
Maternal traits and breeding success in the perspective of climate change: is the future of the Antarctic fur seal (*Arctocephalus gazella*) getting darker?

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Abstract

In response to climate warming, a southward shift in productive frontal systems serving as the main foraging sites for many top predator species is likely to occur in the Subantarctic areas. Central place foragers, as seabirds and pinnipeds, are thus likely to cope with an increase in the distance between foraging locations and their land-based breeding colonies. Understanding how central place foragers should modify their foraging behavior in response to changes in prey accessibility appears crucial. A spatially explicit individual-based simulation model, including bio-energetic components, was built to evaluate effects of possible changes in prey resources accessibility on individual performances and breeding success. The study was calibrated on a particular example: the Antarctic fur seal (*Arctocephalus gazella*) which alternate between oceanic areas in which females feed and the land-based colony in which they suckle their young over the 120 days rearing period. Our model showed the importance of the distance covered to feed and prey aggregation which appeared to be key factors to which animals are highly sensitive. Memorization and learning abilities also appeared to be essential breeding success traits. Females were found to be most successful for intermediate levels of prey aggregation and small distance to the resource, resulting in optimal female body length. We can thus fear that increased distances to resources due to climate warming should hinder pups’ growth resulting into smaller and smaller animals in the course of successive generations.

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