

Using citizen science projects for monitoring – experiences from practical examples

Dr. Annette Bombosch – The Polar Citizen Science Collective

11. October 2023



Outline

- Citizen Science explained
- Citizen Science in Antarctic Tourism
- 3 Case Studies
- Limitations & Opportunities



Citizen Science explained

- Citizen Science = involvement of public in scientific research
 - Community science, crowd-sourced science, public participation in scientific research
- Involvement at various stages
 - Project design
 - Data collection
 - Data analysis
- Participation
 - Contribute to scientific research
 - Increases educational learning & scientific literacy

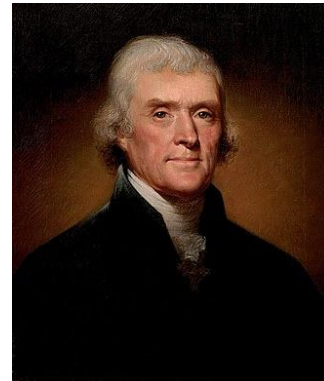


History of Citizen Science - Then

- Long history to at least middle of 18th century



Benjamin Franklin
1706-1790



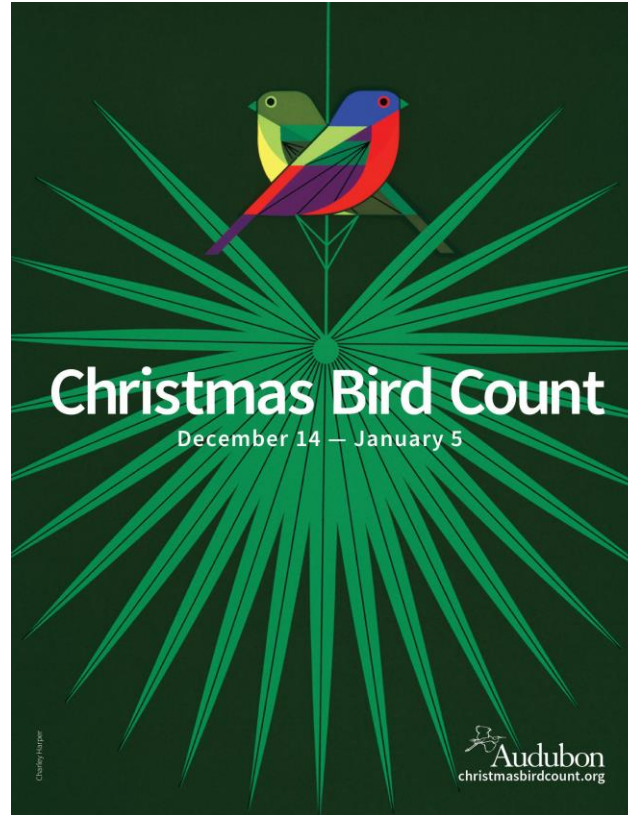
Thomas Jefferson
1743-1826



Florence Nightingale
1820 -1910



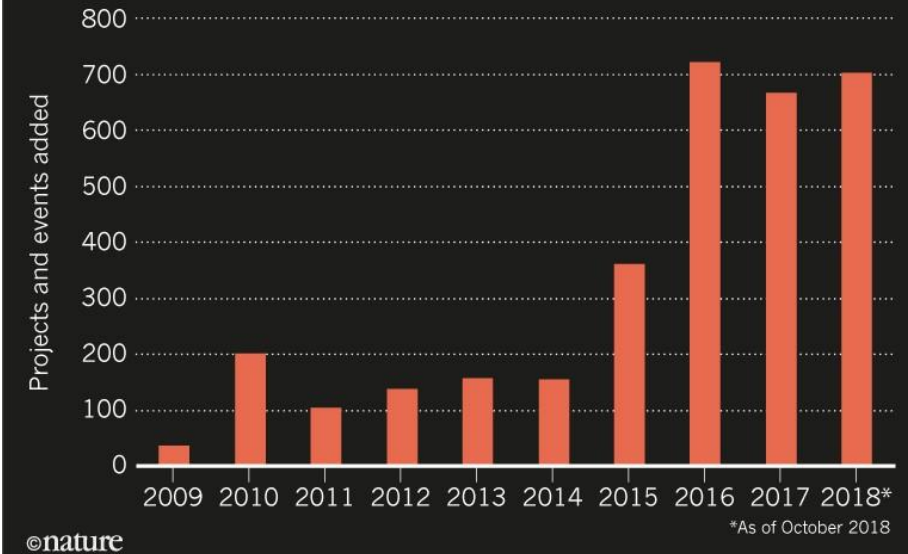
History of Citizen Science - Now



1900: 27 observers
2022: 76,880 observers

CROWD POWER

The SciStarter repository has been documenting the rise of citizen-science projects and events. The field is largely decentralized, which makes such efforts hard to track. Dates on this chart reflect the year in which the initiatives were added to SciStarter's records.



