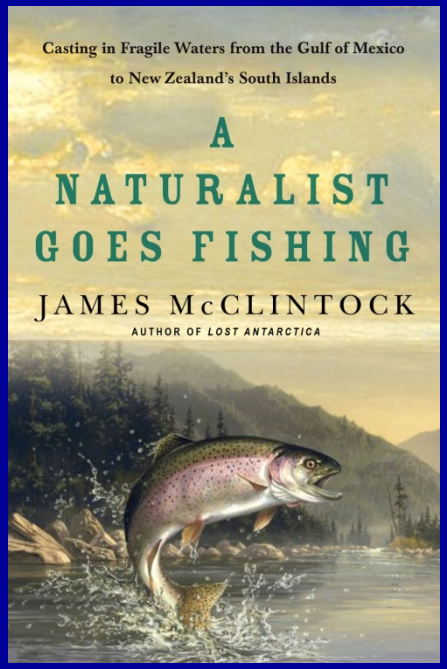
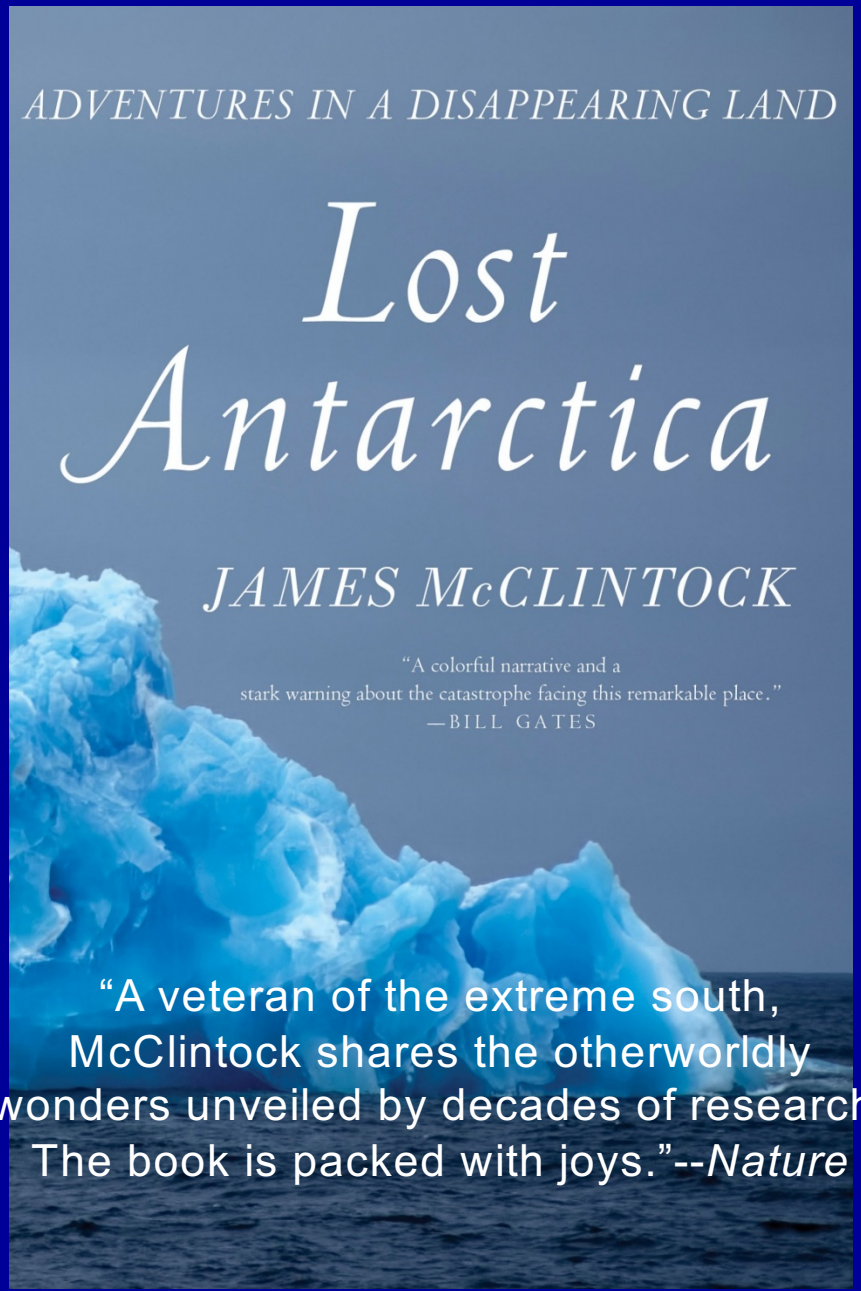
@JiminAntarctica



Recent Release!



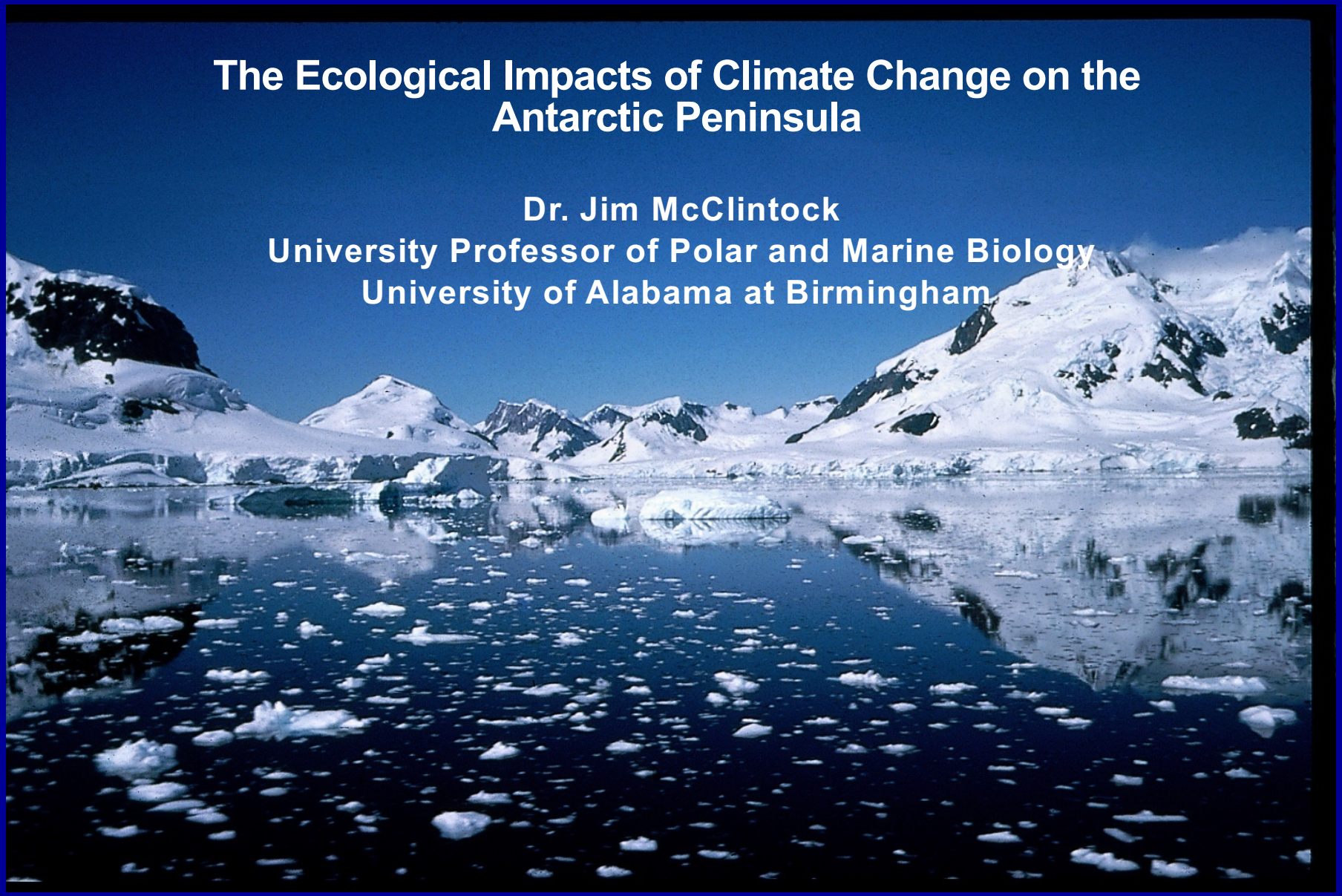
"A veteran of the extreme south, McClintock shares the otherworldly wonders unveiled by decades of research. The book is packed with joys."--*Nature*

I was gazing at a ceiling aglow and adorned with intricate platelets of ice.

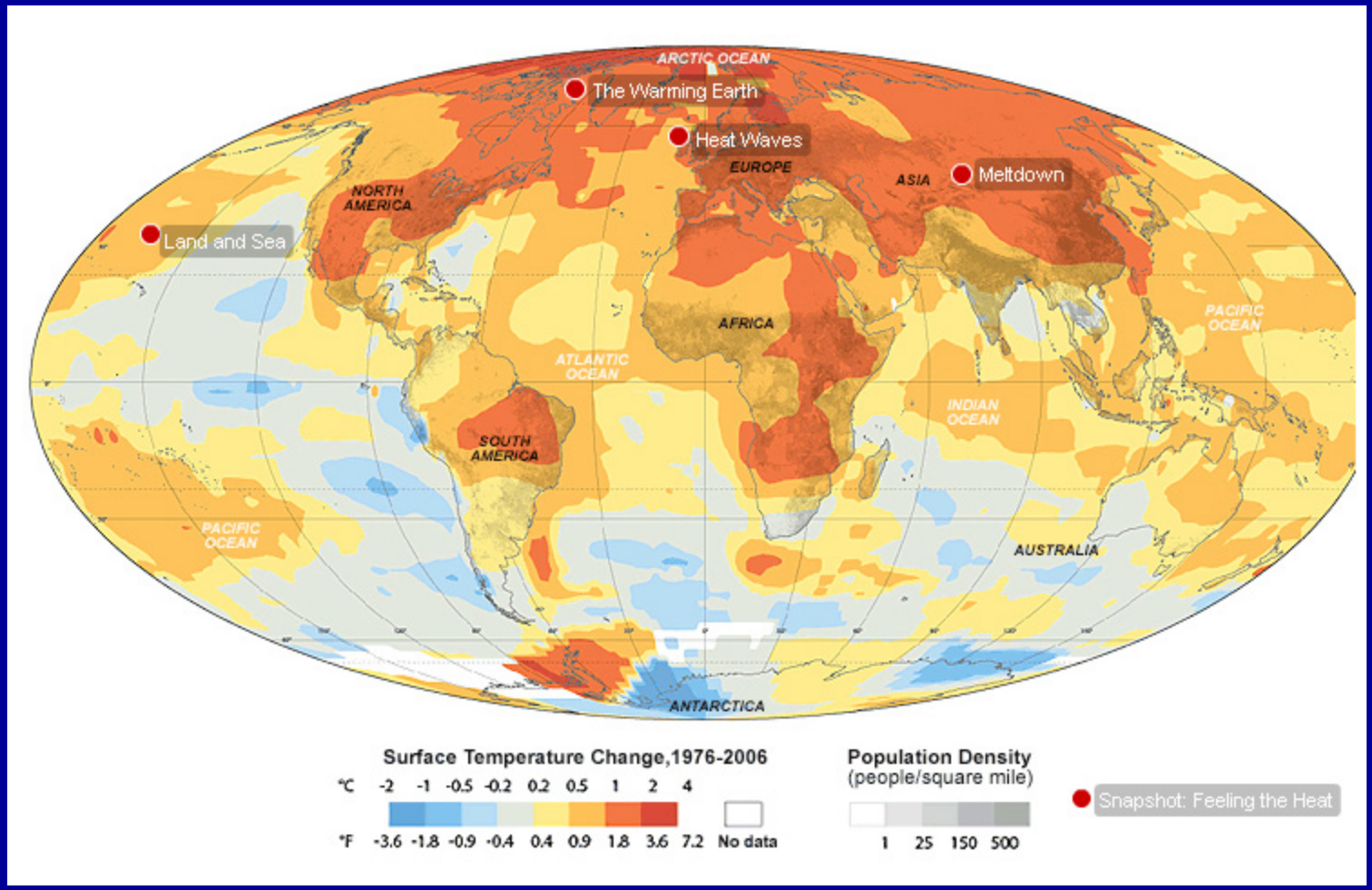
Lost Antarctica

The Ecological Impacts of Climate Change on the Antarctic Peninsula

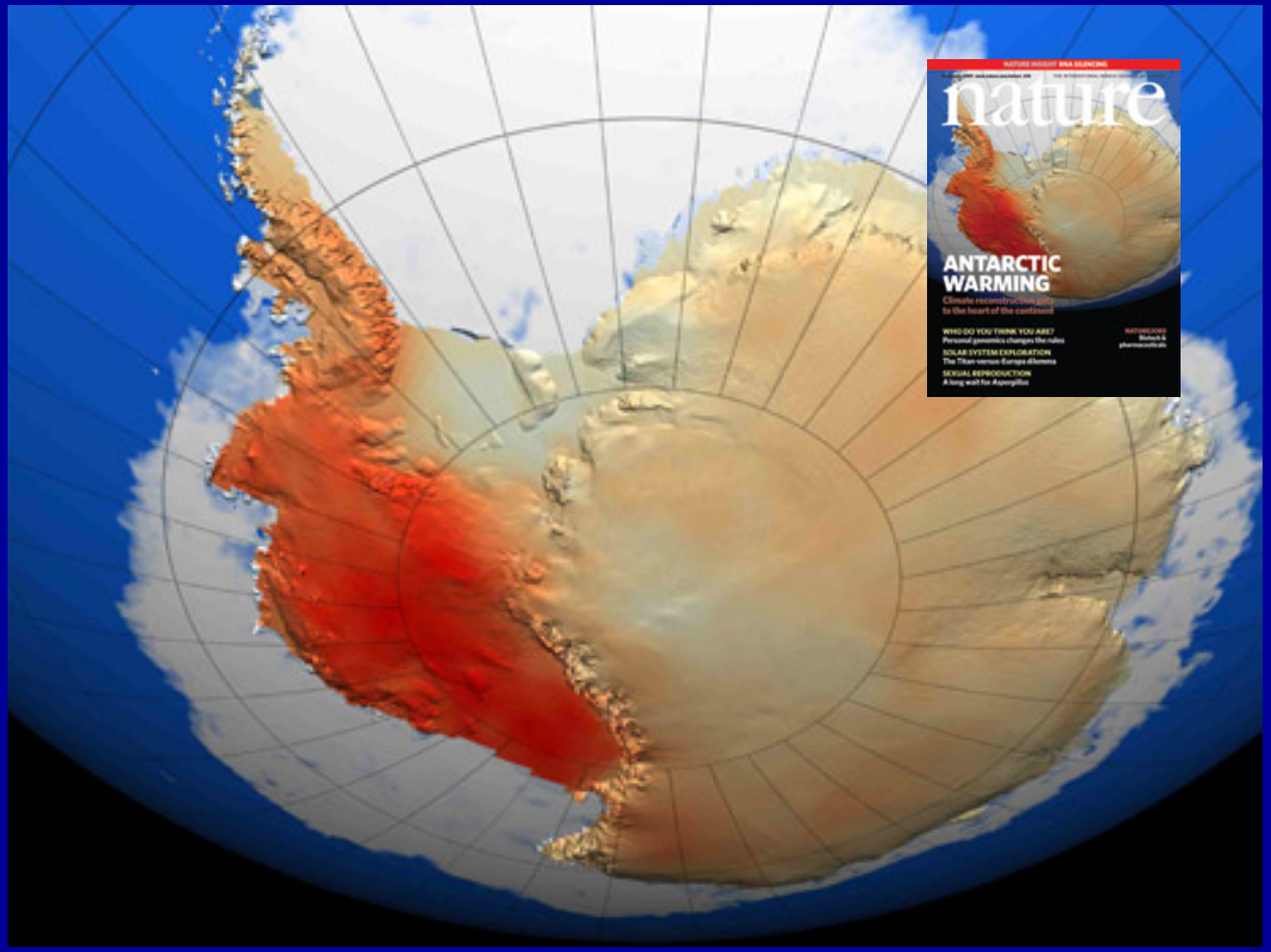
Dr. Jim McClintock
University Professor of Polar and Marine Biology
University of Alabama at Birmingham



Surface temperature changes 1976-2006

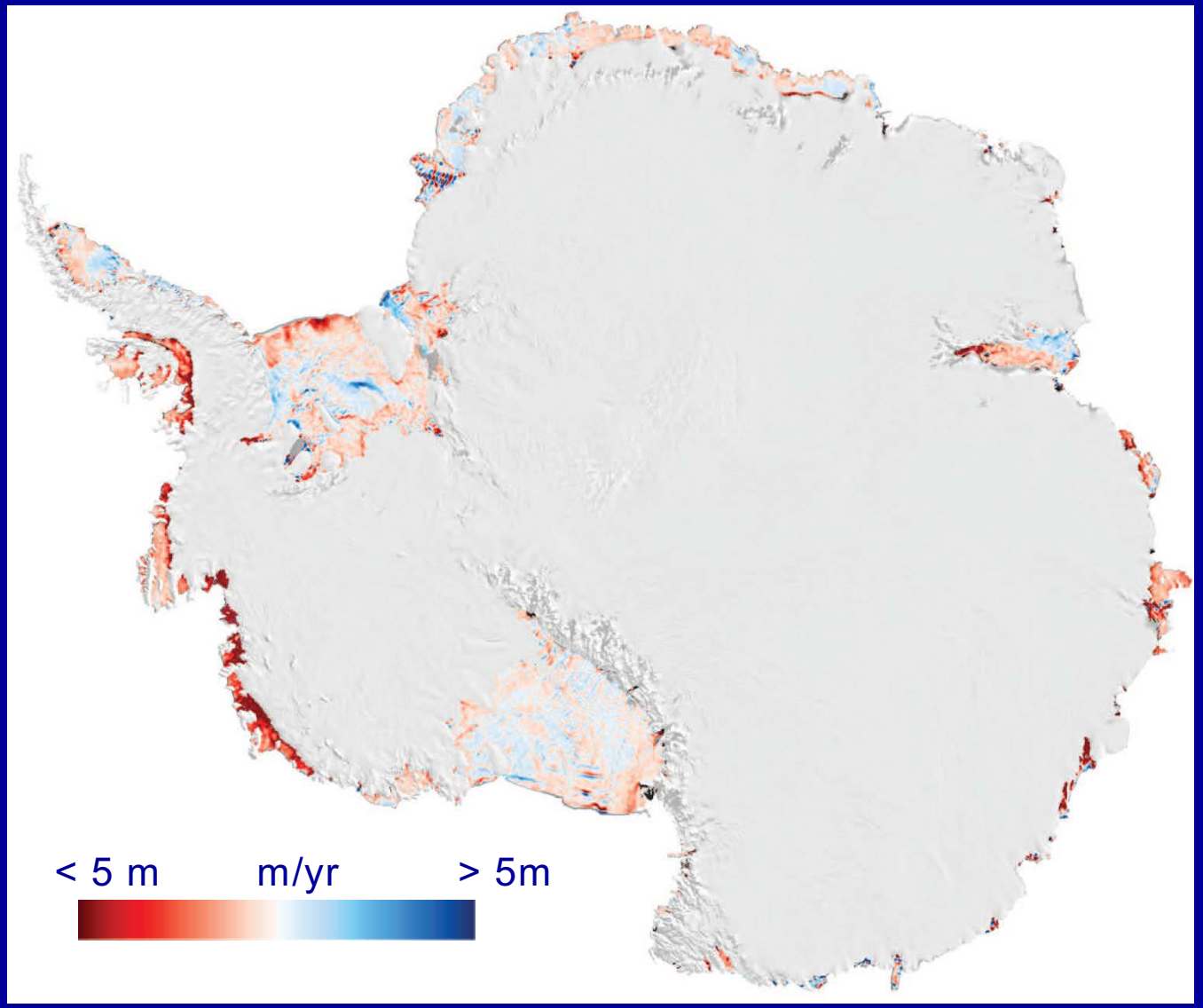


National Geographic 2007



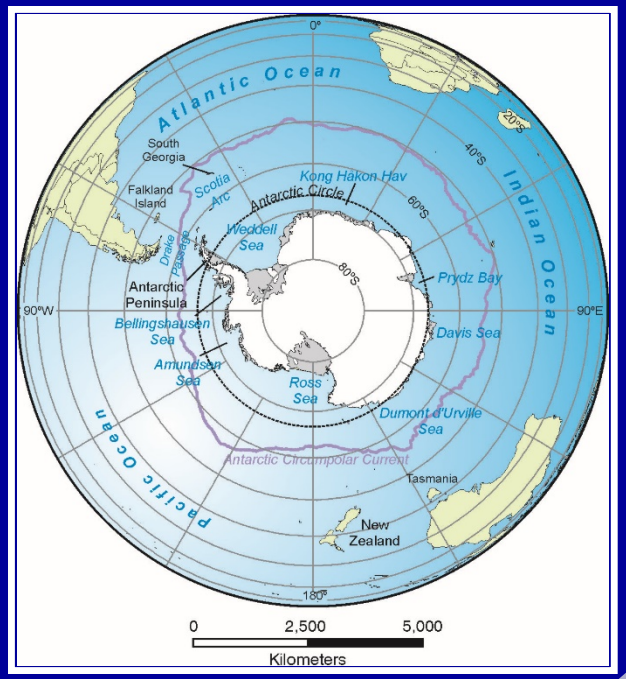
Antarctic warming patterns based on satellite and ground station data

