

# Antarctic penguin colony repeatedly decimated by volcanic eruptions

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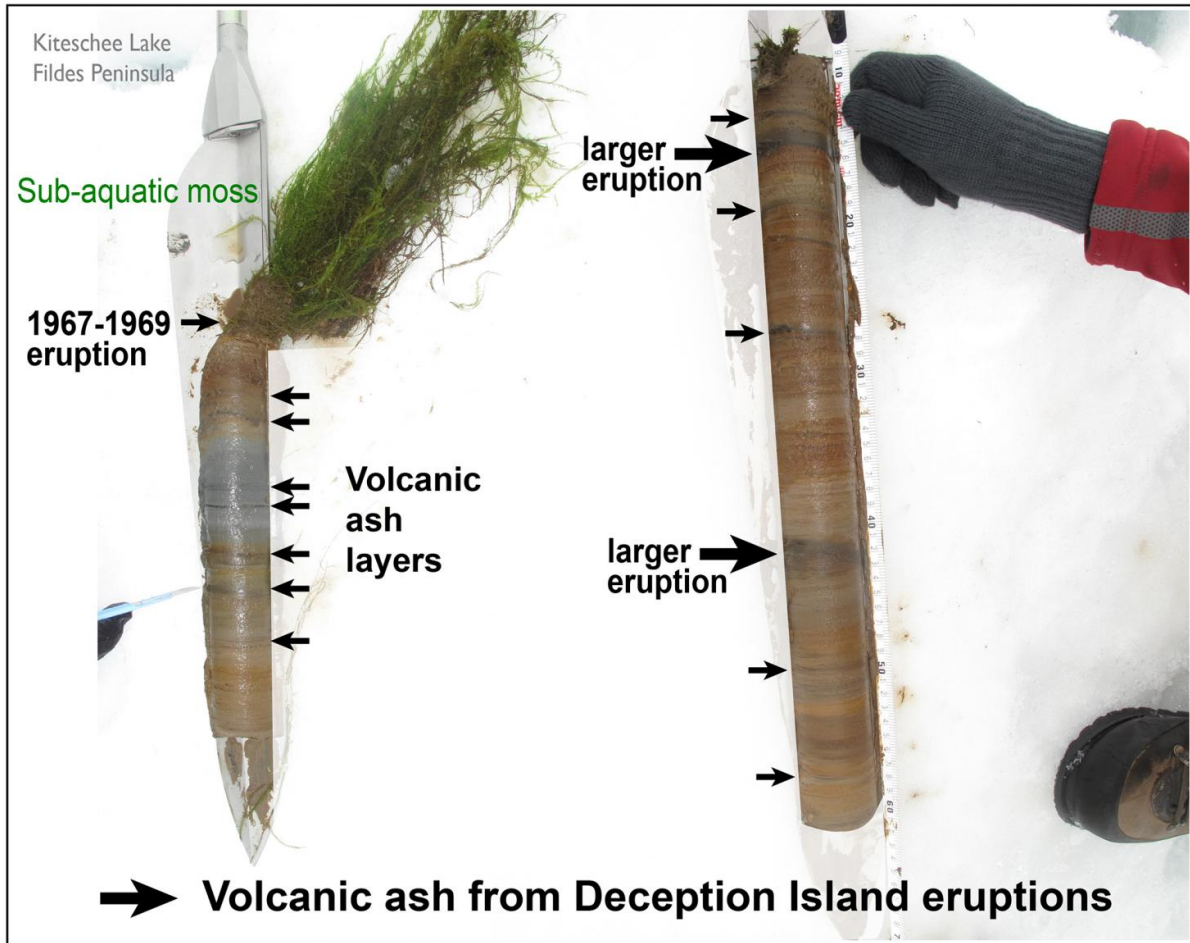
Gentoo penguins climbing slopes to the nesting colony on Ardley Island. Credit: Stephen Roberts

One of the largest colonies of gentoo penguins in Antarctica was decimated by volcanic eruptions several times during the last 7,000 years

according to a new study. An international team of researchers, led by British Antarctic Survey (BAS), studied ancient penguin guano and found the colony came close to extinction several times due to ash fall from the nearby Deception Island volcano. Their results are published this week in *Nature Communications*.

Ardley Island, near the Antarctic Peninsula, is currently home to a population of around 5,000 pairs of gentoo penguins. Using new chemical analyses of penguin guano extracted in sediment cores from a lake on the island, the researchers unraveled the history of the penguin colony. Climate conditions around Ardley Island have been generally favourable for penguins over the last 7,000 years and the team had expected the local population to show minor fluctuations in response to changes in climate or sea ice. The surprising result was that the nearby Deception Island volcano had a far greater impact than originally anticipated.

Lead author Dr Steve Roberts from BAS says: "When we first examined the [sediment cores](#) we were struck by the intense smell of the guano in some layers and we could also clearly see the volcanic ash layers from nearby Deception Island. By measuring the sediment chemistry, we were able to estimate the population numbers throughout the period and see how penguins were affected by the eruptions. On at least three occasions during the past 7,000 years, the penguin population was similar in magnitude to today, but was almost completely wiped out locally after each of three large [volcanic eruptions](#). It took, on average, between 400 and 800 years for it to re-establish itself sustainably."



Volcanic ash layers in lake sediment cores extracted from Kiteschee Lake on Fildes Peninsula. The ash layers shown are associated with comparatively small eruptions from Deception Island in the last c. 2000-3000 years. The largest eruptions preserved in our lake sediment records from Fildes Peninsula and Ardley Island occurred at c. 7,000 years ago and c. 5,500-4,500 years ago and deposited over a metre of airfall and reworked ash in some lake sediment cores. Credit: Stephen Roberts and Emma Pearson.

Dr Claire Waluda, penguin ecologist from BAS says: "This study reveals the severe impact volcanic eruptions can have on penguins, and just how difficult it can be for a colony to fully recover. An eruption can bury

penguin chicks in abrasive and toxic ash, and whilst the adults can swim away, the chicks may be too young to survive in the freezing waters. Suitable nesting sites can also be buried, and may remain uninhabitable for hundreds of years."

The techniques developed in this study will help scientists to reconstruct past changes in colony size and potentially predict how other penguin populations may be affected elsewhere. For example, the chinstrap penguins on Zavodovski Island, which were disturbed by eruptions from the Mt Curry volcano in 2016.

Waluda continues: "Changes in [penguin populations](#) on the Antarctic Peninsula have been linked to climate variability and sea-ice changes, but the potentially devastating long-term impact of volcanic activity has not previously been considered."

**More information:** Past penguin colony responses to explosive volcanism on the Antarctic Peninsula, *Nature Communications* (2017). [nature.com/articles/doi:10.1038/ncomms14914](https://doi.org/10.1038/ncomms14914)

Provided by British Antarctic Survey

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