

MEMBER COUNTRY: POLAND						
National Report to SCAR for year 2018						
Activity	Contact Name	Address	Telephone	Fax	Email	web site
National SCAR Committee						
President	Jacek Jania	University of Silesia, Department of Karst Geomorphology, 60 Będzińska st. 41-200 Sosnowiec, Poland	(48 32) 291 72 01	(48 32) 291 58 65	jjania@cto.us.edu.pl	www.wnoz.us.edu.pl
SCAR Delegates						
Delegate	Wojciech Majewski	Institute of Paleobiology, Polish Academy of Sciences, 51/55 Twarda st., 00-818 Warszawa, Poland	(48 22) 697 88 53	(48 22) 620 62 25	wmaj@twarda.pan.pl	www.paleo.pan.pl
Alternate Delegate	Robert Bialik	Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Department of Antarctic Biology, Pawinskiego 5a, 02-106 Warszawa, Poland	(48 22) 659 57 96	(48 22) 592 21 90	rbialik@ibb.waw.pl	www.arctowski.aq
Standing Scientific Groups						
Life Sciences						
	Katarzyna Chwedorzewska	Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Department of Antarctic Biology, Pawinskiego 5a, 02-106 Warszawa, Poland	(48 22) 659 57 94	(48 22) 592 21 90	kchwedorzewska@go2.pl	www.arctowski.aq
	Piotr Kukliński	Institute of Oceanology, Polish Academy of Sciences, 55 Powstańców Warszawy st., 81-967 Sopot, Poland	(48 58) 731 17 76	(48 58) 551 21 30	kuki@iopan.gda.pl	www.iopan.gda.pl

	Maria Olech	Jagiellonian University, Department of Polar Studies and Documentation, Institute of Botany, 27 Kopernika st., 31-501 Kraków, Poland	(48 12) 421 02 77 ext. 26	(48 12) 423 09 49	olech@ib.uj.edu.pl	
	Jacek Siciński	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 42 92	(48 42) 635 44 40	sicinski@biol.uni.lodz.pl	www.invertebrates.u ni.lodz.pl/en/
Geosciences						
	Marek Lewandowski	Institute of Geophysics, Polish Academy of Sciences, 64 Księcia Janusza st., 01-452 Warszawa, Poland	(48 22) 691 57 64	(48 22) 691 59 15	lemar@igf.edu.pl	www.igf.edu.pl
	Wojciech Majewski	Institute of Paleobiology, Polish Academy of Sciences, 51/55 Twarda st., 00-818 Warszawa, Poland	(48 22) 697 88 53	(48 22) 620 62 25	wmaj@twarda.pan.pl	www.paleo.pan.pl
Physical Sciences						
	Robert Bialik	Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Department of Antarctic Biology, Pawinskiego 5a, 02-106 Warszawa, Poland	(48 22) 659 57 96	(48 22) 592 21 90	rbialik@ibb.waw.pl	www.arctowski.aq
Activity	Contact Name	Address	Telephone	Fax	Email	web site
Scientific Research Program						
PAIS						
	Andrzej Gaździcki	Institute of Paleobiology, Polish Academy of Sciences, 51/55 Twarda st., 00-818 Warszawa, Poland	(48 22) 697 87 96	(48 22) 620 62 25	gazdzick@twarda.pan.pl	www.paleo.pan.pl

