Foraging ecology of short-tailed shearwater in the Southern Ocean

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Krill are key prey species in the Southern Ocean. Recent studies, however, indicate myctophids can be alternative (Murphy et al. 2007). Short-tailed shearwater *Puffinus tenuirostris* (STSH) employ a dual foraging strategy involving short trips around breeding site and long trips to the Southern Ocean (Weimerskirch and Cherel 1998). Fatty acid composition of stomach oil showed STSH feed myctophids during long trip (Connan et al. 2005). To know the large-scale distribution and understand the trophic importance of myctphids, we aimed to know feeding area of individual STSH using GPS logger and specified their prey species using fatty acid signature of stomach oils collected from these individuals.

We conducted a survey on Wedge Island in Tasmania, Australia from Jan 29 to Feb 15 2019. We attached GPS logger (Gipsy-Remote) to 27 chick rearing birds. Among them 3 birds came back from long trip and 2 oil samples were collected from chicks of these 3 birds during our stay. After we left the island, the base station was retrieved on May 20 which give tracking data from Jan 19 to May 10 2019. Finally, we sampled 14 long trips from 12 birds and 45 short trips from 25 birds.

During long trips, we assumed that the critical speed separating flying from landing was 7m/s; under this speed birds were assumed to be landing. We defined areas within 95% kernel density of "landing position" as "maximum-use areas" and those within 50% kernel density as "core-use areas" using long trip data. We recognized 4 maximum-use areas and 2 core-use areas (Figure 1). One core-use area was in 160°E 67°S around Balleny Islands ("core-2") and the other was in 120°E 57°S ("core-3"). We analyzed STSH daily behavior, landing rate from position status (landing or flying) in each area.

Most birds went almost straight towards core-2 area. In area around Balleny Islands, density of Antarctic krill is high (Atkinson et al. 2017). STSH is expected to feed on Antarctic krill presumably in marginal ice zone, though there has been no evidence showing that STSH feed on Antarctic krill yet. Core-3 area was used by some trips and may also be an important foraging area. STSH might feed on myctophids in this area because Antarctic krill density is low, while myctophids are available around 60°S at least (Moteki et al. 2017). Landing rate in core-2 was comparatively low in both daytime and nighttime, while that in core-3 was high, especially in the nighttime: indicating the difference in the diurnal pattern of food availability. Diel vertical migration of myctophids has been confirmed at 60°S～64°S area (Moteki et al. 2017) and therefore STSH possibly feed myctophids going up to the depth STSH can dive at night in core-3.

After analyzing fatty acid composition of stomach oil, we will compare specified prey species with tracking data for each bird.

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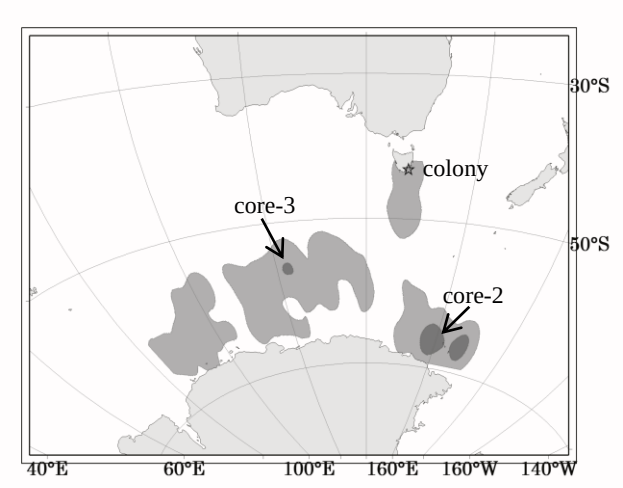

Figure 1. Kernel density distribution of STSH during long trip. Light gray shows maximum-use areas and dark gray shows core-use areas.

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