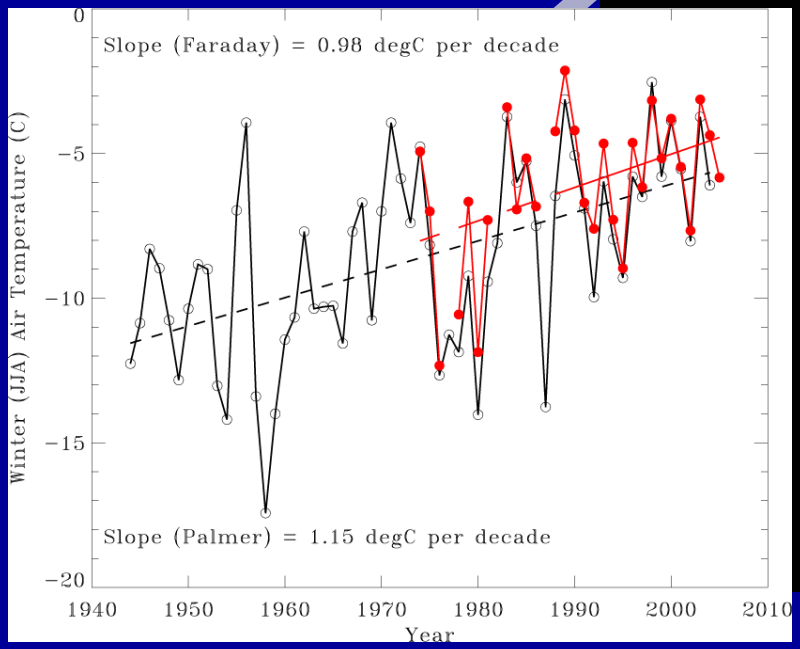
Steig et al. Nature 2009

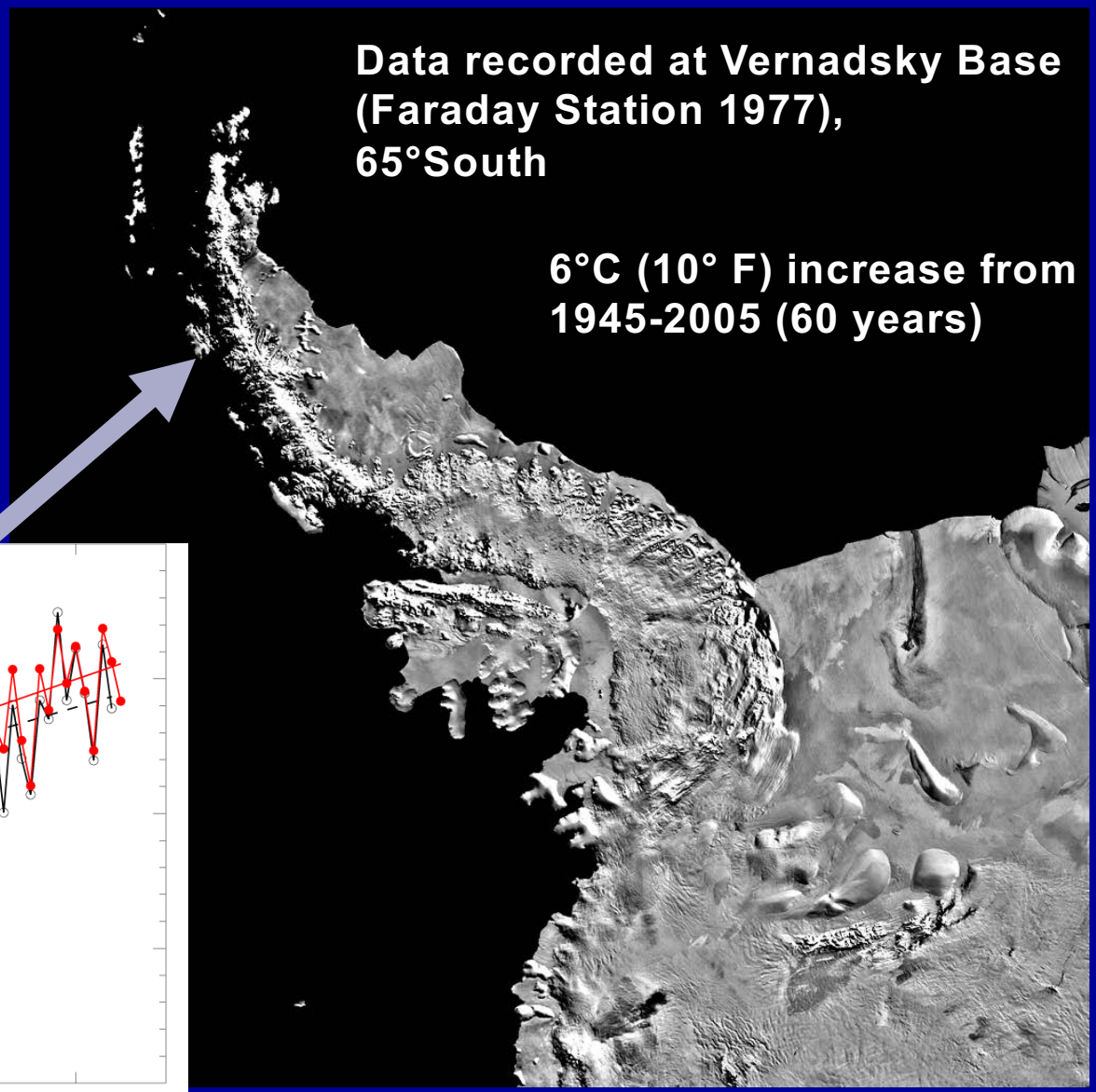


Ice Shelf Melting Around Antarctica

Rignot et al. 2013 Science 341, 266



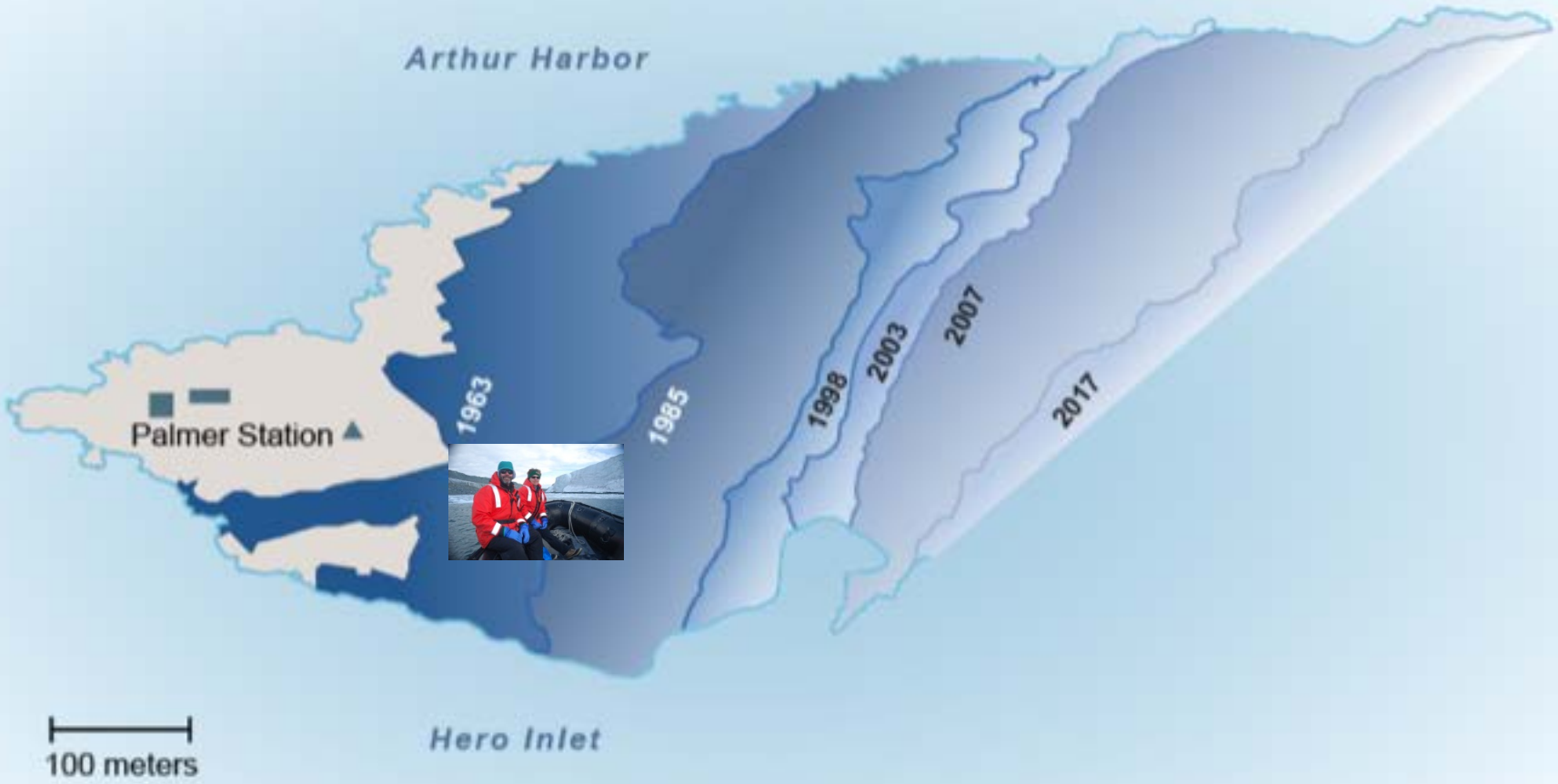


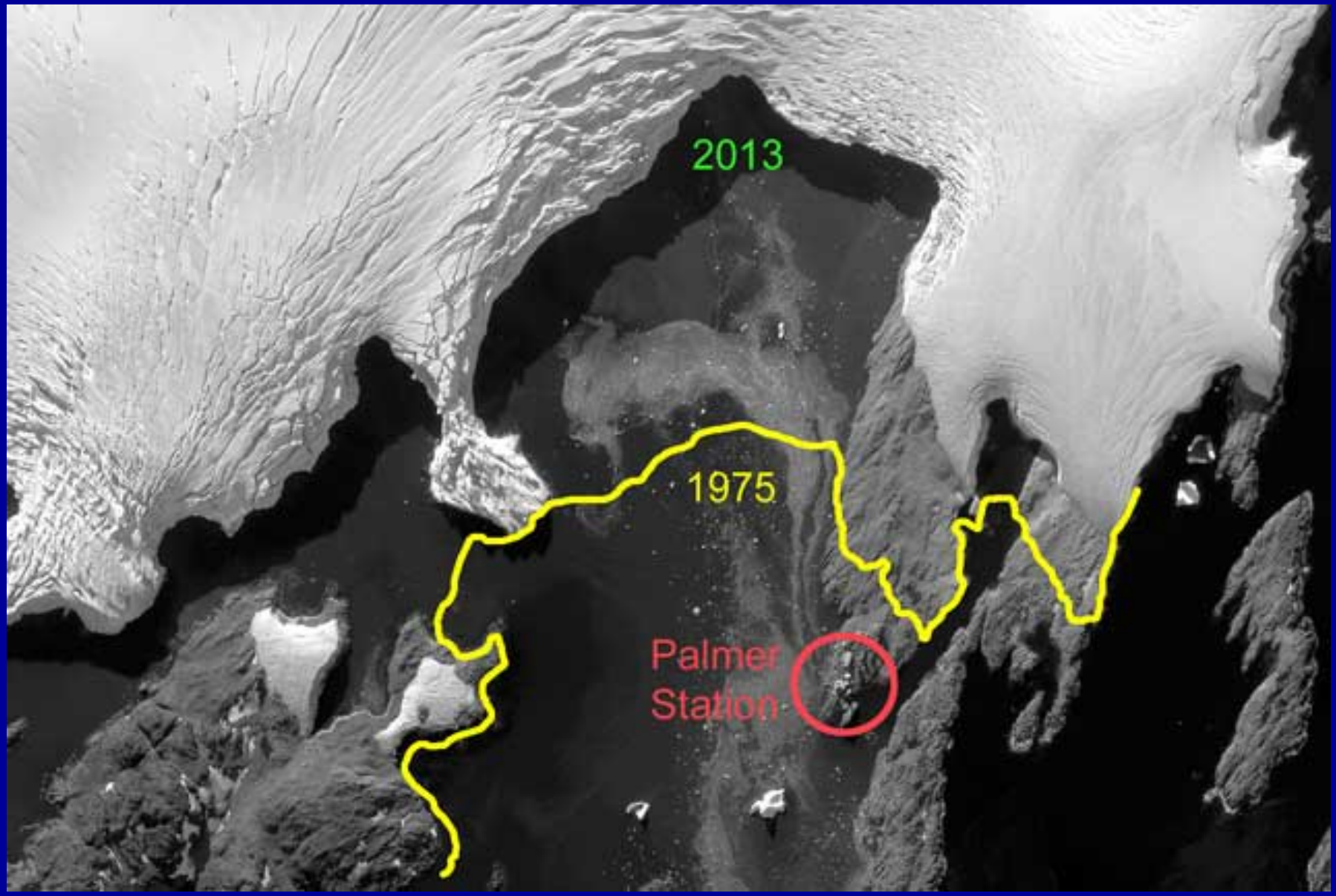


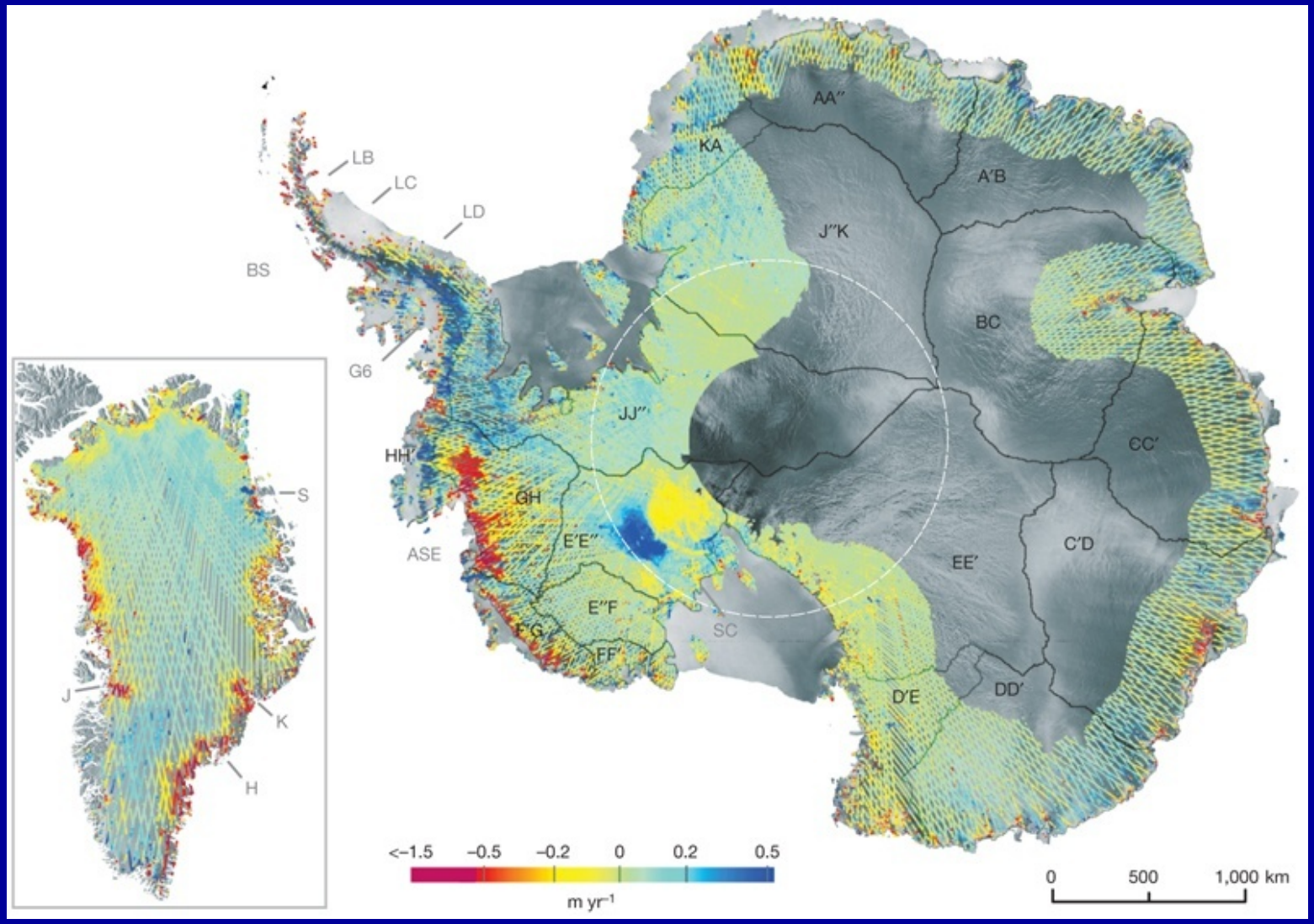
Source- H. Ducklow – NSF LTER

PHYSICAL IMPACTS OF CLIMATE CHANGE

Increased glacial calving – Marr Glacier, Anvers Island 2006


Arthur Harbor
Palmer Station
1963
1985
1998
2003
2007
2017
100 meters
Hero Inlet


2013
1975
Palmer
Station



Satellite generated measure of glacial ice thickness

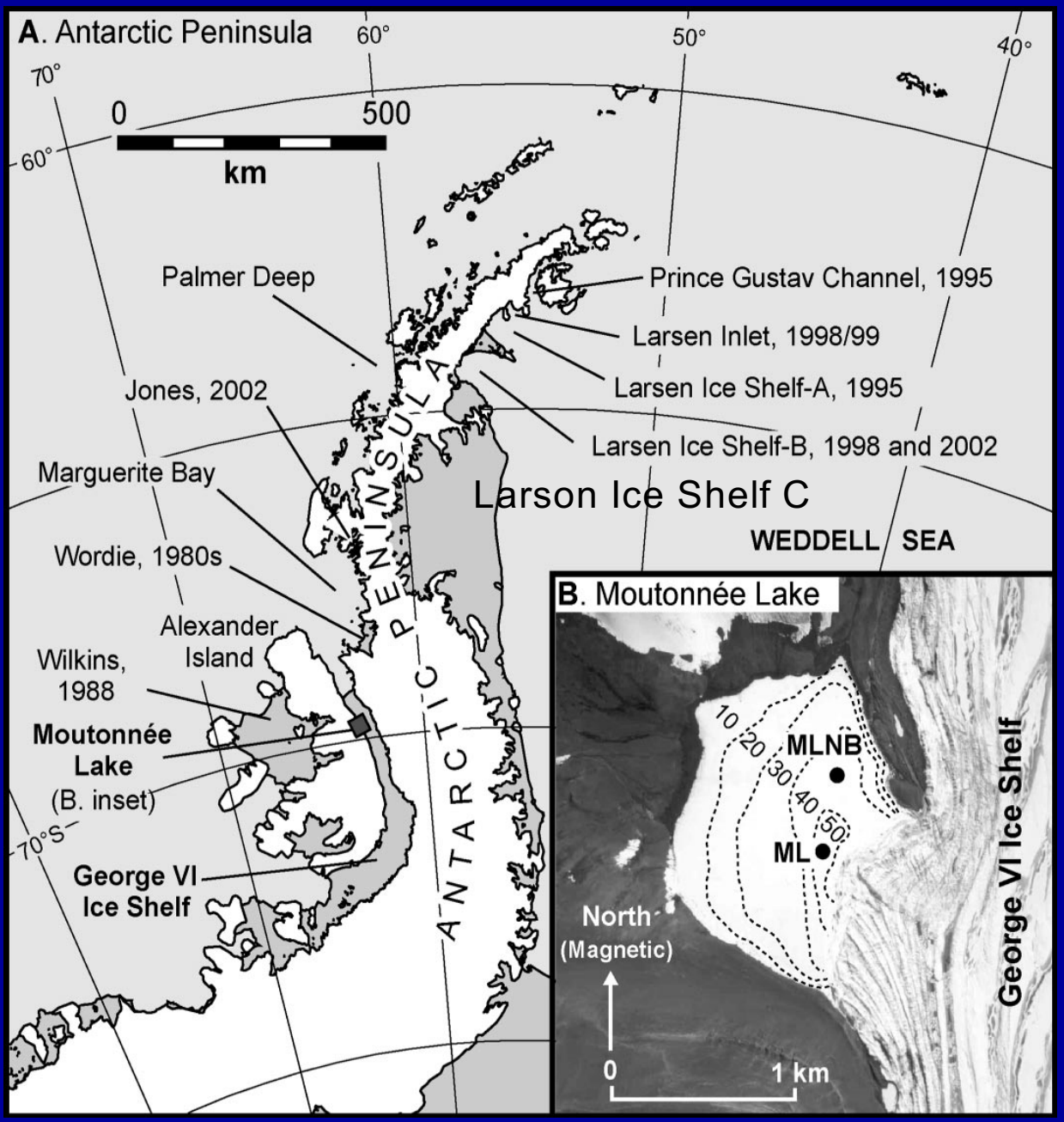
No Stopping the Collapse of West Antarctic Ice Sheet – *Science*

Thwaites Glacier 1992-2011 retreated 14 km between 1992-2011
Unprecedented for Antarctica

Models predict acceleration to 5 km per year and complete collapse in 200-500 years

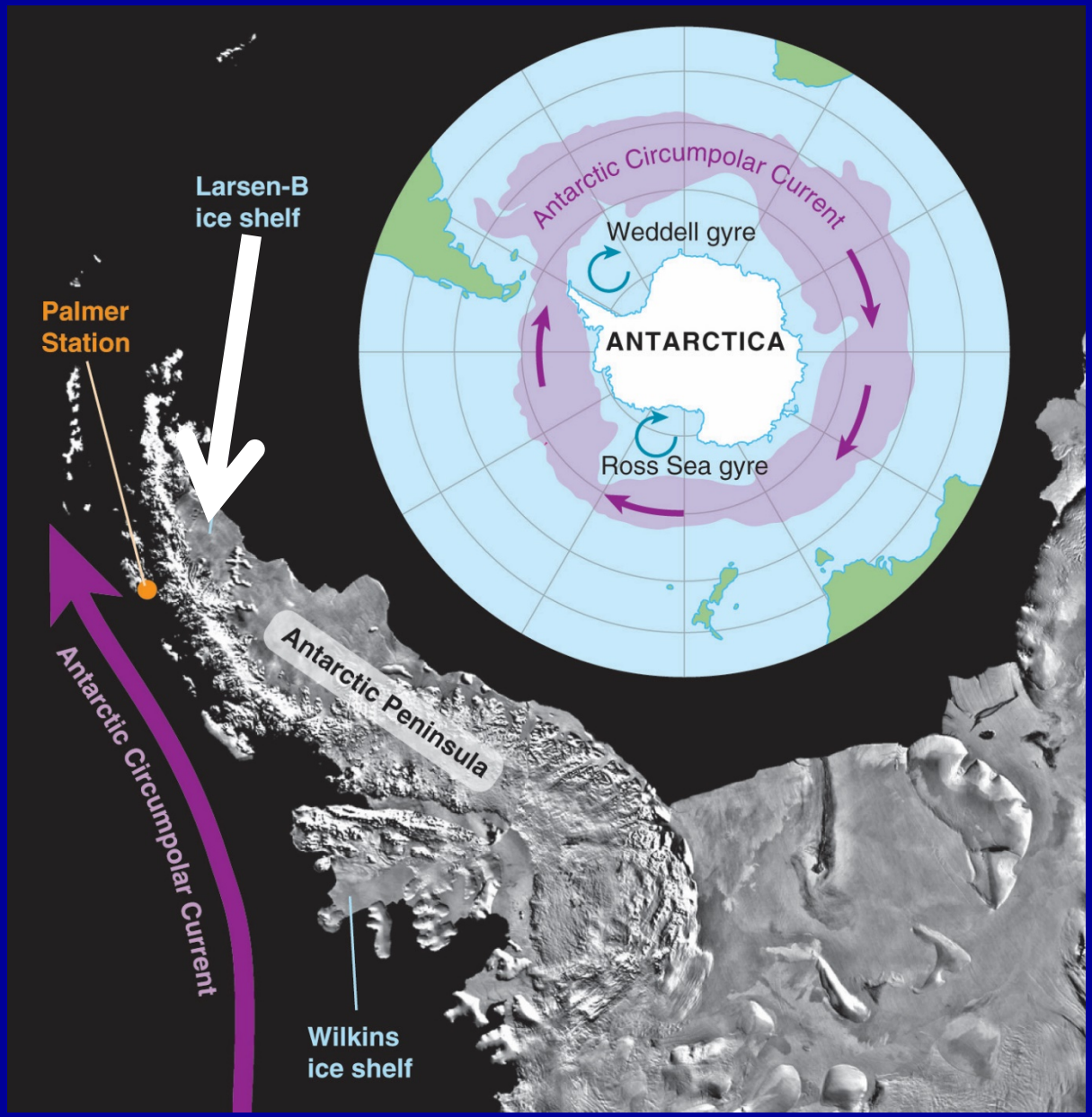
Once gone – collapse of West Antarctic Ice Sheet

Science 344 May 16 2014

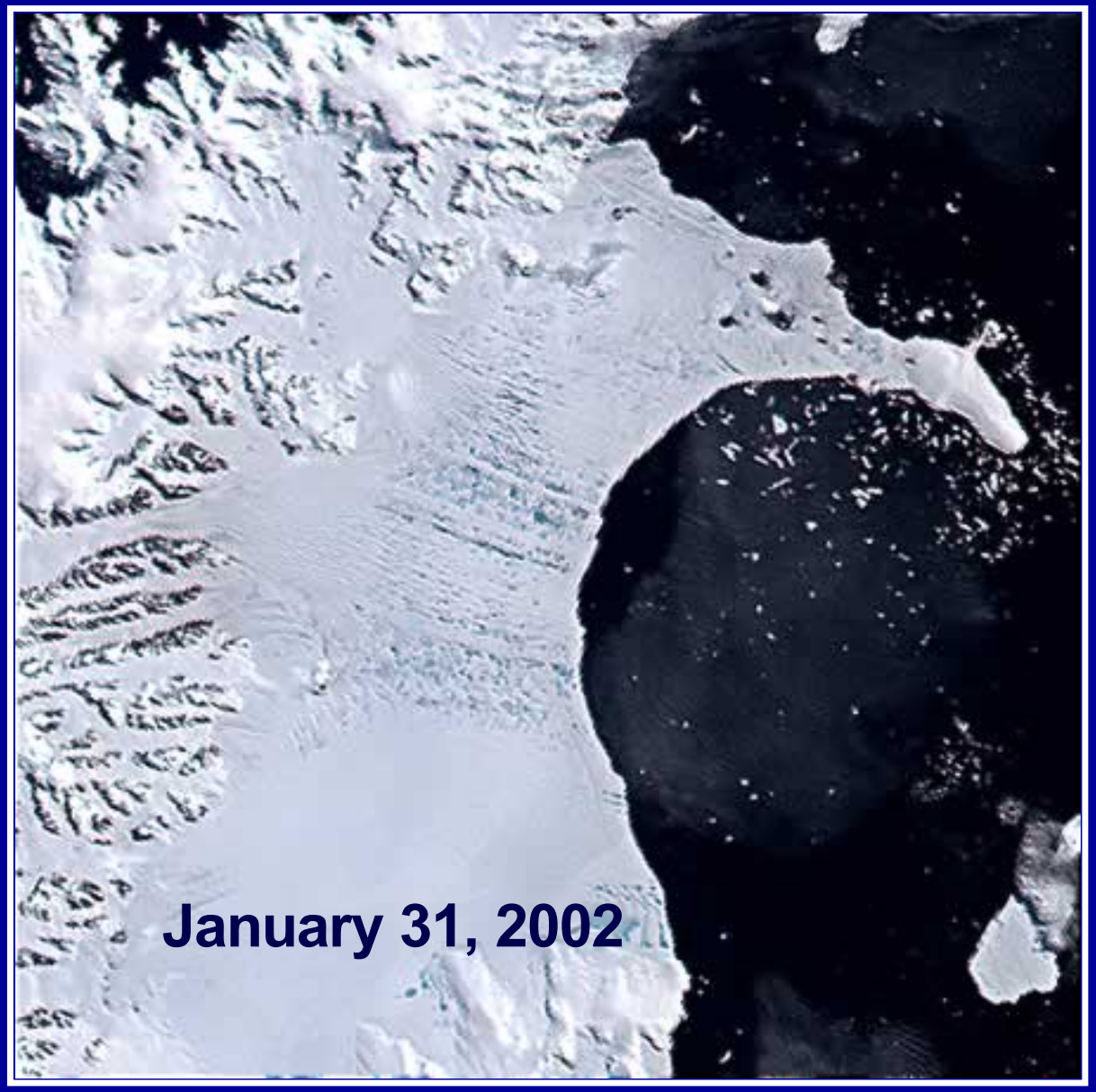


Bentley et al. Geology 2005

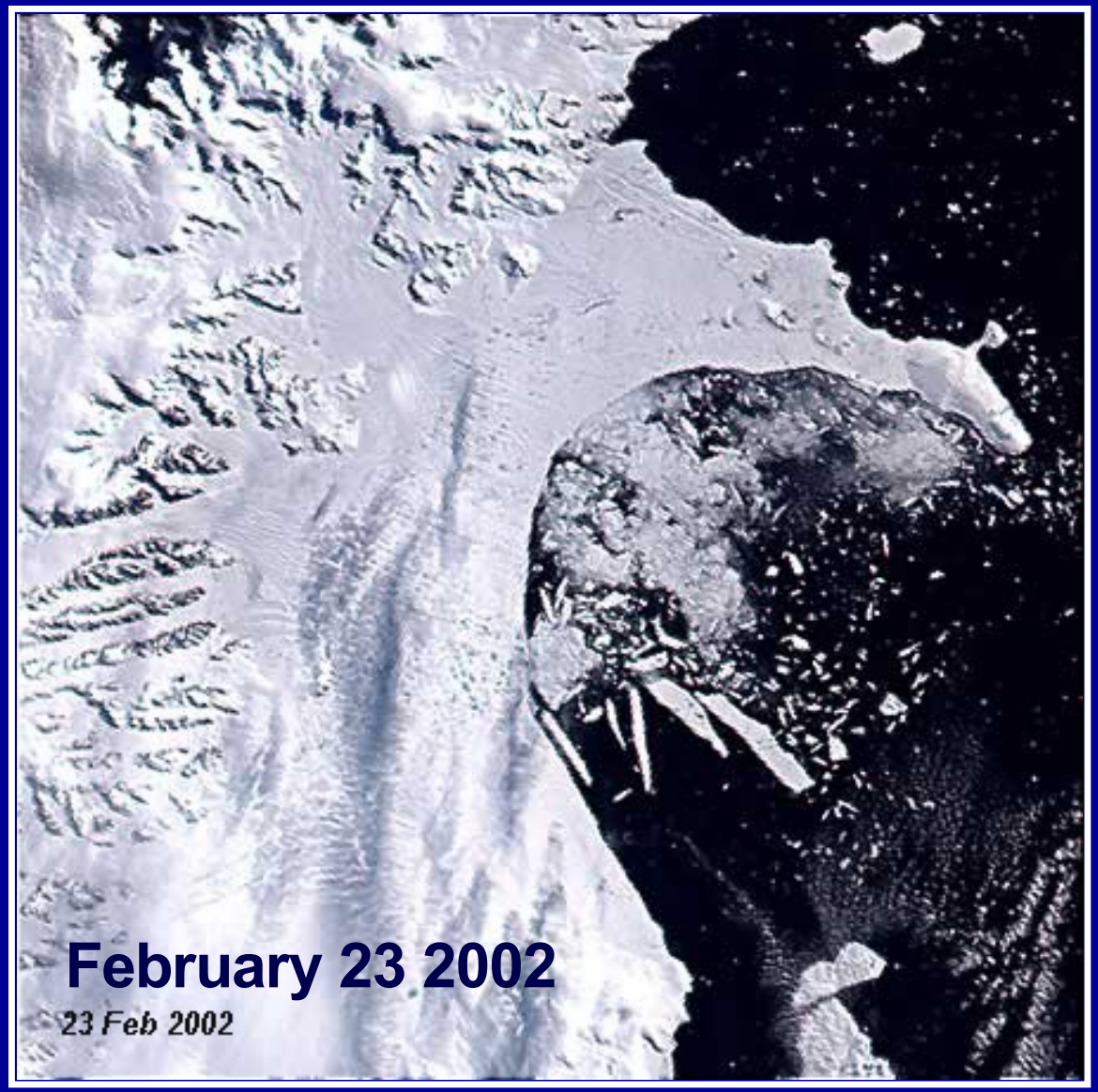
Larsen Ice Shelf Collapse



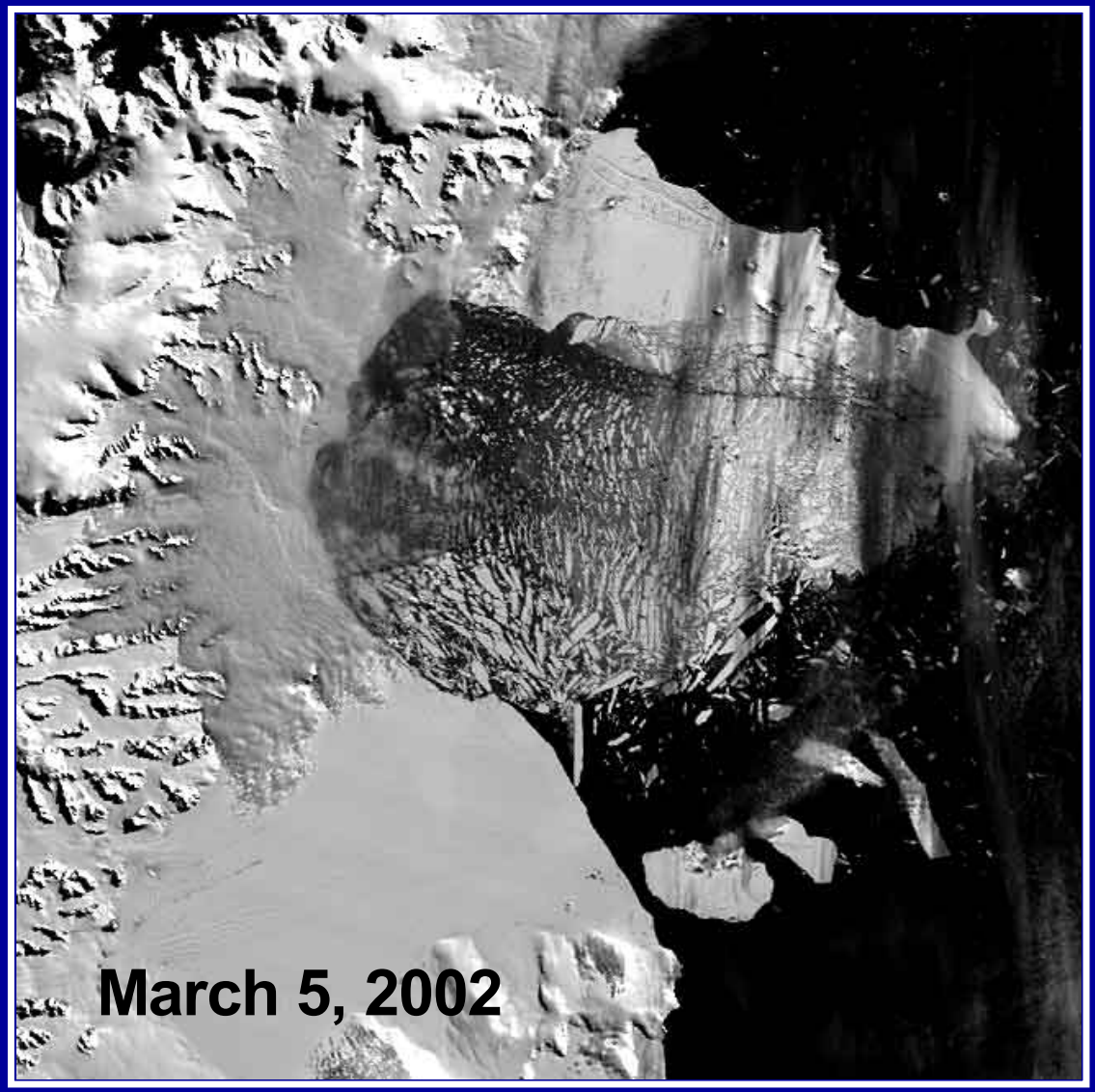
Larsen Ice Shelf – Eastern Antarctic Peninsula



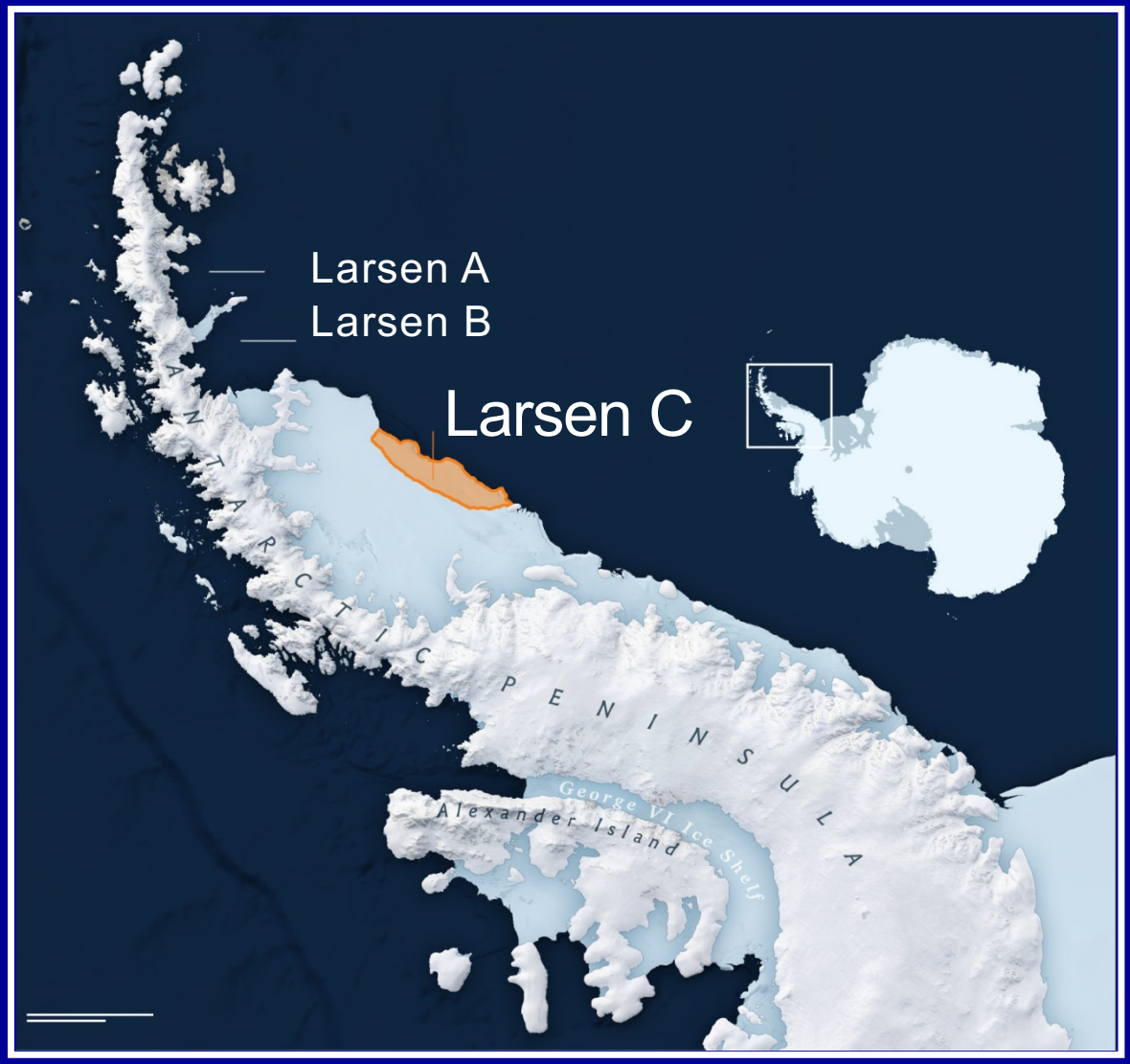
Larsen Ice Shelf – Eastern Antarctic Peninsula