	Andrzej Tatur	Warsaw University, Faculty of Geology, Department for Protection of Environment and Natural Resources, Żwirki i Wigury 93, 02-089 Warszawa, Poland	(48) 660 92 85 01		tatura@interia.pl	
	Wojciech Majewski	Institute of Paleobiology, Polish Academy of Sciences, 51/55 Twarda st., 00-818 Warszawa, Poland	(48 22) 697 88 53	(48 22) 620 62 25	wmaj@twarda.pan.pl	www.paleo.pan.pl
AnT-ERA						
	Jacek Siciński	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 42 92	(48 42) 635 44 40	sicinski@biol.uni.lodz.pl	www.invertebrates.uni.lodz.pl/en/
	Krzysztof Jazdzewski	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 44 45	(48 42) 635 44 40	kryjaz@biol.uni.lodz.pl	www.invertebrates.uni.lodz.pl/en/
	Krzysztof Pabis	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 42 93	(48 42) 635 44 40	cataclysta@wp.pl	www.invertebrates.uni.lodz.pl/en/
	Magda Błazewicz	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 42 97	(48 42) 635 44 40	magdalena.blazewicz@biol.uni.lodz.pl	www.invertebrates.uni.lodz.pl/en/
	Anna Jazdzewska	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 44 42	(48 42) 635 44 40	ajazdz@biol.uni.lodz.pl	www.invertebrates.uni.lodz.pl/en/

	Katarzyna Chwedorzewska	Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Department of Antarctic Biology, Pawinskiego 5a, 02-106 Warszawa, Poland	(48 22) 659 57 94	(48 22) 592 21 90	kchwedorzewska@go2.pl	www.arctowski.aq
	Małgorzata Korczak-Abshire	Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Department of Antarctic Biology, Pawinskiego 5a, 02-106 Warszawa, Poland	(48 22) 659 57 94	(48 22) 592 21 90	korczakm@gmail.com	www.arctowski.pl
AnT-Eco						
	Jacek Siciński	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 42 92	(48 42) 635 44 40	sicinski@biol.uni.lodz.pl	www.invertebrates.uni.lodz.pl/en/
	Krzysztof Jazdzewski	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 44 45	(48 42) 635 44 40	kryjaz@biol.uni.lodz.pl	www.invertebrates.uni.lodz.pl/en/
	Krzysztof Pabis	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 42 93	(48 42) 635 44 40	cataclysta@wp.pl	www.invertebrates.uni.lodz.pl/en/
	Magda Błazewicz	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 42 97	(48 42) 635 44 40	magdalena.blazewicz@biol.uni.lodz.pl	www.invertebrates.uni.lodz.pl/en/
	Anna Jazdzewska	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 44 42	(48 42) 635 44 40	ajazdz@biol.uni.lodz.pl	www.invertebrates.uni.lodz.pl/en/

	Katarzyna Chwedorzewska	Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Department of Antarctic Biology, Pawinskiego 5a, 02-106 Warszawa, Poland	(48 22) 659 57 95	(48 22) 592 21 90	kchwedorzewska@go2.pl	www.arctowski.aq
	Małgorzata Korczak-Abshire	Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Department of Antarctic Biology, Pawinskiego 5a, 02-106 Warszawa, Poland	(48 22) 659 57 94	(48 22) 592 21 90	mka@ibb.waw.pl	www.arctowski.aq
	Wojciech Majewski	Institute of Paleobiology, Polish Academy of Sciences, 51/55 Twarda st., 00-818 Warszawa, Poland	(48 22) 697 88 53	(48 22) 620 62 25	wmaj@twarda.pan.pl	www.paleo.pan.pl
EXPERT GROUPS						
Geological heritage and Geoconservation	Robert Bialik	Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Department of Antarctic Biology, Pawinskiego 5a, 02-106 Warszawa, Poland	(48 22) 659 57 96	(48 22) 592 21 90	rbialik@ibb.waw.pl	www.ibb.waw.pl
SOOS	Piotr Kukliński	Institute of Oceanology, Polish Academy of Sciences, 55 Powstańców Warszawy st., 81-967 Sopot, Poland	(48 58) 731 17 76	(48 58) 551 21 30	kuki@iopan.gda.pl	www.iopan.gda.pl

