



**SDM** **11**  
 Agenda Item: 4.1.4  
 Person Responsible: J Strugnell & H Griffiths

**XXXV SCAR Delegates Meeting  
 Davos, Switzerland, 25-26 June 2018**

**State of the Antarctic Ecosystem (AntEco)**

**Report Authors** - Jan Strugnell (Australia) & Huw Griffiths (UK), Steering Committee

**Summary of activities from 2016-18 and other important matters**

AntEco has been active in three main initiatives since the last report to the Delegates – i) the SCAR Biology Conference in Leuven, Belgium, ii) the Southern Ocean/AntEco scientific expedition to the South Orkney Islands and iii) the Marine Ecosystem Assessment of the Southern Ocean Conference in Hobart, Australia. AntEco provided support for these initiatives through advocacy, active participation and travel funding. AntEco continues to coordinate research in line with the objectives of the implementation plan and disseminate the findings through scientific publications and outreach.

AntEco recognises the importance of the SCAR Open Science Conference in June, Polar 2018 as a major opportunity to bring together the community and facilitate workshops and collaborations. We have concentrated our limited funds on travel support for participants (with particular attention to less well-represented SCAR member nations and early career researchers). We are also allocating funds to planned workshops and meetings.

**Recommendations**

We, the AntEco steering committee, believe that the community needs to start planning for the next generation of biological themed SRPs. To this end we have been active in encouraging the community in generating ideas and attending conferences such as MEASO 2018 and PAIS.

**Summary Budget 2017 to 2020**

	2017	2018	2019	2020
	Spent	Allocated	Request	Request
<b>(US\$)</b>	\$20,028.39	\$21,000	\$20,000	\$20,000



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### Progress and Plans

#### Major Outcomes

- AntEco has played an active role in ensuring that the key research themes of AntEco are well represented at SCAR OSC 2018, through contributing to planning of the conference, development of sessions (including conveners), and provision of travel support for active AntEco research, with a focus on early career researchers and researchers from developing countries. 21 of the 24 funded travel applications came from ECRs.
- A second report on the major findings of the SO-AntEco expedition to the South Orkney Islands MPA has been submitted to CCAMLR (also accepted as a paper in a special issue of Biodiversity on MPAs).
- Active participation in the Marine Ecosystem Assessment of the Southern Ocean (MEASO) conference in Hobart and subsequent meetings.

#### Notable Papers

- Griffiths, H. J., Meijers, A. J., & Bracegirdle, T. J. (2017). More losers than winners in a century of future Southern Ocean seafloor warming. *Nature Climate Change*, 7(10), 749.  
This work provides insights into the potential impacts of climate change on benthic species and communities in the Southern Ocean. It uses data collected for the SCAR Biogeographic Atlas to form the basis of the analyses.
- Waller, C. L., Griffiths, H. J., Waluda, C. M., Thorpe, S. E., Loaiza, I., Moreno, B., ... & Hughes, K. A. (2017). Microplastics in the Antarctic marine system: An emerging area of research. *Science of the Total Environment*, 598, 220-227.  
This paper summarises all known plastic records (micro & macro) from the Southern Ocean and compares these data with estimated regional plastic inputs. Results show that much of the plastic is likely to have originated elsewhere.
- Lee, J. R., Raymond, B., Bracegirdle, T. J., Chadès, I., Fuller, R. A., Shaw, J. D., & Terauds, A. (2017). Climate change drives expansion of Antarctic ice-free habitat. *Nature*, 547(7661), 49.  
The authors find that isolated ice-free areas will coalesce over the twenty-first century due to climate change. While the effects on biodiversity are uncertain, they hypothesize that changes could eventually lead to increasing biotic homogenization, the extinction of less-competitive species and the spread of invasive species.
- Strugnell JM, Pedro J, Wilson NG (2018) Dating Antarctic ice sheet collapse: proposing a molecular genetic approach. *Quaternary Science Reviews*.  
<https://doi.org/10.1016/j.quascirev.2017.11.014>  
This perspective piece sets out an ecological genetics method to help resolve when the West Antarctic Ice Shelf last collapsed.
- Gutt J, Isla E, Bertler N, Bodeker GE, Bracegirdle TJ, Cavanagh RD, Comiso JC, Convey P, Cummings V, De Conto R, DeMaster D, di Prisco G, d'Ovidio F, Griffiths H, Khan AL, Lopez-Martinez J, Murray AE, Nielsen U, Ott S, Post A, Ropert-Coudert Y, Saucedo T, Scherer R, Schiaparelli S, Schloss I, Smith CR, Stefels J, Stevens C, Strugnell J, Trimborn S, Verde C, Verleyen E, Wall DH,



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Wilson NG, Xavier J. (2017) Cross-disciplinarity in the advance of Antarctic ecosystem research. *Marine Genomics*. doi.org/10.1016/j.margen.2017.09.006

This perspective piece outlines the benefits of cross disciplinary Antarctic research and is the culmination of a cross program workshop.

