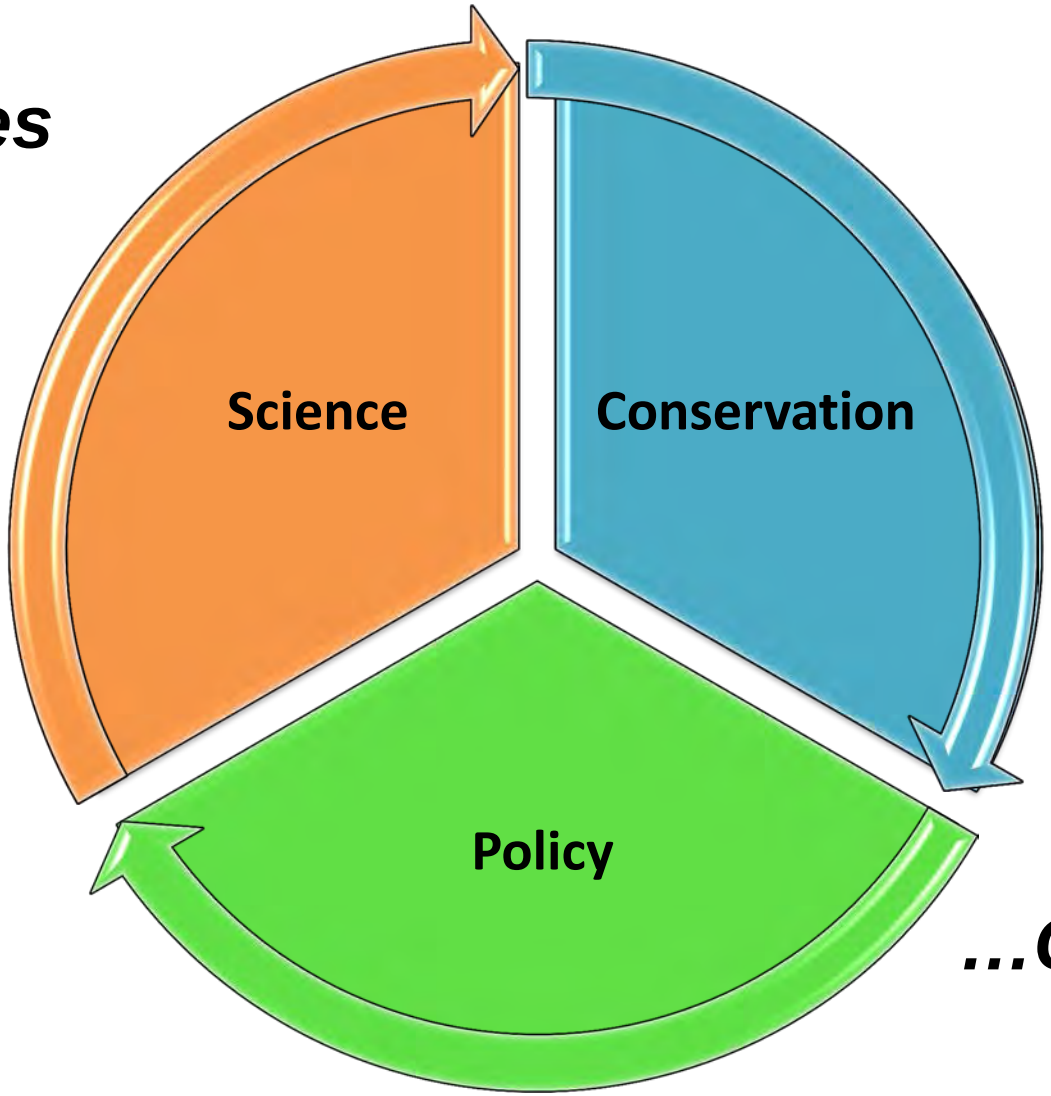
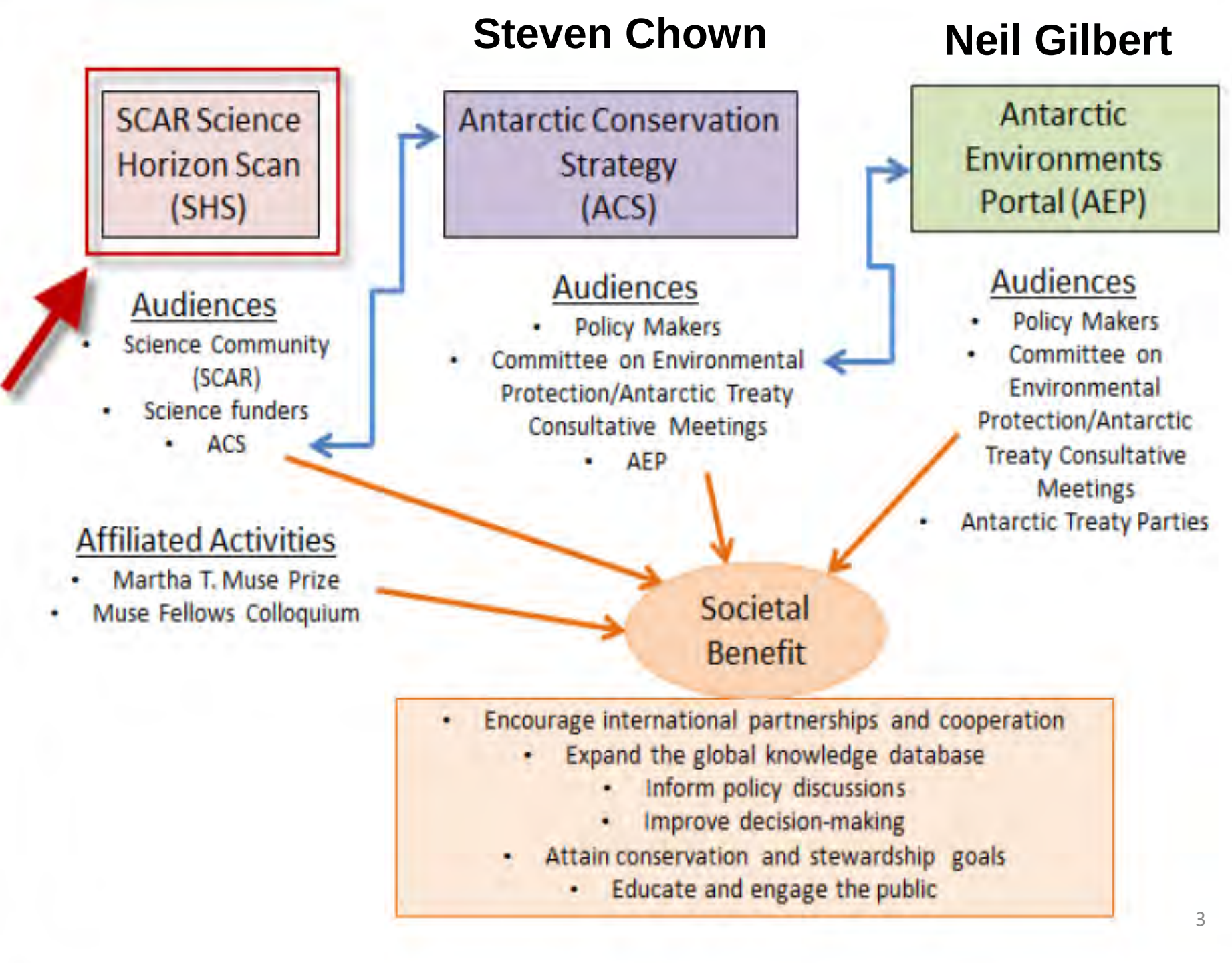
Integrating Science, Conservation and Policy in Antarctica in the 21st Century