SCADM						
	Katarzyna Chwedorzewska	Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Department of Antarctic Biology, Pawinskiego 5a, 02-106 Warszawa, Poland	(48 22) 659 57 94	(48 22) 592 21 90	kchwedorzewska@go2.pl	www.arctowski.aq
NATIONAL ANTARCTIC DATA CENTRE						
Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Department of Antarctic Biology, Pawinskiego 5a, 02-106 Warszawa, Poland			(48 22) 846 33 83	(48 42) 846 19 12	secretariate@ibb.waw.pl	www.ibb.waw.pl
Department of Polar Studies and Documentation, Institute of Botany, Jagiellonian University, 27 Kopernika st., 31-501 Kraków, Poland			(48 12) 421 02 77 ext. 26	(48 12) 423 09 49	olech@ib.uj.edu.pl	
SCAR-MarBIN (RAMS editors)						
	Jacek Siciński	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 42 92	(48 42) 635 44 40	sicinski@biol.uni.lodz.pl	www.invertebrates.uni.lodz.pl/en/
	Magda Błazewicz	University of Łódź, Department of Invertebrate Zoology & Hydrobiology, 12/16 Banacha st., 90-237 Łódź, Poland	(48 42) 635 42 97	(48 42) 635 44 40	magdalena.blazewicz@biol.uni.lodz.pl	www.invertebrates.uni.lodz.pl/en/
	Katarzyna Błachowiak-Samołyk	Institute of Oceanology, Polish Academy of Sciences, 55 Powstańców Warszawy st., 81-967 Sopot, Poland	(48 58) 731 17 77	(48 58) 551 21 30	kasiab@iopan.gda.pl	www.iopan.gda.pl
	Piotr Kukliński	Institute of Oceanology, Polish Academy of Sciences, 55 Powstańców Warszawy st., 81-967 Sopot, Poland	(48 58) 731 17 76	(48 58) 551 21 30	kuki@iopan.gda.pl	www.iopan.gda.pl
	Anna Rocka	Institute of Parasitology, Polish Academy of Sciences, 51/55 Twarda st., 00-818 Warszawa, Poland	(48 22) 751 17 14	(48 22) 620 62 27	abroczy@poczta.onet.pl	www.ipar.pan.pl

	Krzysztof Zdzitowiecki	Institute of Parasitology, Polish Academy of Sciences, 51/55 Twarda st., 00-818 Warszawa, Poland	(48 22) 697 89 81	(48 22) 620 62 27	kzdzit@twarda.pan.pl	www.ipar.pan.pl
A BRIEF SUMMARY OF SCIENTIFIC HIGHLIGHTS:						
<i>See the following pages</i>						

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.

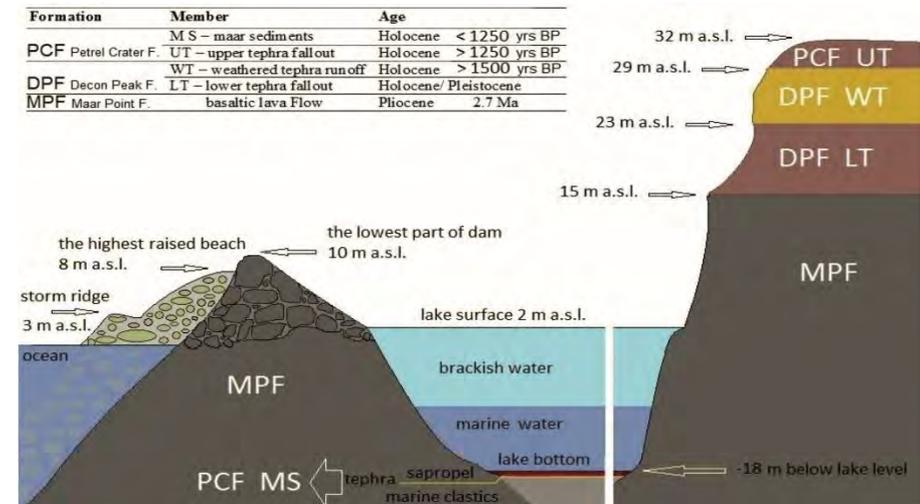
An effort to analyze the complex historical ornithological field data were taken. The reported data represent an unique reference basis and provide valuable information about indicator species, suitable for

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 *Pygoscelis* 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.

Wasilowska 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.

