



Cracks in the ice: Significant chick loss at historic Cape Crozier Emperor Colony

Annie Schmidt, aschmidt@pointblue.org

Emperor penguins (*Aptenodytes forsteri*) breed only in Antarctica and depend on stable fast ice (i.e., frozen ocean that is anchored to land or ice shelves) to successfully raise their chicks. As the climate warms, the amount and thickness of sea ice is expected to decrease, putting many emperor penguin colonies at risk. However, model predictions indicate that more southerly habitats should remain suitable for much longer, perhaps giving the species time to adapt.

The emperor penguin colony at Cape Crozier is the first known breeding location for the species, and was first discovered in 1902. Only one emperor penguin colony is located further south and it is one of only a few colonies that are regularly monitored. In this study, we observed the emperor colony every year beginning in 1996, with formal counts of chicks conducted annually since 2001, extending a long-term time series begun by other researchers in 1960.

At a time when sea ice extent and concentration are in steep decline in many sectors of the polar ocean, the importance of monitoring the status of ice-obligate species is heightened.

The colony has been steadily increasing over the past decade and the number of chicks at the colony in December 2018 was the highest ever recorded. The reasons for the positive population trend are not known, but it is potentially related to an increase in the amount of available fast ice at Cape Crozier, contrasting with other Emperor penguin breeding locations.

Just a few days after the 2018 count was conducted, a high wind event caused the fast ice that the colony was located on to break up and resulted in nearly half of the chicks drifting out to sea. The breakup occurred almost 20 days earlier than the average date of chick departure.

This may have been a one-time event, but it is concerning as it could indicate that the impacts of rising global temperatures have already reached the southern limit of the emperor penguin's range. High winds at Cape Crozier during the critical early December pre-fledging period have been increasing over the past couple decades and 2018 offered a glimpse of a scenario that is likely to occur more often, and at more colonies, as global temperatures continue to rise.

Main Points

The Cape Crozier emperor penguin colony, historically notable and one of the southernmost colonies, has been growing rapidly in recent years

In the 2018 breeding season, strong winds and early fast ice breakup resulted in unusually high chick loss

Monitoring the status of ice-dependent species like the emperor penguin is increasingly important as this kind of early breakup event may become more common with climate change

Annie E. Schmidt, Grant Ballard. 2020. [Significant chick loss after early fast ice breakup at a high-latitude emperor penguin colony](#). Antarctic Science. 10.1017/S0954102020000048