Interfaces and…



…Challenges


Steven Chown
Neil Gilbert
SCAR Science Horizon Scan (SHS)
Antarctic Conservation Strategy (ACS)
Antarctic Environments Portal (AEP)
Audiences
Science Community (SCAR)
Science funders
ACS
Audiences
Policy Makers
Committee on Environmental Protection/Antarctic Treaty Consultative Meetings
AEP
Audiences
Policy Makers
Committee on Environmental Protection/Antarctic Treaty Consultative Meetings
Antarctic Treaty Parties
Affiliated Activities
Martha T. Muse Prize
Muse Fellows Colloquium
Societal Benefit
Encourage international partnerships and cooperation
Expand the global knowledge database
Inform policy discussions
Improve decision-making
Attain conservation and stewardship goals
Educate and engage the public

1st SCAR
Antarctic and Southern Ocean Science Horizon Scan

Word Cloud

The 1st SCAR Antarctic and Southern Ocean Science Horizon Scan

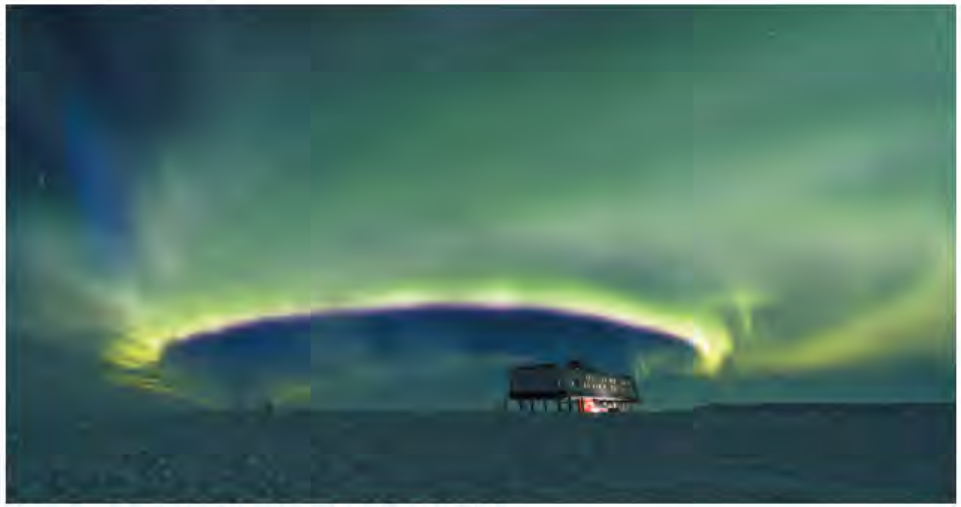
The international Antarctic community came together to "scan the horizon" to identify the highest priority scientific questions that researchers should aspire to answer in the next two decades and beyond.

An inclusive process

- Community-wide question solicitations
  - Round 1 – 751 questions
  - Round 2 – 115 questions
- Retreat invitation nominations
  - 789 nominations of 510 individuals
- Scientists, Program Directors/Managers, policy makers, decision makers and early career scientists.

- 75 Retreat attendees from 22 countries
- 6-8 Observers (Nature, MFAT, Tinker Foundation, Media)

COMMENT



STEFAN CHRISTMANN/CBBS

The aurora australis over the German Antarctic research base, Neumayer-Station III.

Six priorities for Antarctic science

Mahlon C. Kennicutt II, Steven L. Chown and colleagues outline the most pressing questions in southern polar research, and call for greater collaboration and environmental protection in the region.

Antarctica. The word conjures up images of mountains draped with glaciers, ferocious seas dotted with icebergs and iconic species found nowhere else. The continent includes about one-tenth of the planet's land surface, nearly 90% of Earth's ice and about 70% of its fresh water. Its encircling ocean supports Patagonian toothfish and krill fisheries, and is crucial for regulating climate and the uptake of carbon dioxide by sea water.

Antarctic scientists are unlocking the secrets of Earth's climate, revealing lakes and mountains beneath the ice, exploring the deep sea and contemplating the origins of life and the Universe. Once seen as a desolate place frozen in time, Antarctica is now known to be experiencing relentless change. Local transformations such as the loss of ice, changes in ocean circulation and recovery of atmospheric ozone have global consequences — for climate, sea level, biodiversity and society.

In April 2014, the Scientific Committee on Antarctic Research (SCAR) convened 75 scientists and policy-makers from 22 countries to agree on the priorities for Antarctic research for the next two decades and beyond. This is the first time that the international Antarctic community has formulated a collective vision, through discussions, debate and voting. The SCAR Antarctic and Southern Ocean Science Horizon Scan narrowed a list of hundreds of scientific questions to the 80 most pressing ones (see Supplementary Information; go.nature.com/iilhsa). A full report will be published in August.

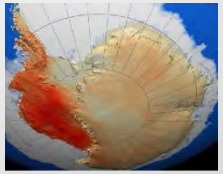
Process and Outcomes

Online August 2014

QR Code

SCIENCE PRIORITIES FOR…

DEFINE
the global reach of the Antarctic atmosphere and Southern Ocean



Stieg et al 2009

UNDERSTAND
how, where and why ice sheets lose mass

RECOGNIZE AND MITIGATE
human influences

Antarctic and Southern Ocean Science

REVEAL
Antarctica's history

OBSERVE
space and the Universe

LEARN
how Antarctic life evolved and survived

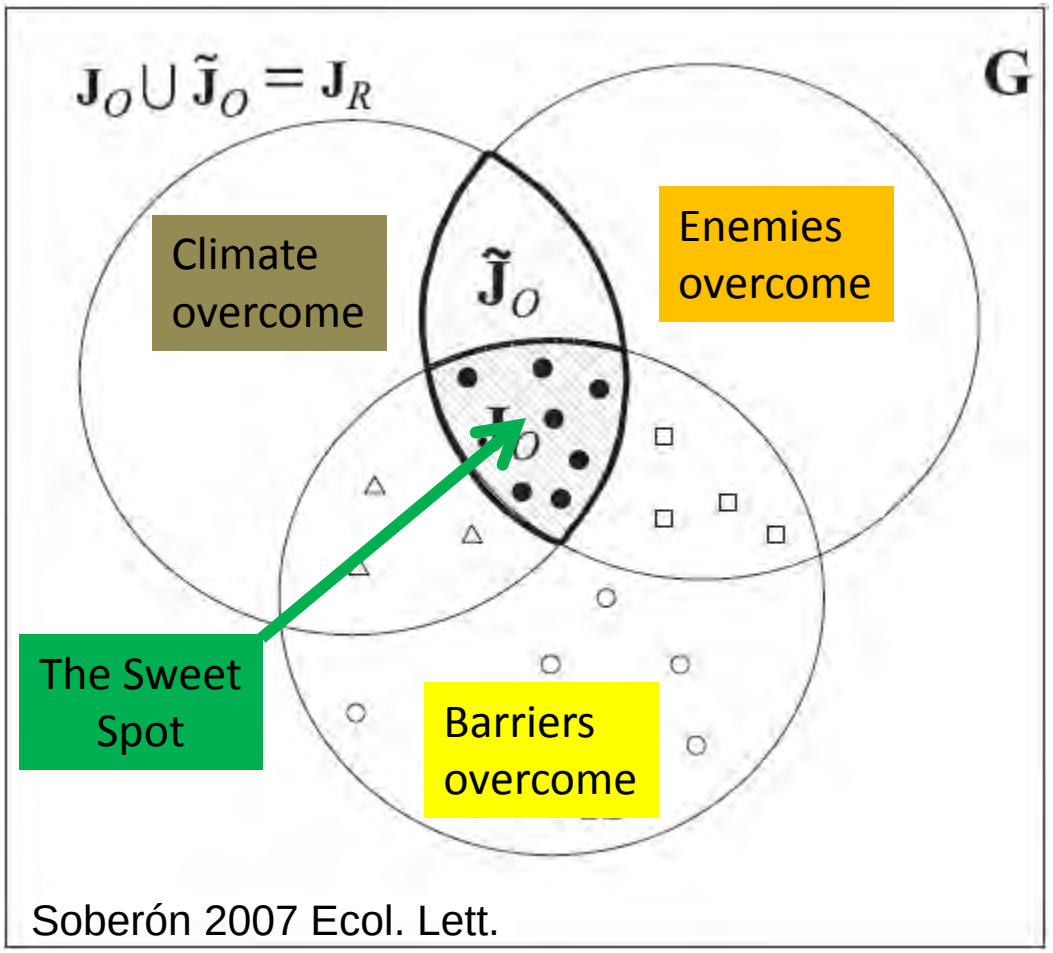
Integrated Science
The History and Future of Life