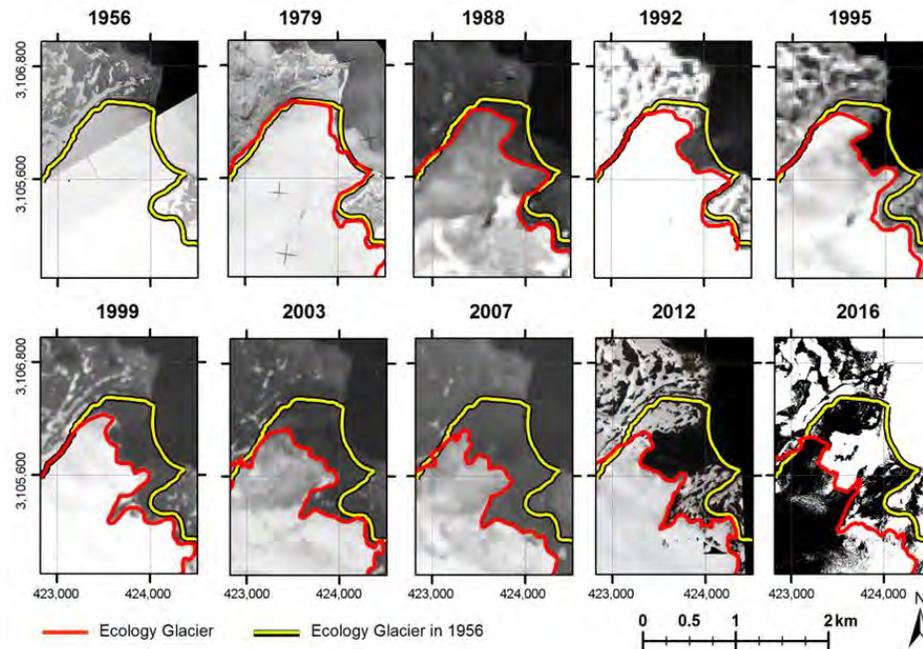


Stratigraphy of the Penguin Island volcano, South Shetland Islands.

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., Szilo 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 km² 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

1. Bacior M., Nowak P., Harańczyk H., Patryas S., Kijak P., Ligęzowska A., Olech M.A. 2017. Extreme dehydration observed in Antarctic *Turgidosculum complicatulum* and in *Prasiola crispa*. *Extremophiles* 21: 331–343.
2. Białkowska A.M., Szulczewska K.M., Krysiak J., Florczak T., Grome E., Kassassir H., Kur J., Turkiewicz M. 2017. Genetic and biochemical characterization of yeasts isolated from Antarctic soil samples. *Polar Biology* 40: 1787–1803.
3. Galera H., Wódkiewicz M., Czyż E., Łapiński S., Kowalska M.E., Pasik M., Rajner M., Bylina P., Chwedorzewska K.J. 2017. First step to eradication of *Poa annua* L. from Point Thomas Oasis (King George Island, South Shetlands, Antarctica). *Polar Biology* 40: 939–94.
4. Kellman-Sopyła W., Koc J., Górecki R.J., Domaciuk M., Giełwanowska I. 2017. Development of generative structures of polar Caryophyllaceae plants: the Arctic *Cerastium alpinum* and *Silene involucreta*, and the Antarctic *Colobanthus quitensis*. *Polish Polar Research* 38: 83–104.
5. 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.
6. Łopieńska-Biernat E., Pastorczyk M., Giełwanowska I., Żółtowska K., Stryński R., Zaobidna E. 2017. The influence of short-term cold stress on the metabolism of non-structural carbohydrates in polar grasses. *Polish Polar Research* 38: 187–204.
7. Mieczan T., Adamczuk M., Tarkowska-Kukuryk M. 2017. Ecology of ciliates in microbial mats in meltwater streams, King George Island, maritime Antarctica. *Polar Biology* 40: 1071–1083.
8. Znój A., Chwedorzewska K.J., Androsiuk P., Cuba-Diaz M., Giełwanowska I., Koc J., Korczak-Abshire M., Grzesiak J., Zmarz A. 2017. Rapid environmental changes in the Western Antarctic Peninsula region due to climate change and human activity. *Applied Ecology and Environmental Research* 15: 525–539.