Larsen Ice Shelf – Eastern Antarctic Peninsula

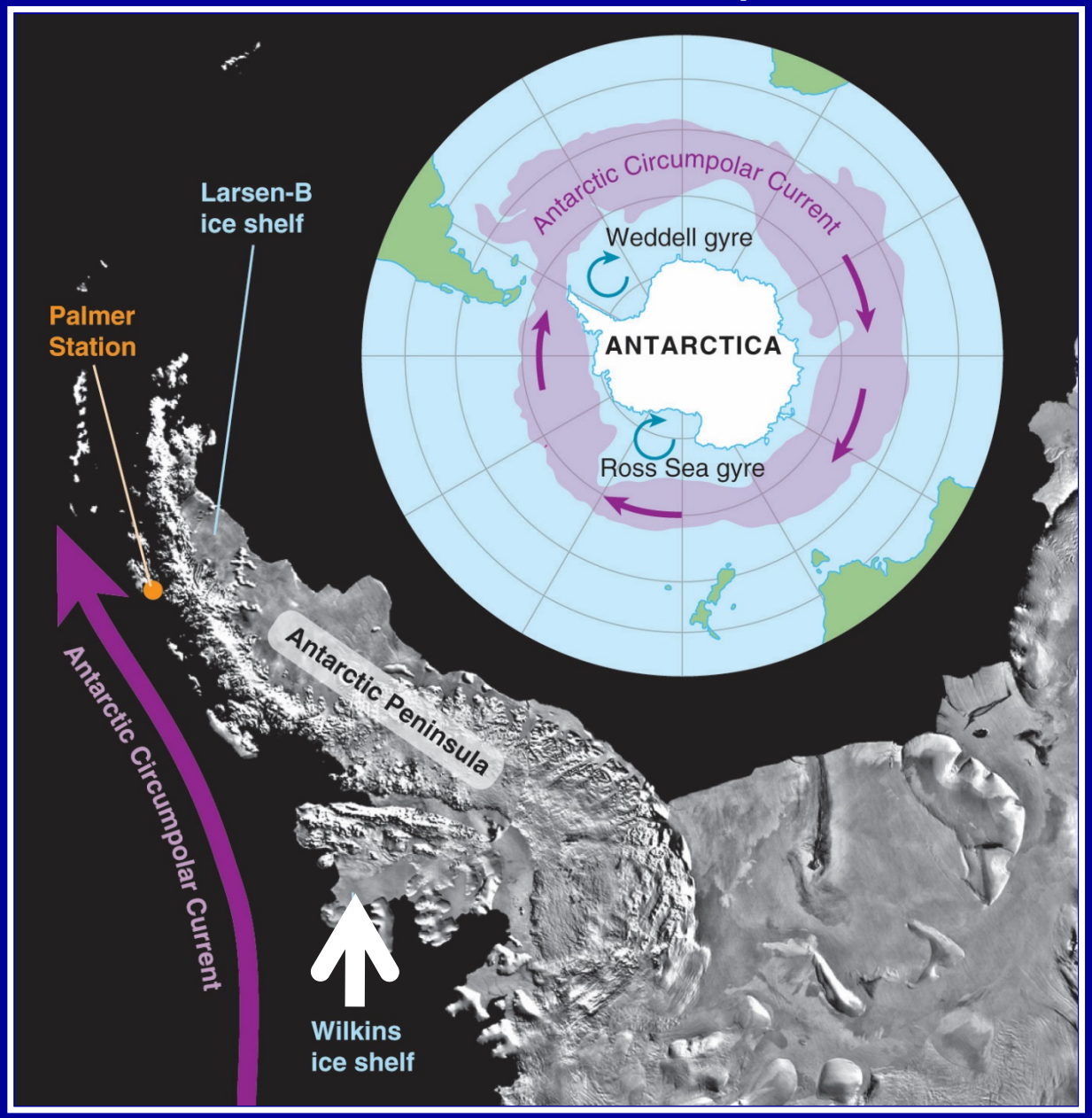


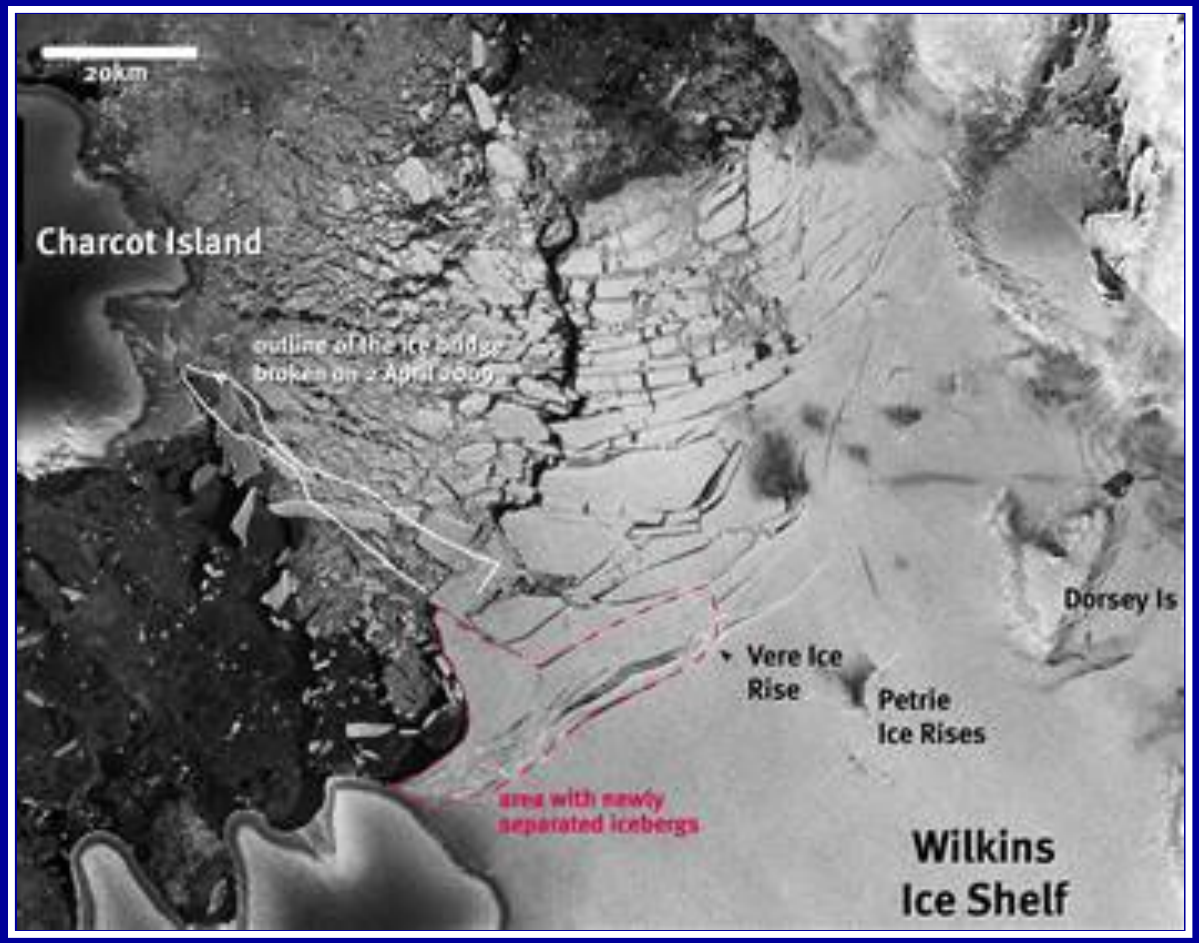
Total size of break out = 5700 square kilometers
Size of Rhode Island



Larsen C ice shelf – July 12, 2017 – 5700 square km
Size of Delaware

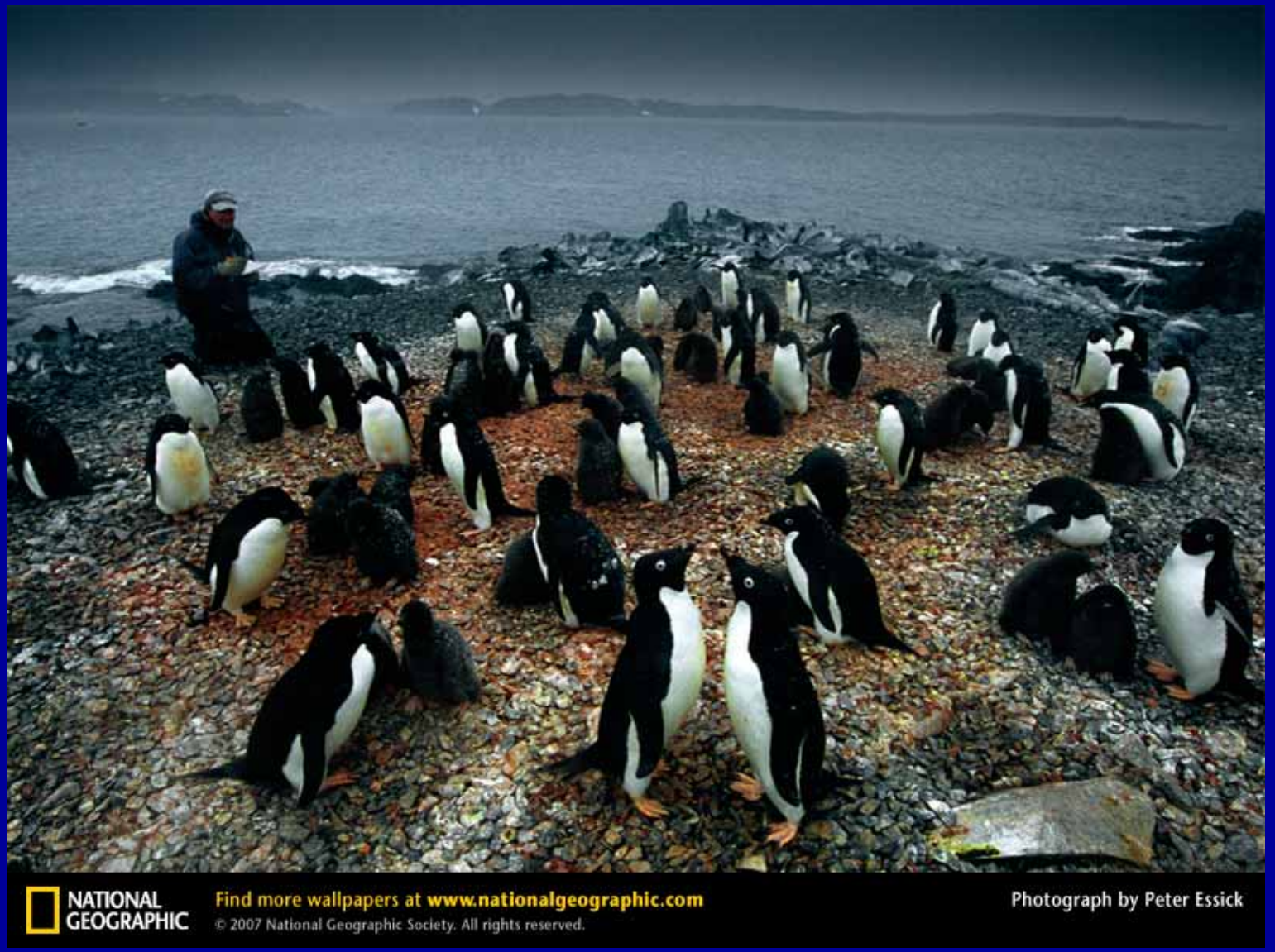
Wilkins Ice Shelf Collapse





Disintegration of Wilkins Ice Shelf – April 27, 2009
Total size of breakout = 29,000 square kilometers
Size of Connecticut

ECOLOGICAL IMPACTS OF CLIMATE CHANGE



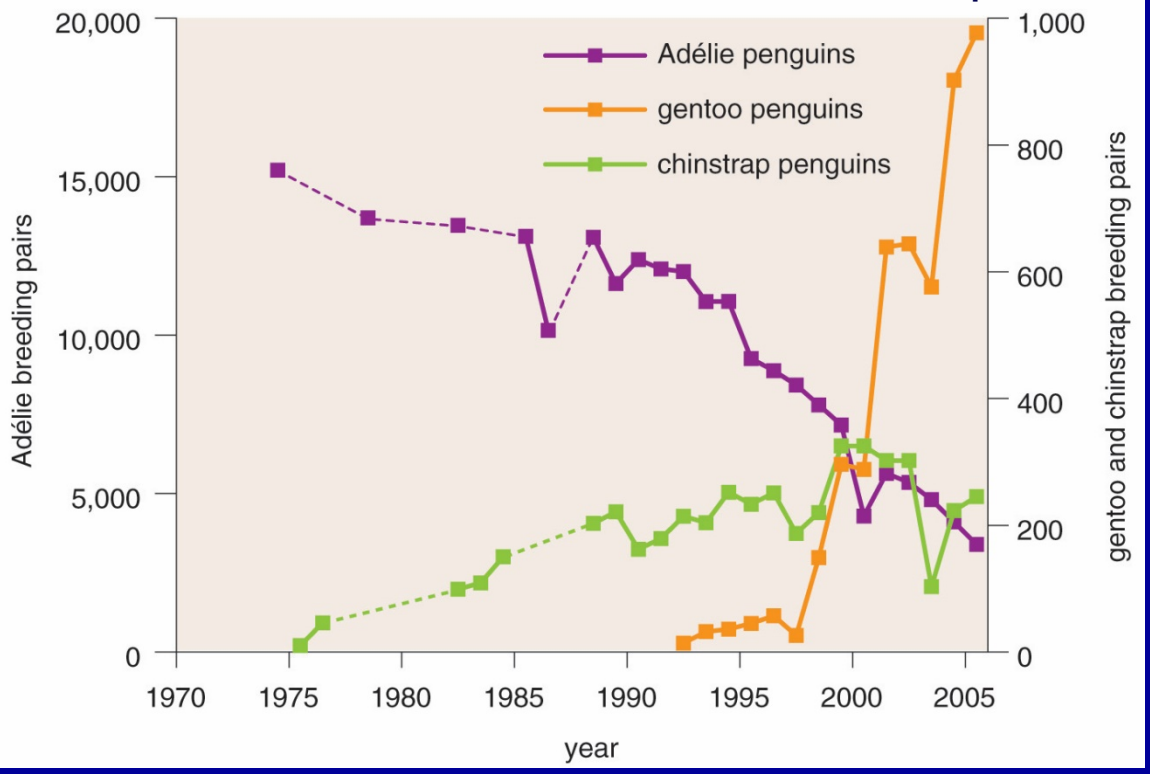
Bill Fraser – Conducting population census of Adélie Penguins
40 year data base (1975- present)

Penguin population trends – Antarctic Peninsula

Adélie

Gentoo

Chinstrap



Adélie

- 1500 pairs

2017

Nesting Adélie penguins buried in snow suffer high egg mortality

Nov 19, 2001 storm event

Photos – Heidi Geisz

Climate warming over past 25 years has resulted in a 40% reduction in extent of annual sea ice cover along the western Antarctic Peninsula

Photo – Dan Martin

***Euphausia superba* grazing on sea-ice associated microalgae**

- Reduction in Peninsular sea ice is correlated with reduction in krill

Reductions in numbers of Weddell Seals – postulated to be related to their ecological dependence on annual sea ice

Fundamental alterations of phytoplankton communities

Dr. Hugh Ducklow – Sampling phytoplankton
NSF Palmer Long-term Ecological Research Program

Recent Changes in Phytoplankton Communities Montes-Hugo et al. 2009. Science 323, 1470-1473

Recent Changes in Phytoplankton Communities Associated with Rapid Regional Climate Change Along the Western Antarctic Peninsula

Martin Montes-Hugo,[1] Scott C. Doney,[3] Hugh W. Ducklow,[2] William Fraser,[4] Douglas Martinson,[5] Sharon E. Stammerjohn,[6] Oscar Schofield[1]

The climate of the western shelf of the Antarctic Peninsula (WAP) is undergoing a transition from a cold-dry polar-type climate to a warm-humid sub-Antarctic-type climate. Using three decades of satellite and field data, we document that ocean biological productivity, inferred from chlorophyll a concentration (Chl a), has significantly changed along the WAP shelf. Summertime surface Chl a (summer integrated Chl a ~63% of annually integrated Chl a) declined by 12% along the WAP over the past 30 years, with the largest decreases equatorward of 63°S and with substantial increases in Chl a occurring farther south. The latitudinal variation in Chl a trends reflects shifting patterns of ice cover, cloud formation, and windiness affecting water-column mixing. Regional changes in phytoplankton coincide with observed changes in krill (*Euphausia superba*) and penguin populations.

Over the past several decades, the marine ecosystem along the western continental shelf of the Antarctic Peninsula (WAP) (62° to 69°S, 59° to 78°W, ~1000 by 200 km) has undergone rapid physical climate change (*1*). Compared with conditions in 1979 at the beginning of satellite data coverage, seasonal sea ice during 2004 arrived 54 ± 9 (1 SE) days later in autumn and departed 31 ± 10 days earlier in spring (*2*). Winter air temperatures, measured between 62.2°S, 57.0°W and 65.3°S, 64.3°W, warmed at up to 4.8 times the global average rate during the past half-century (*3*–*5*). This warming is the most rapid of the past 500 years and stands in contrast to a marked cooling between 2700 and 100 years before the present (*5*–*7*). As the once-perennial sea ice and glaciers retreat (*8*), maritime conditions are expanding southward to displace the continental, polar system of the southern WAP (*9*).

As a result, populations of sea ice–dependent species of lower and higher trophic levels are being demographically displaced poleward and are being replaced by ice-avoiding species (e.g., krill are being replaced by salps, and Adélie penguins by Chinstrap penguins) (*1*, *10*, *11*). Do these biogeographic modifications originate from changes at the base of the food web?

In the short term (monthly-interannual scale) and during spring and summer, variations in latitudinal gradients in phytoplankton biomass as a function of time have been associated with sea ice timing and extent (*12*, *13*). However, this mechanism has not been investigated over a longer time scale of decades. Further, the relative importance of subregional differences in climate variables other than sea ice (e.g., cloudiness and currents) in determining WAP alongshore phytoplankton dynamics is not known. In contrast to previous work, we suggest that alongshore phytoplankton distribution in this region has been adjusting to the ongoing, long-term sea ice decline and spatial modifications of other physical climate factors. Short-term evidence from seasonal cruises (*13*–*15*) suggests an inverse relationship between phytoplankton biomass in surface waters (0- to 50-m depth) and the depth of the upper mixed layer (UML). As the UML becomes less stratified, mean light levels for phytoplankton photosynthesis decrease, and phytoplankton growth is not large enough compared with Chl a loss (e.g., grazing and sinking) to support Chl a accumulation in surface waters (*14*). Because deepening of UML is mainly determined by greater surface wind stress (*14*), particularly during ice-free conditions, the expectation is for a decrease (increase) of phytoplankton biomass at <64° to 64.5°S (>64° to 64.5°S) due to deeper (shallower) UML given a shorter (longer) sea ice season and greater (smaller) influence of wind in determining UML depth and, therefore, mean light levels.

Based on Chl a concentration derived from satellites [Coastal Zone Color Scanner (CZCS) and Sea-Viewing Wide Field-of-View Sensor (SeaWiFS)] (Chl_S) and in situ shipboard measurements ($Chl_{in\ situ}$) (*16*), we report a two-decadal (1978–1986 to 1998–2006) increase (decrease) of biomass in summer (December to February) phytoplankton populations in the continental shelf waters situated south (north) with respect to the central part of the WAP region (Palmer Archipelago, 64.6°S, 63.6°W). These spatial trends were mainly associated with geographic differences in receding sea ice cover and solar illumination of the sea surface.

Since the 1970s, there has been a 7.5% areal decline in summer sea ice throughout the WAP, with the declines varying regionally (Fig. 1, blue bars, and fig. S5, A and E). Cloudiness (Fig. 1, pink bars, and fig. S5, B and F) and wind patterns (Fig. 1, black bars, and fig. S5, C and G) have also changed during the past decade. In the 1970s, overcast skies tended to be positively associated with windy conditions, but in the past 10 years this covariation has weakened considerably (fig. S5, B, C, F, and G). Surface winds have become more intense (up to 60% increase) during mid to late summer (January and February) (Fig. 1 and fig. S5, C to G). Overall, these climate variations were associated with a 12% decline in Chl_S over the entire study region (Table 1) that resembles Chl_S declines reported in northern high latitudes (>40°N) between 1979–1986 and 1997–2000 (*17*).

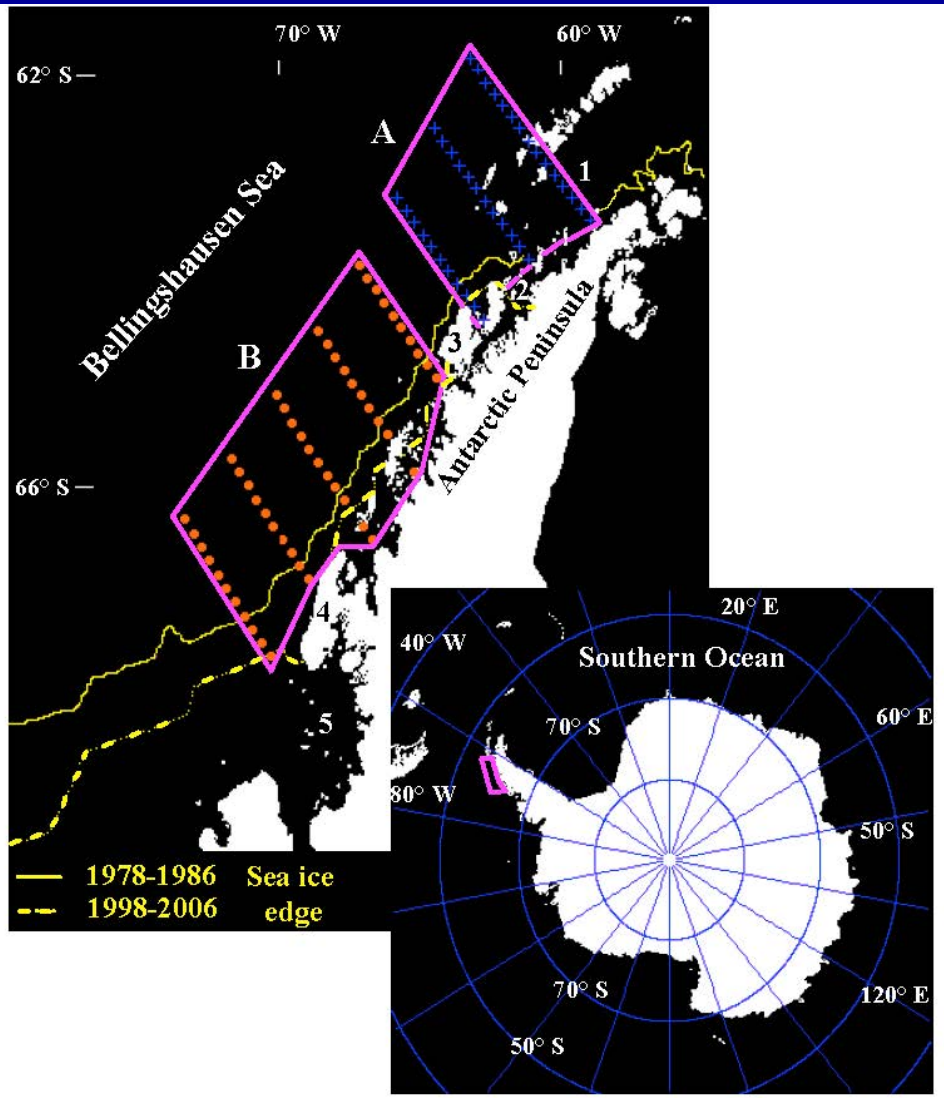
In the northern subregion of the WAP (61.8° to 64.5°S, 59.0° to 65. 8°W), the skies have become cloudier, winds persistently stronger (monthly mean up to 8 m s^{-1}), and summer sea ice extent less, conditions favoring deeper wind-mixing during the months most critical for phytoplankton growth (December and January) (Fig. 1 and fig. S5, A to D). Hence, phytoplankton cells inhabiting these waters have been exposed to a deeper mixed layer and overall less light for photosynthesis (*14*) that may explain the dramatic Chl_S decrease (seasonal average, 89%) detected in recent years (Fig. 1, Fig. 2A, and fig. S5D). Additionally, recent declines of Chl a over the northern WAP subregion might also be partially related to a greater advection of relatively poor Chl a waters coming from the Weddell Sea into the Bellingshausen Sea through the Bransfield and Gerlache Straits (*18*). A Chl a decrease was less evident during February (Table 1), which suggests that increased mixing early in the growth season caused a lag in phytoplankton bloom initiation but did not influence Chl a levels as strongly later in the growth season. Two possible trigger mechanisms for such a delay are stronger winds [up to 5.4% increase, January (table S5)] and an insufficient volume of fresh water from melting sea ice [up to 79% less sea ice, December (table S5)] that otherwise would create a favorable, strongly stratified, shallow UML (*13*–*15*).

In the southern subregion of the WAP (63.8° to 67.8°S, 64.4° to 73.0°W), remotely sensed Chl a has undergone a remarkable increase (66% on average) from 1978–1986 to 1998–2006 (Fig. 1, fig. S5H, Fig. 2A, and Table 1) that can be

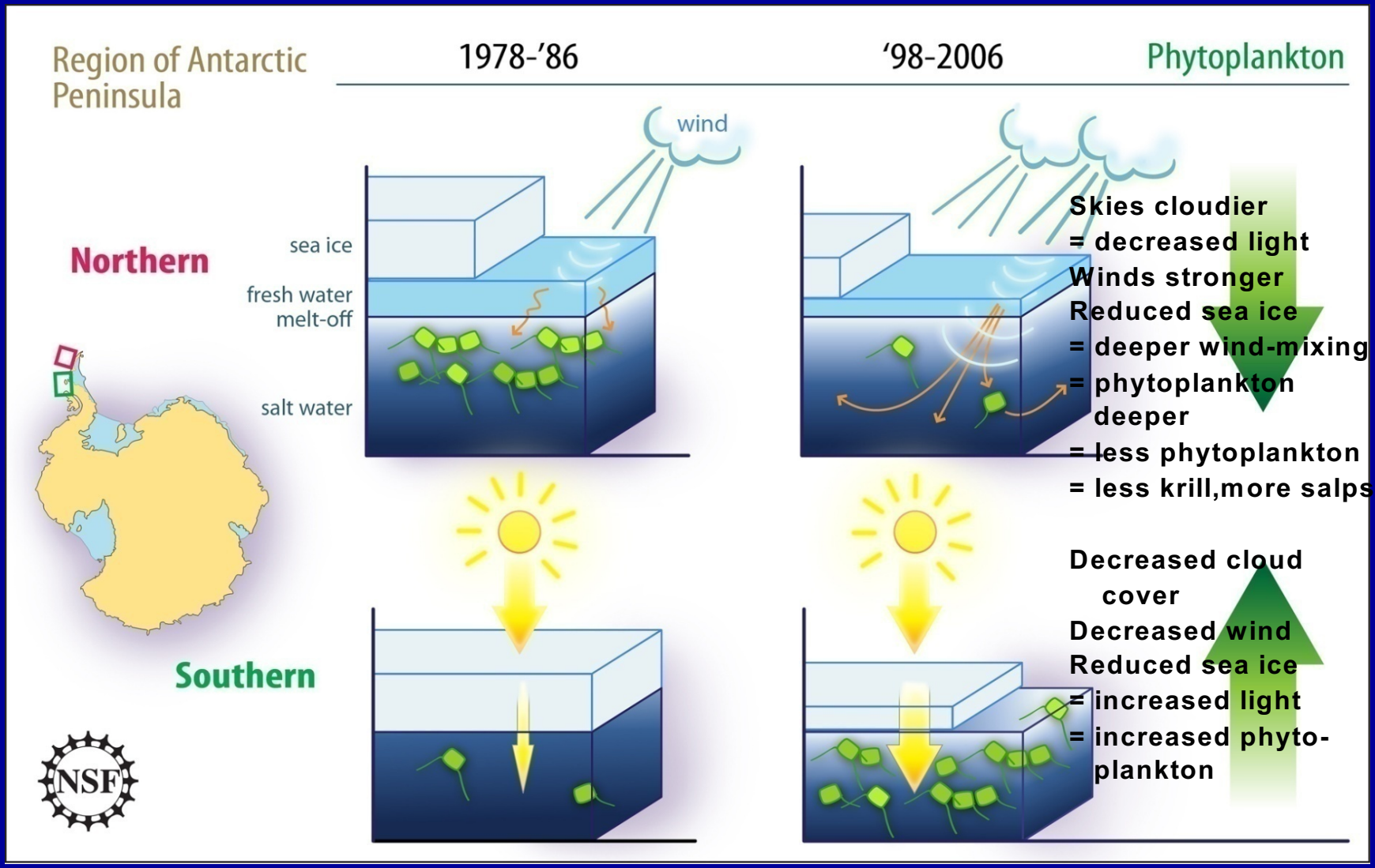
[1]Coastal Ocean Observation Lab, Institute of Marine and Coastal Sciences, School of Environmental and Biological Sciences, Rutgers University, New Brunswick, NJ 08901, USA. [2]Department of Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA. [3]The Ecosystems Center, Woods Hole, MA 02543, USA. [4]Polar Oceans Research Group, Post Office Box 368, Sheridan, MT 59749, USA. [5]Lamont-Doherty Earth Institute, Palisades, NY 10964, USA. [6]Ocean Sciences, University of California, Santa Cruz, CA 95064, USA.