Informing policy, changing the course of events

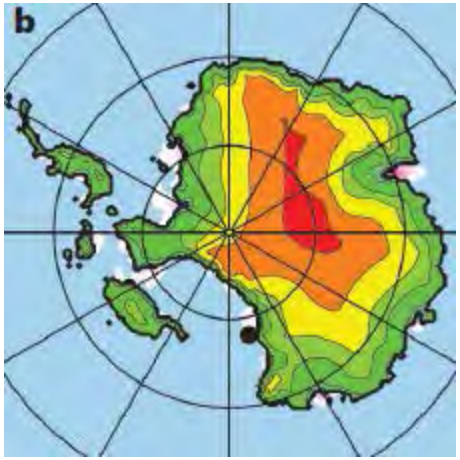
Six priorities for Antarctic science

environments.aq

Theory, empiricism, technology, policy

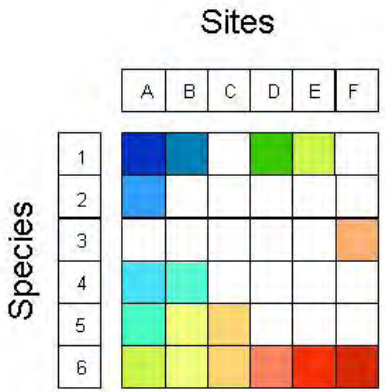


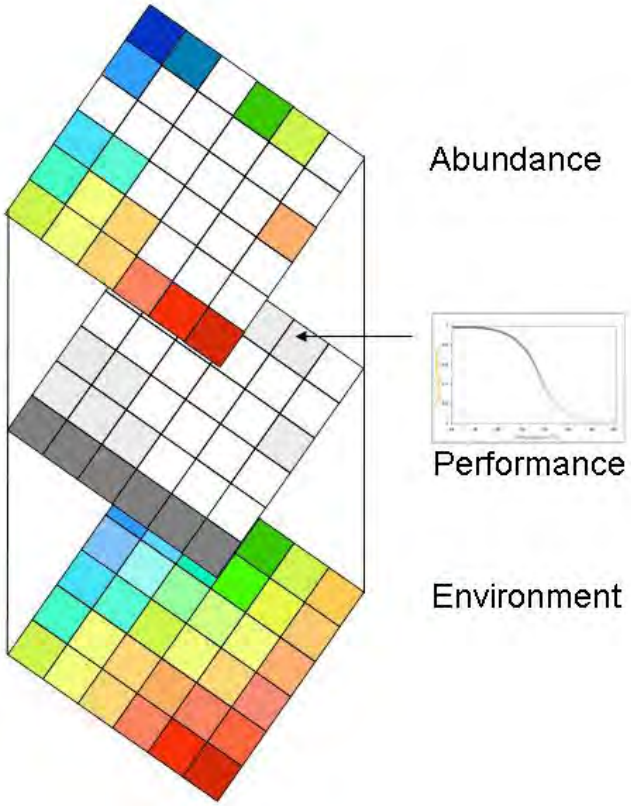
Soberón 2007 Ecol. Lett.

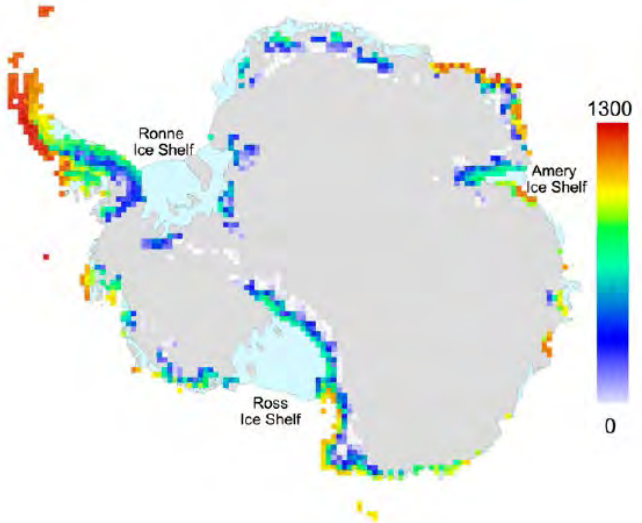


Pollard & Deconto 2009 Nature.

Theory, empiricism, technology, policy



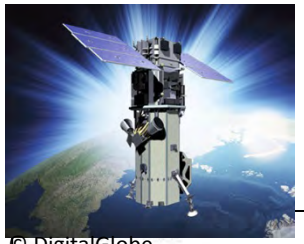




Time

Compact genome of the Antarctic midge is likely an adaptation to an extreme environment

Joanna L. Kelley[1,2], Justin T. Peyton[3,4,*], Anna-Sophie Fiston-Lavier[5,6,*], Nicholas M. Teets[3,7], Muh-Ching Yee[1,8], J. Spencer Johnston[9], Carlos D. Bustamante[1], Richard E. Lee[10] & David L. Denlinger[3,4]



