



SCAR SRP / PPG

AntEco

Paper 4 Agenda item 4

Person Responsible: Huw Griffiths & Jan Strugnell

SCAR Executive Committee Meeting 2019

Plovdiv, Bulgaria, 29-31 July 2019

State of the Antarctic Ecosystem **(AntEco)** **2018-19 Report**

Report Authors

Jan Strugnell (Australia) & Huw Griffiths (UK), Steering Committee

Summary

AntEco has been active in several initiatives since the last report to Delegates – i) the SCAR OSC 2018 in Davos, Switzerland, ii) planning finalization activities and iii) the Marine Ecosystem Assessment of the Southern Ocean. AntEco continues to coordinate research in line with the objectives of the implementation plan and disseminate the findings through scientific publications and outreach.

AntEco is now firmly focused on the upcoming conclusion of the programme with a significant proportion of the 2019 budget this year being dedicated to workshops and meetings that will produce legacy products for the programme. For Davos SCAR OSC 2018 in we ensured that the majority of our 2018 budget was spent on travel support for participants (with particular attention to less well-represented SCAR member nations and early career researchers). Our 2020 activities will once again mostly revolve around the SCAR OSC in Hobart and facilitating the attendance of the meeting by ECRs and developing Antarctic nations.

AntEco has also had several new significant contributions to the Antarctic Environments Portal on important topics (marine plastics, marine biodiversity, pathways for the introduction of terrestrial non-native species, non-native microbial introductions, specially protected and managed areas in Antarctica (updated) and the status of known non-native species introductions and impacts (updated)).

SRP updates since 2018 Delegates Meeting

Please list any information that has changed since the SCAR 2018 Delegates Meeting, following the headings below.

What has been achieved?

Date	Activity
August 2018	DAVOS – Polar 2018 included travel funding for 24 attendees (including 21 ECRs), workshops and meetings, and several sessions from AntEco themes and contributors.
June 2019	The first Marine Ecosystem Assessment of the Southern Ocean (MEASO) Workshop

What lies ahead?

Date	Activity
2019	Seymour Island Synthesis Workshop
2019	Modelling polar ecosystem health synthesis & workshop
2019	SCAR-EGABI- “Tools for Southern Ocean spatial analysis and modelling course
2019	Workshop on microbial resilience, emerging knowledge from Antarctic ecosystems
2020	Workshop at SCAR OSC to co-ordinate and safeguard the fate of Antarctic biological collections (Narissa Bax lead)

SRP planned final products (including related to OSC2020)

Date	Output/product
2020	The first Marine Ecosystem Assessment of the Southern Ocean (MEASO)
2020+	Reports and publications from the AntEco sponsored workshops and meetings (see above)
2020	MEASO special issue of Frontiers

Budget

Changes to planned use of funds for 2019 and 2020

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2019	Seymour Island Synthesis & Workshop	\$5000	Rowan Whittle	roit@bas.ac.uk
2019	Modelling polar ecosystem health synthesis & workshop	\$4620	Diana King	dianak@uow.edu.au
2019	SCAR-EGABI- Tools for Southern Ocean spatial analysis and modelling course	\$5000	Anton Van de Putte	antonarctica@gmail.com
2019	Workshop on microbial resilience, emerging knowledge from Antarctic ecosystems	\$5000	Chong Chun Wie	ChongChunWie@imu.edu.my
Total		\$19,620		

Membership

Changes to SRP Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Co-chair	Jan	Strugnell	James Cook University	AUS	jan.strugnell@jcu.edu.au	2013	2020
Co-chair	Huw	Griffiths	BAS	UK	hjk@bas.ac.uk	2013	2020
Co-deputy	Don	Cowan	U. Pretoria	RSA		2013	2020
Co-deputy	Pete	Convey	BAS	UK		2013	2020
	Aleks	Terauds	AAD	AUS		2013	2020
	Angelika	Brandt	Senckenberg Museum	DE		2013	2020
	Alison	Murray	DRI	USA		2013	2020
	Annick	Wilmotte	U. Liège	BEL		2013	2020
	Craig	Cary	U. Waikato	NZ		2013	2020
	Guido	di Prisco	U. Naples	IT		2013	2020
						2013	
	Claudio	Gonzales-Wevar	U. Chile	CHI		2013	2020
	Dom	Hodgson	BAS	UK		2013	2020
	Anton	van de Putte	RBINS	BEL		2013	2020
	Stefano	Schiaparelli	U. Genoa	IT		2013	2020
	Mary-Ann	Lea	IMAS, U Tas	AUS		2013	2020

