Limited sexual segregation in depth use by southern elephant seals from Marion Island

T. McIntyre¹, I.J. Ansorge², M.N. Bester³, H. Bornemann³, J. Plötz³ and C.A. Tosh³

1. Mammal Research Institute, Department of Zoology and Entomology, University of Pretoria, Pretoria, 0002, South Africa.
2. Department of Oceanography, Marine Research Institute, University of Cape Town, Rondebosch, Cape Town, 7700, South Africa.
3. Alfred Wegener Institute for Polar and Marine Research, Postfach 120161, D-27515, Bremerhaven, Germany.

Background and Research Questions

- Spatial foraging segregation has been documented in various pinnipeds, including Antarctic fur seals, New Zealand fur seals, grey seals, northern elephant seals and southern elephant seals from Macquarie Island and South America.
- Segregation in seals is likely driven by forage selection, predator avoidance, activity budgets and/or social affinity (Staniland & Robinson 2008).
- General positive relationship between sexual size dimorphism and spatial segregation (Mysterud 2000).

(1) Is there a difference in dive depths obtained between male and female southern elephant seals from Marion Island?

(2) Do male southern elephant seals from Marion Island utilise different water depths, when compared to females (i.e. the depths where they spend most time)?

Methods

- Fifty-five satellite-relay data loggers (SMRU) deployed between 2004 and 2008 on southern elephant seals hauled out on Marion Island. Forty-eight tracks provided useful dive data (track duration ranged between 27 and 345 days);
- Only dive data obtained from adult and sub-adult animals (no juveniles) were used for this investigation;
- After removing incomplete profiles, we used 182 882 dive profiles for analyses;
- Dive profiles were binned in order to obtain actual time estimates spent by each animal in various depth categories (method described in McIntyre et al. in prep.).

Results

- Male elephant seals dived deeper on average than females (mean maximum depth of 565.3 ± 292 m vs. 459.3 ± 176.5 m; T = 73.6; df = 63651; p < 0.0001);
- Males occasionally performed benthic dives, up to depths of approximately 2000 m, while females performed almost exclusively pelagic dives (Figure 2);
- Females spent more time in water depths between 200 m and 500 m, while males spent more time in depths between 600 m and 1250 m (Table 1 and Figure 3);
- Substantial overlap exists between the sexes in the number of dives to depths in the region of 500 m, and also in the percentages of time spent by individuals between 500 m and 600 m.

Discussion

- Some segregation exists between sexes of southern elephant seals in the depth use patterns displayed by animals of either sex. Males tend to utilise deeper water depths more than females;
- Segregation between the sexes is not as extreme as was predicted, based on the extreme sexual dimorphism displayed by this species;
- We therefore suggest that the segregation in depth use exhibited in this species is a by-product of greater physical ability and physiological capabilities of males, and is not driven by forage selection, predator avoidance, activity budgets or social affinity.

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References