- Jansen, J., Hill, N. A., Dunstan, P. K., McKinlay, J., Sumner, M. D., Post, A. L., ... & Johnson, C. R. (2018). Abundance and richness of key Antarctic seafloor fauna correlates with modelled food availability. *Nature Ecology & Evolution*, 2(1), 71.

This work explores the strength of pelagic–benthic coupling along the East Antarctic shelf and its dependence on both physical processes and the types of benthic organisms considered.

- Coetzee, B.W.T., Convey, P. & Chown, S.L. (2017) Expanding the protected area network in Antarctica is urgent and readily achievable. *Conservation Letters* doi: 10.1111/conl.12342.

This piece considers the practicalities and urgency of expanding the current protected area system in Antarctica in a robust and representative manner.

- Chown, S.L., Brooks, C.M., Terauds, A., Le Bohec, C., van Klaveren-Impagliazzo, C., Whittington, J.D., Butchart, S.H.M., Coetzee, B.W.T., Collen, B., Convey, P., Gaston, K.J., Gilbert, N., Gill, M., Höft, R., Johnston, S., Kennicutt II, M.C., Kriesell, H.J., Le Maho, Y., Lynch, H.J., Palomares, M., Puig-Marcó, R., Stoett, P. & M.A. McGeoch, M.A. (2017). Antarctica and the strategic plan for biodiversity. *PLoS Biology* **15(3)** e2001656. doi.org/10.1371/journal.pbio.2001656.

Major paper outcome of the first Monaco Antarctic Biodiversity meeting, providing a key assessment of the status of Antarctica in relation to the Aichi Targets of the Kyoto Protocol.

- Amesbury, M.J., Roland, T.P, Royles, J., Hodgson, D.A., Convey, P., Griffiths, H. & Charman, D.J. (2017). Widespread biological response to rapid warming on the Antarctic Peninsula. *Current Biology* **27**, 1616-1622, doi 10.1016/j.cub.2017.04.034.

Paper using palaeobiological evidence from moss peat cores and contained microbiota to infer wide scale responses over time to climate change across the entire Antarctic Peninsula.

- Biersma E.M., Jackson J., Hyvönen, J., Koskinen, S., Linse K., Griffiths H. & Convey, P. (2017). Global movements in bipolar moss species. *Royal Society Open Science* **4**: 170147. doi: 10.1098/rsos.170147

First use of molecular biological approaches to document and estimate timing of (rare) bipolar dispersal events into and from both Polar Regions over multimillion year timescales in a major bipolar moss genus.