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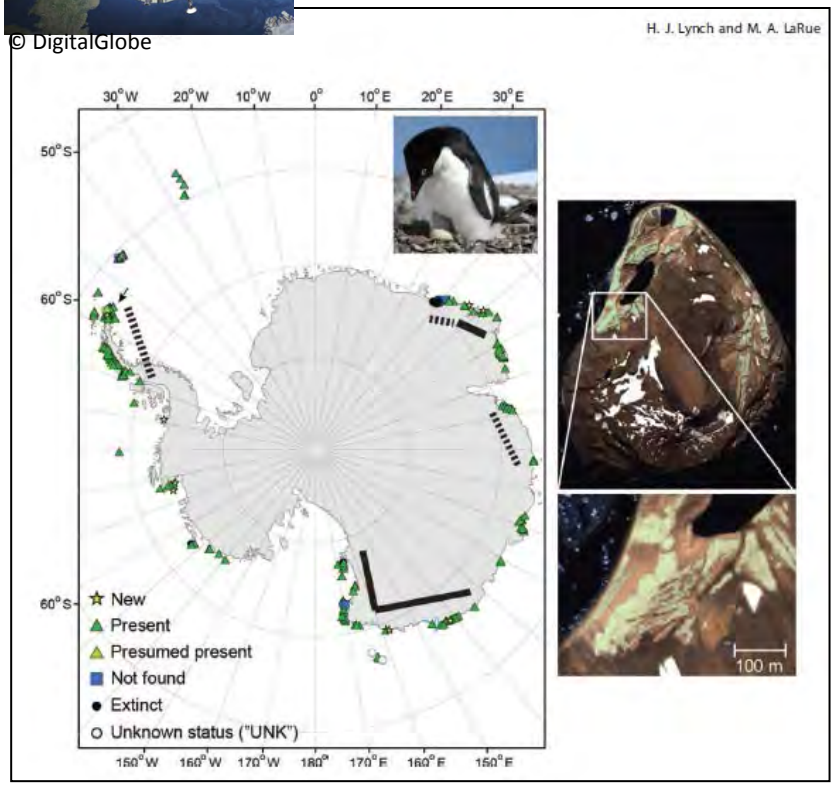
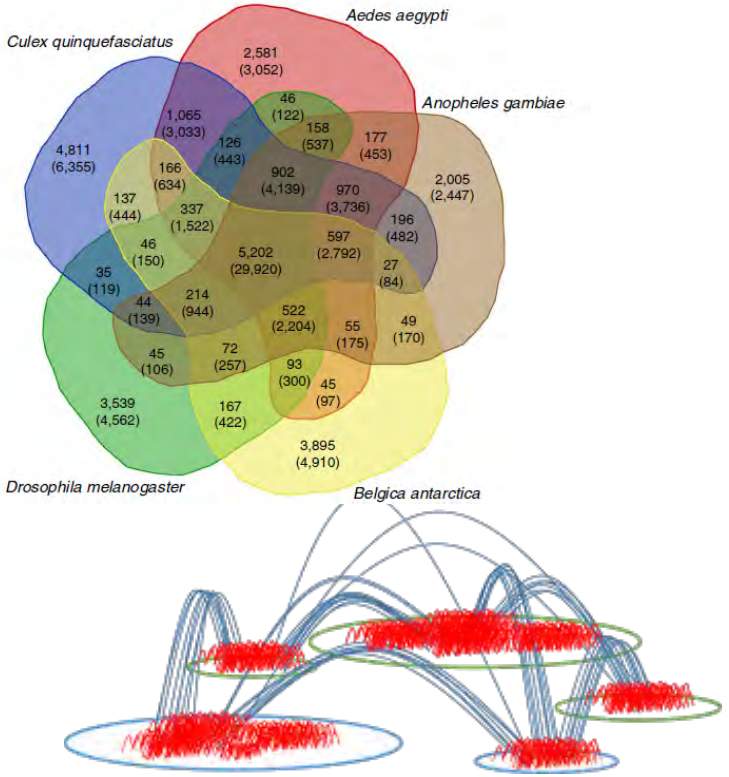




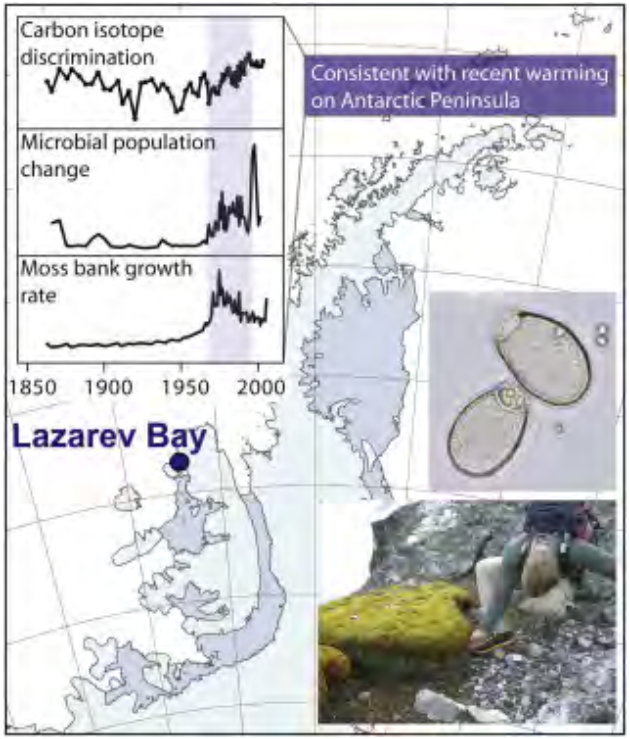
Eric Sokol's
MCSim metacommunity model

Whales from Space: Counting Southern Right Whales by Satellite

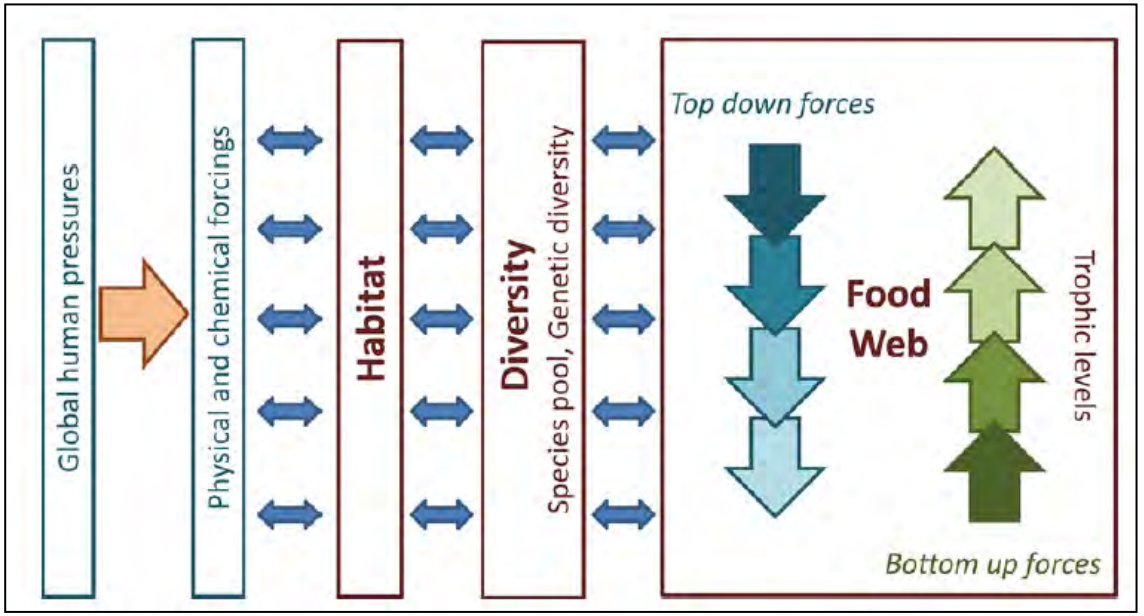
Peter T. Fretwell[1]*, Iain J. Staniland[2], Jaume Forcada[2]

ECOSPHERE

Local and regional influences over soil microbial metacommunities in the Transantarctic Mountains



Royles et al. 2013, Curr. Biol.



