

Foraging distribution, habitat preferences and diet of breeding Antarctic fulmarine petrels in East Antarctica

Dehnhard Nina^{1,2}, Helen Achurch², Judy Clarke², Loïc N. Michel³, Rob King¹, Andrea Walters⁴, Colin Southwell², Marcel Eens¹ and Louise Emmerson²

¹ University of Antwerp, Behavioural Ecology & Ecophysiology Group, Universiteitsplein 1, 2610 Wilrijk (Antwerpen), Belgium

E-mail: nina.dehnhard@uantwerpen.be

² Australian Antarctic Division, 203 Channel Highway, Kingston, TAS 7050, Australia

³ Laboratory of Oceanology, University of Liège, B6C, Allée du 6 Août 15, Quartier Agora, Sart-Tilman, 4000 Liège, Belgium

⁴ Institute for Marine and Antarctic Studies, University of Tasmania, IMAS Waterfront Building, 20 Castray Esplanade, Battery Point, TAS 7004, Australia

Knowledge about the currently utilized foraging habitat and diet of Antarctic species is crucial to understand potential impacts of climate-change in the Southern Ocean and to identify overlap with the CCAMLR managed fishery in the Southern Ocean. In comparison to other groups of Antarctic top predators, little information is available for the medium-sized Antarctic fulmarine petrels.

In 2015/16 we investigated the foraging behaviour and diet of southern fulmars (*Fulmarus glacialisoides*), Antarctic petrels (*Thalassoica antarctica*) and cape petrels (*Daption capense*) breeding sympatrically on Hop Island (68.82°S, 77.68°E) in the Prydz Bay region (East Antarctica).

Using state-of-the art lightweight GPS loggers, we recorded a total of 277 foraging trips, covering the entire 2015/16 breeding season from incubation to late chick-rearing in all three species, including multiple foraging trips made by several individuals. Blood, feather and egg membranes were collected from the same species, and complemented by prey items obtained in the foraging area during a marine science voyage in the 2015/16 austral summer.

GPS trajectories were separated into foraging locations and commuting legs, using wet/dry data recorded by the GPS loggers and Expectation-Maximization binary Clustering (EMbC; a novel approach based on speed and turning angle to annotate behavioural states). We present the species' foraging distribution during the different breeding stages and identify habitat characteristics (bathymetry, sea ice, chlorophyll a as a predictor of environmental productivity) to determine whether these Southern Ocean predators share foraging 'hot-spots' or if they segregate their foraging activities. Consistency of individuals in their foraging behaviour (e.g. to visit specific areas or show preferences for specific environmental conditions) were also investigated. In addition, stable isotopes were used to explore the dietary overlap between the three seabird species using isotopic niche parameterisation and estimates of resource use through mixing models.

Preliminary results suggest a strong overlap of the foraging locations of all three species at the population level throughout the entire breeding season. Similarly, stable isotope values reflecting the birds' diet during pre-laying, incubation and chick-rearing show a strong overlap among species.