## Main Activities

### 1. SCAR Biology Symposium, Leuven, Belgium

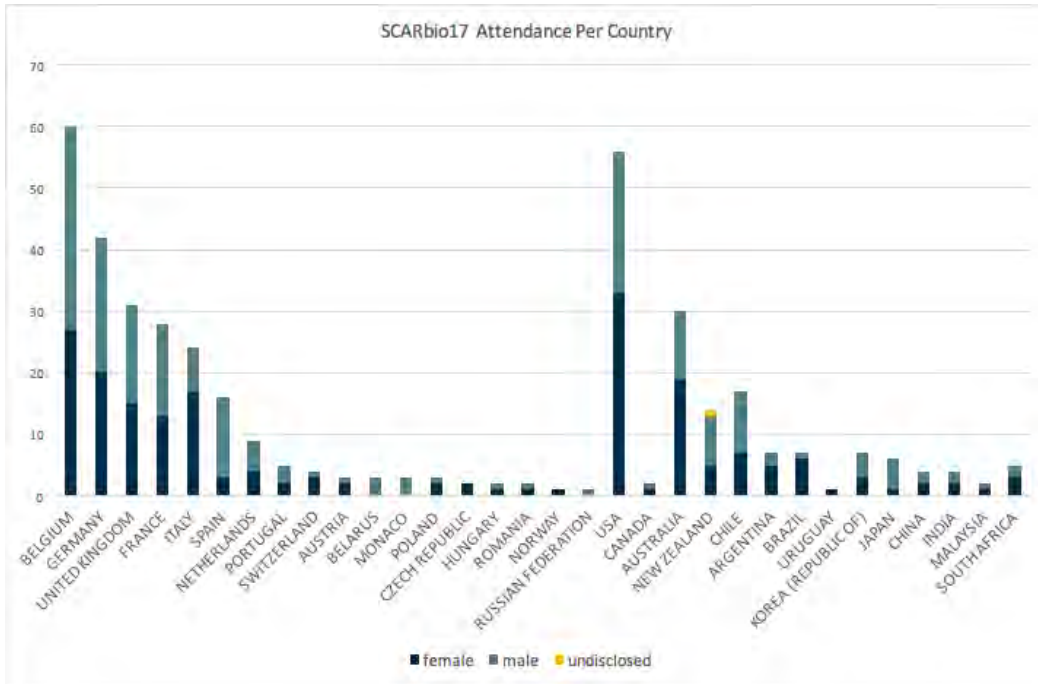
From 10-14 July the XIIth SCAR Biology Symposium took place in Leuven, Belgium. The SCAR Biology Symposium is a significant event for the AntEco community and it provided an important opportunity to bring our members together. Total attendance was 402 people from 32 countries. Attendees were primarily from Europe and equally distributed between genders. 260 people payed the regular fee, 130 an early career fee and there were 12 1-day registrations.



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Several AntEco members actively participated in the Antarctic Priority Threat Management Workshop, held just prior to the SCAR Biology Symposium, providing expert advice on threats to Antarctic species and the benefits of management actions.



**2. SO-Ant-Eco (South Orkneys – State of the Antarctic Ecosystem)**

**SO-AntEco (JR15005)** was a British Antarctic Survey (BAS) led expedition undertaken in conjunction with an international team of scientists from AntEco. The team included 22 participants (7 ECRs) from 9 different countries and 16 institutes. The expedition took place on board the RRS James Clark Ross in February-March 2016 and aimed to investigate the existing South Orkney Islands Marine Protected Area. The expedition has generated two reports to CCAMLR and one in press publication to date.

**3. Marine Ecosystem Assessment of the Southern Ocean (MEASO), Hobart**

The International MEASO conference took place from 9-13 April, 2018 with the aim of ‘Assessing status and trends of habitats, key species and ecosystems in the Southern Ocean’. Several AntEco members participated in the conference including committee members: Huw Griffiths, Jan Strugnell, Anton Van de Putte, Aleks Terauds, Mary-Ann Lea and Stefano Schiaparelli. Huw Griffiths, Jan Strugnell, Anton Van de Putte and Ben Raymond participated in a subsequent meeting held at IMAS on 16 April with Andrew Constable to work through the MEASO process and discuss the inclusion of benthic species and plan the way forward of this assessment.

**Finalization Activities**



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We have scheduled an AntEco committee meeting to occur at Davos. At this meeting we will finalise plans for the final two years of the project. In addition, AntEco members are playing lead roles in shaping the next generation of SCAR programs and will be present in planning meetings regarding these which will be held in Davos. Suggestions for future workshops, which will be discussed with our members at Davos OSC, where there will also be encouragement for suggestion of future ideas, include:

- The role of scale in assessing physical classification of benthic habitats (could be expanded to pelagic and terrestrial).
- Vulnerable Marine Ecosystems – are they working for Antarctic conservation purposes?
- Future directions in Antarctic marine sampling (feeding into MEASO and planning).
- Antarctic biological risk assessment (climate change and human impacts).
- Joint workshop with IOD/OBIS on biological data use.
- 2020 an open data workshop prior to the SCAR OSC in collaboration with SCADM and APECS.
- AntEco will also support the new SCAR Action Group on plastics as it aligns with our 5<sup>th</sup> research sector, Impacts, Trends and Conservation.