Constable et al. 2014, Global Change Biol.

nature COMMUNICATIONS

ARTICLE

Received 10 Oct 2013 | Accepted 14 Apr 2014 | Published 20 May 2014

DOI: 10.1038/ncomms4875

Evidence of global-scale aeolian dispersal and endemism in isolated geothermal microbial communities of Antarctica

Craig W. Herbold[1,2], Charles K. Lee[1,2], Ian R. McDonald[1,2] & S. Craig Cary[1,2,3]

PROCEEDINGS OF THE ROYAL SOCIETY B

rspb.royalsocietypublishing.org

Research

CrossMark

Demographic consequences of heavy metals and persistent organic pollutants in a vulnerable long-lived bird, the wandering albatross

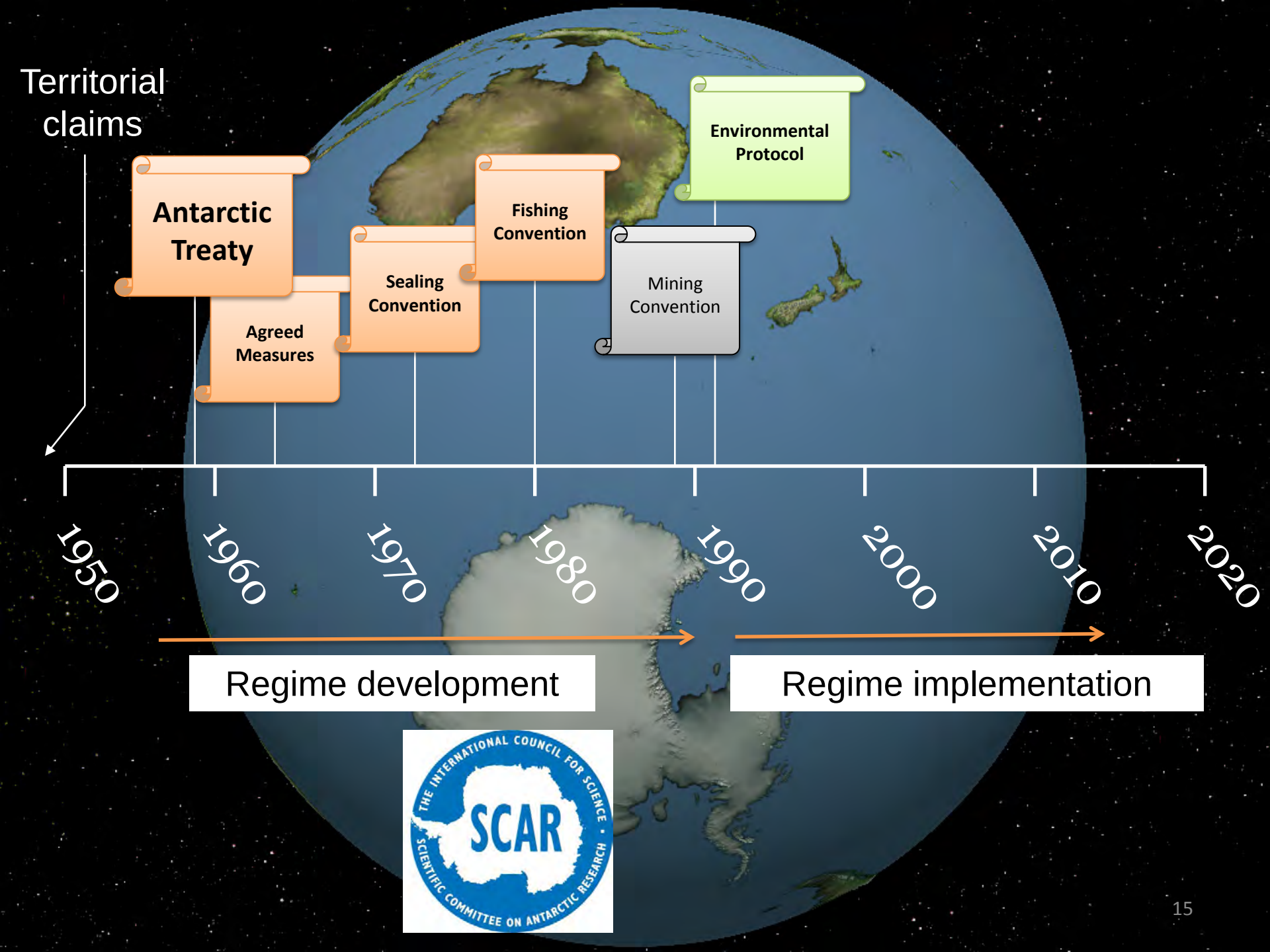
Aurélie Goutte[1,2], Christophe Barbraud[1], Alizée Meillère[1], Alice Carravieri[1], Paco Bustamante[2], Pierre Labadie[3], Hélène Budzinski[3], Karine Delord[1], Yves Cherel[1], Henri Weimerskirch[1] and Olivier Chastel[1]

Informing policy and changing the course of events

The Antarctic Conservation Strategy

Policymaker summary - Pressure, State, Response

1. Biodiversity status
2. Current and future threats
3. Climate change and associated processes
4. Protected areas
5. Biological invasions and disease
6. Species-level management
7. Human disturbance to wildlife
8. Pollution and waste management
9. Habitat degradation
10. Marine noise and light pollution
11. Integrated responses and ecosystems
12. Decision-support and implementation


Territorial claims
Antarctic Treaty
Agreed Measures
Sealing Convention
Fishing Convention
Mining Convention
Environmental Protocol
1950
1960
1970
1980
1990
2000
2010
2020
Regime development
Regime implementation
THE INTERNATIONAL COUNCIL FOR SCIENCE
SCAR
SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH

The Antarctic Treaty System

Antarctic Treaty
Promotes peace and science

Antarctic Treaty Meetings

Environmental Protocol
Designates Antarctica as a natural reserve for peace and science
Sets out tough environmental rules

Committee for Environmental Protection

Commission

Scientific Committee

Convention on Antarctic Marine Living Resources
Conservation and rational use of marine resources

Committee for Environmental Protection

- Advises Treaty Parties on:
  - Environmental protection measures
  - Minimising / mitigating environmental impacts
  - Protecting special areas
  - Protecting species
  - The state of the Antarctic environment
  - The need for scientific research

Informed governance and management of Antarctica

Science to action

- State of environment reporting
- Management Action
  - Protected areas, specially protected species, EIA, guidance material, standards, catch limits, prohibitions
- Support / request research and monitoring
- Adopt / employ conservation tools
- Communicate nationally and internationally

Committee for Environmental Protection (CEP)

NON-NATIVE SPECIES MANUAL

EDITION 2011

Management Plan for

Antarctic Specially Protected Area (ASPA) No. 124

CAPE CROZIER, ROSS ISLAND

Introduction

The Cape Crozier Antarctic Specially Protected Area (ASPA) is located at the eastern extremity of Ross Island, Ross Sea. Approximate area and coordinates: ~70 km (centered at 169° 19' 53" E, 77° 28' 54" S), of which ~43 km (61%) is marine (including ice shelf) and ~27 km is terrestrial (39%). The primary reasons for

y rich vegetation and historic values.

most southerly known, and it also

of the largest known. The Area is

GUIDELINES FOR THE OPERATION OF AIRCRAFT NEAR CONCENTRATIONS OF BIRDS IN ANTARCTICA

Fixed and rotary wing aircraft operations have the potential to cause disturbance leading to changes in the behaviour, physiology and the breeding success of wildlife. The level of impact will vary according to the intensity, duration and frequency of disturbance, the species involved and the phase in their breeding season. Most species are particularly sensitive to disturbance between late September and early May-the period when Antarctic helicopter and fixed wing

Annex to Resolution 3 (2006)

Practical Guidelines for Ballast Water Exchange in the Antarctic Treaty Area

1. The application of these Guidelines should apply to those vessels covered by Article 3 of the IMO's International Convention for the Control and Management of Ships' Ballast Water and Sediments (the Ballast Water Management Convention), taking into account the exceptions in Regulation A-3 of the Convention. These Guidelines do not replace the requirements of the Ballast Water Management Convention, but provide an interim Ballast

Site Guidelines for visitors

The aim of these guidelines is to provide specific instructions on the conduct of activities at the most frequently visited Antarctic sites. This includes practical guidance for tour operators and guides on how they should conduct visits in those sites, taking into account their environmental values and sensitivities.