*To whom correspondence should be addressed. E-mail: montes@marine.rutgers.edu

MS no: RE1164533/CJH



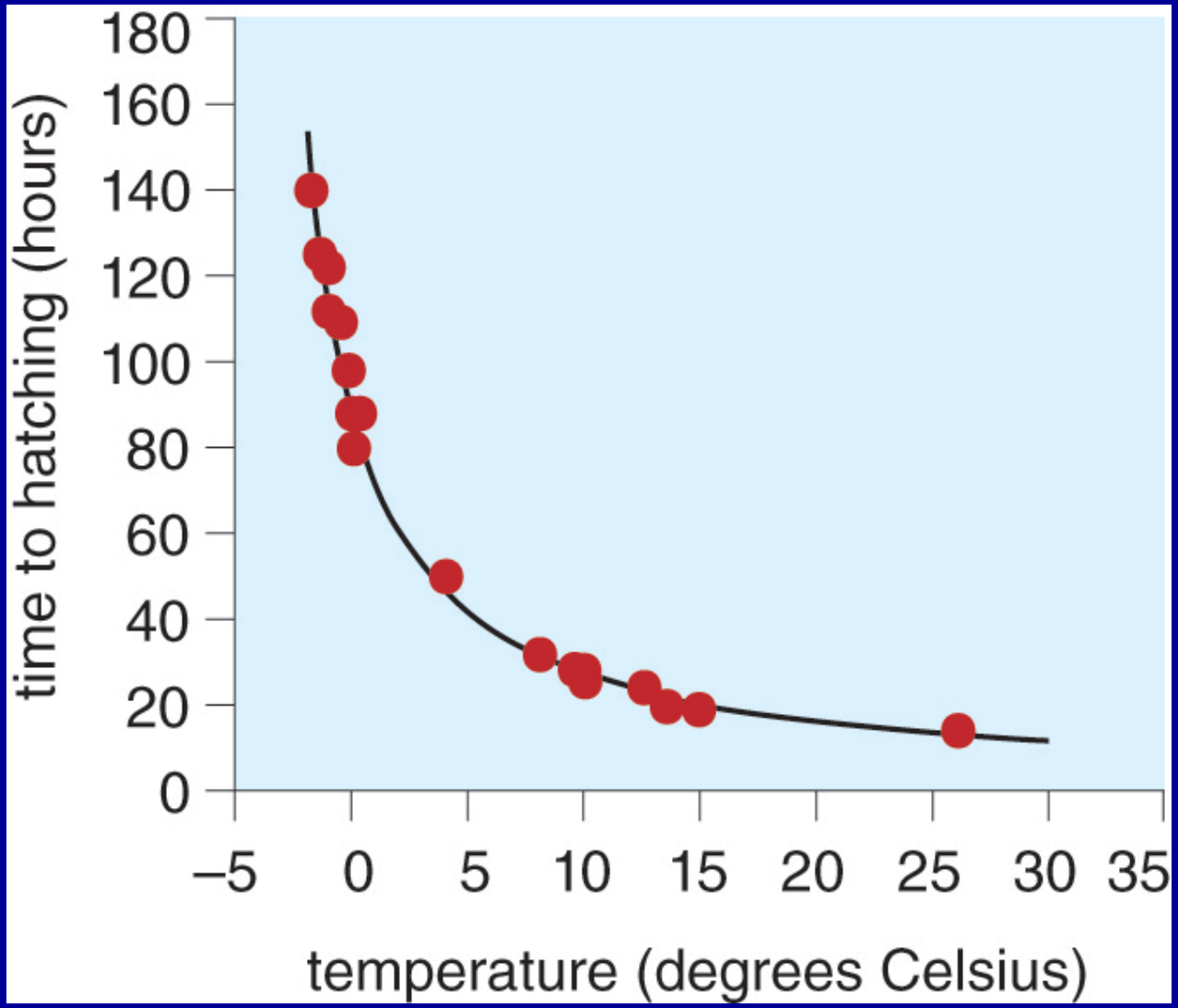
Shift from cold-dry polar type climate to warm-humid sub-Antarctic type climate
Concomitant changes in planktonic phytoplankton communities



Developed from Montes-Hugo et al. 2009. Science 323, 1470-1473

Increased temperature and decreased sea-ice may induce range extensions and alter trophic interactions in macroalgal dominated communities of the Antarctic Peninsula

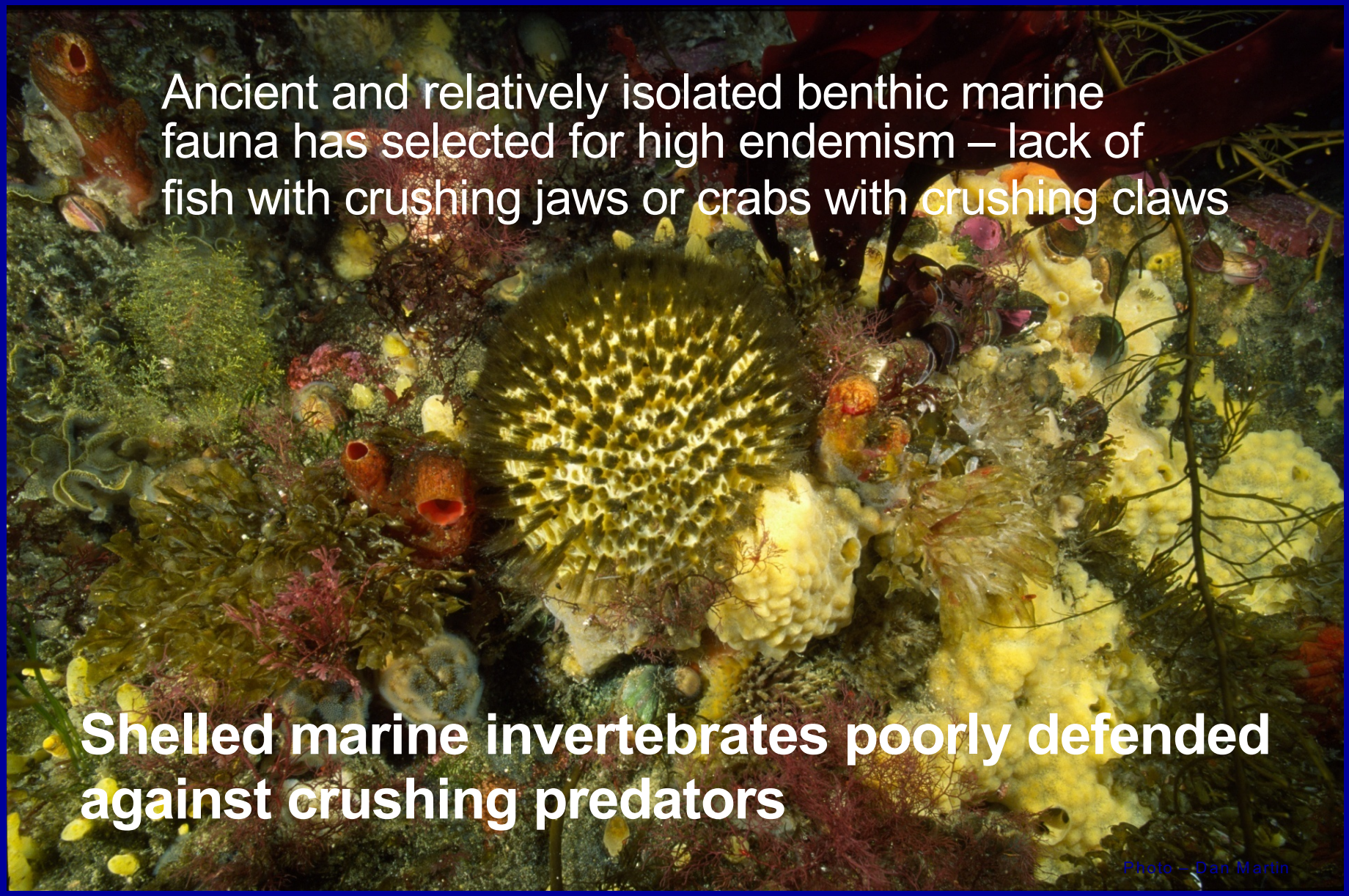
Antarctic marine invertebrate larvae – developmental rates highly temperature sensitive



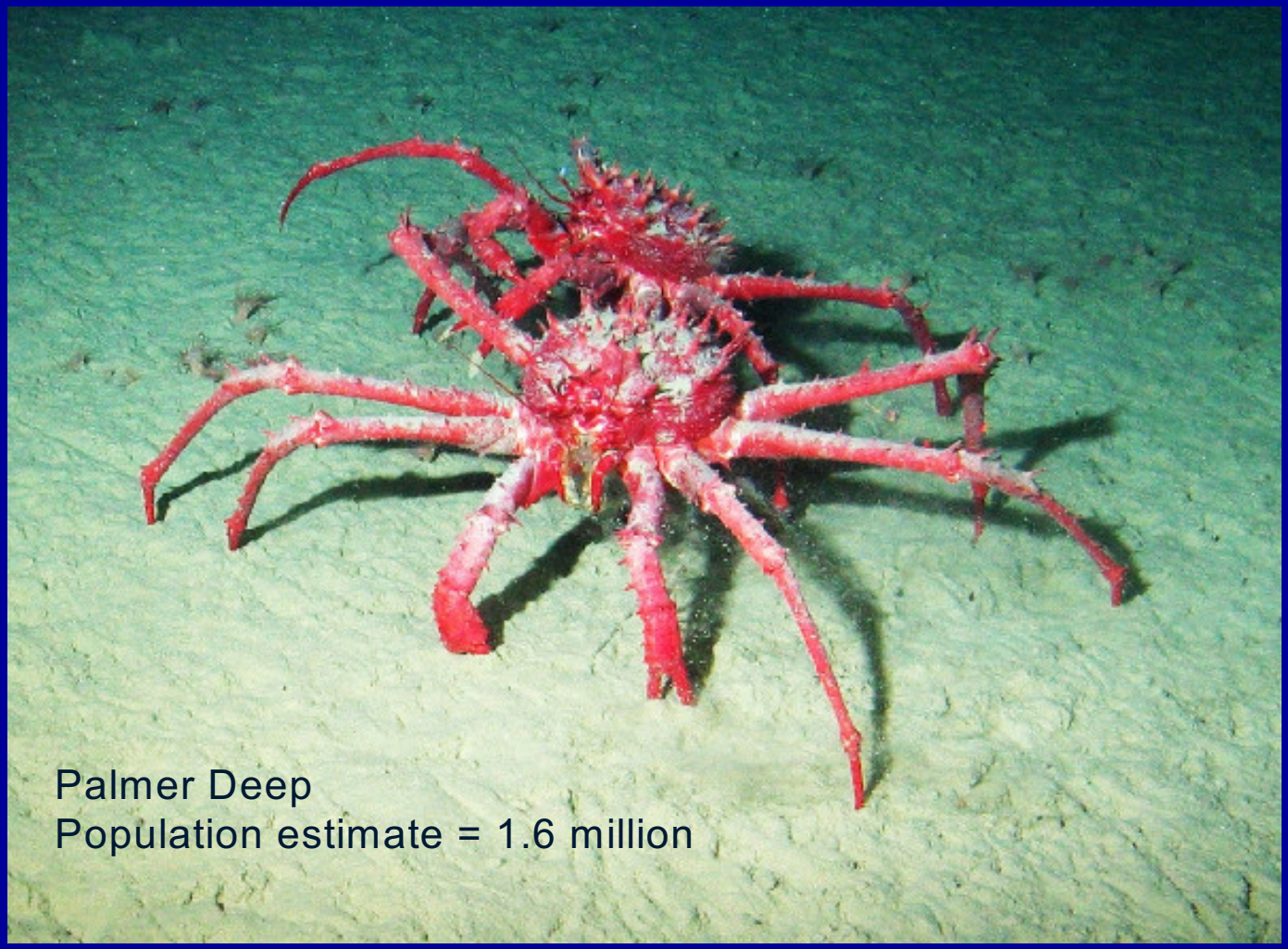
From McClintock et al. 2008. American Scientist 96, 302-310

SPECIES RANGE EXTENSIONS

Southern extension of Antarctic elephant and fur seals


Ancient and relatively isolated benthic marine fauna has selected for high endemism – lack of fish with crushing jaws or crabs with crushing claws
Shelled marine invertebrates poorly defended against crushing predators
Photo – Dan Martin

The lithodid king crab *Paralomis birsteini*
Bellingshausen Sea, Antarctica (1123 m depth) Jan 25 2007

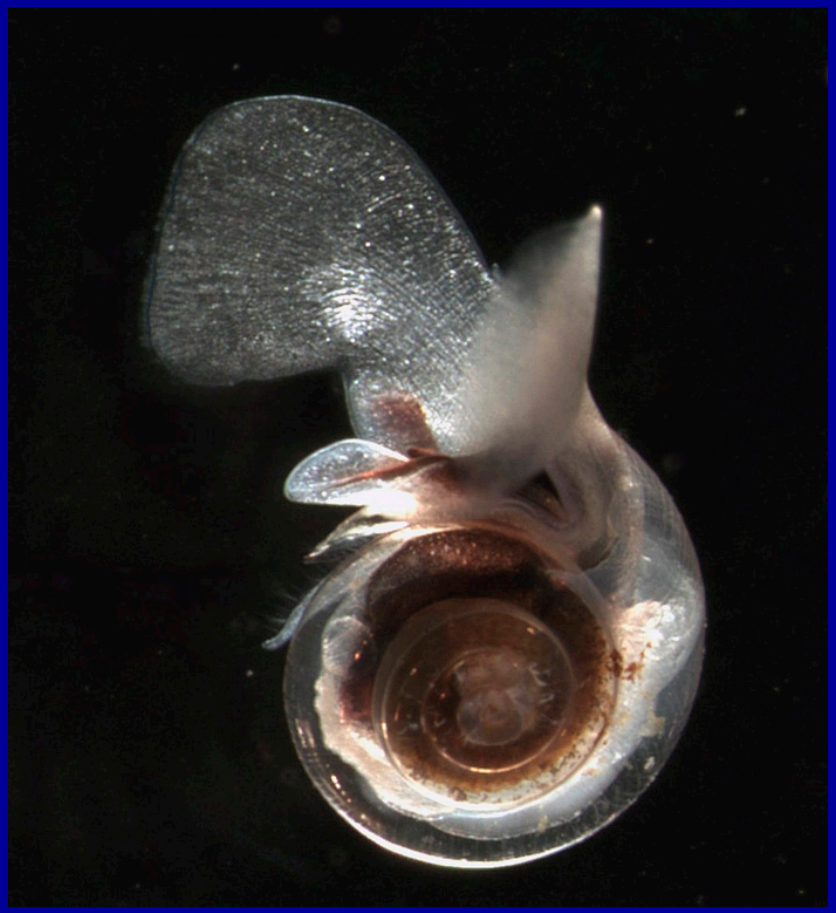


Discovery of large population of king crabs in the Palmer Deep - *Neolithodes yaldwyni* - (Reported in 2011 by Craig Smith et al.)

Aronson and McClintock – King crab research program – Marguerite Bay
Funded by the National Science Foundation 2010 – 2017 (*PNAS 2015)*

High vulnerability to Ocean Acidification

- Generally thin shells
- Southern Ocean is the greatest sink for atmospheric carbon dioxide
- Inverse relationship between decalcification and temperature
- Undersaturation of aragonite (25 yrs), calcite (50 yrs)



Limacina helicina antarctica

Ocean Acidification Research at Palmer Station, Antarctica

Team leaders – J. McClintock, C. Amsler and R. Angus

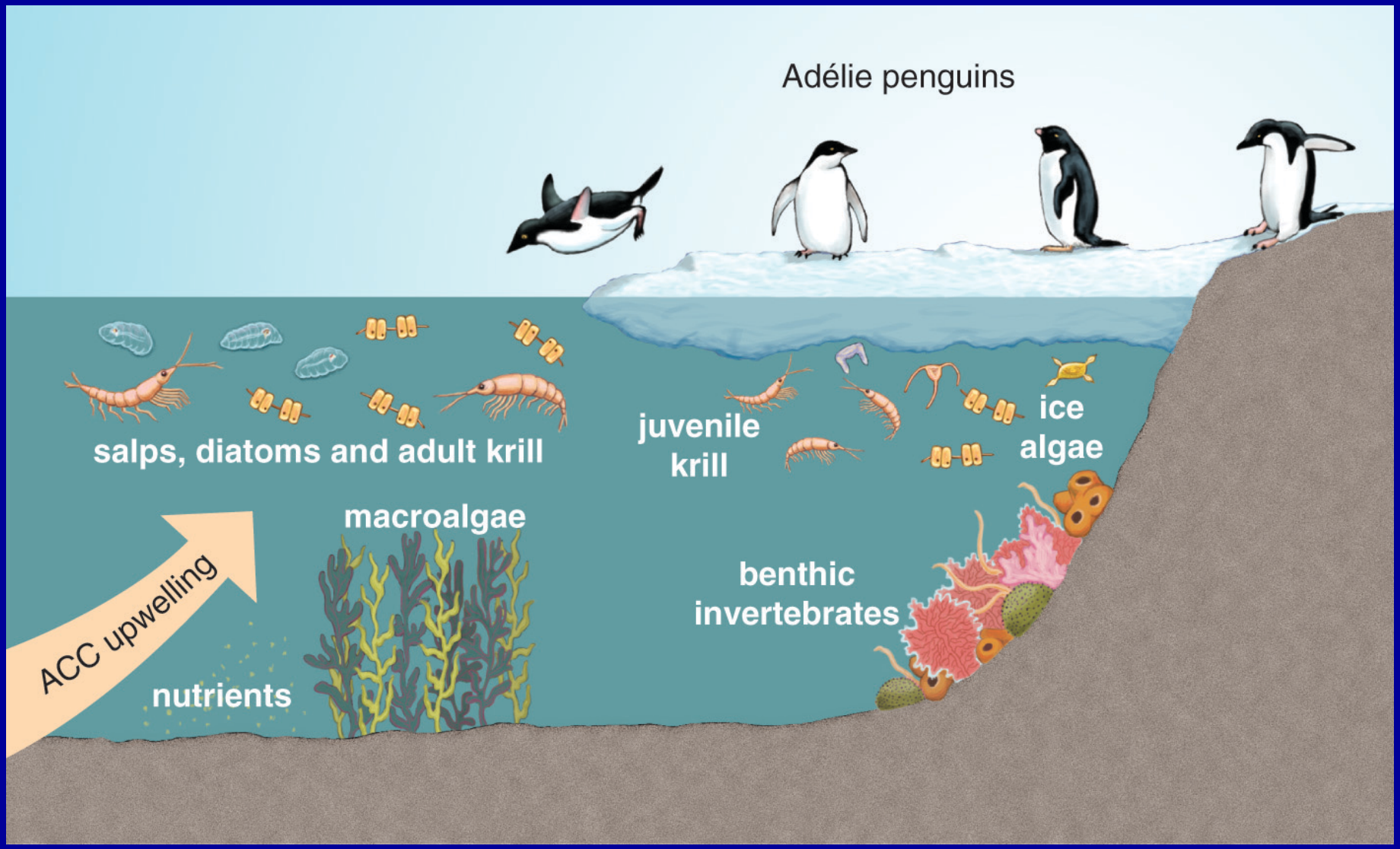
US Palmer Station

Some Antarctic amphipods suffer high mortality with near future ocean Acidification – Schram et al. 2016

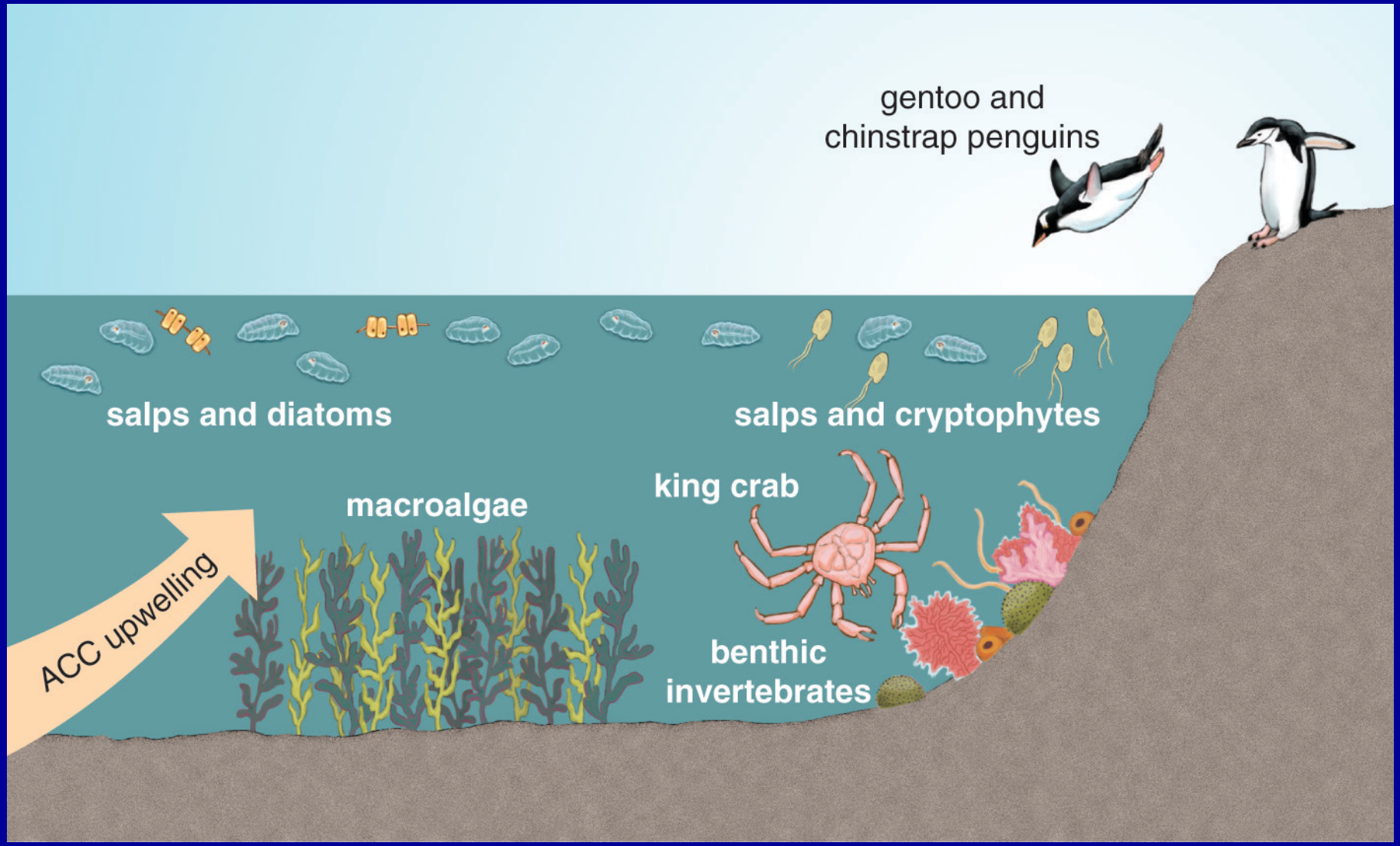
Antarctic Peninsula and Climate Change

- Marked acceleration of glacial recession
- Coastal ice sheet break-up events
- Decreased extension of annual ice pack
- Declines in populations of annual sea ice associated Adélie Penguins, Weddell seals, and krill
- Changes in phytoplankton communities
- Possible effects on macroalgal communities
- Potential temperature impacts on larval development
- Southern extension of elephant and fur seals
- Invasive predatory species – king crabs
- High vulnerability to ocean acidification

Pre Climate Warming



Post Climate Warming



Why should we care about climate change impacting the marine life of Antarctica?

March 27, 2007

UAB Marine Biologists Unlock Polar Secrets to Fight Disease

POSTED: 10:52 a.m. EDT, March 27, 2007

Researchers from the University of Alabama at Birmingham are exploring new possibilities for cancer treatment in Antarctica.

Previous Next

STORY HIGHLIGHTS

- Scientists from 60 countries working at Earth's polar regions
- UAB researchers at Palmer Station, Antarctica, studying marine life
- Marine life defense mechanisms may provide keys to cancer fighting drugs

By Marsha Walton
CNN

Adjust font size: − +

(CNN) -- They may not have the charisma of penguins or polar bears. But plants and animals like seaweed, sea stars and sponges may be just as important in understanding the Earth's polar regions.

During International Polar Year, (IPY) scientists from more than 60 countries are working at the far ends of the Earth, looking for clues about climate change, weather forecasting, even cures for diseases.

Researchers from the University of Alabama at Birmingham will spend February to May of this year at Palmer Station in the Antarctic. They are looking at how the defense mechanisms of marine plants and animals may provide keys to cancer fighting drugs.

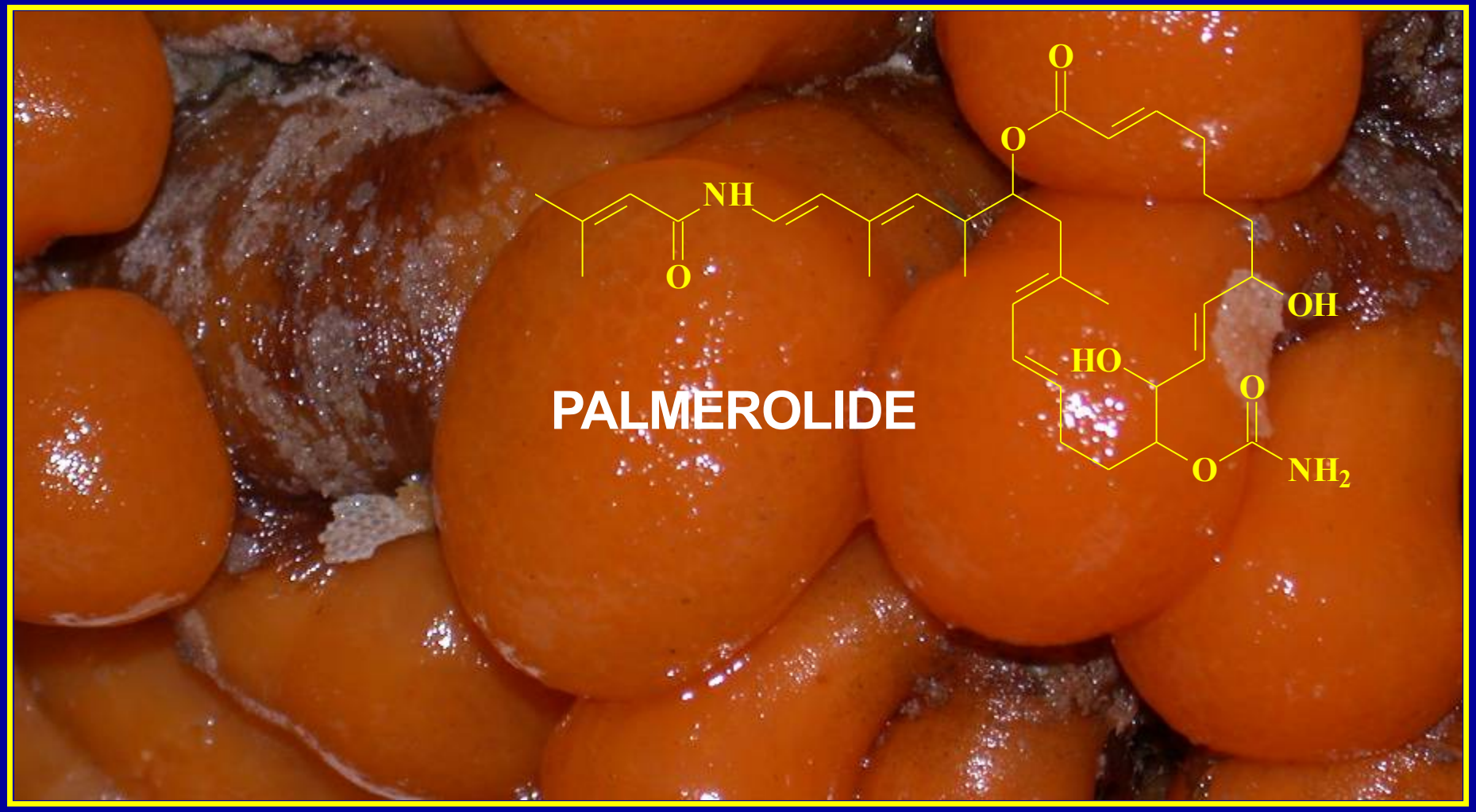
McMurdo Sound – sub-ice diving

Chris Mueller helps prepare Chuck Amsler, who will descend beneath the ice at New Harbor at McMurdo Sound.

"Deep-sea species live close to the surface here, because the water is cold, just like the deep sea, about 28 degrees F. So that gives us scuba divers access to animals that we would need a submersible to withstand the depths further north. Many of the animals that live in the seabed here are also unusually large, which is a consequence of their slow growth induced by infrequent food availability." Dr. Kathleen Conlan

McMurdo Sound, Antarctica

Palmer Station, Antarctic Peninsula



Synoicum adareanum

A Protein with Strong Anti-Influenza Activity from the Marine Red Alga *Gigartina skottsbergii*

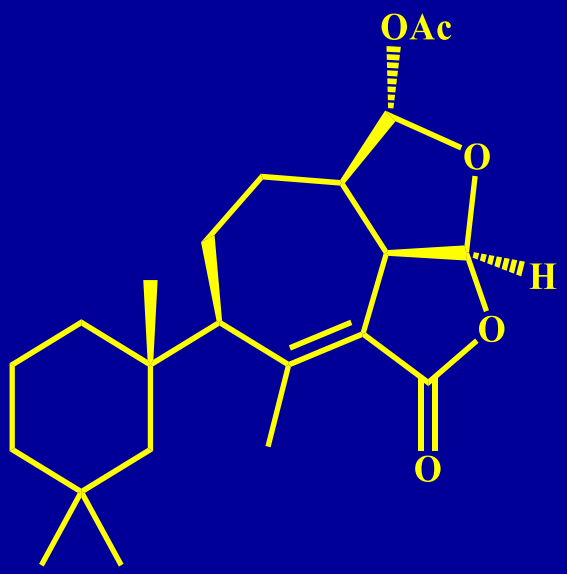
J Alan Maschek[1], Cindy Bucher[2], Alberto van Olphen[2], James B. McClintock[3], Charles D. Amsler[3] and Bill J Baker[4]

[1]Department of Chemistry, [2]Department of Global Health & Center for Biological Defense and [1,2]Center for Molecular Diversity in Drug Design, Discovery and Delivery, University of South Florida, [3]Department of Biology, University of Alabama at Birmingham

American Society of Pharmacognosy 50th Annual Meeting

June 28th, 2009

Darwinolide
Activity against MRSA biolfilm



Methicillin Resistant
Staphylococcus aureus: 135 µM = relatively low activity (aqueous form)

MRSA biofilm: 35 µM (enticing activity)

Mammalian cytotoxicity SI: > 60 = low toxicity

Dendrilla membranosa

Biofilm = protective film of polysaccharides, proteins, mucus, etc. (similar issue in bacteria that cause cystic fibrosis)

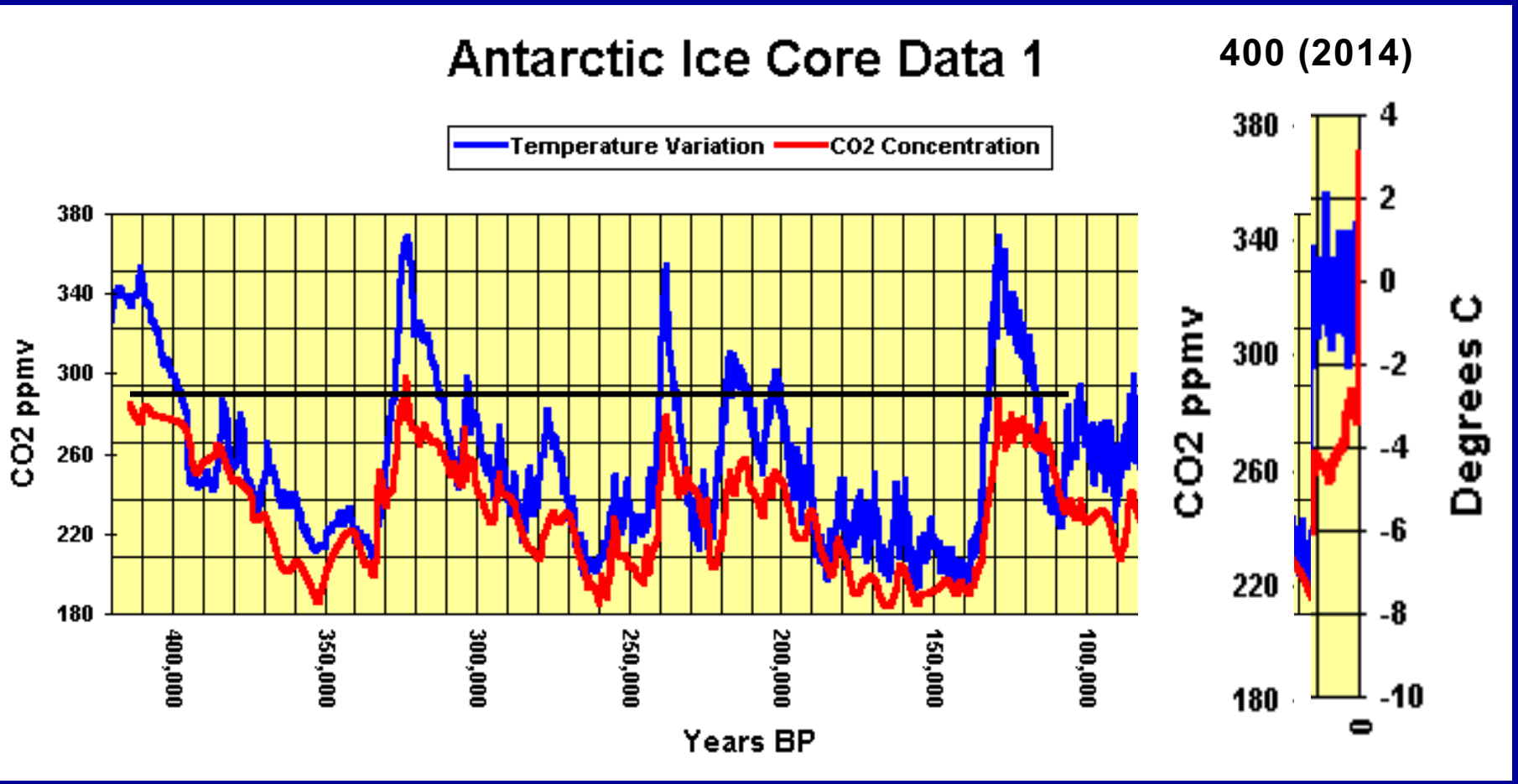
Von Salm et al., *Org. Lett.* **2016**, *18*, 2596

Is the climate really warming?

