Breeding of seabirds insensitive to shifting ocean temperatures

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**An Information Paper submitted by Portugal, Canada, New Zealand, South Africa and the United Kingdom**

***Summary***

Current climate change may alter the timing of breeding of species at different rates, resulting in a temporal mismatch between the needs of predators and the abundance of their prey. This paper provides scientific evidence that seabirds worldwide, including data from species from the Antarctic, have not adjusted their breeding seasons over time or in response to rising sea surface temperature. If climate change results in altered timing of prey availability during a key point in the season, many seabird species may struggle to feed their young. This information is relevant to effective conservation and management of the Antarctic fauna and important in monitoring Antarctic seabirds within the Antarctic Treaty Area.

***Introduction***

Seabirds of the Southern Ocean are amongst the most threatened birds in the world. Scientific information about their status is much needed with climate change being one of their biggest threats.

Under such context, the Committee for Environmental Protection (CEP) called for additional climate change research and monitoring to improve the basis for decision making, prioritizing the work of the Subsidiary Group on Climate Change Response (SGCCR) in particular the continued progress on the Climate Change Response Works Programme (CCRWP) (Resolution 4 (2015) (ATCM XLII Final Report, agenda item 7, Paragraph 48). Such work will be relevant in cooperation with other bodies, such as the Scientific Committee on Antarctic Research (SCAR), the Agreement for the Conservation of Albatrosses and Petrels (ACAP) and the Commission for the Conservation of Antarctic Living Resources (CCAMLR).

In this paper, a comprehensive meta-analysis of breeding populations of seabirds worldwide, (including the following species from Antarctica: Antarctic skua (*Catharacta maccormicki)*, Cape petrel (*Daption capense)*, Southern fulmar (*Fulmarus glacialoides)*, Wilson´s storm petrel (*Oceanites oceanicus)*, Snow petrel (*Pagodroma nivea)*, Adélie penguin (*Pygoscelis adeliae)*, Chinstrap penguin (*Pygoscelis antarctica)* and Gentoo penguin (*Pygoscelis papua*)), was used to assess the relationships between breeding periods of seabirds and sea surface temperature (Figure 1) (Keogan et al. 2018).

*Mapa

Descripción generada automáticamente*

Figure 1: The data from the Antarctic populations in this study comprises 41 times series from 8 seabird species across 9 locations, collected between 1952 and 2015. The numbers beside the colony names in this figure correspond to the species as follows: 1) Antarctic skua (*Catharacta maccormicki*), 2) Cape petrel (*Daption capense*), 3) Southern fulmar (*Fulmarus glacialoides*), 4) Wilson´s storm petrel (*Oceanites oceanicus*), 5) Snow petrel (*Pagodroma nivea*), 6) Adélie penguin (*Pygoscelis adeliae*), 7) Chinstrap penguin (*Pygoscelis antarctica*), 8) Gentoo penguin (*Pygoscelis papua*).

***Conclusions***

Data from 145 breeding populations of seabirds worldwide, collected between 1952 and 2015, show that on average, seabird populations worldwide have not adjusted their breeding seasons over time or in response to change in sea surface temperature (Keogan et al., 2018). With such a lack of a trend over time, the results suggest that if lower trophic levels are shifting in parallel with changing temperature, seabirds, in general, may be at risk from increasing levels of trophic mismatch (Keogan et al., 2018). In relation to Antarctic seabirds, models predict that (1) the timing of breeding of Antarctic seabirds will be later in higher latitudes due to stronger photoperiodic cues in high latitudes and, (2) temperature trends will be more negative in high latitudes because polar systems are experiencing warming faster than other areas in the planet. This limited plasticity of reproductive timing in seabirds potentially makes these top predators highly vulnerable to future mismatch with lower-trophic-level resources (Keogan et al., 2018). Monitoring of timing and abundance of prey availability is critically needed for Antarctic seabird populations.

Overall, these results provide evidence of the insensitivity of the timing of breeding of seabirds, including Antarctic seabirds, and reinforces the need to monitor Antarctic seabird populations and their interactions with prey species relevant to inform management actions.

***Reference***

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