Site Guidelines (2014)


1. Penguin Island


2. Barrientos Island - Aitcho Islands


3. Cuverville Island


4. Jougla Point


5. Goudier Island, Port Lockroy


6. Hannah Point


7. Neko Harbour

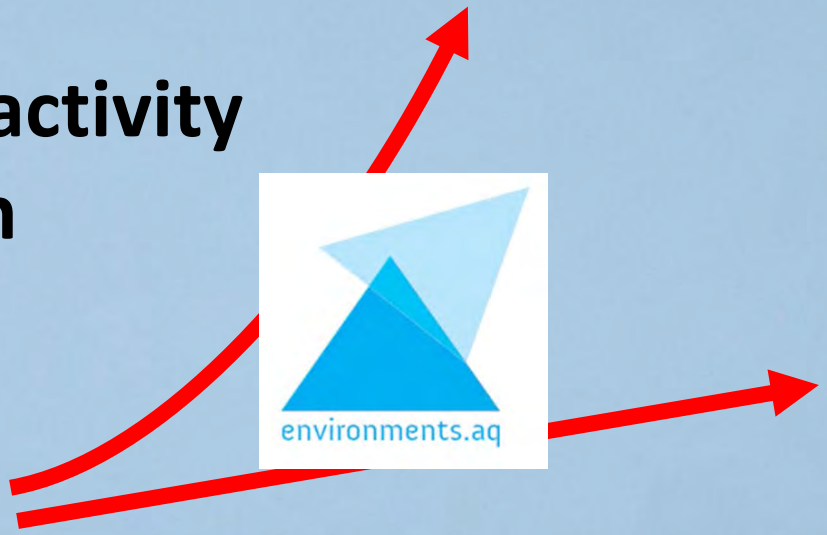

8. Paulet Island


9. Petermann Island


10. Pléneau Island

The pace of change:

- climate
- human activity
- research



The pace of decision making:

- information
- awareness
- strategic planning
- Management tools

The Auk
Ornithological Advances

RESEARCH ARTICLE

First global census of the Adélie Penguin

H. J. Lynch[1]* and M. A. LaRue[2]

[1] Department of Ecology and Evolution, Stony Brook University, Stony Brook, New York, USA
[2] Conservation Biology Graduate Program, University of Minnesota, St. Paul, Minnesota, USA
* Corresponding author: heather.lynch@stonybrook.edu

Submitted February 6, 2014; Accepted May 1, 2014; Published July 9, 2014

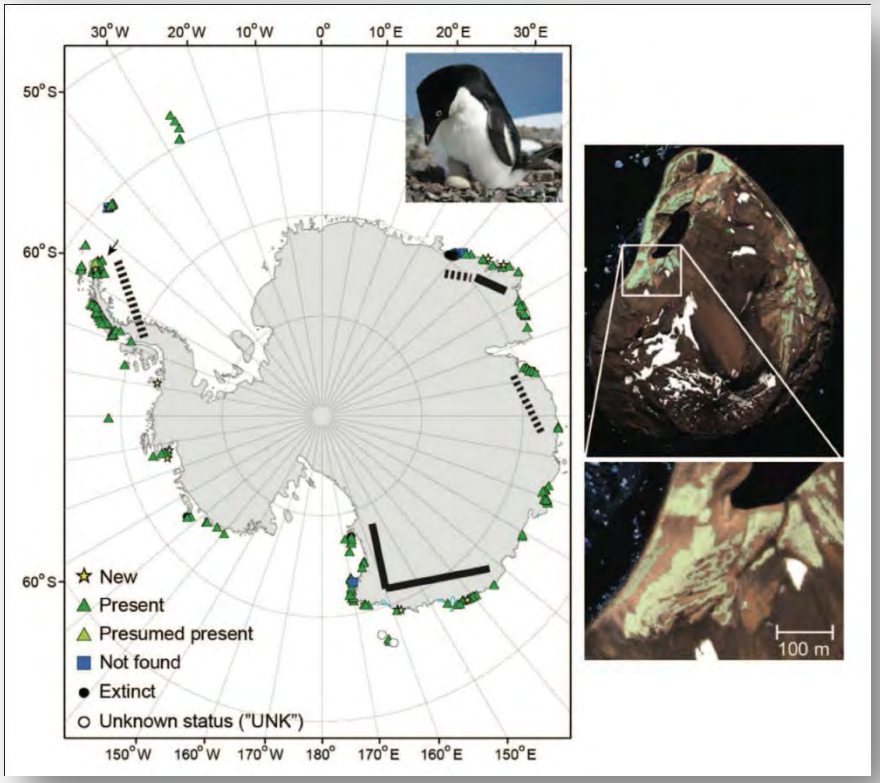
OPEN ACCESS Freely available online

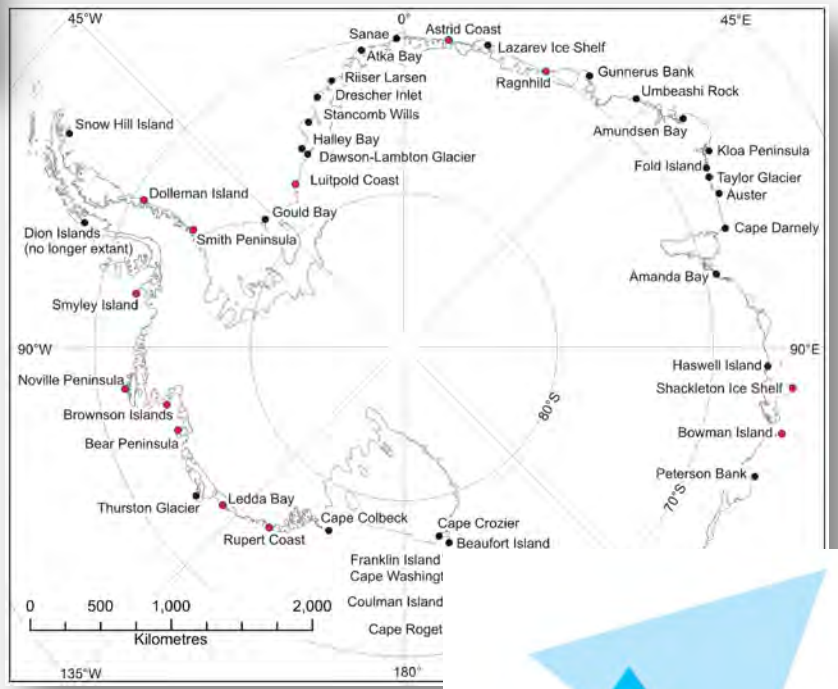
PLoS one

An Emperor Penguin Population Estimate: The First Global, Synoptic Survey of a Species from Space

Peter T. Fretwell[1]*, Michelle A. LaRue[2], Paul Morin[2], Gerald L. Kooyman[3], Barbara Wienecke[4], Norman Ratcliffe[1], Adrian J. Fox[1], Andrew H. Fleming[1], Claire Porter[2], Phil N. Trathan[1]