Are human activities playing a significant role in this warming?

Historic CO_2 concentrations and temperature variations based on Vostok ice core samples

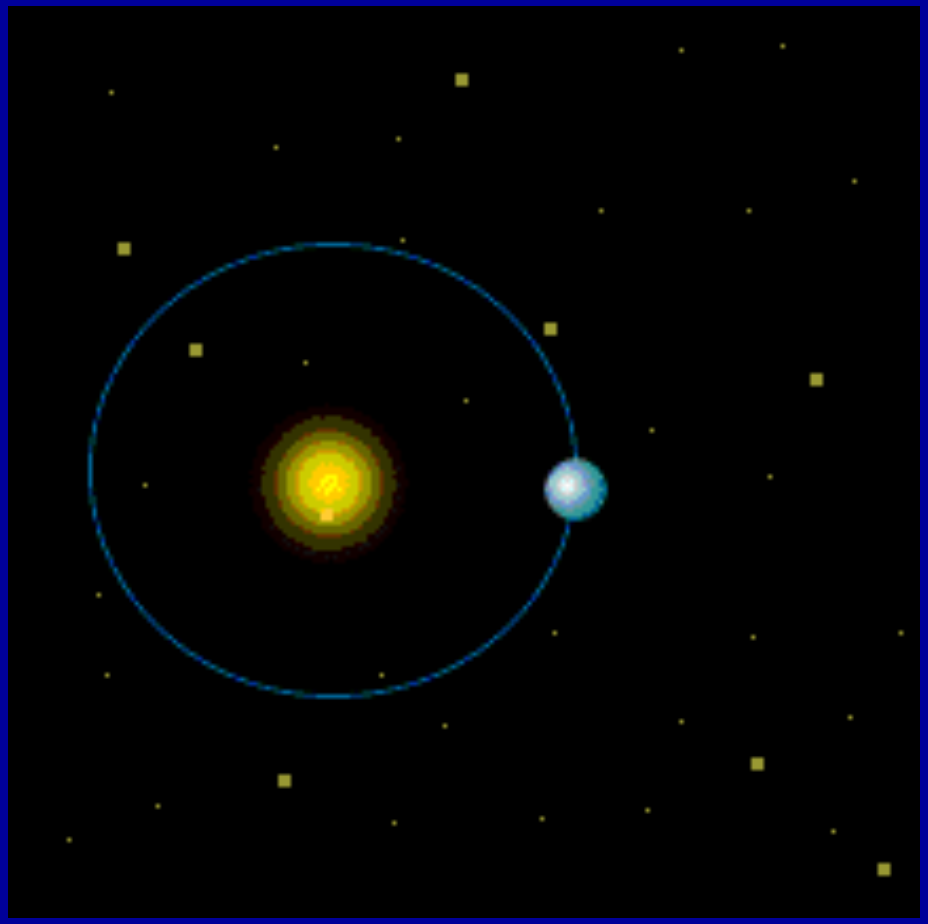
25% ↑ in CO_2



From Petit et al. 1999. Nature.

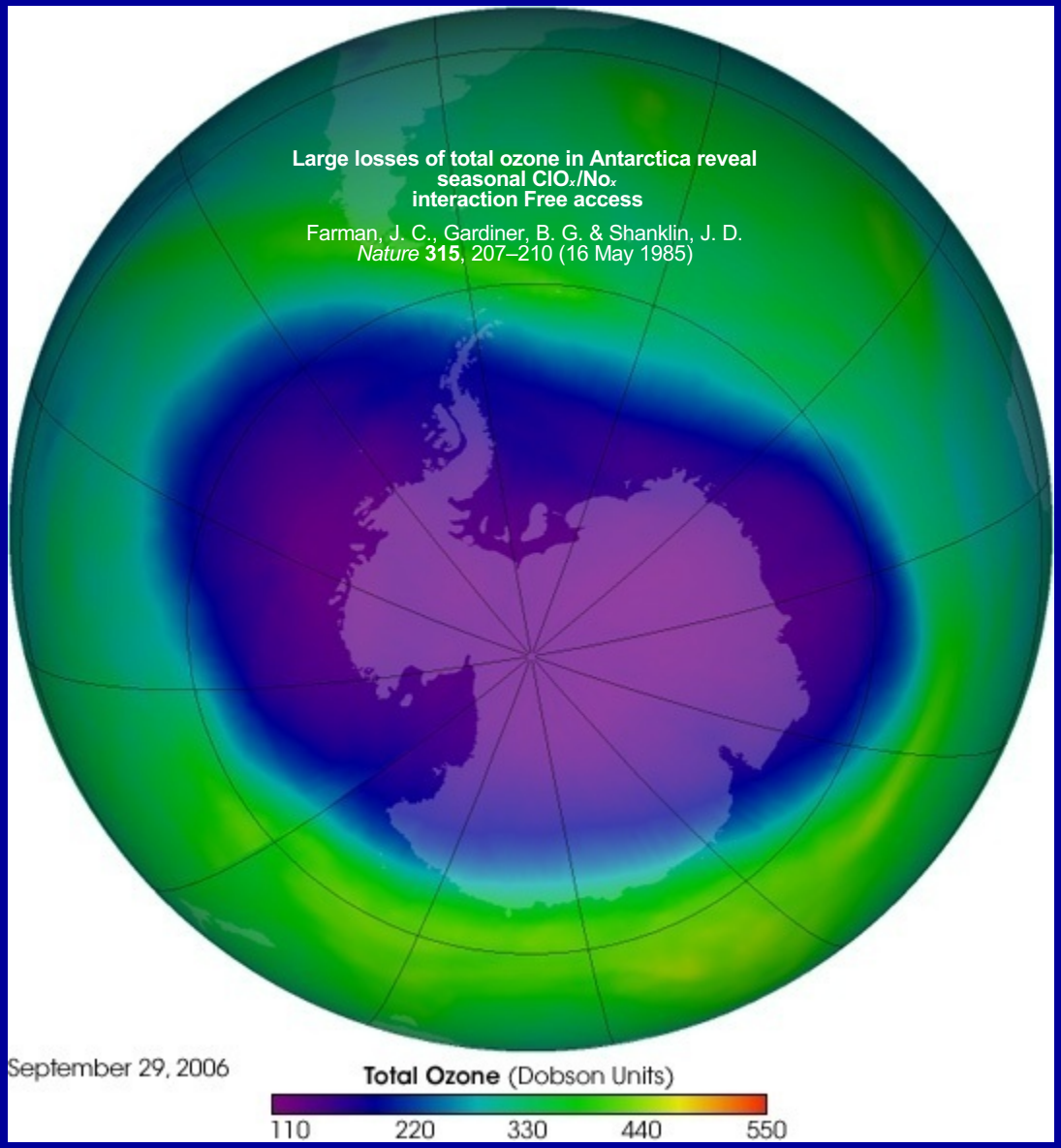
Ice core depth = 3600 m

"Business as usual" prediction – 750 ppm by end of century



Milankovitch cycle

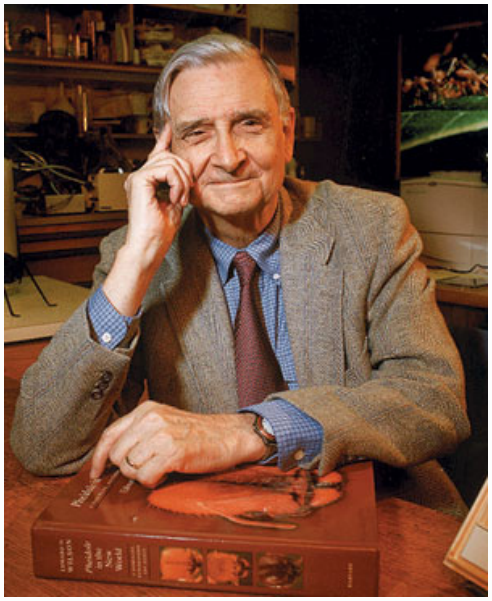
Stratospheric ozone hole over Antarctica: A model for hope?



Ozone reduction facilitated by ice crystals in atmosphere providing reaction surfaces for ozone depleting chemicals

Ban on chlorofluorocarbons (CFCs)

Stabilized - expect eventual closing of hole by centuries end



e.o.wilson BIODIVERSITY FOUNDATION

Importance of Biodiversity

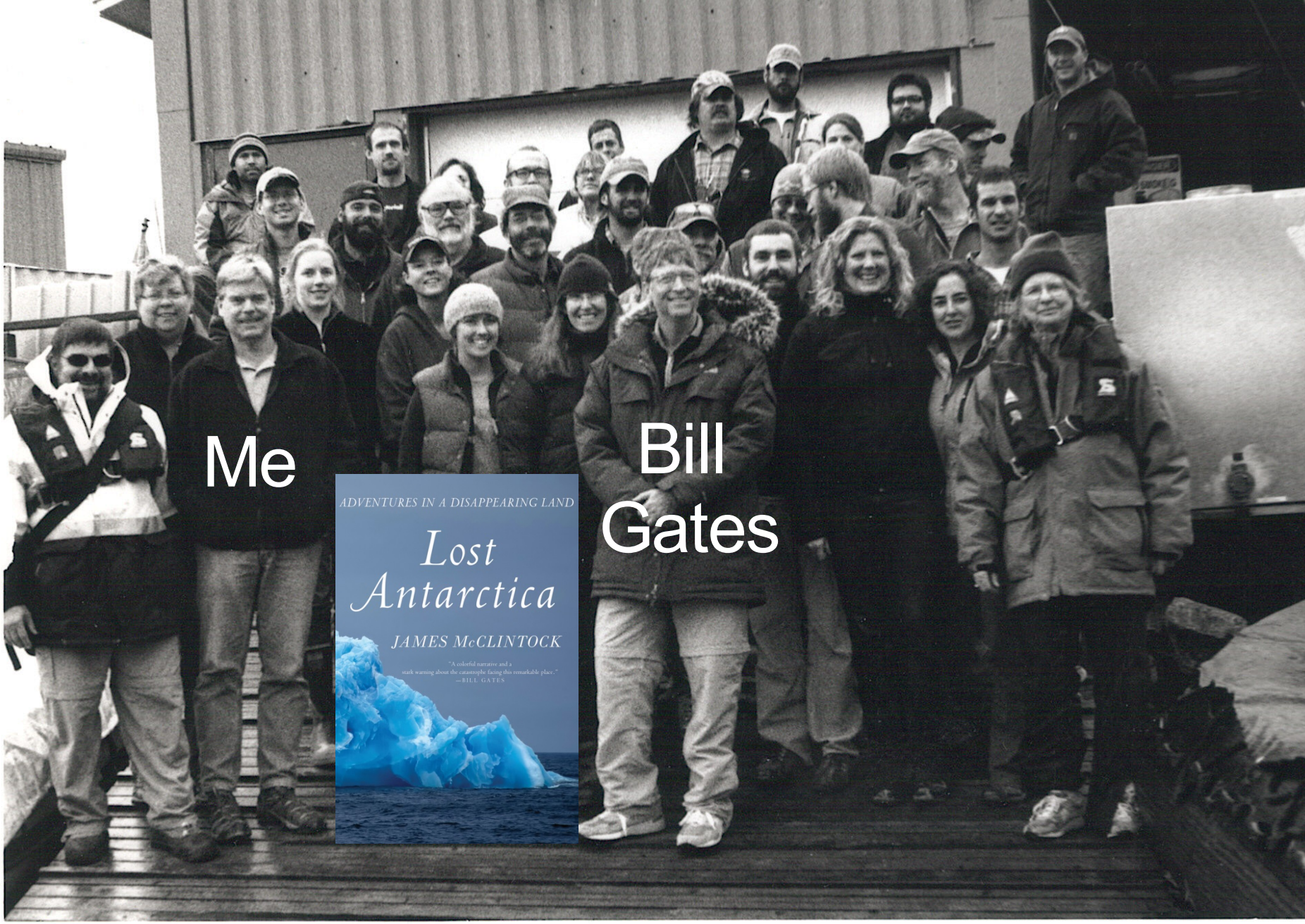
Preservation of our biological heritage

Harrison Ford

Narrates *Lost Antarctica* Video – *Ghost Rookeries*

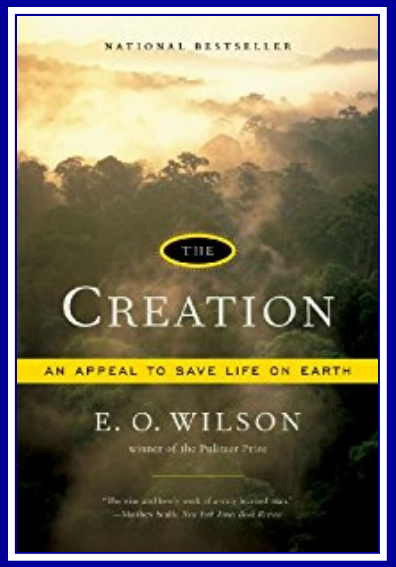
Ghost Rookeries: Climate Change and the Adelie Penguin

from **EOWilson Biodiversity Foundation** PLUS 1 month ago NOT YET RATED



the GATES @ PALMER

Jul 2010



CAMP MCDOWELL

A PLACE TO WORSHIP, LEARN, GROW, REST, AND PLAY SINCE 1948.

Spirituality and Climate, a Conference in the Forest

Please join us at Camp McDowell November 13-15, 2015 as Professor James McClintock and The Rev. Mark Johnston provide insight into the hot topic of climate change. While the workshop will highlight impacts that our changing climate has made on Antarctica and waterways in the U.S., there will be hopeful information about the role of religion in the stewardship of creation and the importance of energy efficiency. We will leave with practical action items that we can each do at home and at work.

DR. JAMES B. MCCLINTOCK is an internationally recognized Antarctic Marine Biologist Professor of Polar and Marine Biology at the University of Alabama at Birmingham. He has 25 years of research experience in Antarctica and over 230 scientific publications. He has been featured in National Geographic Magazine, Discover Magazine, Chicago Tribune, Wall Street Journal, and appeared on The Weather Channel. He lives in Birmingham, AL. Jim's new book, A Naturalist Goes Fishing, will be available in October.

THE REV. MARK JOHNSTON is an Episcopal priest and advocate for the care of God's creation. A graduate of Sewanee— both undergrad and seminary—he has been the Executive Director of Camp McDowell for 25 years. In 1993 Mark started the McDowell Environmental Center, now the largest residential program in the Southeast. He has received numerous awards and recognitions including, Alabama's Outstanding Young Religious Leader in 1982, The James C. Dockery Southern Environmental Leadership Award in 1999, and Forest Steward of the year for Winston County in 2012. Mark loves to hunt, fish, paddle, camp, garden, and run. He also watches Braves baseball.

CAMP MCDOWELL, 105 DELONG RD, NAUVOO, AL 35578 • WWW.CAMPMCDOWELL.COM

James McClintock Ph.D.
Communicating Climate Change
Expedition Cruise to Antarctica

Abercrombie and Kent Antarctic (January 6-20, 2018, 2019)

Ten ways to Impact Climate Change

Vote – call, write, talk to your elected officials
Insulate your business or house
Turn off power
Smart consumption (avoid items heavily packaged)
Adjust the temperature of your thermostat
Change driving habits
Plant a tree
Conserve water
Recycle
Change a light bulb
Educate your friends and family

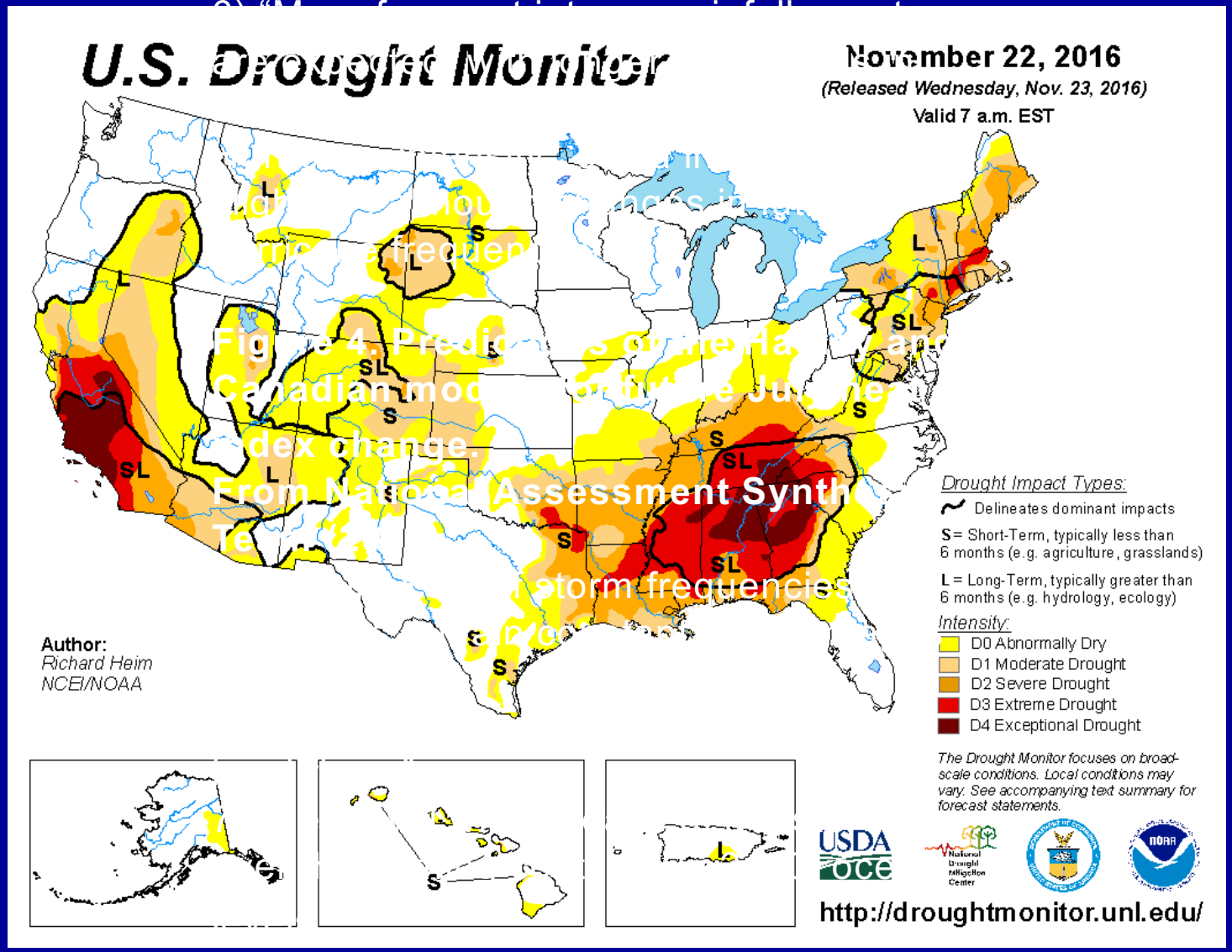
From – Alabama Environmental Council

Predictions for Climate Change Impacts in Alabama

(cited in 2007 report by Larry Davenport, Department of Biology, Samford University based on information from the Union of Concerned Scientists)

1) A 3-10°F [1.6-5.5°C] rise in winter low temperatures and a 3-7°F [1.6-3.8°C] rise in summer highs.
2) The July heat index could rise by 10-25°F in Alabama--a major jump in the temperature actually felt.
3) The freeze line will move north.
4) Rainfall will decrease in the immediate coastal region.
5) Summer soil moisture will either increase or decrease in the northern parts of the state, depending on the model utilized. The same is true for upland areas.
6) More frequent intense rainfall events are expected, with longer dry periods in between. Hurricanes may become more intense.
7) Sea level will increase at a faster rate over the coming century. By 2100, ocean levels around Alabama could be 15 inches [38 cm] higher than today, based on a continued average subsidence rate of 2 inches per century and a mid-range sea-level rise scenario.

depending on the model utilized. The same is true for upland areas.



around Alabama could be 15 inches [38 cm] higher than today, based on a continued average

Adam Vines
Chinese Antarctic Station

YouTube Video of This Presentation

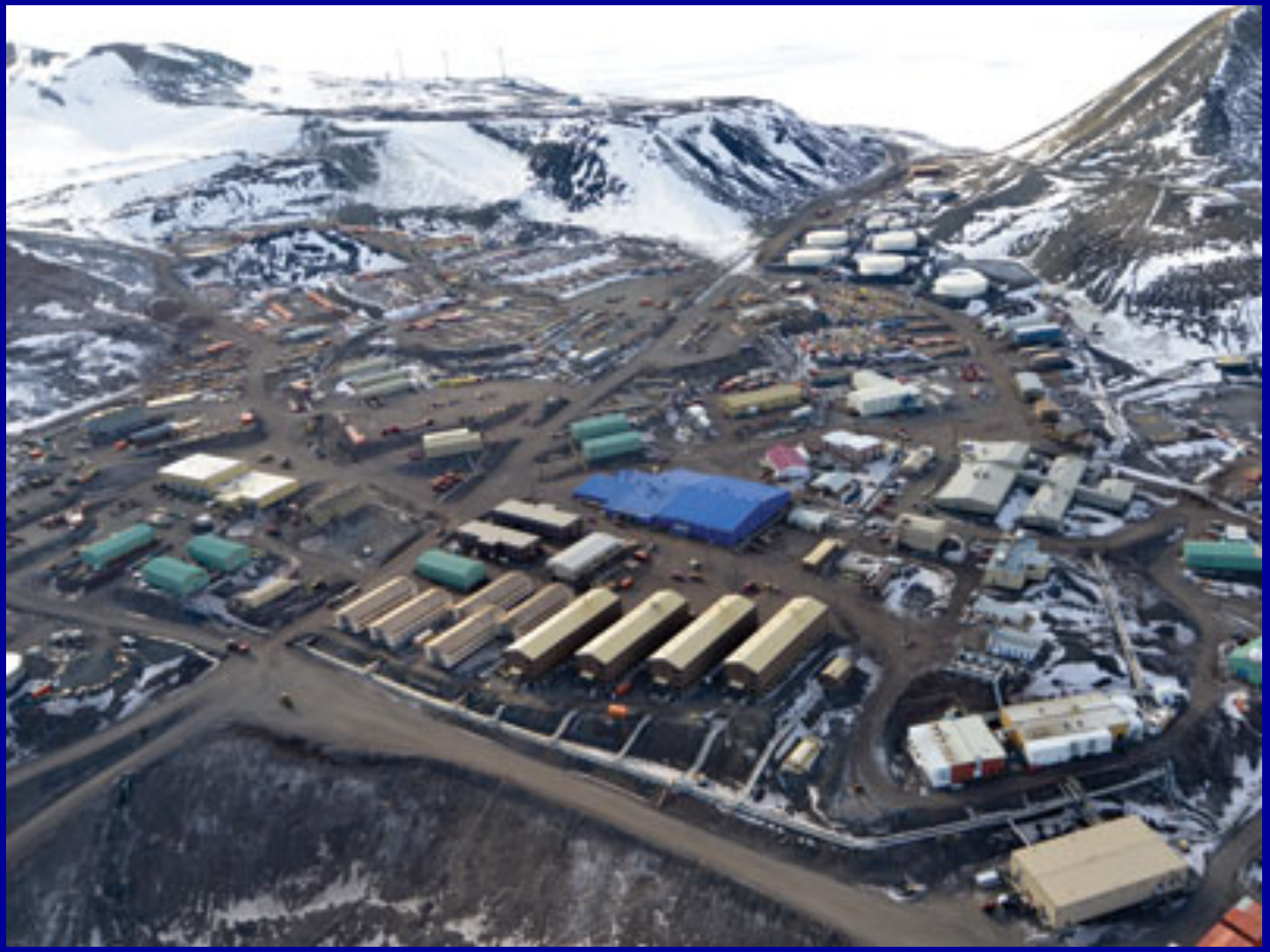
Google search:

YouTube McClintock “From Penguins to Plankton”

Antarctic Research Stations

Planning, Construction and Architectural Issues

- Energy Efficiency (high cost)
- High wind (structure stability)
- Low temperatures (insulation)
- Fire risk (redundancy issues)



McMurdo Station, Antarctica

McMurdo Station, Antarctica

McMurdo Station – Resupply

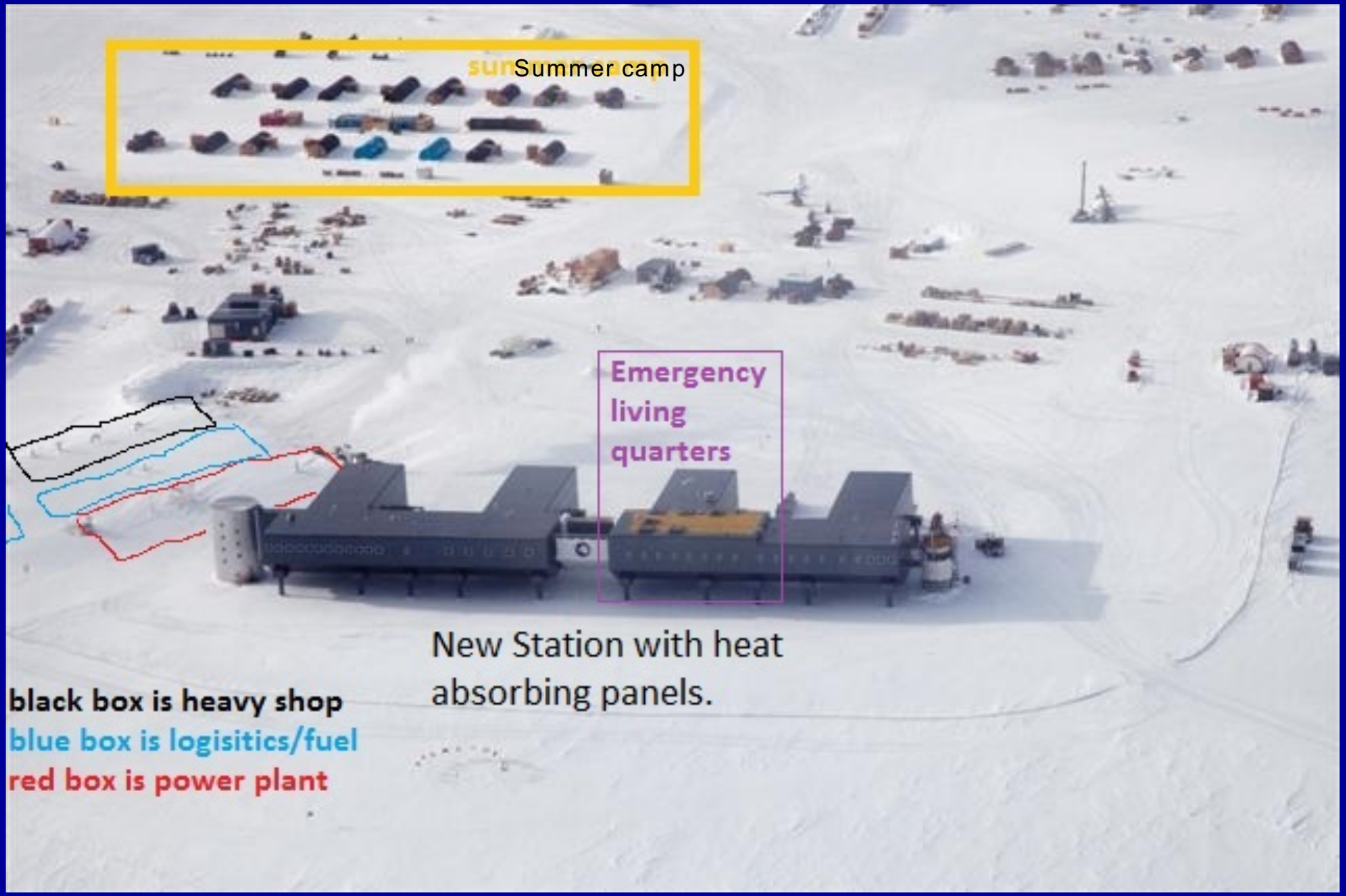
Palmer Station, Antarctic Peninsula


NO PARK


Hero Inlet
Palmer Station, Antarctic Peninsula
Pier
Bonthouse
Bio Lab
Shop
Fuel Tanks
GWR
Building

