



SCAR SRP / PPG

AnT-ERA

Paper 5 Agenda item 4

Person Responsible: J. Gutt

## SCAR Executive Committee Meeting 2019

Plovdiv, Bulgaria, 29-31 July 2019

# Antarctic Thresholds – Ecosystem Resilience and Adaptation (AnT-ERA)

## 2018-19 Report

### Report Author(s)

Julian Gutt with contributions from SSC members (from Argentina, Canada, Germany, Italy, Japan, New Zealand, Portugal, South Korea, Spain, UK, USA).

### Summary

1. Capacity building. (a) A **course on "Biological Processes in Antarctic Ecosystems"** in Buenos Aires, Argentina, for 44 graduate, PhD students and post-docs from ten countries held by ten AnT-ERA lecturers and local experts, hosted by the Instituto Antártico Argentino and made possible by SCAR support.

2. Support for early-career scientists. (a) Most of the 2018 budget used for spring course for ECS, see above. (b) In addition, nine mini-grants were awarded in 2018 to **ECS from six countries.**

3. Scientific output. (a) A half-day **workshop on "Antarctic and Arctic Ecosystems"** chaired by AnT-ERA (Gutt) and IASC/Marine Working group (Kedra & Cooper) with approx. 100 participants as side event of the 2018 OSC. The protocol provides the basis for a unique SCAR manuscript to be published in 2019.

4. Dissemination. (a) AnT-ERA contributed significantly to the 2019 **ACCE** update to the ATCM, (b) to the first Global Assessment of the **IPBES**, (c) to **SOOS** initiatives. (d) The article on "Antarctic Marine Biodiversity" was published online by the "**Antarctic Environments Portal**" with contributions from AnT-ERA. (e) Announcements for events and job opportunities are sent regularly, approx. twice per months, to the approx. 520 **mailing list** members.

5. Final scientific outcome of AnT-ERA. A synthesis workshop "**Most important findings 2010-2020 on biological processes in Antarctica and the Southern Ocean**" in Coimbra, Portugal is in an advanced stage of preparation. The structure will provide the basis for a paper, being a unique SCAR output, eventually partly in assessment style, to be published before the 2020 OSC, where the results are to be presented.

6. Miscellaneous. (a) Support of the 2018 OSC with key notes and chairman-ship of sessions. (b) International events were co-chaired by AnT-ERA SC members and key notes were given, e.g. on sea-ice and polar environments.

## SRP updates since 2018 Delegates Meeting

### What has been achieved?

Date	Activity
17 June '18	" <i>Antarctic and Arctic Ecosystems</i> " brainstorming workshop, chaired by AnT-ERA/IASC, OSC, Davos.
23 - 29 Sept '18	Spring Course " <i>Biological Processes in Antarctic Ecosystems</i> " for ECS, Buenos Aires, Argentina.

### What lies ahead?

Date	Activity
24 - 27 June '19	Synthesis-workshop " <i>Biological Processes in Antarctic Ecosystems – Advances and Highlights</i> ", Coimbra, Portugal.
June '19 – July '20	Outreach on major findings of the synthesis workshop, implementation to be discussed during the workshop.
June '19 – July '20	Writing a synthesis paper.
August 2020	Presentation of final output at SCAR OSC, Hobart.

### SRP planned final products (including related to OSC2020)

Date	Output/product
Before August 2020	Publication of the results of the " <i>Antarctic and Arctic Ecosystems</i> " brainstorming workshop in a peer-reviewed journal
Before August 2020	Publication of the results of the " <i>Biological Processes in Antarctic Ecosystems – Advances and Highlights</i> " synthesis workshop in a peer-reviewed journal
August 2020	Presentation of final output, details to be discussed and decided during the Coimbra workshop in June 2019

## Budget

### Changes to planned use of funds for 2019 and 2020

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2019	Coimbra synthesis workshop	34,000	J. Gutt J. Xavier	Julian.gutt@awi.de jxavier@zoo.uc.pt
2020	ECS/OSC	4,000	Several NN	
2019/20	ECS/Miscellaneous	4,000	J. Gutt	Julian.gutt@awi.de
<b>Total</b>		<b>42,000</b>		

## Membership

**No changes since 2018, no changes expected until the end of the AnT-ERA life period in 2020.**

### 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
José	Xavier	jxavier@zoo.uc.pt	Marine ecology, trophic interactions
Vonda	Cummings	Vonda.Cummings@niwa.co.nz	Shallow water marine ecosystems
Cinzia	Verde	c.verde@ibp.cnr.it	Biochemistry, physiology, genomics
Akinori	Takahashi	atak@nipr.ac.jp	Marine megafauna, tracking

### Significant Deviations from the Implementation Plan

The Spring Course for ESC was held in 2018 instead of 2015, since in 2015 we organized a cross-disciplinary brainstorming workshop in Barcelona in addition to the planned events.

The Antarctic-Arctic workshop in 2018 in Davos was an additional event stimulated by the joint SCAR/IASC conference.

A planned meeting to discuss the future of AnT-ERA had been replaced by the idea to identify and publish the most important results of the AnT-ERA life period. Planning of future SRPs is underway within the PPGs, including AnT-ERA SSC members.

The final workshop planned for 2020 will be held in 2019 since the publication of the outcome which was originally not planned demands time before the 2020 OSC.

## Additional information (optional)

### Outreach, communication and capacity-building activities

We focus on a wider dissemination of our outcome of the Coimbra synthesis workshop for stakeholders in 2019/2020.