#### **Expected Final Outcomes**

AntEco conducted a public meeting as part of the SCAR Biology Symposium in Belgium to discuss with the wider scientific community what sort of final outcomes would be of interest to the wider SCAR scientific community and other stakeholders. There was great interest in more policy maker engagement (see MEASO work) and the potential for focussed workshops aimed at addressing specific questions. We anticipate several synthesis and perspective pieces to be drafted by members of the AntEco community over the next two years. These will bring together the extensive progress that has been made since the initiation of AntEco and outline how the outcomes of our program can be built upon to address key questions in Antarctic science in the future. We will finalise our plans at Davos. An ongoing and potential legacy activity is the AntEco supported Marine Ecosystem Assessment of the Southern Ocean process. MEASO fits well with the three key AntEco questions ([www.scar.org/science/anteco/](http://www.scar.org/science/anteco/)). The outcomes of the Conference, Policy Forum and assessment are expected to provide significant input to the Antarctic Treaty's Committee on Environment Protection (CEP), the Scientific Committee for the Conservation of Antarctic Marine Living Resources (SC-CAMLR), and other organisations interested in the management and conservation of Southern Ocean ecosystems.

#### **Significant Deviations from the Implementation Plan**

N/A



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**Budget**

**Planned use of funds for 2018 to 2020**

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2020	Workshops & Travel Grants	\$20,000	Jan Strugnell & Huw Griffiths	<a href="mailto:Jan.strugnell@jcu.edu.au">Jan.strugnell@jcu.edu.au</a> <a href="mailto:hjg@bas.ac.uk">hjg@bas.ac.uk</a>
2019	Workshops & Travel Grants	\$20,000		<a href="mailto:Jan.strugnell@jcu.edu.au">Jan.strugnell@jcu.edu.au</a> <a href="mailto:hjg@bas.ac.uk">hjg@bas.ac.uk</a>
2018	Travel to SCAR OSC – primarily for ECRs and developing Antarctic programs	21,000	Jan Strugnell & Huw Griffiths	<a href="mailto:Jan.strugnell@jcu.edu.au">Jan.strugnell@jcu.edu.au</a> <a href="mailto:hjg@bas.ac.uk">hjg@bas.ac.uk</a>
2018	Accommodation and airport transfer for Jan Strugnell to attend MEASO	\$917	Jan Strugnell & Huw Griffiths	<a href="mailto:Jan.strugnell@jcu.edu.au">Jan.strugnell@jcu.edu.au</a> <a href="mailto:hjg@bas.ac.uk">hjg@bas.ac.uk</a>

**Briefly describe what the funds usage and desired results**

The funds will be allocated to workshops and meetings (including travel grants for ECRs). The final decisions on what will receive funding and how much will be decided by the committee in Davos (see Expected Final Outcomes section).

**Percentage of the budget to be used for support of early career researchers**

2018: ~88%  
 2019: Minimum 50%  
 2020: Minimum 50%

**Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes**

2018: 25% for Initial-Stage Programmes  
 2019: Aim minimum 25%  
 2020: Aim minimum 25%

**Linkages**

**Direct support from outside organisations**

- BAS/NERC – funded SO-Ant-Eco cruise (and a 3 month position to analyse the results)



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- ACE- (Swiss Polar) – Antarctic Circumpolar Expedition – several AntEco members received direct funding and research cruise berths (including Dominic Hodgson, Jan Strugnell, Nerida Wilson, David Barnes, Christoph Held, Chester Sands, Elise Biersma, Felipe Simoes, Narissa Bax).

#### Major collaborations

##### Within SCAR

- PAIS – Jan Strugnell and Pete Convey were invited to present keynotes at the PAIS meeting in Trieste, Italy 2017.
- Collaborative paper published in conjunction with members from AntClim21, Ant-Era & PAIS (Gutt et al 2017 as above).
- SC-ATS – AntEco advised SC-ATS on research relevant to the CEPs Climate Change Response Work Program. AntEco continues to liaise regularly with SC-ATS to ensure relevant research is considered for dissemination to the CEP and/or CCAMLR.

##### Outside SCAR

- Swiss Polar (ACE) – several AntEco members participated in the Antarctic Circumpolar Expedition
- 13 Institutes in SO-Ant-Eco
- MEASO (SOOS, ACE-CRC)
- GBIF, OBIS.

### Outreach and Capacity Building

1. Jan Strugnell participate in a 'Pint of Science' event 2018 to raise the profile of Antarctic evolutionary research
2. Terauds was invited to, and attended, two APECS workshops (Oceania 2017, MEASO 2018) where he has presented, sat on Q&A panels and interacted directly with Antarctic ECRS to raise the profile of SCAR and discuss opportunities for getting involved.
3. Huw Griffiths attended the Lyme Regis Fossil Festival in 2017 & 2018 with the British Antarctic Survey, the event and Antarctic Biodiversity display were visited by over 10,000 visitors each year. He also gave two public lectures.
4. Pete Convey participate in a 'Pint of Science' event 2017 and also invited plenary speaker to the Latin American Antarctic Congress in Punta Arenas in late 2017