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	Conxita	Avila	U. Barcelona	ESP		2013	2020
	Andres	Barbosa Alcon	MNCN	ESP		2013	2020
	Lucas	Ruberto	Instituto de Nanobiotecnología	ARG		2016	2020
	Satoshi	Imura	NIPR	JPN		2016	2020
	Julian	Gutt	A. W. Inst.	DE		2013	2020

*Please identify early-career researchers with * in first column*

SCAR Fellowship Reviewers

Please list any people (name and email address) volunteered by the SRP who would be willing to serve as reviewers for the next few years, along with 1-3 keywords on their principal expertise.

First Name	Last Name	E-mail	Principal Expertise
Huw	Griffiths	hjj@bas.ac.uk	Marine ecology, biodiversity, biogeography
Jan	Strugnell	Jan.strugnell@jcu.edu.au	Genetics

Significant Deviations from the Implementation Plan

N/A

Additional information (optional)

Outreach, communication and capacity-building activities

Pete Convey was invited to teach on the recent UKPN-APECS Russia polar science workshop.

A team from BAS and the Polar Museum (Cambridge) met 12,000 members of the public to talk all things Antarctic (including the work of AntEco) at the Lyme Regis Fossil Festival (May 2019).

Jan Strugnell was invited to present a keynote lecture about the use of genetic tools to explore Southern Ocean biodiversity at the 8th International barcode of life (iBoL) conference in Norway in June, 2019.

Antarctica's 'moss forests' are drying and dying (2018) *The Conversation*, 25 Sep. Available at: <https://theconversation.com/antarcticas-moss-forests-are-drying-and-dying-103751> (Accessed 30 May 2019).

East Antarctic mosses reveal a windier, drier climate (2018). Available at: <https://www.youtube.com/watch?v=LF4p3ng0HRQ> (Accessed 30 May 2019).

UB researchers discover a disease threatening the most plentiful starfish on the Antarctic sea floor

https://www.ub.edu/web/ub/en/menu_eines/noticies/2018/07/054.html

Notable Papers

1. Jones, P.G., Smith, H.H. & Deloitte, I.T. 2017. Human-mediated dispersal of terrestrial species between Antarctic biogeographic regions: A preliminary risk assessment. *Journal of Environmental Management* **232**, 73-89.

This paper strongly highlights of the risks and implications of human transfer, and is an illustration of the increasing use of climate and biological modelling in predicting future distributions of both native and non-native species.

2. Brasier, M, *et al.*, 2018. Benthic biodiversity in the South Orkney Islands Southern Shelf Marine Protected Area. *Biodiversity* **19**, 5-19.

This publication, featured in a special issue on marine protected areas, is the outcome of the SO-AntEco expedition to the South Orkney Islands MPA. The internationally authored paper was led by an early career researcher and is the first such assessment of an Antarctic MPA.

3. Strugnell, J. M., Pedro, J. B., & Wilson, N. G. 2018. Dating Antarctic ice sheet collapse: Proposing a molecular genetic approach. *Quaternary Science Reviews* **179**, 153-157.

This publication details how genetic signatures that are contained within benthic animals present in Antarctica today could be used to investigate the last time a historic seaway occurred across Antarctica - thereby resolving when the West Antarctic Ice Shelf last collapsed.

4. Chenuil, A, *et al.*, 2018. Understanding processes at the origin of species flocks with a focus on the marine Antarctic fauna. *Biological Reviews* **93**, 481-504.

Species flocks fascinate evolutionary biologists who wonder whether such striking diversification can be driven by normal evolutionary processes. This paper uses the isolated fauna of Antarctica as a model to understand a complex and important set of questions about how the processes of evolution work.