AnT-ERA contributed to the outputs, out of the EUPOLARNET/EPB workshop in Madrid, for EU future strategy: Wilmotte et al. 2019. Footprints on changing polar ecosystems: Processes, threats, responses and opportunities for future generations. The EU-PolarNet White Papers: 20-27.

José Xavier was co-coordinator of the Polar Educators International (PEI) Workshop, Cambridge, UK, 7-11 April 2019.

Vonda Cummings gave an invited presentation at "Art & Climate", Auckland, New Zealand.

Support of the 2018 OSC with key notes and chairman-ship of sessions.

### Notable Papers

*Only papers which focus on biological processes, the key object of AnT-ERA, are presented here and only papers with AnT-ERA SSC members as co-authors:*

1. Ha S-Y, **Ahn I-Y**, Moon H-W, Choi B, Shin k-H 2019. Tight trophic association between benthic diatom blooms and shallow-water megabenthic communities in a rapidly deglaciated Antarctic fjord. *Estuarine, Coastal and Shelf Science* 218: 258-267.  
This paper reports a unique benthic food web built on intense bloom of a rarely reported benthic diatom in a rapidly warming Antarctic fjord.
2. **Gutt J**, Arndt J, Kraan C, et al. 2019. Benthic communities and their drivers: a spatial analysis off the Antarctic Peninsula. *Limnology and Oceanography*  
The paper describes drivers of the Antarctic shelf benthos at both sides of the tip of the Antarctic Peninsula.
3. **Peck LS** 2018. Antarctic marine biodiversity adaptations, environments and responses to change. *Oceanography and Marine Biology: An Annual Review* 56: 105-236  
The author reviewed the isolation, history and unusual environmental conditions of Southern Ocean biota, which have resulted in the fauna producing a range and scale of adaptations to low temperature and seasonality. He evaluated the impacts these adaptations have on capacities to resist, or respond to change in the environment.
4. Henley S, Schofield O, Hendry K, **Schloss IR**, et al. 2019. Variability and change in the west Antarctic Peninsula marine system: research priorities and opportunities. *Progress in Oceanography* 173: 208-237  
This paper presents a comprehensive synthesis of the actual knowledge on the WAP ecosystems.
5. Rintoul SR, Chown SL, DeConto RM, England MH, Fricker HA, Masson-Delmotte V, Naish TR, Siebert MJ, **Xavier JC** 2018. Choosing the future of Antarctica. *Nature* 558: 233-241  
Two future possible scenarios for Antarctica and the Southern Ocean are discussed, with a "worst" scenario, in which greenhouse gas emissions remained unchecked, the climate continued to warm, with worldwide impacts.
6. **Cummings VJ**, Hewitt JE, Thrush SF, Marriott PM, Halliday NJ, Norkko AM 2018. Linking Ross Sea coastal benthic ecosystems to environmental conditions: documenting baselines in a changing world. *Frontiers in Marine Science* 5: 232. doi: 10.3389/fmars.2018.00232  
A spatial analysis of coastal Antarctic benthic epi- and infaunal communities and their relationships to multiple environmental characteristics.
7. Coppola D, Giordano D, Milazzo L, Howes BD, Ascenzi P, **di Prisco G**, Smulevich G, Poole RK, **Verde C** 2018. Coexistence of multiple globin genes conferring protection against nitrosative stress to the Antarctic bacterium *Pseudoalteromonas haloplanktis* TAC125. *Nitric Oxide* 73: 39-51.

This research article focusses on the properties of the genome of the Antarctic cold-adapted bacterium *Pseudoalteromonas haloplanktis* TAC125 (PhTAC125) and the role of oxygen-binding proteins in protection against oxidative and nitrosative stress.

8. **Takahashi A**, et al. 2018. Migratory movements and winter diving activity of Adélie penguins in East Antarctica. *Marine Ecology Progress Series* 589: 227-239.

This paper describes the winter diving activity of Adélie penguins for the first time, and highlight how penguin movement and behavior are closely associated with the seasonal polar environment.

*This is an important paper with no AnT-ERA SSC member as co-author but the issue links closely to the AnT-ERA ecosystem theme and AnT-ERA SSC members often and intensively discussed this issue especially with Paul Dayton but also the other authors:*

9. Dayton PK, Jarrell SC, Kim S, Parnell PE, Thrush SF, Hammerstrom K, Leichter JJ. 2019. Benthic responses to an Antarctic regime shift: food particle size and recruitment biology. *Ecological Applications* 29(1):e01823. Doi: 10.1002/eap.1823

This paper describes 40+ years observations of environmental conditions and the responses of benthic epifauna. It highlights perturbations resulting in shifts in food particle size, and those forming barriers to recruitment.

### **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)*

**None**

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

#### **Within SCAR**

- |           |                 |            |
|-----------|-----------------|------------|
| 1. AntEco | 2. BEPSII       | 3. ACCE    |
| 4. SOOS   | 5. MEASO (ICED) | 6. EG-BAMM |
| 7. ANTOS  |                 |            |

#### **Outside SCAR**

- |          |         |         |
|----------|---------|---------|
| 1. IPBES | 2. IPCC | 3. IASC |
|----------|---------|---------|

### **Updates for your group's SCAR web page**

Due to time limitation (also due to a high priority of other SCAR/AnT-ERA obligations) we did not have the capacity to familiarize with the new software and update our webpage ourselves. During the Coimbra synthesis meeting we will develop a "low-effort" plan, how to publish the most important issues on the webpage with the support of the SCAR secretariat.

**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.)*

All such activities focus on the output of the Coimbra workshop to be published in 2020. A short report on the Spring Course for ECS was published on the SCAR webpage.