#### SCAR Fellowship Reviewers

First Name	Last Name	E-mail	Principal Expertise
Jan	Strugnell	<a href="mailto:Jan.strugnell@jcu.edu.au">Jan.strugnell@jcu.edu.au</a>	Ecological and evolutionary genetics
Aleks	Terauds	<a href="mailto:aleks.terauds@gmail.com">aleks.terauds@gmail.com</a>	Terrestrial ecology, invasive species, climate



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			change impacts on biodiversity
<b>Peter</b>	Convey	<a href="mailto:pcon@bas.ac.uk">pcon@bas.ac.uk</a>	Polar ecology, biodiversity, climate change impacts, human impacts
<b>Griffiths</b>	Huw	<a href="mailto:hjg@bas.ac.uk">hjg@bas.ac.uk</a>	Polar ecology, biodiversity, climate change impacts, human impacts

## Membership

### Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Chief Officer	Jan	Strugnell	James Cook University	AUS	<a href="mailto:jan.strugnell@jcu.edu.au">jan.strugnell@jcu.edu.au</a>	2012	
Chief Officer	Huw	Griffiths	BAS	UK	<a href="mailto:hjg@bas.ac.uk">hjg@bas.ac.uk</a>	2012	
Deputy Chief Officer	Don	Cowan	U. Pretoria	RSA	<a href="mailto:don.cowan@up.ac.za">don.cowan@up.ac.za</a>	2012	
Deputy Chief Officer	Pete	Convey	BAS	UK	<a href="mailto:pcon@bas.ac.uk">pcon@bas.ac.uk</a>	2012	

\* *Early Career Scientists*

### Other members

First Name	Last Name	Affiliation	Country	Email
Aleks	Terauds	AAD	AUS	<a href="mailto:aleks.terauds@gmail.com">aleks.terauds@gmail.com</a>
Angelika	Brandt	Senckenberg Museum	DE	<a href="mailto:angelika.brandt@senckenberg.de">angelika.brandt@senckenberg.de</a>
Alison	Murray	DRI	USA	<a href="mailto:Alison.Murray@dri.edu">Alison.Murray@dri.edu</a>
Annick	Wilmotte	U. Liège	BEL	<a href="mailto:awilmotte@ulg.ac.be">awilmotte@ulg.ac.be</a>
Craig	Cary	U. Waikato	NZ	<a href="mailto:caryc@waikato.ac.nz">caryc@waikato.ac.nz</a>
Guido	di Prisco	U. Naples	IT	<a href="mailto:guido.diprisco@ibbr.cnr.it">guido.diprisco@ibbr.cnr.it</a>
Claudio	Gonzales-Wevar	U. Chile	CHI	<a href="mailto:omeuno01@hotmail.com">omeuno01@hotmail.com</a>
Dom	Hodgson	BAS	UK	<a href="mailto:daho@bas.ac.uk">daho@bas.ac.uk</a>
Anton	van de Putte	RBINS	BEL	<a href="mailto:antonarctica@gmail.com">antonarctica@gmail.com</a>
Stefano	Schiaparelli	U. Genoa	IT	<a href="mailto:Stefano.Schiaparelli@unige.it">Stefano.Schiaparelli@unige.it</a>
Mary-Ann	Lea	IMAS, U Tas	AUS	<a href="mailto:MaryAnne.Lea@utas.edu.au">MaryAnne.Lea@utas.edu.au</a>





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Conxita	Avila	U. Barcelona	ESP	<a href="mailto:conxita.avila@ub.edu">conxita.avila@ub.edu</a>
Andres	Barbosa Alcon	MNCN	ESP	<a href="mailto:barbosa@mncn.csic.es">barbosa@mncn.csic.es</a>
Lucas	Ruberto	Instituto de Nanobiotecnología	ARG	<a href="mailto:luruberto@gmail.com">luruberto@gmail.com</a>
Satoshi	Imura	NIPR	JPN	<a href="mailto:imura@nipr.ac.jp">imura@nipr.ac.jp</a>
Julian	Gutt	A. W. Inst.	DE	<a href="mailto:julian.gutt@awi.de">julian.gutt@awi.de</a>

*\*Early Career Scientists*

### Requests to the Secretariat

We appreciate the support from the Secretariat that we currently receive for finance, mailing list and website matters. If SCAR is considering producing more education and outreach materials or tools then we would love to be involved.