Prey-field use by a Southern Ocean top predator: enhanced understanding using integrated datasets
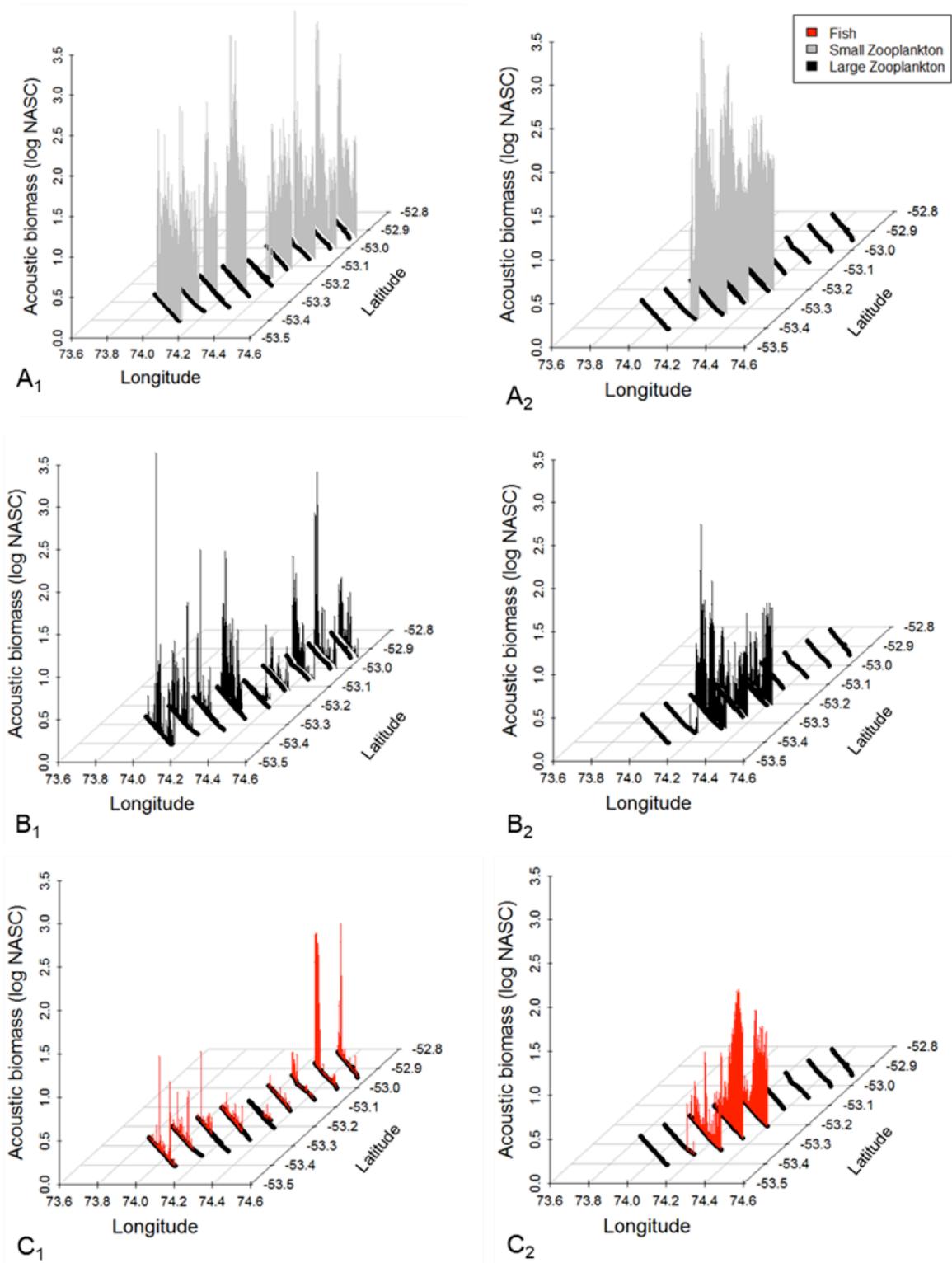
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Supplement.

Figure S1. Log-transformed acoustic biomass (NASC) of small zooplankton (A), large zooplankton (B) and fish (C) in the top 100 m of the water column as a function of transect location for transects conducted during the day (1) and at night (2).

Table S1. Required energy intake for adult macaroni penguins (values adjusted to three significant figures). ADMR = average daily metabolic rate (see 'Methods: Energetics' in the main paper for references).

		Location	ADMR (kJ/d)	Time spent at location (%)	Energy required at location (kJ/d)
GUARD STAGE	**Female**	on shore	2070	35	720
		at sea	3010	65	1960
		TOTAL			**2680**
	Male	FASTING	1480	100	1480
CRÈCHE STAGE	**Female**	on shore	2150	55	1180
		at sea	3060	45	1380
		TOTAL			**2560**
	Male	on shore	2480	50	1240
		at sea	3530	50	1770
		FROM GUARD	1480	100	960*
		TOTAL			**3970**

*Assumes that the energy used during fasting by male penguins in the guard stage (24 days) is replenished during the crèche stage (37 days).

Table S2. Estimated prey consumption for Heard Island macaroni penguins during the guard and crèche stages (values adjusted to three significant figures); Capsize Beach colony (50 000 breeding pairs; Deagle et al. 2008) and the whole island (1 million breeding pairs; Woehler & Green 1992, Woehler 2006). Required prey consumption with figures for zooplankton and fish derived from diet proportions are detailed in Table 4 in the main paper (here, zooplankton comprises krill and amphipods). Available prey biomasses are determined from densities reported in Pruvost et al. (2005) for the Kerguelen Plateau region and applied for the area of the 2D kernel densities shown in Figure 3 in the main paper (for densities greater than 0.8; see 'Methods: Impacts on prey' in the main paper).

		Required prey consumption (tonnes)	Available biomass (tonnes)	% Consumed assuming no replenishment
GUARD STAGE for colony	Zooplankton	960	58100	1.70
	Fish	190	13200	1.40
CRÈCHE STAGE for colony	Zooplankton	2440	104000	2.40
	Fish	1230	23700	5.20
GUARD STAGE for whole island	Zooplankton	19200	58100	33.00
	Fish	3750	13200	28.00
CRÈCHE STAGE for whole island	Zooplankton	48800	86200	57.00
	Fish	24600	20100	122.00

Pruvost P, Duhamel G, Palomares M (2005) An ecosystem model of the Kerguelen Islands' EEZ. In: Palomares M, Pruvost P, Pitcher T, Pauly D (eds) Modeling Antarctic marine ecosystems. Fisheries Centre Research Reports 13(7). Fisheries Centre, University of British Columbia, Vancouver, p 40–64