Citizen Science in Antarctic Tourism

- Beginnings ~2006/07
- Projects communicated via IAATO & IAATO FOM



The Polar Citizen Science Collective



Dr. Annette Bombosch
Expedition Guide
Science



Dr. Alex Cowan
Expedition Guide
Science



Lauren Farmer
Expedition Guide



Ted Cheeseman
Expedition Guide
Science





Bob Gilmore
Expedition Guide



Challenges:

- Polar regions are remote
- Research time is limited
- Geographic coverage is limited
- Research is expensive

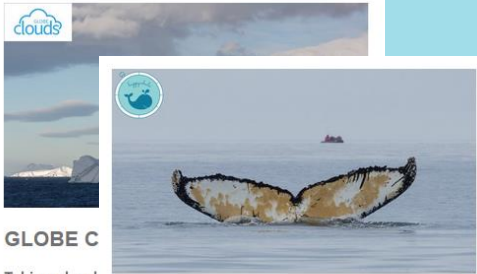
Opportunities:

-  Utilize expedition cruise vessels as unique platforms of opportunity for research via Citizen Science
 - Increased spatial & temporal coverage
 - Reduced costs
 - Increased science outreach
-  Contribute to informed management decisions & policy change



Stakeholders:

Scientists



GLOBE C
Taking cloud regions.

Happywhale
Collaborating globally to understand and protect marine mammals through photo-ID..

Operators & Field Staff



POLAR LATITUDES.

aurora
expeditions

HURTIGRUTEN EXPEDITIONS

Intrepid

PONANT

Bark Europa

Travellers

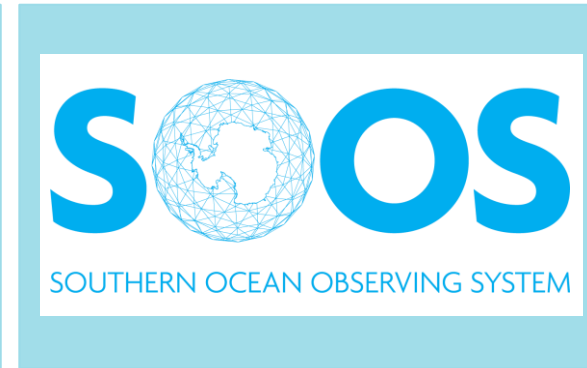


Partners:

