Agreement on the Conservation of Albatrosses and Petrels

Seventh Meeting of the Population and Conservation Status Working Group

Edinburgh, United Kingdom, 18 - 19 May 2023

Local-scale impacts of extreme events drive demographic asynchrony in neighbouring top predator populations

Francesco Ventura, Andrew Stanworth, Sarah Crofts, Amanda Kuepfer, and Paulo Catry

A **password is required** to view the full text document

Ventura F, Stanworth A, Crofts S, Kuepfer A, Catry P. 2023. Local-scale impacts of extreme events drive demographic asynchrony in neighbouring top predator populations. *Biology Letters* **19**: 20220408. https://doi.org/10.1098/rsbl.2022.0408

SUMMARY

Extreme weather events are among the most critical aspects of climate change, but our understanding of their impacts on biological populations remains limited. Here, we exploit the rare opportunity provided by the availability of concurrent longitudinal demographic data on two neighbouring marine top predator populations (the black-browed albatross, *Thalassarche melanophris*, breeding in two nearby colonies) hit by an exceptionally violent storm during one study year. The aim of this study is to quantify the demographic impacts of extreme events on albatrosses and test the hypothesis that extreme events would synchronously decrease survival rates of neighbouring populations. Using demographic modelling we found that, contrary to our expectation, the storm affected the survival of albatrosses from only one of the two colonies, more than doubling the annual mortality rate compared to the study average. Furthermore, the effects of storms on adult survival would lead to substantial population declines (up to 2% per year) under simulated scenarios of increased storm frequencies. We, therefore, conclude that extreme events can result in very different local-scale impacts on sympatric populations. Crucially, by driving demographic asynchrony, extreme events can hamper our understanding of the demographic responses of wild populations to mean, long-term shifts in climate.