to catch birds and collect food samples.

The aim of this study is: 1) to assess the degree of inter-specific (species) and intra-specific (sex, age groups) segregation and individual foraging specialisation; 2) to investigate variability of diet composition at different temporal scales: between life-history stages, i.e. breeding vs non-breeding periods, and within the breeding season; 3) to study potential effects of climate changes on foraging strategies by comparing the diet composition between recent and available historical data from the same site; 4) to compare foraging behavior and distribution between the species and sexes based on data from archival light loggers (geolocators); 5) to compare locations of foraging areas determined based on geolocators data and estimated from regression function based on isotopic signatures of feathers.

Considering differences in body size and diet composition between both studied species, inter-specific differences in trophic niches/foraging areas may be expected. Considering discrete differences in parental provisioning reported for one of studied species and sexual size dimorphism in both species, exploration of different trophic niches by both sexes may be expected. Considering relatively wide trophic niches for both species, individual foraging specialisation may be expected, especially during non-breeding season when birds are not restricted in their foraging range by the necessity of periodical return to the colony. Considering currently undergoing climate changes, especially well visible in Antarctic Ocean, changes in diet composition of both studied species caused by expected lower krill availability are expected.

The study is planned to be conducted on King George Island, South Shetlands. To study feeding ecology of two storm petrel species, stable isotope analysis (C and N) as well as a conventional method, analyse of regurgitated prey will be used. Those methods will be supported by investigation of foraging areas based on geolocators (electronic archival tracking device periodically recording ambient light level to determine bird location). To catch birds and collect samples from them for dietary analyses (feathers for stable isotopes analyses and regurgitated food), two methods will be used: mistnet capture and on-nest capture.

Isotopic signatures of feathers reflect the diet during the period of their synthesis. Stable isotope analyses will reveal information on diet during both non-breeding (feathers from adults) and breeding [regrown feathers of adults (after earlier collection) and feathers of chicks] seasons. Regurgitated food samples will be collected from individuals both mistnetted at night (adults) and captured in nests (both adults and chicks). To investigate foraging areas and strategy, use of miniaturised archival light loggers, i.e. geolocators (0.9 g) is planned. It should provide unique information from the whole year, currently not available with use of any other available methods. Rapid global changes observed (especially in polar regions) induce novel broad-scale changes in marine ecosystem posing new and unprecedented challenges for many organisms. Hence, there is urgent need to investigate diet composition and delineate areas exploited by top predators, to better understand the implications of these risks and to develop conservation approaches to protect ocean habitat and marine biodiversity effectively. The Antarctic Treaty Members urge long-term monitoring and sustained observations of the Antarctic environment and the associated data management, to detect, understand and forecast the impacts of climate change-driven environmental variability. In this context, ecological studies of storm petrels diet, abundant marine top predators in the Maritime Antarctic, are crucial for comprehending the environmental variability in the Southern Ocean.