1 British Antarctic Survey, Cambridge, United Kingdom, 2 Polar Geospatial Center, University in Minnesota, Minneapolis, Minnesota, United States of America, 3 Scripps Institution of Oceanography, University of California San Diego, La Jolla, California, United States of America, 4 Australian Antarctic Division, Hobart, Tasmania, Australia

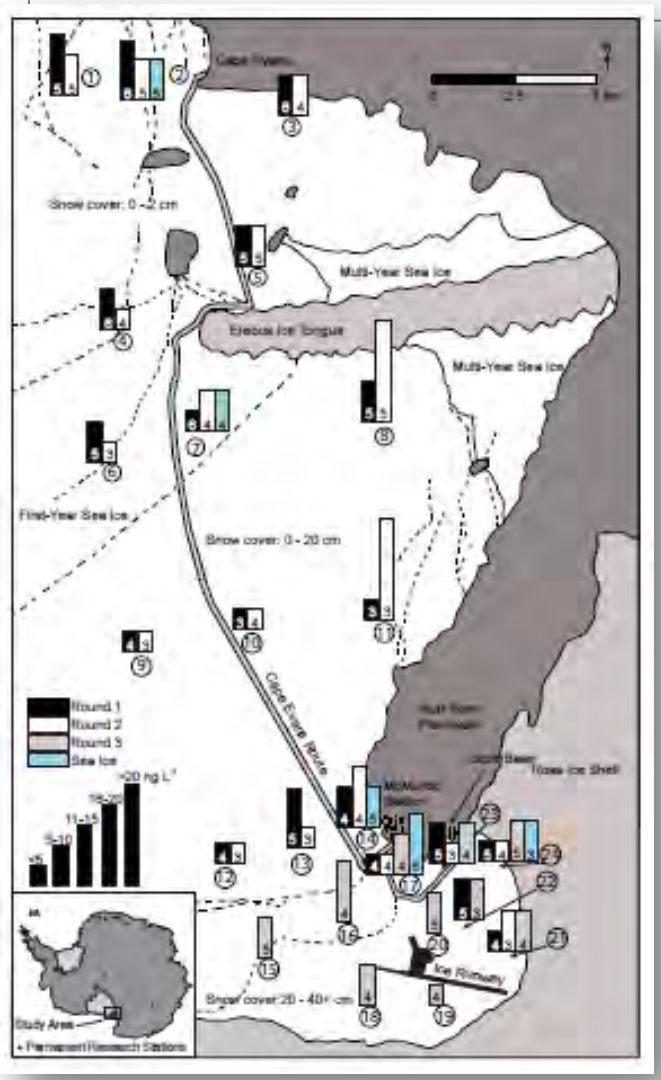




Information Summary

environments.aq

Out to Sea: Antarctic Research Station Effluents as a Source of Organic Micropollutants in Coastal Waters. Gaw, Emnet, Graham, Northcott, Storey. University of Canterbury



- Target analytes detected 25 km from the research bases
- Target analytes detected at concentrations similar to those reported in temperate environments with higher population densities.

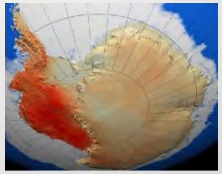
Emerging Issue

environments.aq

- Urgent & increasing need for information
- The Portal:
  - Antarctic science at the fingertips of policy makers
  - Independent, reliable, up-to-date, policy ready summaries on priority issues
  - Raises awareness of emerging issues
- Outcomes
  - Future proofing
  - Sustainable Antarctica
  - Sustainable Antarctic Treaty Syste

THE CHALLENGE…

SUSTAIN STABLE FUNDING



Stieg et al 2009

PROVIDE ACCESS

Region-wide

Year-round

COMMUNICATE

with all stakeholders

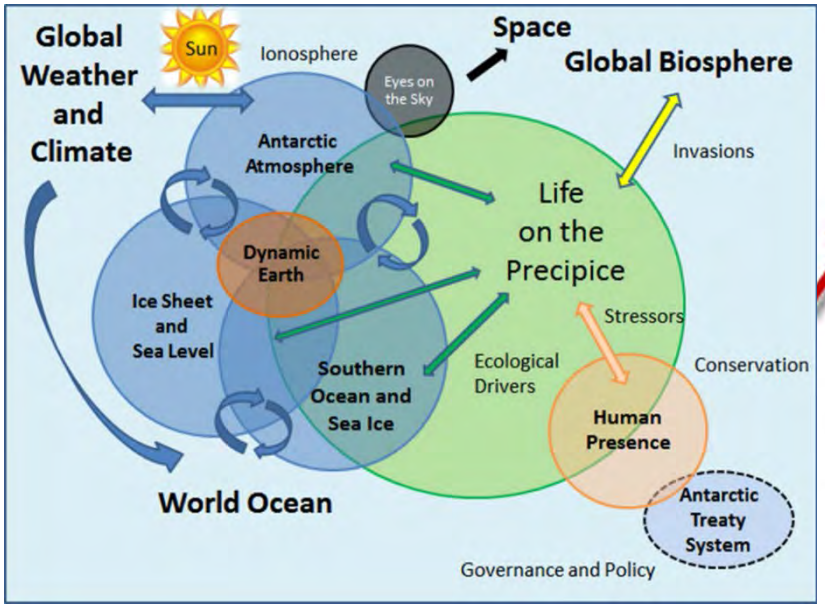
Realizing the Promise of Antarctic Science

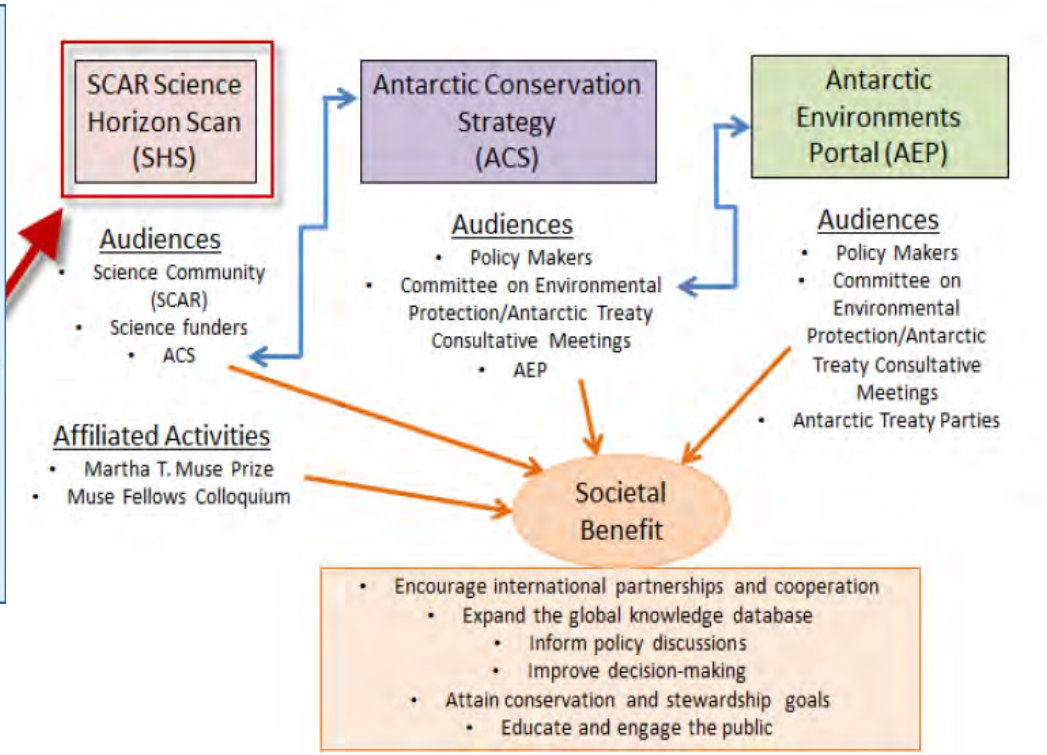
APPLY EMERGING TECHNOLOGIES

ENHANCE INTERNATIONAL COOPERATION

STRENGTHEN ENVIRONMENTAL PROTECTION

"The best way to predict the future is to invent it." A. Kay





"Tomorrow belongs to those who prepare for it today"

