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| **A BRIEF SUMMARY OF SCIENTIFIC HIGHLIGHTS:** | | | | | | |
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| *See the following pages* | | | | | | |

***Sierakowski K., Korczak-Abshire M., Jadwiszczak P. 2017. Changes in bird communities of Admiralty Bay, King George Island (West Antarctic): insights from monitoring data (1977–1996). Polish Polar Research 38: 231–262.***

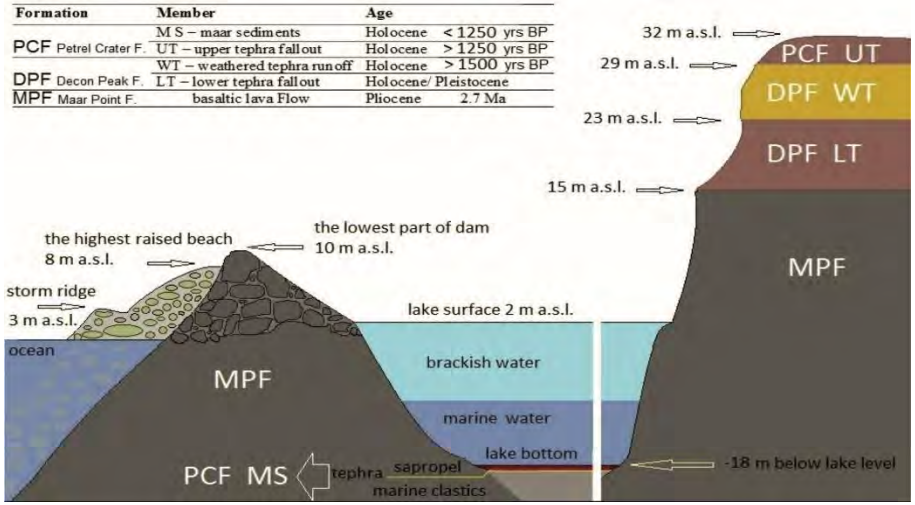
Seabirds and their response to the climate perturbations have been recorded as important bioindicators of changes in the Antarctic ecosystem. Collecting extensive data on track the breeding and population dynamics is important for seabird conservation and management.

Colony of Adélie penguins in Admiralty Bay, King Geogre Island.

An effort to analyze the complex historical ornithological field data were taken. The reported data represent an unique reference basis and provide valuable information about indicator species, suitable for comparison with contemporary observations of bird populations in the Antarctic Peninsula region, a place of rapidly occurring climate changes and intensive harvesting of marine living resources. The paper summarizes results of twenty years of seabird observations carried out between 1977 and 1996 on the western shore of Admiralty Bay (King George Island, South Shetlands, maritime Antarctic). Changes in population size, distribution and phenology of the breeding species as well as the appearance of non-breeding species are reported. A total of 34 species of birds were observed, including 13 breeding species. Among the non-breeding species, four were observed to visit the site regularly, six rarely, and the remaining eleven were observed only occasionally. Among breeding populations, three Pygoscelis penguin species, the main krill consumers, were most numerous. In 1978, together 33,961 breeding pairs were recorded. The Adélie penguin (*P. adeliae*) dominated among the penguins, two other penguin species chinstrap penguin (*P. antarcticus*) and gentoo penguin (*P. papua*) were less abundant. During the following two decades, breeding populations of Pygoscelid species experienced a declining trend and their numbers were reduced by 68% for chinstrap, 67% for gentoo, and 34% for Adélie penguins. Detailed spatial and geographic distribution of penguin nesting areas in particular years were presented. This impressive data collection easily can serve to enrich the open access databases, like the Mapping Application for Penguin Populations and Projected Dynamics (MAPPPD). Those useful tool provides free and ready access to the population counts and modelled data, and can act as a facilitator for data transfer between scientists and Antarctic stakeholders to help inform management decisions for the continent.

***Wasiłowska A., Tatur A., Pushina Z., Barczuk A., Verkulich S. 2017. Impact of the 'Little Ice Age' climate cooling on the maar lake ecosystem affected by penguins: A lacustrine sediment record, Penguin Island, West Antarctica. The Holocene 27: 1115–1131.***

A Pliocene-age volcano on Penguin Island near King George Island became active again in the Pleistocene/Holocene, forming the main cone of the island – Deacon Peak, and leaving with delay late-Holocene phreatomagmatic craters, including 'Petrel Crater', ~200 m in diameter, filled by a maar lake. Environmental, geochemical and biotic proxies of petrographic, geochemical, photosynthetic pigment, and diatom data from the 72-cm-long sediment core reveal that the crater was initially a marine lagoon with typical phytoplankton assemblages. Most probably, tectonic–volcanic activity about 1250 years ago, documented in tephra fallout, triggered an abrupt glacio-isostatic uplift that separated the lake from the sea. The horizon of tephra fallout, probably from the Deception Island volcano (distant ~200 km in the south-west direction), marks a sudden change in environment from brackish to lacustrine. The ecological evolution of the Petrel Crater lake was initially constrained by an uplift, whereas the influence of marine water vanished with time, the lake became meromictic, and the freshwater mixolimnion layer expanded, while the monimolimnion became anoxic due to the influence of a penguin rookery situated on the shore. During the 'Little Ice Age' (LIA), the maar may have been covered by permanent ice. A discharge of mineralized guano from the possibly enlarged penguin rookery on the lake shore caused an expansion of the anoxic monimolimnion to the ice surface and an important reduction of autochthonous lacustrine biota of the maar, whereas a substantially increased participation of biota passively supplied with guano. That record in the lake sediment core reaffirms the occurrence of a regional LIA event in the maritime Antarctic.