Former U.S. South Pole Station

New U.S. South Pole Station



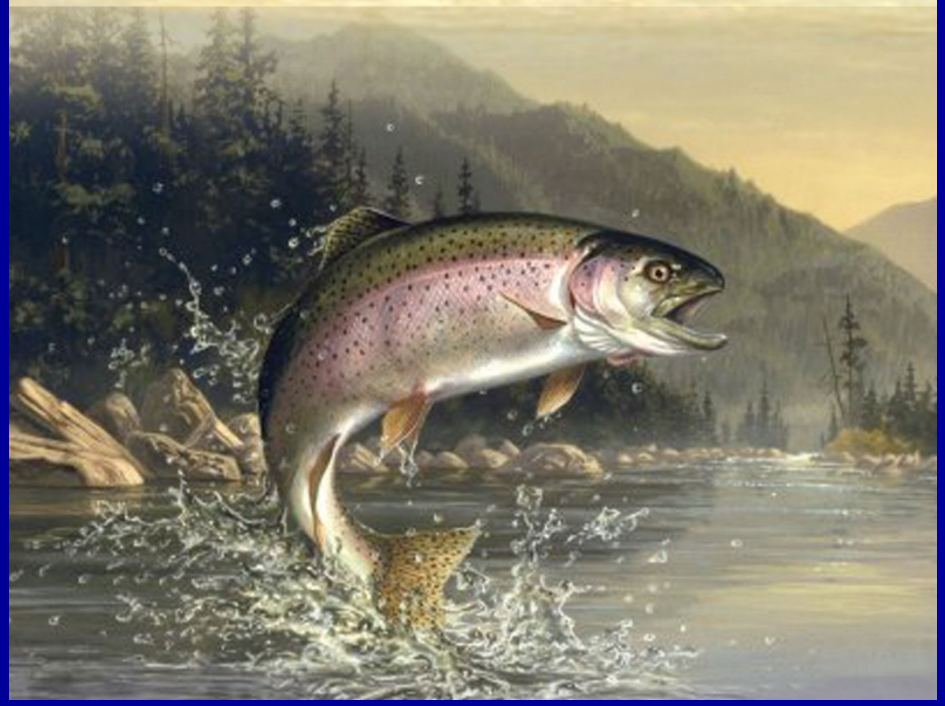
New U.S. South Pole Station

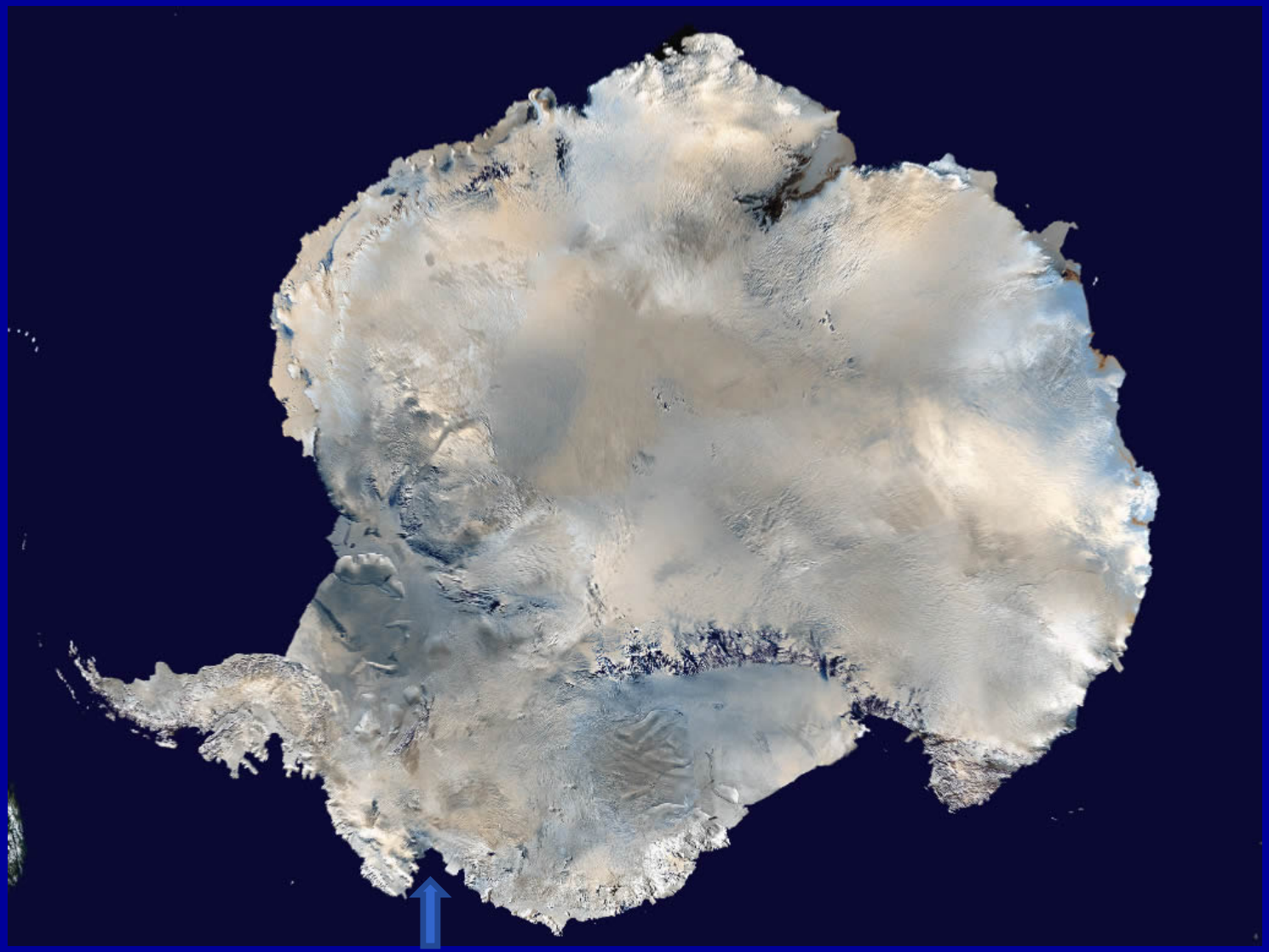
Casting in Fragile Waters from the Gulf of Mexico to New Zealand's South Islands

A NATURALIST GOES FISHING

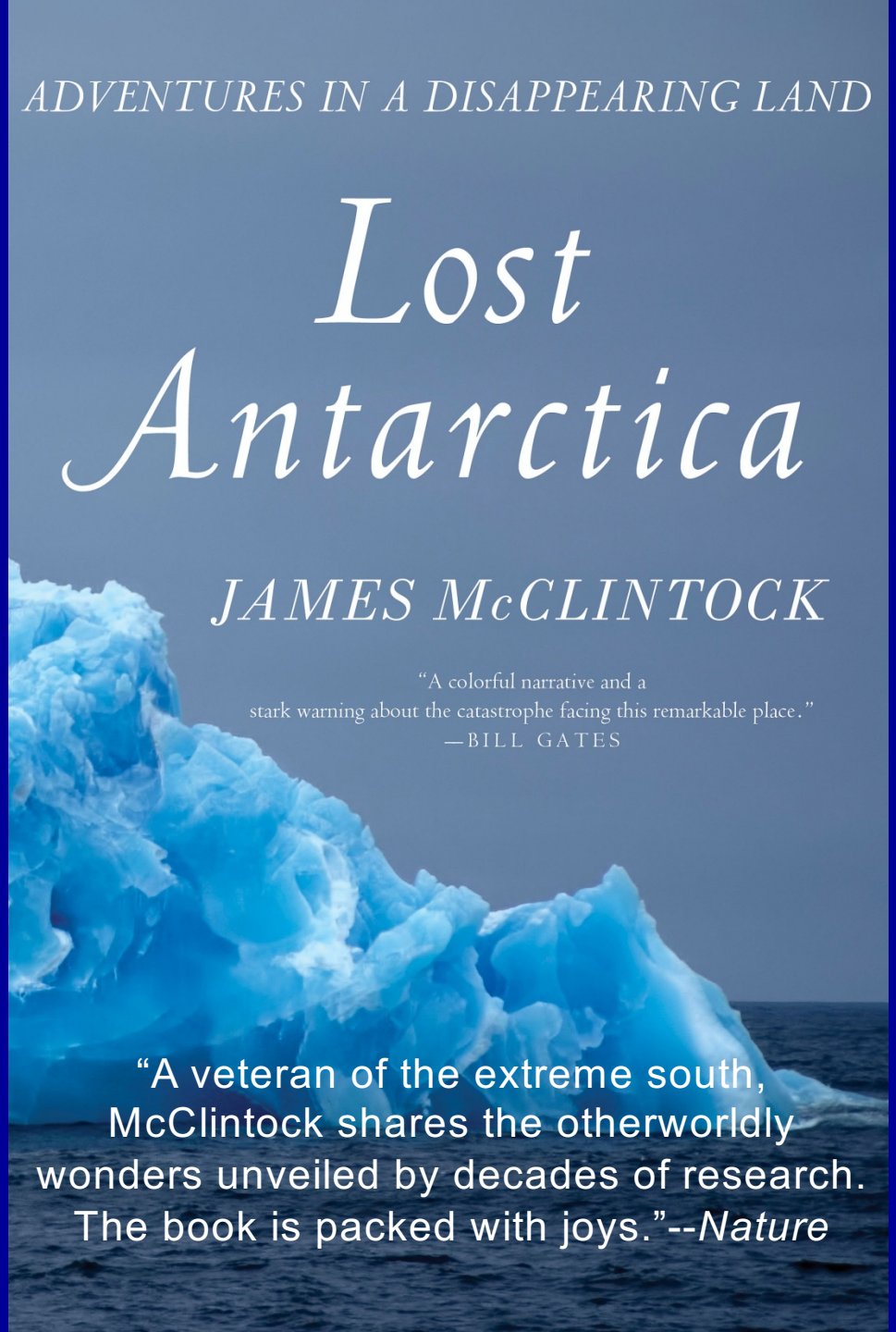
JAMES McCLINTOCK

AUTHOR OF *LOST ANTARCTICA*



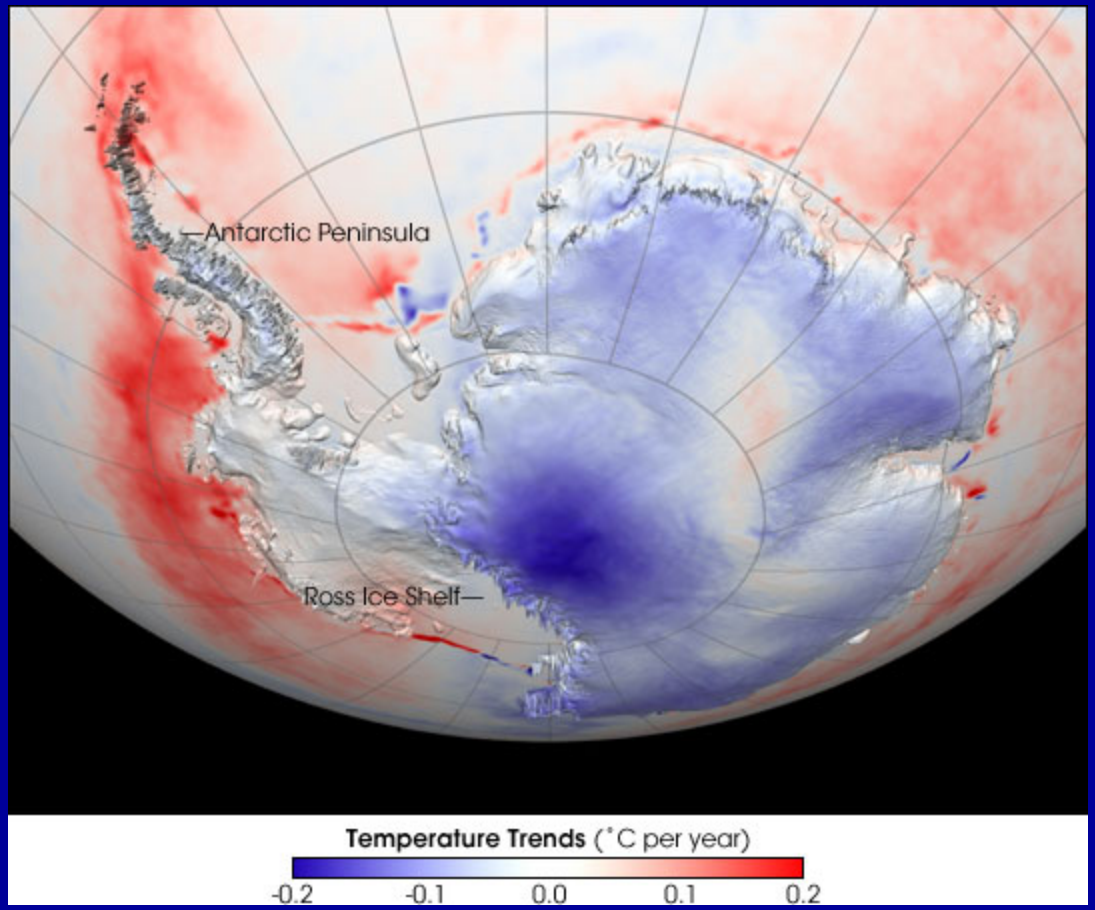


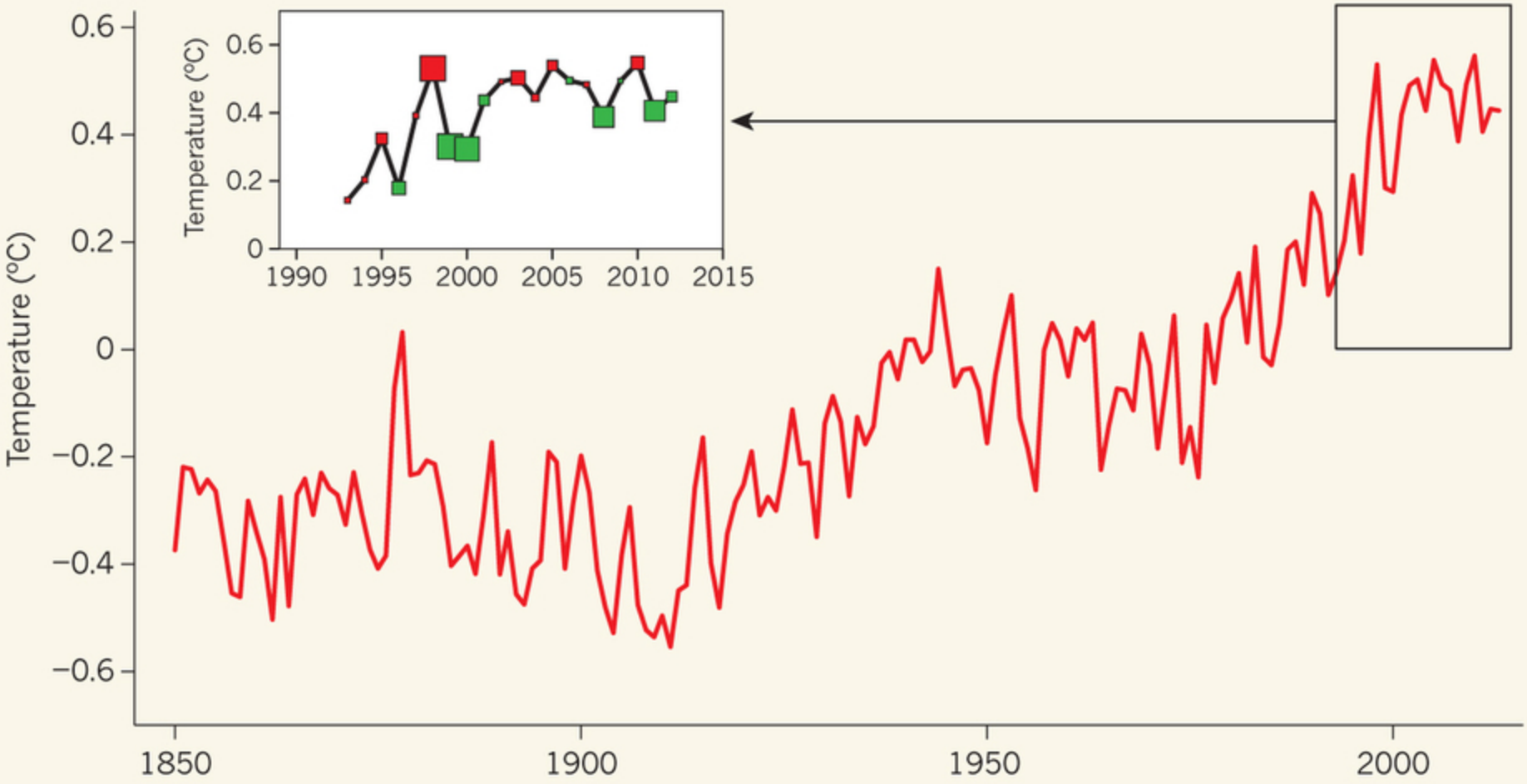
Pine Island Glacier – Major ice stream that drains West Antarctic Ice Sheet



"A veteran of the extreme south, McClintock shares the otherworldly wonders unveiled by decades of research. The book is packed with joys."--*Nature*

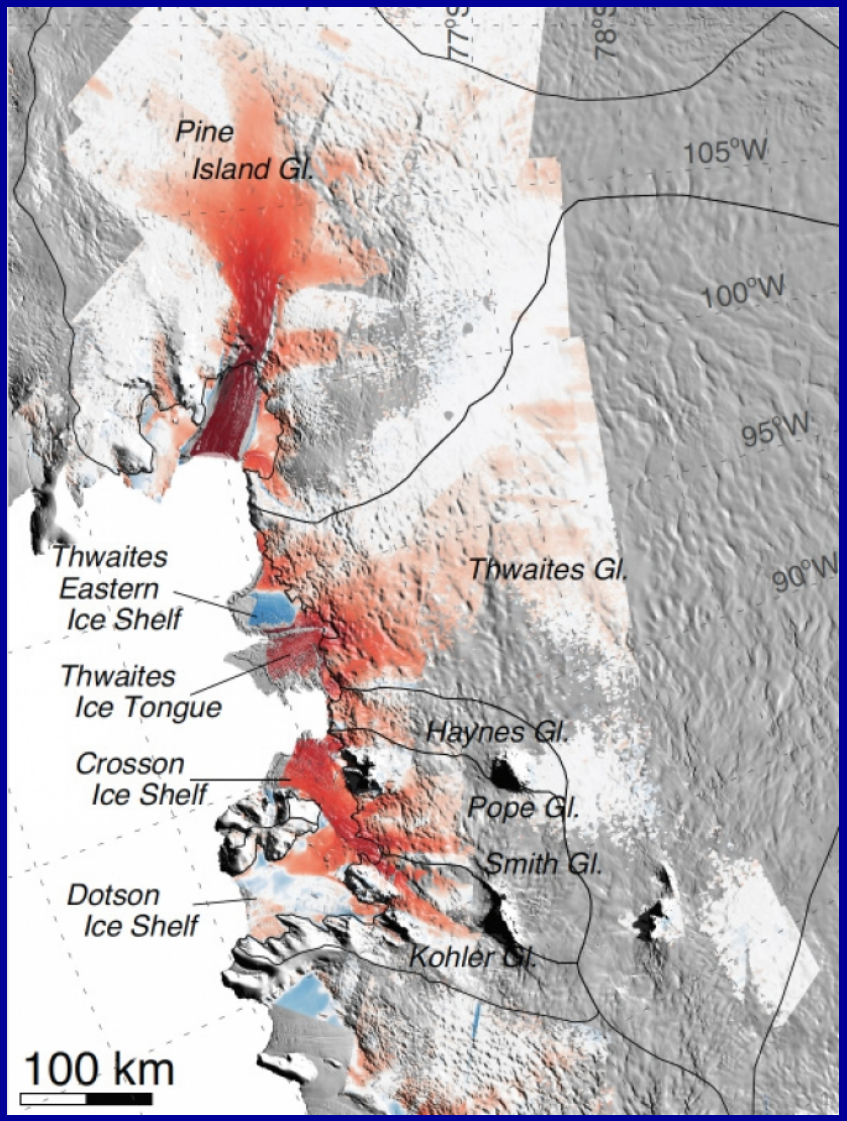
New U.S. South Pole Station


—Antarctic Peninsula
Ross Ice Shelf—
Temperature Trends (˚C per year)
-0.2
-0.1
0.0
0.1
0.2


Temperature (°C)
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
1850
1900
1950
2000
Temperature (°C)
0.6
0.4
0.2
0
1990
1995
2000
2005
2010
2015

Le Boreal


LE BOREAL
MATA UTU



A new 2014 study by researchers at NASA and the University of California, Irvine, finds a rapidly melting section of the West

The glaciers studied by Rignot's research team. Red indicates areas where flow speeds have increased over the past 40 years. The darker the color, the greater the

Huge technological challenges posed by climate change

Critical need for innovation in all the sciences

-Alternative fuels
-Solar energy
-Wind energy
-Fusion research
-Energy conservation
-Materials Science – lighter stronger materials
-Medical research and care to cope with spread of diseases
-Engineering to better protect against severe weather events and sea level rise
-Etc.Etc.Etc.

Now a decade after my first visit to the abandoned station site, I clamber up and over the boulders, dodge the dive-bombing Skuas, and take a circuitous route around several fur seals. A short climb takes me to the summit of Amsler Island. Below me, a small island called Elephant Rocks bustles with a breeding colony of barking elephant seals, the product of a range extension from the warmer subantarctic. Torgerson Island, which is also within earshot, is oddly quiet, its former Adélie colonies in large part permanently abandoned. To the west, the tongue of the Marr Glacier that had so recently extended seaward, covering Amsler Island, has dissipated, its final vestiges melting rapidly to reveal dirt and rock. As I descend from the summit, I pause to gaze into the distance at the cluster of deep-blue, tan-roofed buildings that make up Palmer Station. What sort of a world, I wonder, will future generations of Antarctic scientists find when they come to this remarkable place? And when they gaze over this landscape, will they be reminded how this place, this peninsula, these ecosystems, served as a wake-up call to jump-start the technological, societal, and political paths to a sustainable planet?

Lost Antarctica

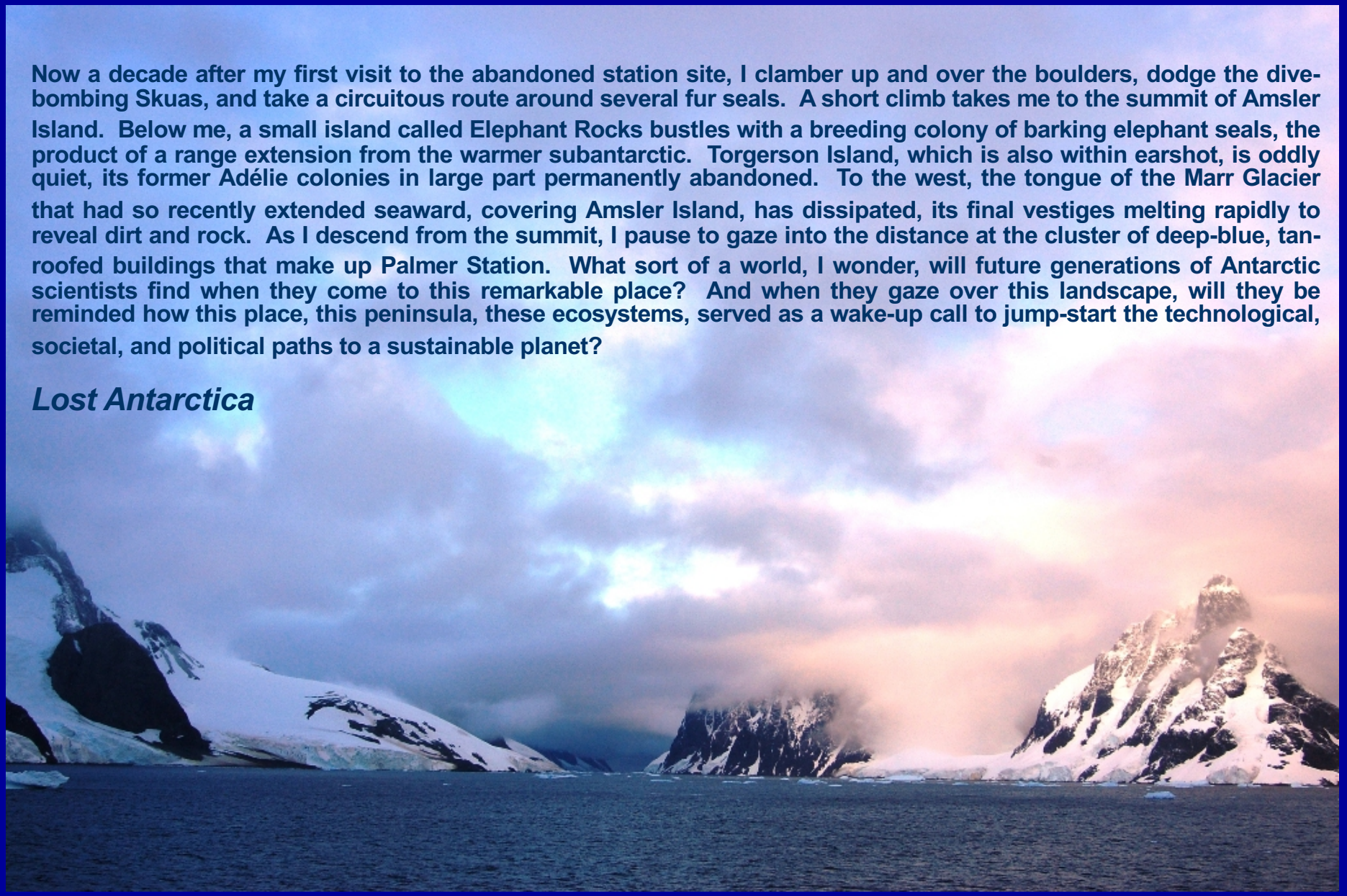
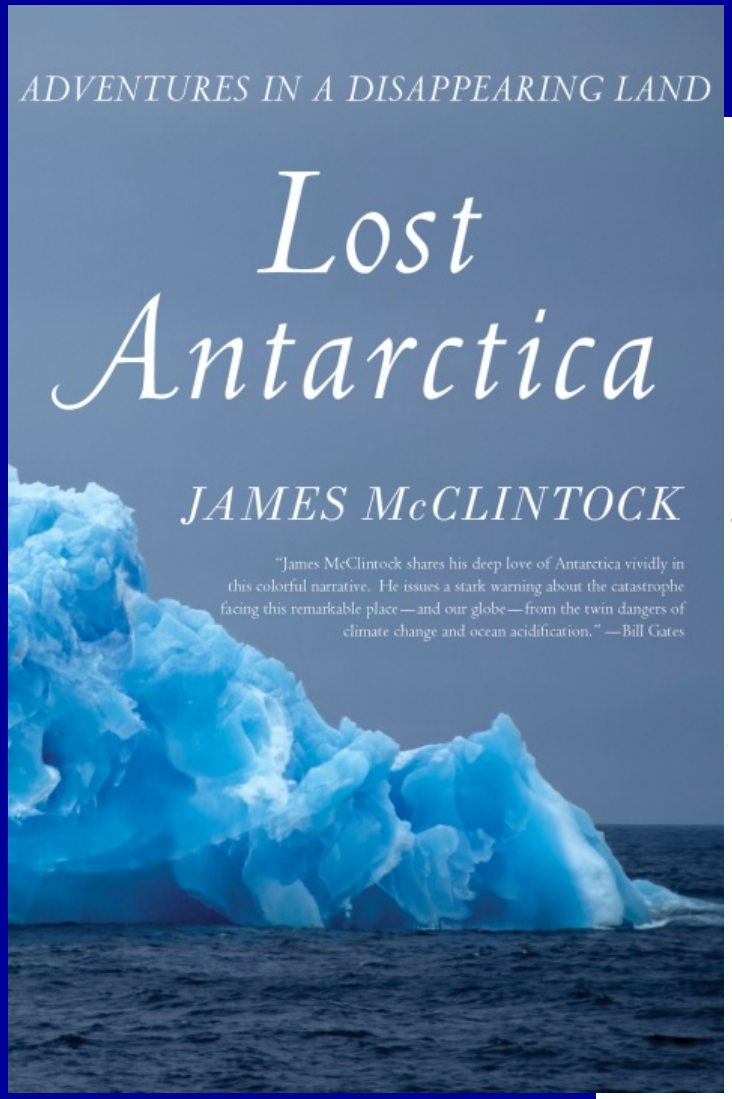


Photo - Alan Maschek



Contents

Eight pages of photographs appear between pages 114 and 115.