5. Bokhorst, S., Convey, P., & Aerts, R. 2019. Nitrogen Inputs by Marine Vertebrates Drive Abundance and Richness in Antarctic Terrestrial Ecosystems. *Current Biology*.

This is the first clear Antarctic documentation of the importance of fertilization of the terrestrial environment by top predators in determining the biodiversity of vegetation on land. The work is significant as it provides a proxy for distribution of Antarctic terrestrial diversity on both Peninsula and continent.

6. Barnes, D. K., *et al.*, 2018. Icebergs, sea ice, blue carbon and Antarctic climate feedbacks. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* **376**, 20170176.

The dense and rich organisms of polar continental shelves are a major stock of Earth's blue carbon natural capital. Blue carbon is increasing in response to both sea ice losses and ice shelf disintegration and as such is one of the most powerful negative feedbacks on climate change. This paper is a first attempt to quantify the extent of this negative feedback, and societal value to polar nature.

7. Archer SDJ, *et al.*, 2019. Airborne microbial transport limitation to isolated Antarctic soil habitats. *Nature Microbiology*.

This paper demonstrates, for the first time, there is evidence for very limited local aerial transport of soil particles and their associated microbiomes in Antarctica, which has implications for local microbiome endemicity in Antarctic Dry Valleys.

8. Robinson, S.A., *et al.*, 2018 Rapid change in East Antarctic terrestrial vegetation in response to regional drying *Nature Climate Change*, 8 (10), pp. 879-884. DOI: 10.1038/s41558-018-0280-0

This paper demonstrates that rapid vegetation change is occurring in East Antarctica and that its mosses provide potentially important proxies for monitoring coastal climate change.

9. Morley, S.A., Barnes D.K.A, Dunn, M.J. 2019. Predicting which species succeed in Climate-forced polar seas. *Frontiers in Marine Science* doi: 10.3389/fmars.2018.00507

This paper applied risk assessment techniques to polar species physiological capacities to identify their exposure to climate change and their vulnerability and found that more species that are likely to benefit from the near-future predicted change (the winners), especially predators and deposit feeders, whilst fewer species were scored at risk (the losers), although animals that feed on krill scored consistently as under the highest risk.

10. Moles, J.; Avila, C.; Malaquías, M.A. 2019. Unmasking Antarctic cryptic lineages: novel evidence from philinoid snails (Gastropoda: Cephalaspidea). *Cladistics* 2019: 1-27.

This paper investigated the diversification and biogeography of the molluscan genus *Philine* and detected restricted and grossly non-overlapping distributions suggesting allopatric speciation connected possibly to geographical or bathymetric isolation.

Direct support from outside organisations received for your activities

(Numbered list with values indicated if direct cash support. Please restrict in-kind support to substantive in-kind support only)

1. Sedimentary-Paleontology program at NSF for Seymour Island Synthesis & Workshop (cash support quantum pending).
2. Belgian Science Policy (Belspo), the Antarctic Biodiversity Portal (biodiversity.aq) and EG-ABI, (\$10,000) for SCAR-EGABI- “Tools for Southern Ocean spatial analysis and modelling course

Major collaborations your group has with other SCAR groups and with organisations/groups beyond SCAR

(Numbered list of substantive collaborations)

Within SCAR

PAIS – Jan Strugnell and Nerida Wilson are collaborating with Tim Naish and Nick Golledge directly.

Outside SCAR

Marine Ecosystem Assessment of the Southern Ocean

Updates for your group’s SCAR web page

If you do not update your SCAR web page yourself, please provide us with any additional information or changes that you would like us to make to it.

We collected photos and information from all ECRs that we supported to attend the SCAR OSC 2018 in Davos. We would appreciate it if some of these were highlighted on our website and will make them available.

They can be found here:

https://www.dropbox.com/sh/sa7hngy8lri6mt6/AACZW_Yf3lki5vc4tH-G-c5sa?dl=0

Other information for publicity purposes

Please add here details of, or links to any other information we may use for publicity purposes, such as photos, infographics, quotes and layperson's summaries of your research.

Images as below from Conxita Avila Escartin’s cruise BLUEBIO-2 (Dec 2018-March 2019)