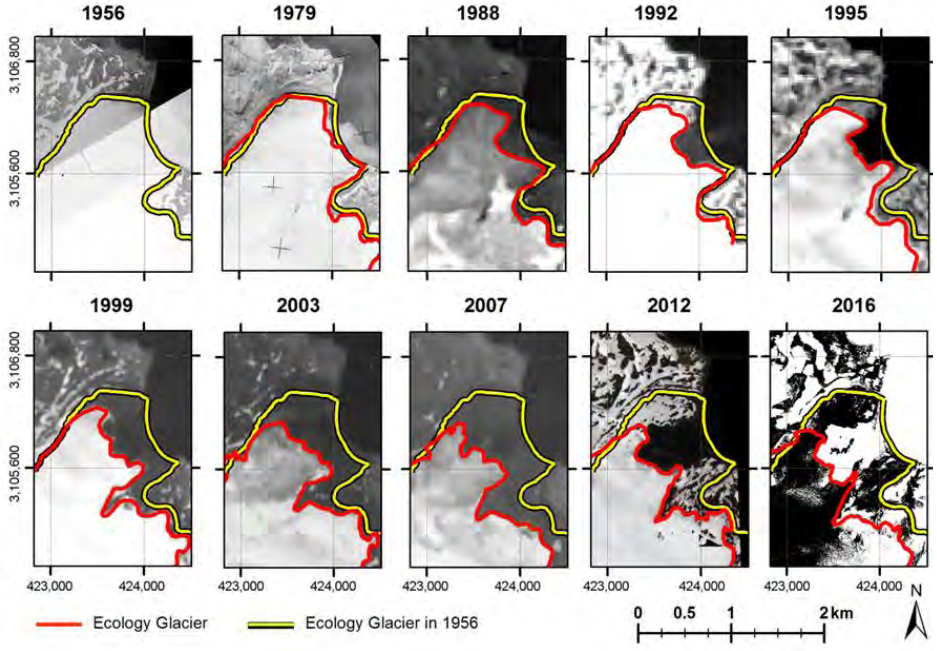


Stratigraphy of the Peguin Island volcano, South Shetland Islands.

The proposed evolution of maar on Penguin Island, reconstructed based on abiotic and biotic proxies seems to fit well regional and global climatic scenarios. Information delivered with diversified proxies help to understand deeper the nature of ecological changes with climate fluctuations, although diverse data from different fields of science make conclusions more subjective that in case of more simplified deduction.

***Pętlicki M., Sziło J., MacDonell S., Vivero S., Bialik R.J. 2017. Recent deceleration of the ice elevation change of Ecology Glacier (King George Island, Antarctica). Remote Sensing 9: 520.***

Glacier change studies in the Antarctic Peninsula region, despite their importance for global sea level rise, are commonly restricted to the investigation of frontal position changes. In order to overcome this deficiency, long-term (37 years; 1979–2016) study of ice elevation changes of the Ecology Glacier (King George Island) were calculated using a combination of archival cartographic material, field measurements of proglacial lagoon hydrography, and state-of-art geodetic surveying of the glacier surface.




The Ecology glacier covers an area of 5.21 km$^2$ and is located close to the *H. Arctowski* Polish Antarctic Station, and therefore has been an object of various multidisciplinary studies with subject ranging from glaciology, meteorology to glacial microbiology. Overall ice mass loss was largest in the beginning of 2000s, and the rate of elevation change substantially decreased between 2012 and 2016. Ice elevation change rate for the common ablation area over all analyzed periods (1979–2001–2012–2016) has decreased from −1.7 ± 0.4 m/year in 1979–2001 and −1.5 ± 0.5 m/year in 2001–2012 to −0.5 ± 0.6 m/year in 2012–2016. This reduction of ice mass loss is likely related to decreasing summer temperatures in this region of the Antarctic Peninsula.

Ecology Glacier front positions in 1956–2016 period derived from aerial (1956–1979) and satellite imagery (1988–2012) and TLS (2016). Reference system: WGS 1984, UTM zone 21S, geoid EGM96.

**PUBLICATION LIST FOR 2017**

**Life sciences**

Ecology of Antarctic and sub-Antarctic terrestrial habitats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**Physical Sciences**

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23. Pasik M., Kowalska M., Łapiński S., Rajner M., Bakuła K. 2017. Large-scale map and 3D modelling of the Henryk Arctowski Polish Antarctic Station. *Polar Record* 53: 280–288.
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27. Szymczak E. 2017. Particle size characteristics of fluvial suspended sediment in proglacial streams, King George Island, South Shetland Islands. *IOP Conf. Series: Earth and Environmental Science* 95: 022015.