paraphrase of an African proverb

Horizon Scan Supporters

Queenstown, NZ
20-23 April 2014

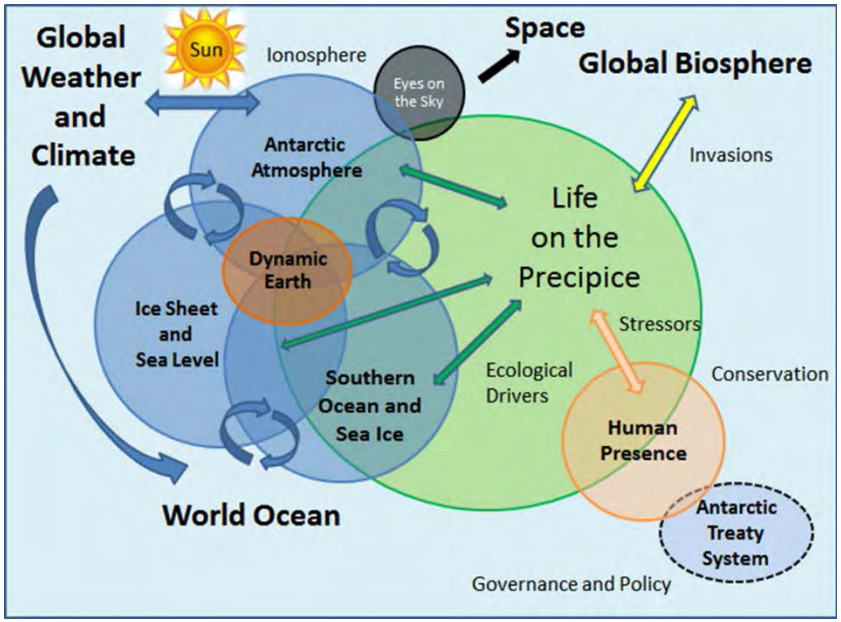
An enthusiastic community effort!

SCAR Antarctic & Southern Ocean Science Horizon Scan

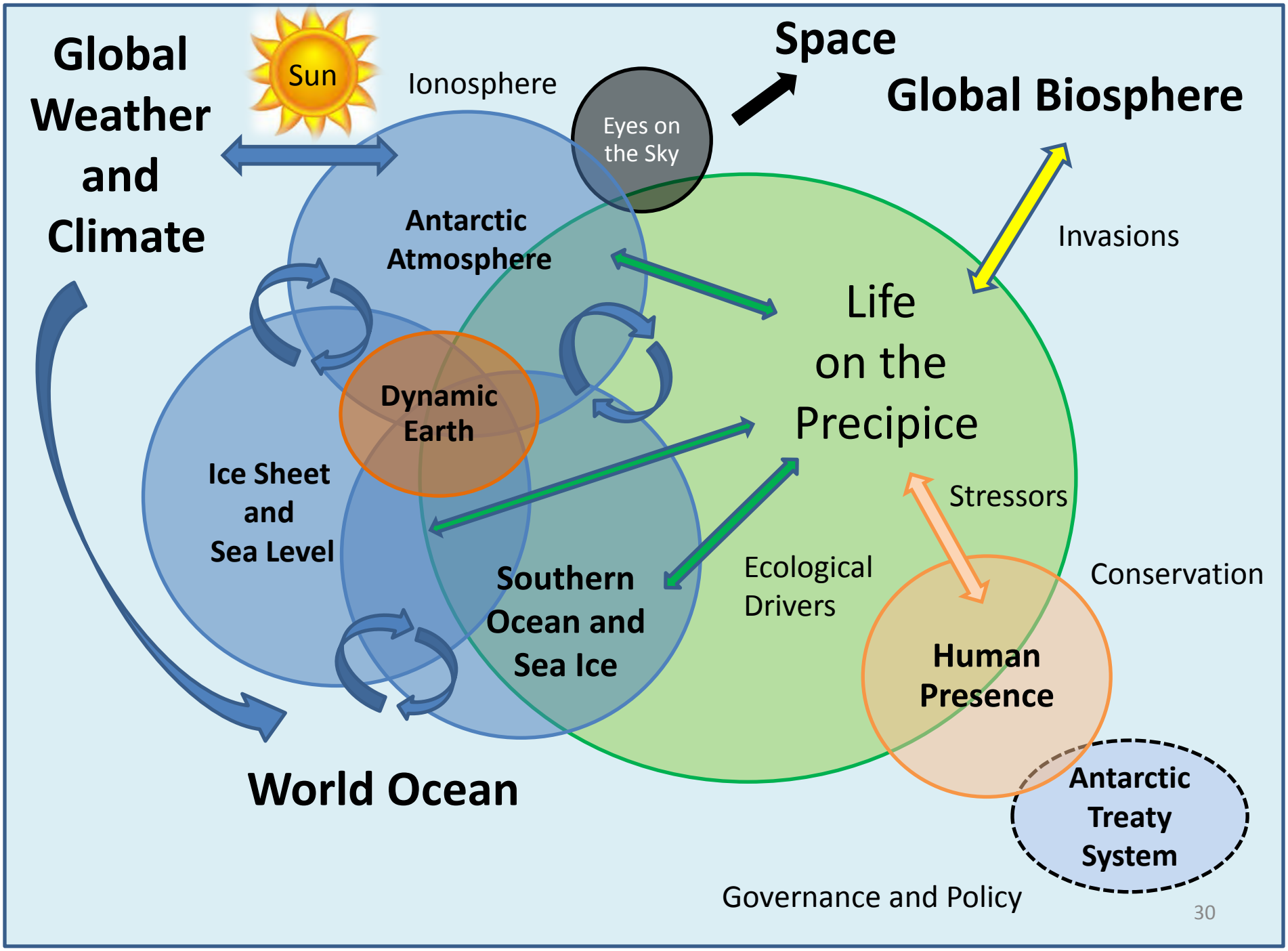
To Reach for the Horizon:

“A coordinated, portfolio of interdisciplinary science, based on enhanced international collaboration as no one scientist, program or nation can realize these aspirations alone.”

"The best way to predict the future is to invent it.” A. Kay



"Tomorrow belongs to those who prepare for it today” paraphrase of an African proverb


Global Weather and Climate
Sun
Ionosphere
Space
Global Biosphere
Eyes on the Sky
Antarctic Atmosphere
Invasions
Life on the Precipice
Dynamic Earth
Ice Sheet and Sea Level
Stressors
Ecological Drivers
Conservation
Southern Ocean and Sea Ice
Human Presence
World Ocean
Antarctic Treaty System
Governance and Policy