

Are foraging areas of Adélie penguins affected by neighboring colonies?

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Intra-specific competition would be an important factor affecting the foraging behavior of animals. Central place foragers, such as breeding seabirds, may face intense intra-specific competition for food near their colonies, especially when the foraging areas of multiple colonies overlap each other. Previous seabird studies suggested that neighboring colonies segregated their foraging areas but often lacked the appropriate ‘null model’ to examine the effect of neighboring colonies. Here, we examined the foraging areas of Adélie penguins *Pygoscelis adeliae* from two neighboring colonies by using bird-borne GPS loggers. The field study was conducted at Hukuro cove (104 nests) and Mizukuguri cove (338 nests) colonies, which located 2 km apart in Lützow-Holm Bay, east Antarctica. We obtained the GPS tracks of 504 foraging trips from 47 chick-rearing penguins, and then evaluated the overlap in the core and peripheral foraging areas (50% and 95% kernel densities) between two colonies. Then we also produced simulated movement tracks assuming no inter-colony competition by using correlated random walk and evaluated the overlap in the simulated foraging areas. Finally, we compared the degree of overlap in the foraging areas from real tracks with that from simulated tracks to examine the effect of neighboring colonies on penguins’ movement. The results indicate that the degree of overlap was significantly smaller in real tracks than in simulated tracks. We suggest that penguins from two neighboring colonies segregated their foraging areas and that the larger Mizukuguri cove colony appeared to affect the foraging area of the smaller Hukuro cove colony.