978-0-230-11245-2_McClintock.indb 7 6/27/12 4:29 PM

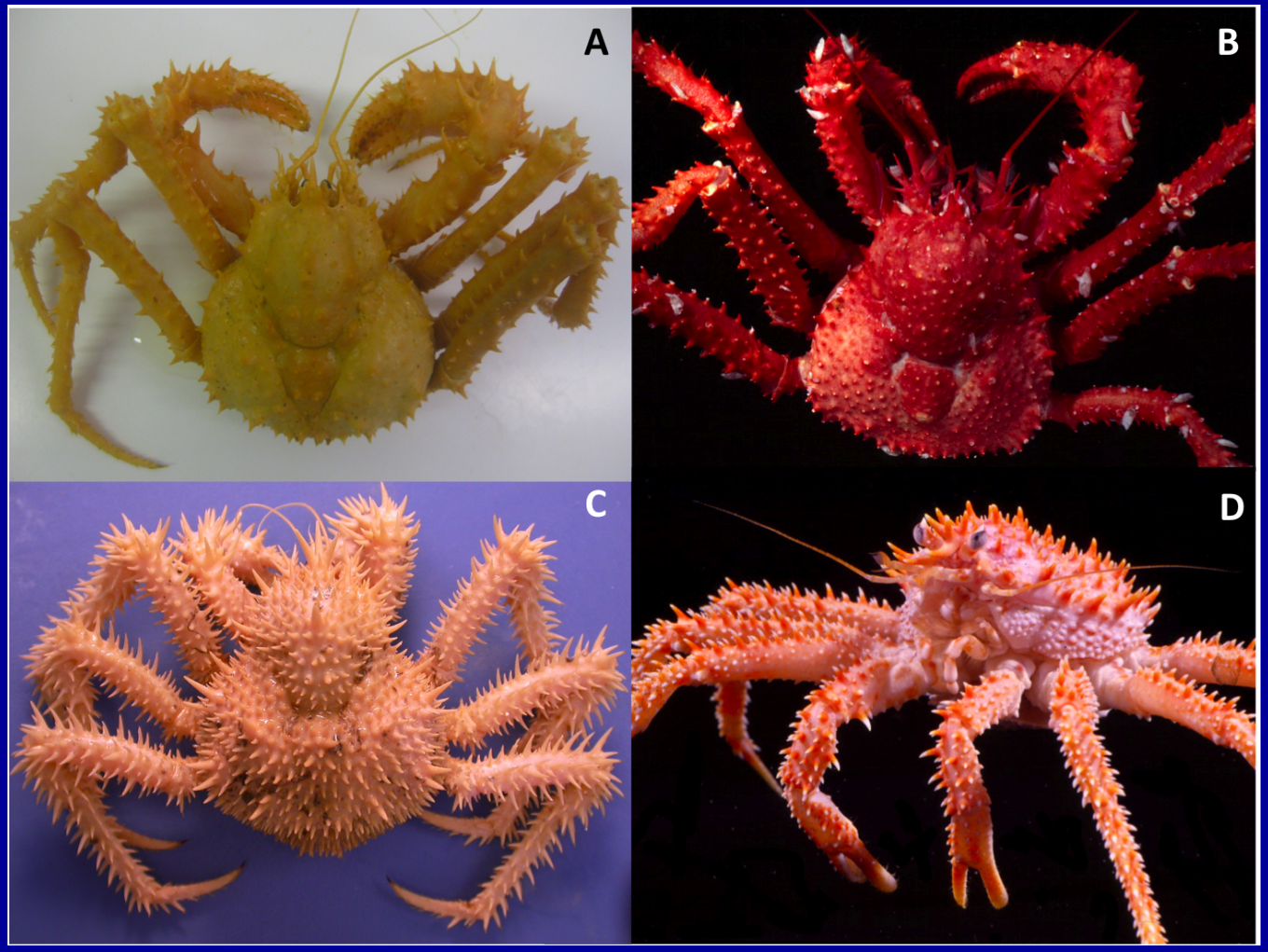
Abercrombie and Kent – UAB Antarctica Cruise
Dec 2007 “Climate Change Challenge”

Nesting Adélie penguins buried in snow suffer high egg mortality

Nov 19, 2001 storm event

Photos – Heidi Geisz

McMurdo Sound, Ross Sea


A
B
C
D

Acknowledgements

FUNDING

National Science Foundation

Office of Polar Programs

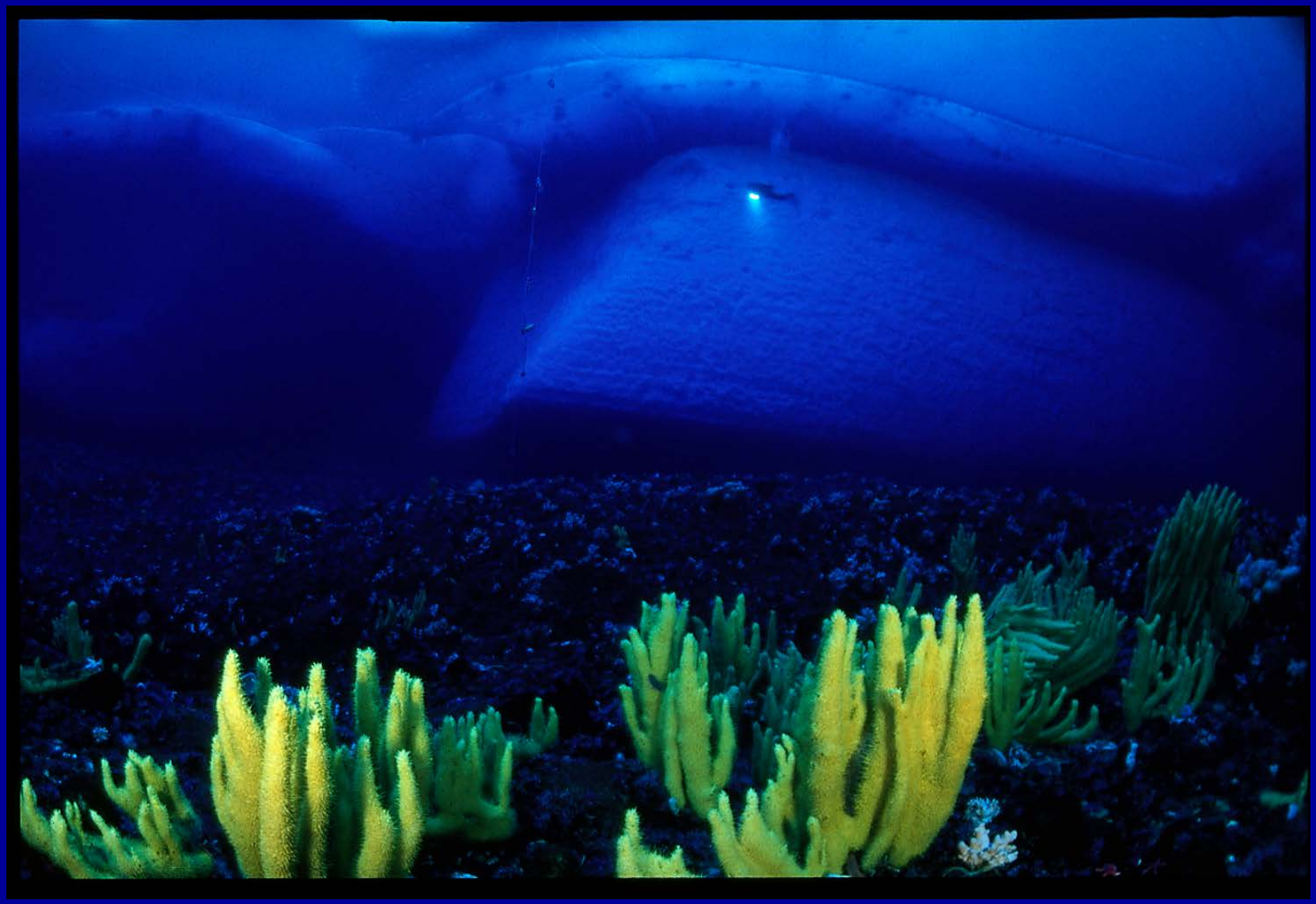
LOGISTICAL SUPPORT

Antarctic Support Associates

Raytheon Polar Services, Inc.

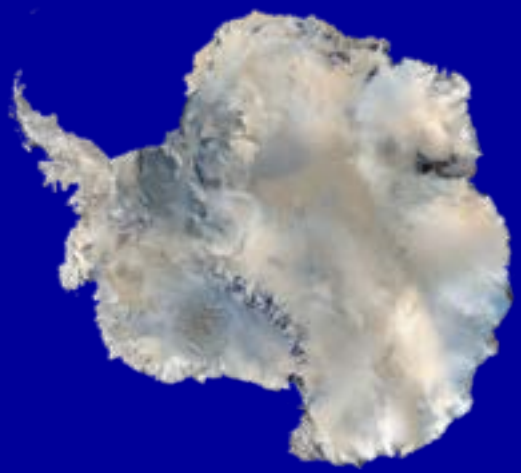
MANY RESEARCH COLLABORATORS AND FIELD TEAM ASSISTANTS

Preparing to dive below the sea ice



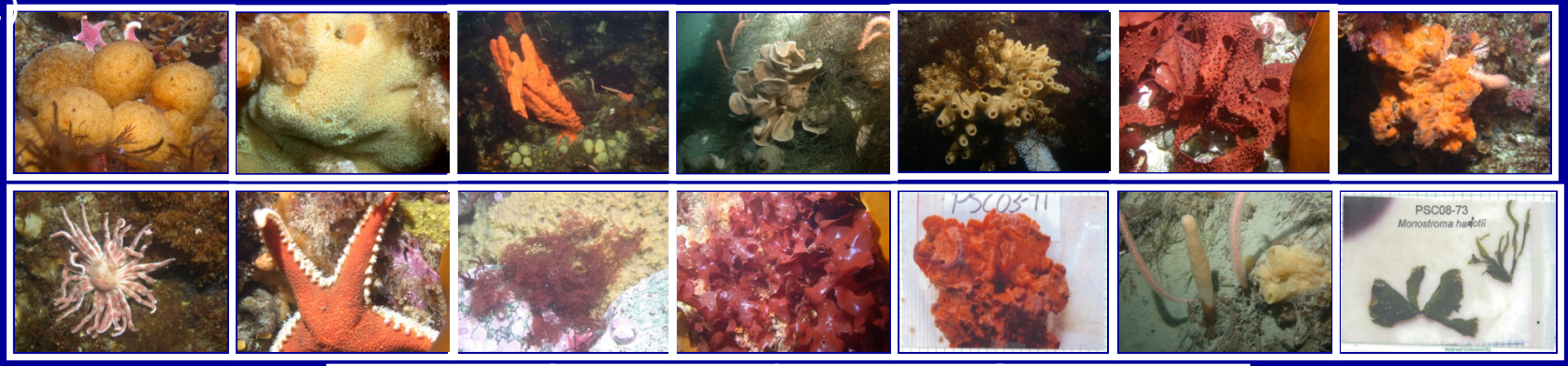
Summary

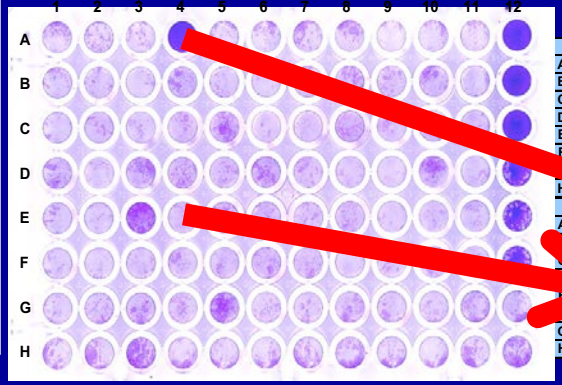
- A protein with strong anti-influenza activity from the marine red alga *Gigartina skottsbergii*
- Active towards Wyoming H3N2 and influenza A(H1N1) virus
- Different mechanism of action from control drugs
- Combination drug assays imply a synergistic effect with the active fraction and control drugs Zanamivir and Ribavirin



Primary Screening

• Only one extract from hundreds showed protection as evaluated by Cytopathic Effect (CPE)





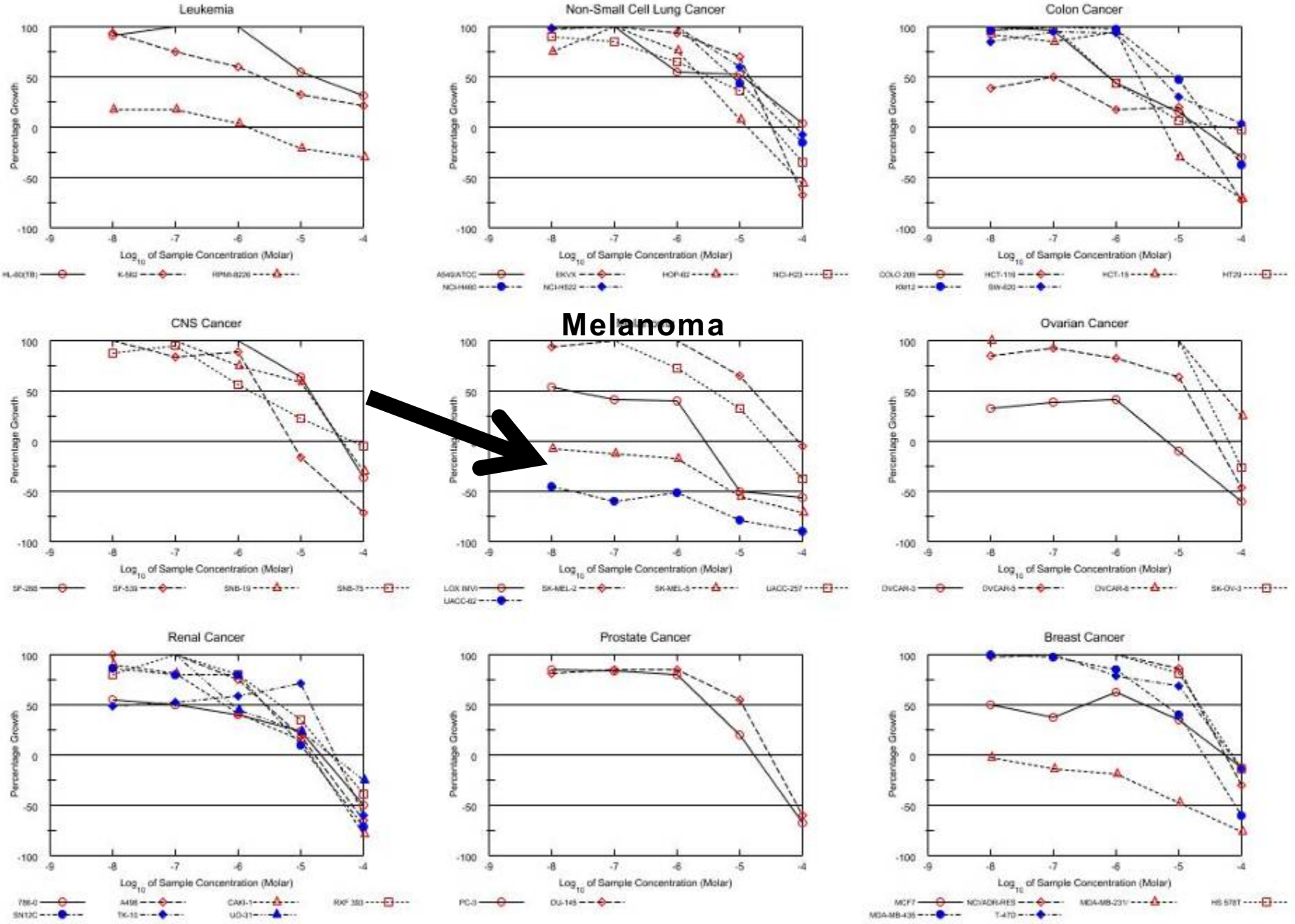
	1	2	3	4	5	6	7	8	9	10	11	12	
A	0.891	0.833	0.869	1.46	1.042	0.986	1.004	0.985	0.838	1.007	0.871	1.458	
B	0.937	0.803	0.588	0.998	0.819	0.833	0.913	0.88	0.914	1.062	0.813	1.567	Nc=1.452
C	0.882	0.886	0.709	0.918	0.929	0.901	0.84	1.126	0.844	0.809	0.999	1.33	
D	1.122	0.743	0.907	1.031	0.812	1.145	0.956	0.826	0.667	1.135	0.819	1.46	
E	0.813	0.931	1.196	1.039	1.073	0.934	0.871	1.049	0.878	0.91	1.047	1.39	
F	0.787	[illegible]	0.765	0.843	0.969	0.881	0.988	0.581	0.938	1.033	0.71	1.45	
G	[illegible]	[illegible]	1.036	0.863	1.129	0.747	0.813	0.913	0.989	1	0.919	1.091	Nc=1.079
H	[illegible]	[illegible]	1.166	0.874	0.992	1.001	1.021	1.017	1.145	0.975	1.084	1.066	

	1	2	3	4	5	6	7	8	9	10	11	12
A	[illegible]	[illegible]	58.8	102.2	-9.8	-24.8	-20.0	-25.1	-64.4	-19.2	-54.0	101.7
B	-37.9	-73.8	-131.4	-21.6	-69.5	-65.8	-44.4	-53.2	-44.1	-4.4	-71.4	130.9
C	[illegible]	-61.5	-99.0	-43.0	-40.1	-47.6	-63.9	12.7	-62.8	-72.2	-21.3	67.4
D	[illegible]	-89.9	-46.0	-12.7	-71.4	17.8	-59.6	-67.7	-110.3	15.1	-69.5	96.9
E	[illegible]	-39.5	31.5	-10.6	-1.5	-38.7	-55.6	-7.9	-53.7	-45.2	-8.4	83.5
F	-78.1	-86.2	-94.0	-63.1	-29.3	-52.9	-24.3	-133.3	-37.7	-12.2	-98.7	99.6
G	-52.9	-64.4	-11.4	-57.7	13.3	-88.8	-71.1	-44.4	-24.0	-47.0	-42.7	3.3
H	-24.3	-15.1	23.4	-55.6	-23.2	-20.8	-15.4	-16.5	17.8	-27.7	2.0	-3.3

- The crude extract in position A4 (*G. Skottsbergii*) was determined to protect against influenza, while the extract in position E3 partially protected.
- Healthy cells stain purple. Lane 12 contains experiment controls.

National Cancer Institute Developmental Therapeutics Program
Dose Response Curves

NSC : D730282 / 1	SSPL : 0NXH	EXP. ID : 0401RS72
Report Date : February 06, 2004	Test Date : January 05, 2004	



A&K Climate Change Challenge Philanthropic Cruise Gift for Palmer Station Scientists

State-of-the- art automated computerized carbon dioxide delivery system - $12,000

Allows for around-the-clock regulation of seawater acidity in over 100 tanks simultaneously

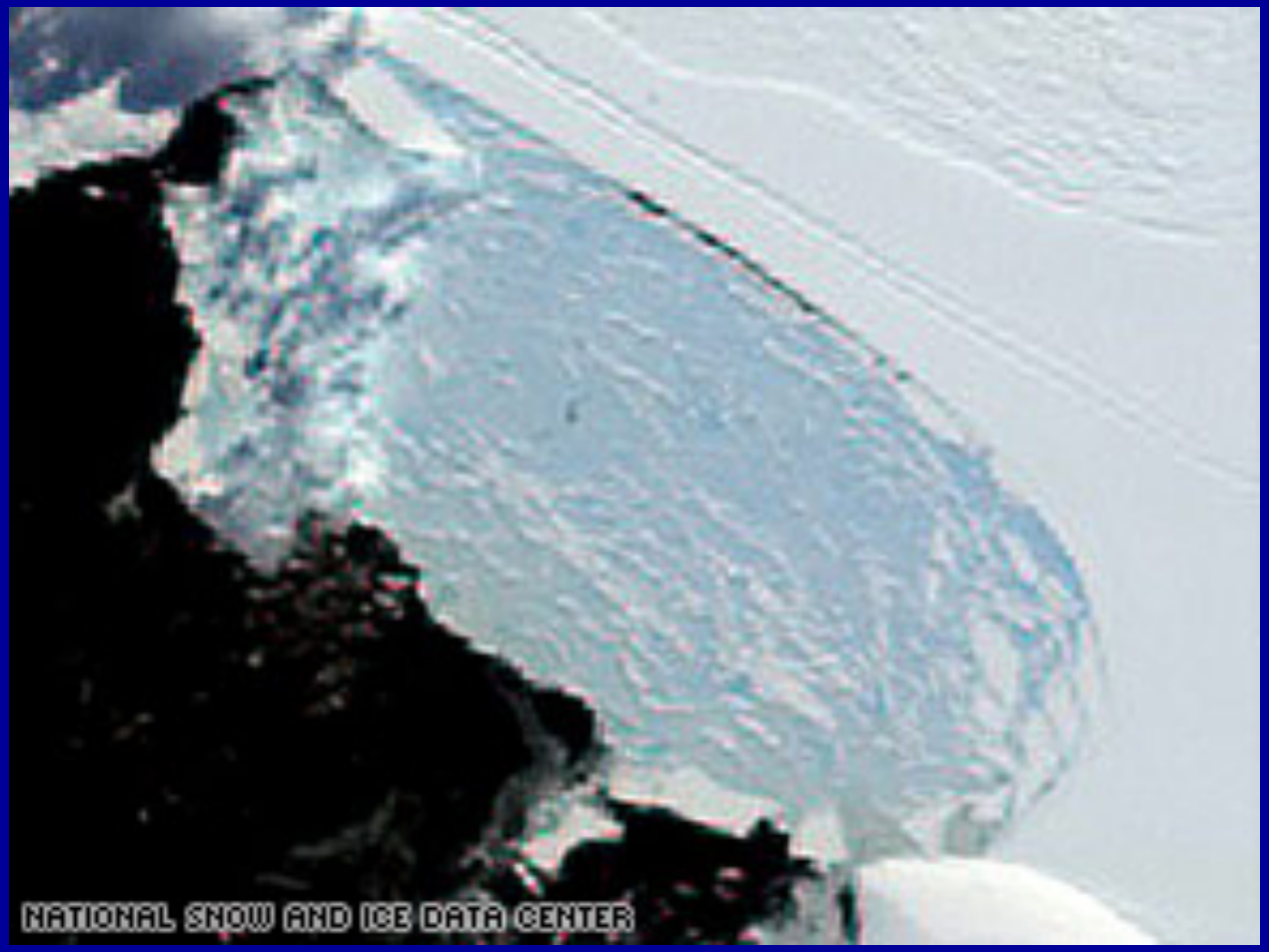
Add cartoon of ocean acidification here

Ecologically dominant macroalgae are chemically defended

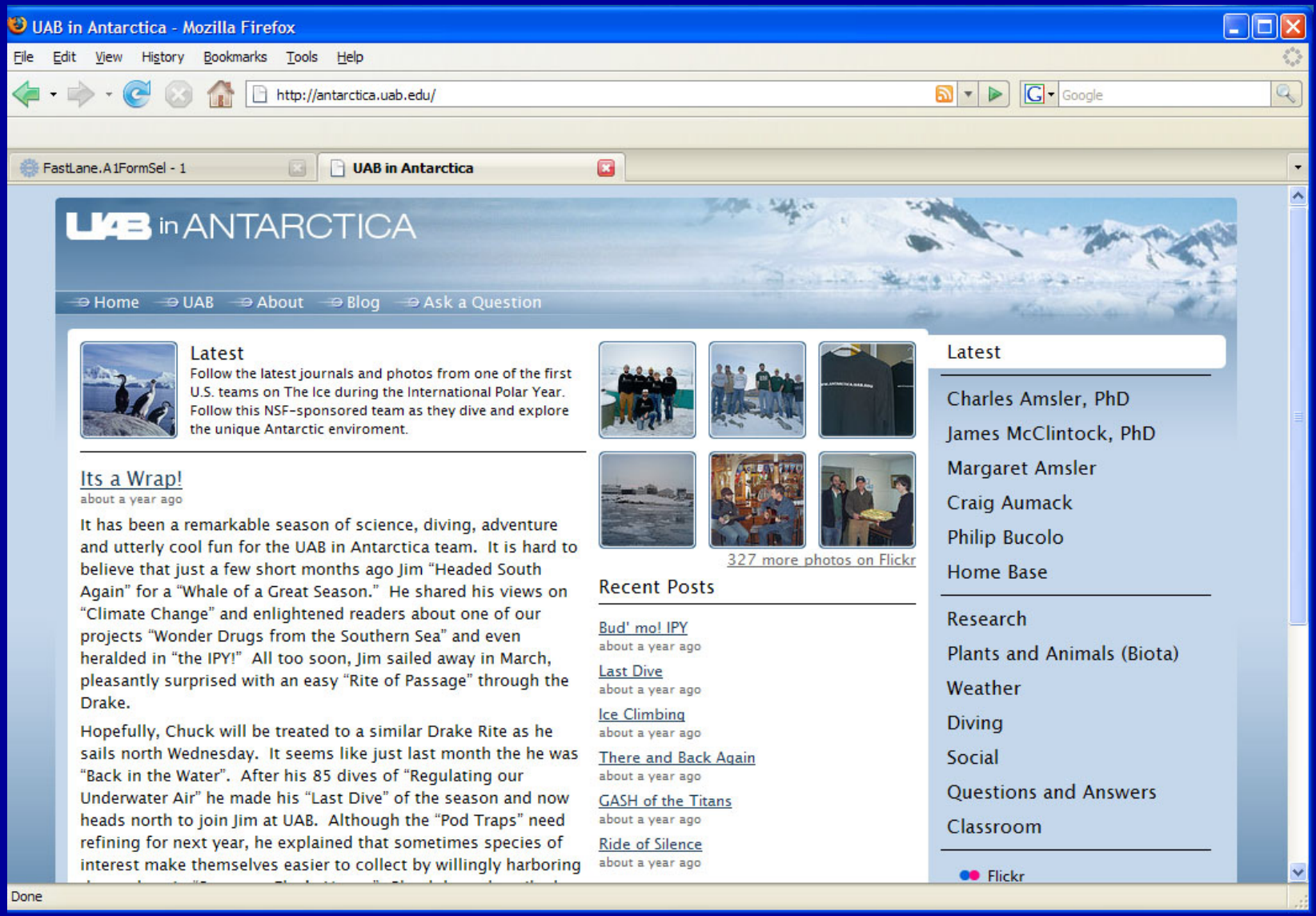
35 species of fleshy macroalgae tested in feeding bioassays

US Palmer Station

March 2008 Wilkins Ice Shelf Collapse



Seven times the size of Manhattan



Antarctica.uab.edu

Two-time national CASE award winning web site

UAB in ANTARCTICA

Classroom

This area is for K-12 teachers, students, and parents to participate and learn about Antarctica and the International Polar Year (March 2007-2009). Ask the UAB team questions and participate in classroom projects.

Our Trip to the Ice

about a year ago

"Can we go on a field trip to Antarctica?" my eager second graders asked. While they really knew that was not a possibility, I think they were secretly wishing I could be a teacher like Ms. Frizzle in the lively Magic School Bus series. Ms. Frizzle can turn a school bus into a submarine or a spaceship with the flip of a switch or the push of a button. Since I was not likely to acquire these extraordinary skills anytime soon, I had to find another way to direct my students' enthusiasm and turn it into a learning adventure they would enjoy.

I began with a classroom standard, a **KWL** chart. On the **KWL** chart, students first listed what they **knew (K)** about Antarctica. Next, they listed questions they **wanted (W)** answered. Eventually, they would list what they **learned (L)** on the last part of the chart. The students asked some very good questions. Where do icebergs come from? What do blue whales eat in the waters surrounding Antarctica? How tall are emperor penguins? How did Shackleton and his men survive being trapped in ice? Why don't fish freeze in the cold waters? What's on the ocean floor? These were just a few of the questions they listed.

Each student ...

read more






40 more photos on Flickr

Recent Posts

Ways to Avoid a Leopard Seal
about a year ago

The Southern Sea's Medical Wonder: Viva Palmerolide!
about a year ago

A High Flying "Teachable Moment"
about a year ago

Its the International Polar Year!
about a year ago

A Layer of Air Experiment
about a year ago

Brrr...Blubber Experiment
about a year ago

more

Latest

Charles Amsler, PhD
James McClintock, PhD
Margaret Amsler
Craig Aumack
Philip Bucolo
Home Base

Research
Plants and Animals (Biota)
Weather
Diving
Social
Questions and Answers
Classroom

Flickr
Youtube
RSS
International Polar Year
U.S. International Polar Year

Photos from International Polar Year group on Flickr









173 more photos on Flickr

The UAB in Antarctica expedition is funded by The National Science Foundation

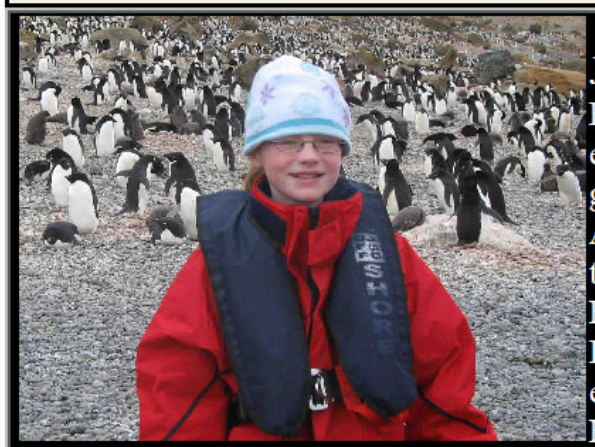
Jamie's Antarctic Journal - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.dpo.uab.edu/~mamsler/index.htm

Jamie's Antarctic Journal

JAMIE'S ANTARCTIC JOURNAL



Jamie, a middle school student from Birmingham, Alabama had an extraordinary opportunity to sail to the great white, frozen continent of Antarctica! Her voyage brought her face to face with whales enroute to the Falklands, gale force winds in the Drake Passage, islands covered with penguins, enormous icebergs and much more. History, geology, and the marine biology of Antarctica – all are part of this exciting trip to one of the remotest places on earth. Each day of the voyage, Jamie shared her journal entry with her classmates back in Alabama and does so now with you. Please join her for this virtual Antarctic adventure recounted in:

Jamie's Antarctic Journal which starts here....