Glacial ecosystems

9. Zdanowski M.K., Bogdanowicz A., Gawor J., Gromadka R., Wolicka D., Grzesiak J. 2017. Enrichment of Cryoconite Hole Anaerobes: Implications for the Subglacial Microbiome. *Microbial Ecology* 73: 532–538.

Diversity and functioning of the Antarctic marine ecosystem

10. Figuerola B., Kuklinski P., Carmona F., Taylor P.D. 2017. Evaluating potential factors influencing branch diameter and skeletal Mg-calcite using an Antarctic cyclostome bryozoan species. *Hydrobiologia* 799: 101.
11. Jażdżewska A.M., Siciński J. 2017. Assemblages and habitat preferences of soft bottom Antarctic Amphipoda: Admiralty Bay case study. *Polar Biology* 40: 1845–1869.
12. Kukliński P., Balazy P., Krzemińska M., Bielecka L. 2017. Species pool structure explains patterns of Antarctic rock-encrusting organism recruitment. *Polar Biology* 40: 2475–2487.
13. Pabis K., Sobczyk R. 2017. *Eulalia picta* Kinberg, 1866 – tube builder or specialized predator? *Polish Polar Research* 38: 85–491.
14. Zemko K., Pabis K., Siciński J., Błażewicz M. 2017. Low abundance and high species richness: the structure of the soft-bottom isopod fauna of a West Antarctic glacial fjord. *Polar Biology* 40: 2187–2199.
15. Zemko K., Pabis K., Siciński J., Błażewicz M. 2017. New records of isopod species of the Antarctic Specially Managed Area No. 1, Admiralty Bay, South Shetland Islands. *Polish Polar Research* 38: 409–41.

GeosciencesCenozoic glaciations and biota evolution

16. Jadwiszczak P., Mörs T. 2017. An enigmatic fossil penguin from the Eocene of Antarctica. *Polar Research* 36: 1291086.
17. Jadwiszczak P., Rothschild B.M. 2017. The first evidence of an infectious disease in early penguins. *Historical Biology* DOI: 10.1080/08912963.2017.1353606.
18. Majewski W., Tatur A., Witkowski J., Gaździcki A. 2017. Rich shallow-water benthic ecosystem in Late Miocene East Antarctica (Fisher Bench Fm, Prince Charles Mountains). *Marine Micropaleontology* 133: 40–49.

Post-LGM records

19. Minzoni R.T., Majewski W., Anderson J.B., Yokoyama Y., Fernandez R., Jakobsson M. 2017. Oceanographic influences on the stability of the Cosgrove Ice Shelf, Antarctica. *The Holocene* 21: 1645–1658.
20. 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.

Physical SciencesMapping and geomorphology

21. Dąbski M., Zmarz A., Pabjanek P., Korczak-Abshire M., Karsznia I., Chwedorzewska K. 2017. UAV based detection and spatial analyses of periglacial landforms on Demay Point (King George Island, South Shetland Islands, Antarctica). *Geomorphology* 290: 29–38.
22. 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.
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.

24. Rodzewicz M., Głowacki D., Hajduk J. 2017. Some dynamic aspects of photogrammetry missions performed by “PW-ZOOM” – the UAV from Warsaw University of Technology. *Archive of Mechanical Engineering* 64: 10.1515/meceng-2017-0003.

Investigating aqueous environments

25. Szopińska M., Szumińska D., Bialik R.J., Chmiel S., Plenzler J., Polkowska Ż. 2017. Impact of a newly-formed periglacial environment and other factors on fresh water chemistry at the western shore of Admiralty Bay in the summer of 2016 (King George Island, Maritime Antarctica). *Science of the Total Environment* 613–614: 619–634.
26. Sziło J., Bialik R.J. 2017. Bedload transport in two creeks at the ice-free area of the Baranowski Glacier, King George Island, West Antarctica. *Polish Polar Research* 38: 21–39.
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.