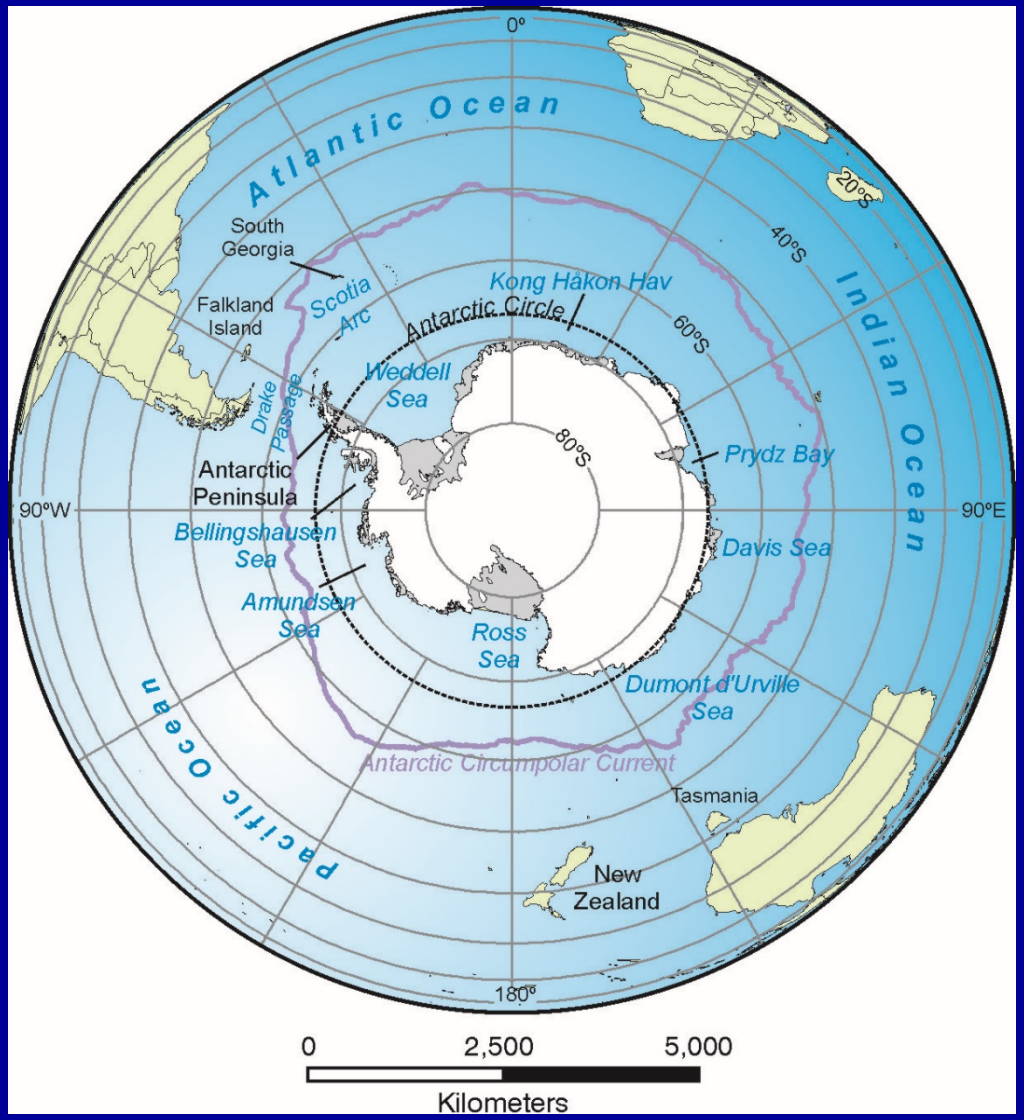
Jamie's Voyage

Done

Jamie's Antarctic Journal

www.uab.edu/antarcticajournal

www.uab.edu/antarcticajournal/teacher


0°
Atlantic Ocean
20°S
40°S
Indian Ocean
South Georgia
Falkland Island
Scotia Arc
Kong Håkon Hav
Antarctic Circle
60°S
Weddell Sea
Drake Passage
80°S
Prydz Bay
Antarctic Peninsula
90°W
90°E
Bellingshausen Sea
Davis Sea
Amundsen Sea
Ross Sea
Dumont d'Urville Sea
Pacific Ocean
Antarctic Circumpolar Current
Tasmania
New Zealand
180°
0
2,500
5,000
Kilometers


A

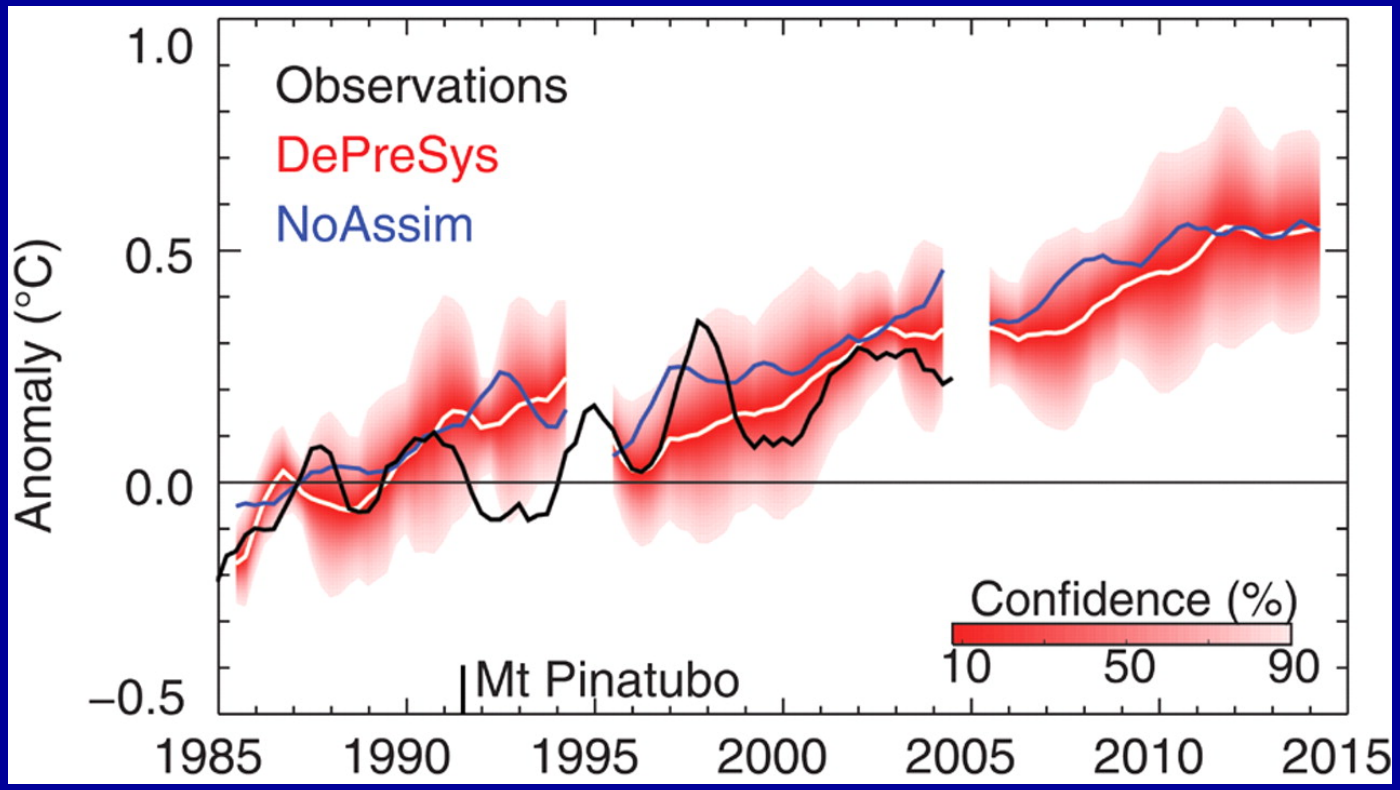

B


C


D

Improved Surface Temperature Prediction for the Coming Decade from a Global Climate Model

D. M. Smith et al., Science 317, 796 -799 (2007)



Globally averaged annual mean surface temperature anomaly (relative to 1979-2001) forecast by DePreSys starting from June 2005

Published by AAAS

Science
AAAS

SEYMOUR ISLAND FOSSIL INVERTEBRATE COMMUNITY

Lack of durophagous predators

Photo – Rich Aronson

Educational Outreach

PENGUIN BREEDING POPULATION CHANGE (%)

GENTOO/CHINSTRAP (% CHANGE)

5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0

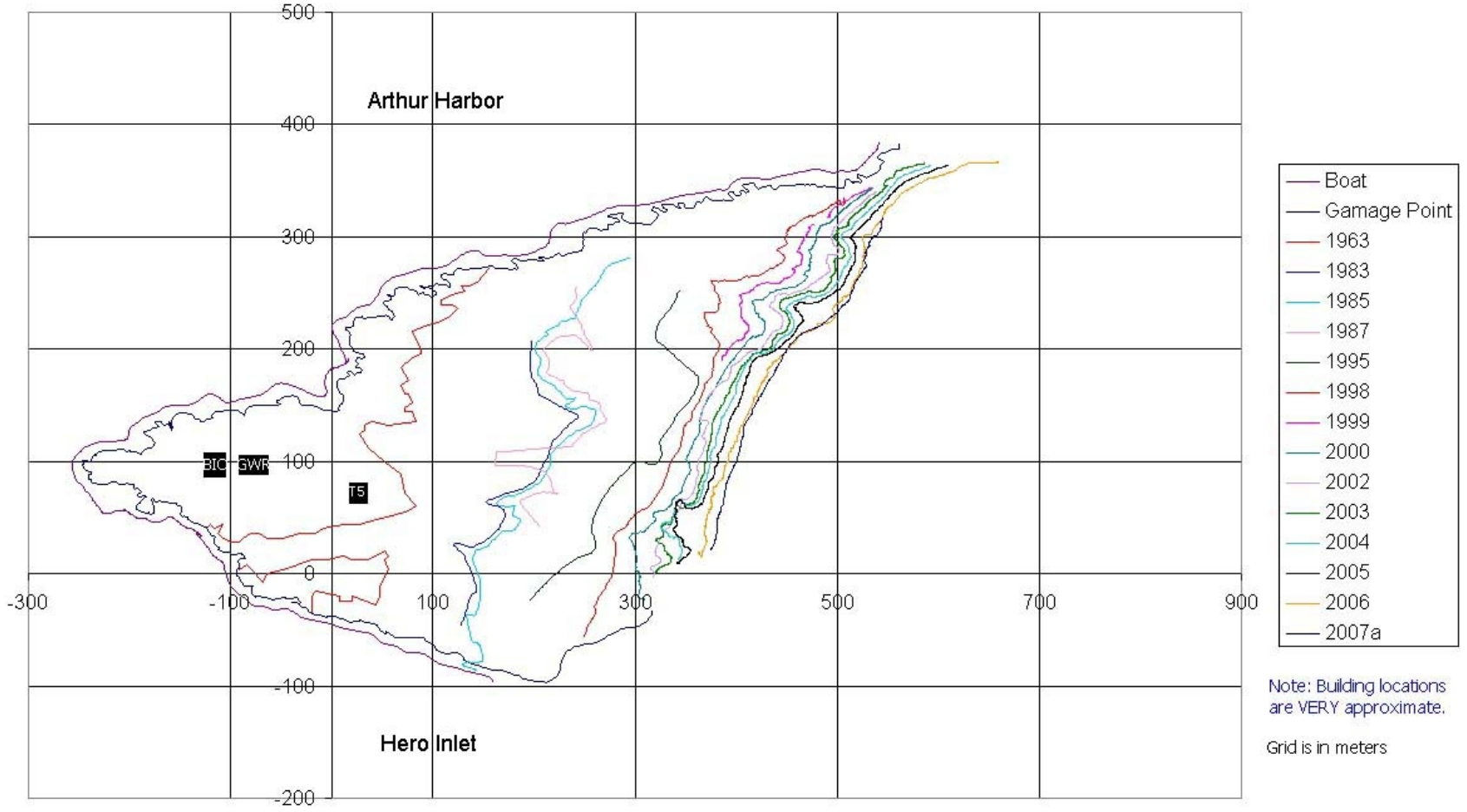
ADELIE (% CHANGE)

120
100
80
60
40
20
0

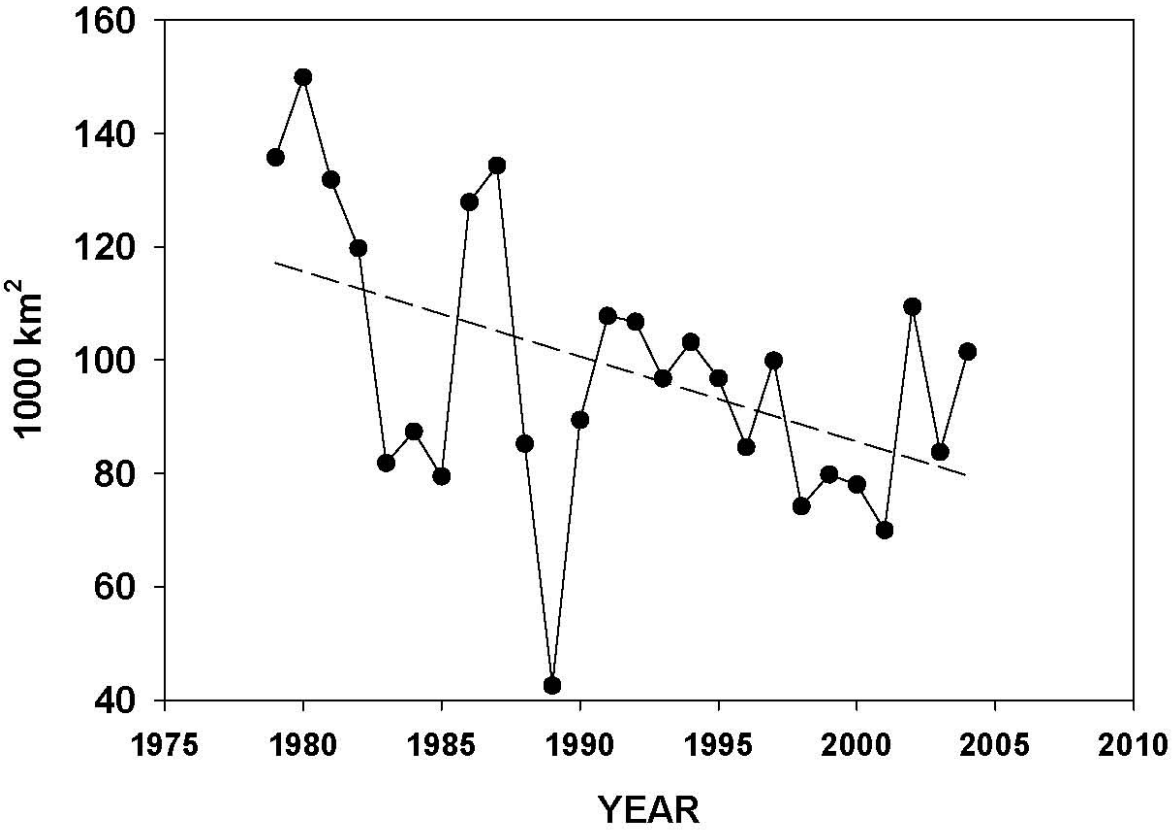
1975 1977 1979 1981 1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003

YEAR

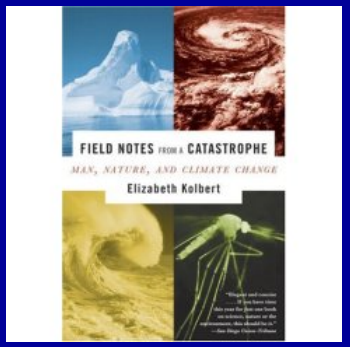
Glacier Terminus -- The Glacier Edge Over Time



Mean extent of annual sea ice on Western Antarctic Peninsula (30% reduction over 30 year period)

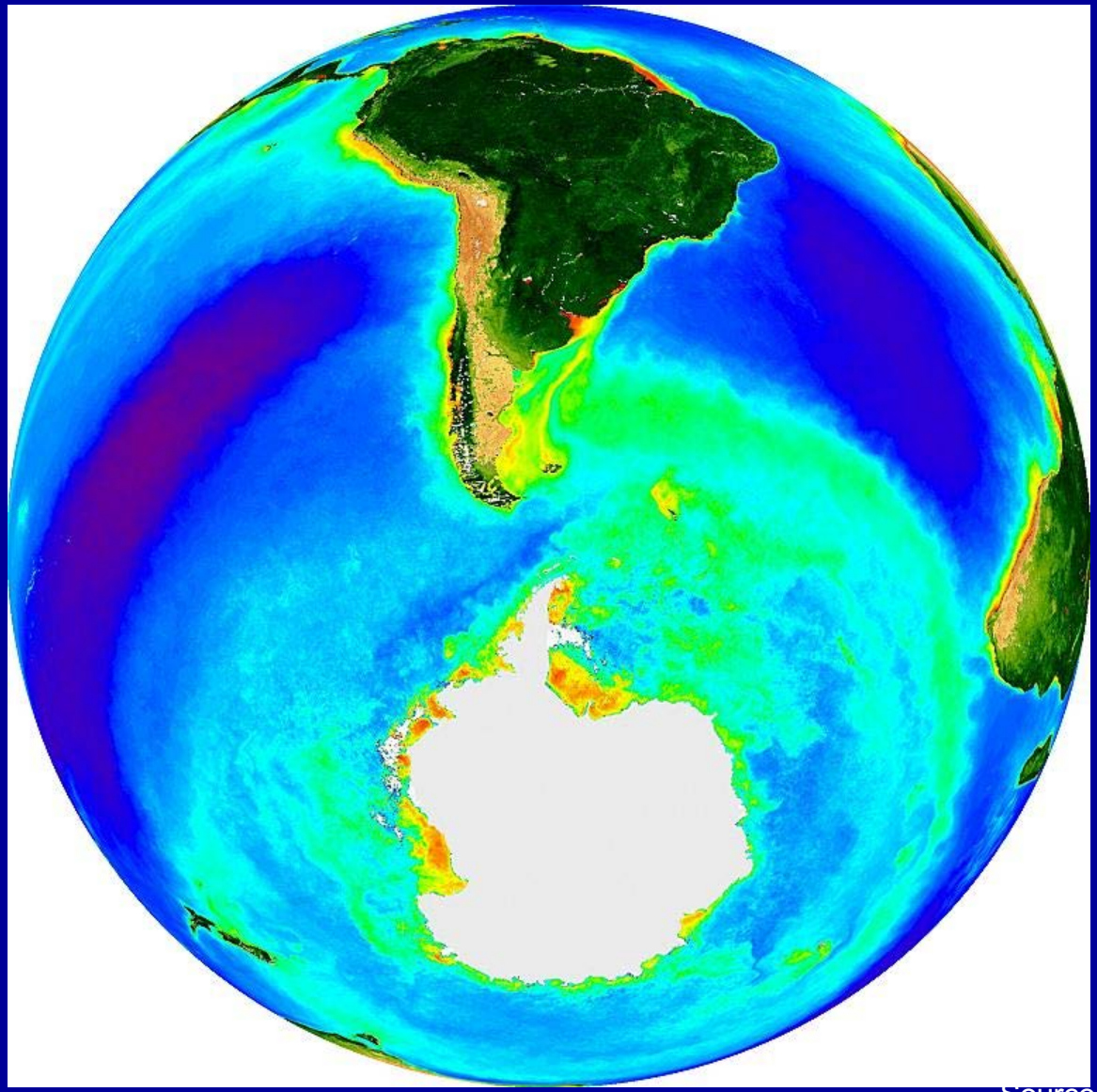


Source – H. Ducklow, NSF LTER

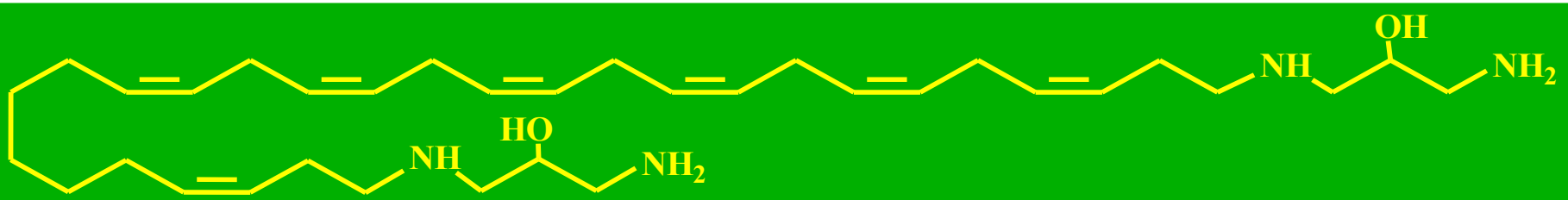

FIELD NOTES FROM A CATASTROPHE
MAN, NATURE, AND CLIMATE CHANGE
Elizabeth Kolbert

Flying Penguins on BBC Documentary.MOV

Composite Dec-Feb concentration of phytoplankton (chlorophyll mg m^3)



Source – NASA SeaWiFS



Rhapsamine, IC50 10-3 mM (KB)

Leucetta leptorhapsis

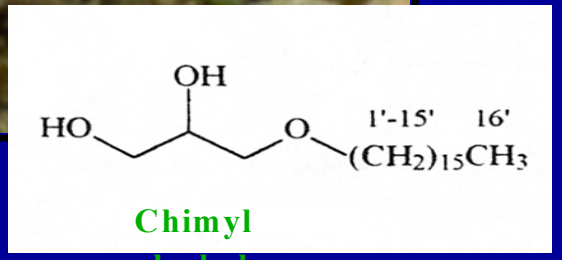
Future Antarctic scientists?

Alcyonium paessleri
Chemical antifeedants

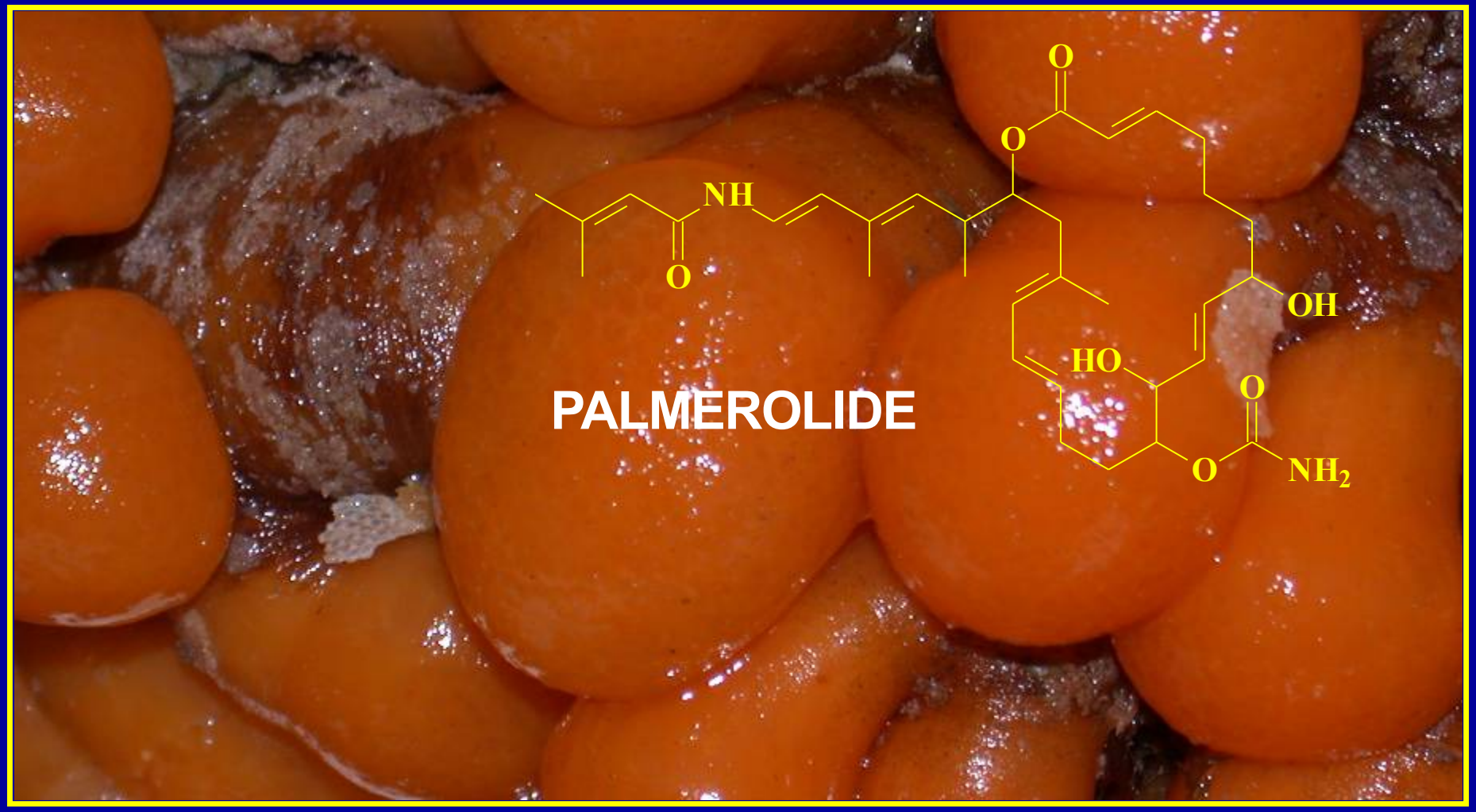
Distaplia cylindrica
Chemical antifeedants
Mucus pH = 1.8


705
RAD
DANGER

Tritoniella belli
Chemical antifeedants

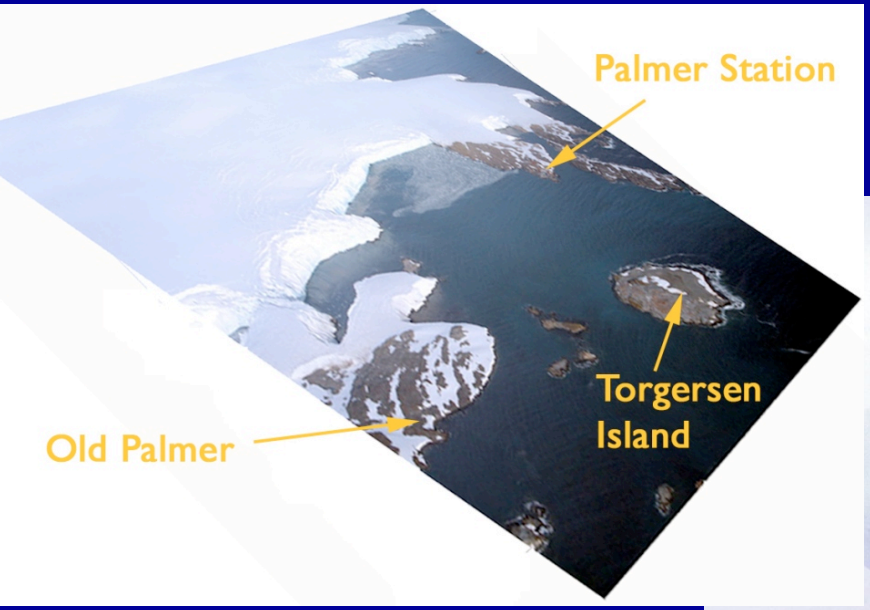


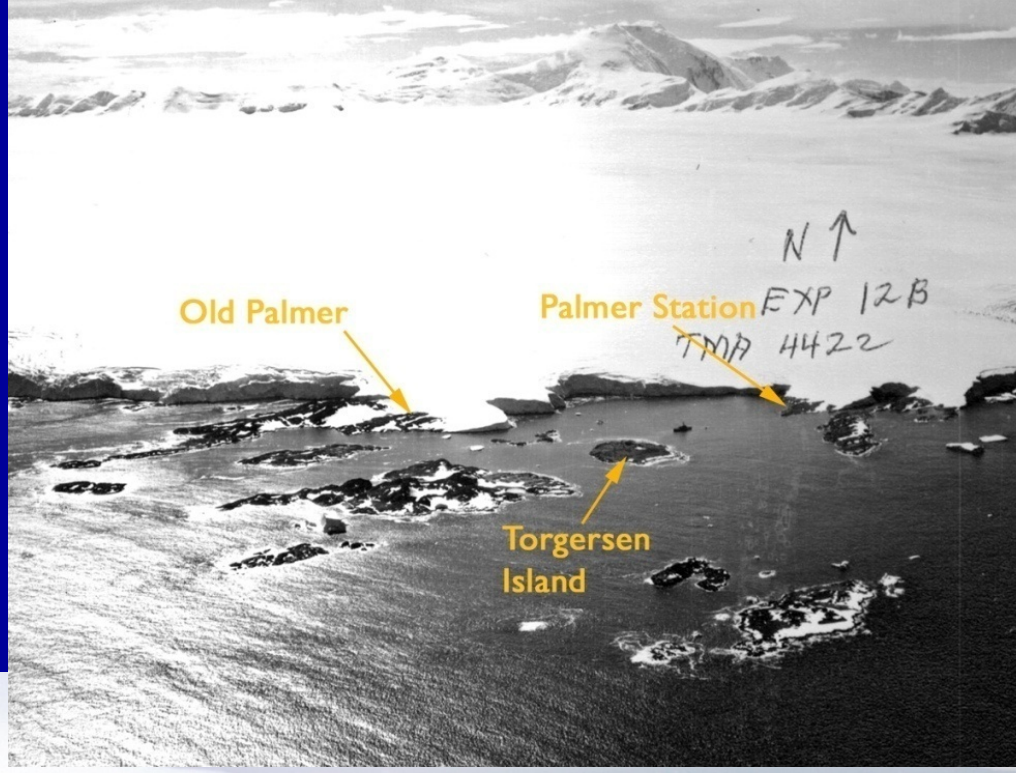
Chimyl alcohol

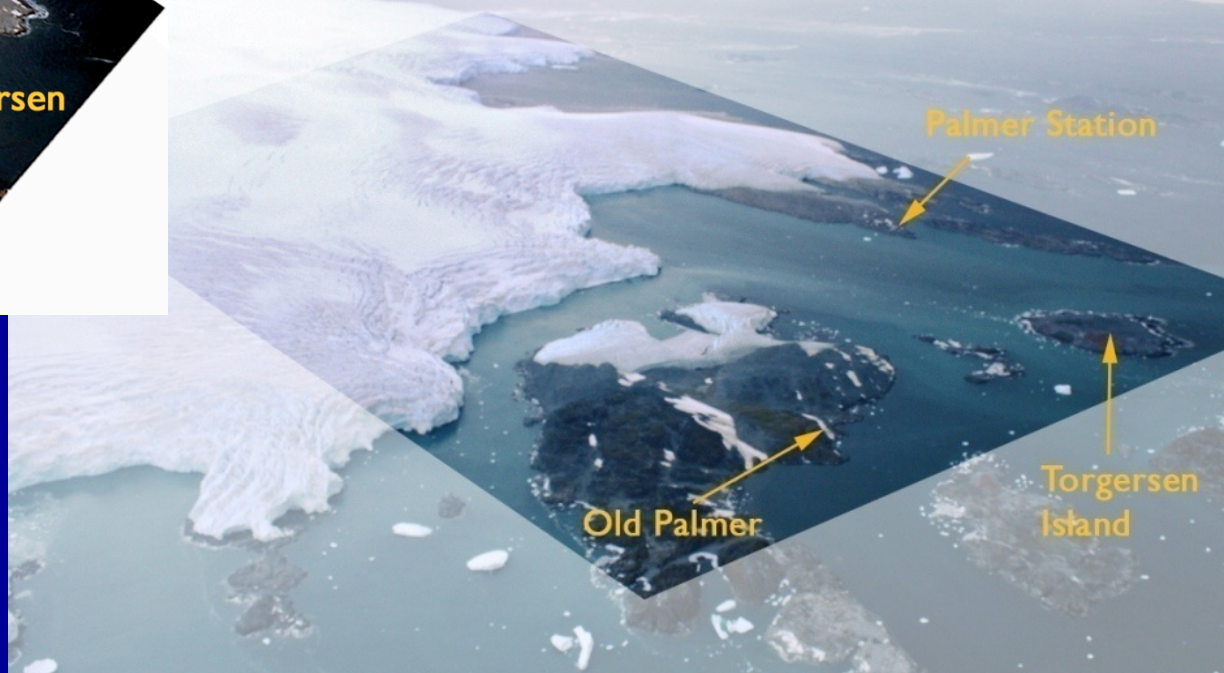


Synoicum adareanum

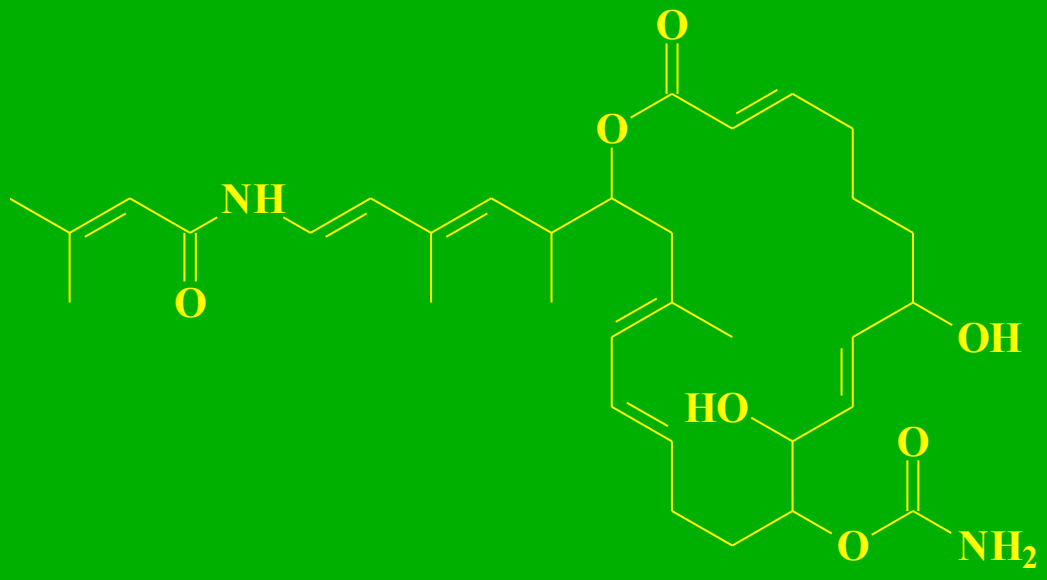
Palmer Vicinity Changes







Palmerolide



Parborlasia corrugatus
Chemical antifeedants
Mucus pH = 2.0 plus neurotoxic peptide


VIKING