IAATO



SOOS



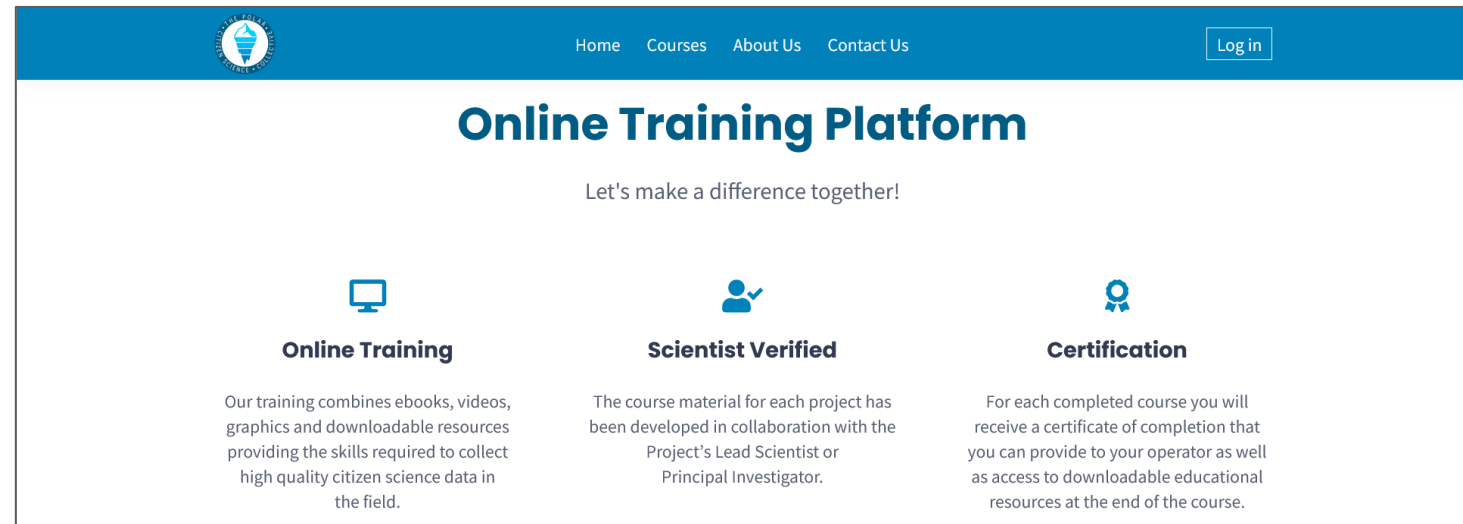
Scientists


- Collaborate to establish successful Citizen Science projects suited to polar tourism
- Vetting process
 - Relevance to polar science
 - Logistic feasibility
 - Educational component
 - Feedback
- Project training



Operators


- Collaborate for committed and successful Citizen Science Programme
 - Citizen Science on Antarctic voyages
 - Project selection
 - Project updates
- Training Platform




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Online Training Platform


Let's make a difference together!


Online Training

Our training combines ebooks, videos, graphics and downloadable resources providing the skills required to collect high quality citizen science data in the field.


Scientist Verified

The course material for each project has been developed in collaboration with the Project's Lead Scientist or Principal Investigator.


Certification

For each completed course you will receive a certificate of completion that you can provide to your operator as well as access to downloadable educational resources at the end of the course.



Travellers

- Science outreach
 - Education
 - Learning opportunities
- Scientific literacy
- Enriched travel experience



Case Study 1: Happywhale

Happywhale *know your whales*



Case Study 1: Happywhale



Case Study 1: Happywhale

1 Set

Set your camera to the local date and time. Turn on GPS if you've got it!



2 Photograph

Capture as many photos as you can clearly showing the ID features of the subject



3 Submit

Go to happywhale.com and upload all photos for each animal. For new users, an account will auto-generate.



Case Study 1: Happywhale - Feedback

2018-07-30_Daniela_Abras_134220.jpg



HW-MN1200226

0.36891



It's a
Match!



Happywhale Notification Digest



Humpback Whale HW-MN1304747 was identified in an encounter on Sunday December 25, 2022 in Antarctica! You **last encountered** this individual on Tuesday December 07, 2021 in Antarctica with **Polar Latitudes**.



THURSDAY OCTOBER 05, 2023 [VIEW](#)



Case Study 1: Happywhale - Feedback

- Meaningful wildlife experiences

The screenshot shows the Happywhale profile for an unnamed humpback whale. On the left, there is a profile card with a whale tail image, the name "[Unnamed]", ID "AHWC-7471", and sex "Unknown". It lists "Also Known As:" with "HW-MN1300279" and "IBJ-2907". It shows "Sightings: 2" with a "First:" sighting on 2007-10-07 in Brazil and a "Last:" sighting on 2015-11-30 in Antarctica. There are "Followers 0" and a "Follow" button. Below this is a "Seen this individual?" section with a "Share Your Experience" button and a "Show My Encounters Only" toggle.

On the right, a map of South America shows the whale's migration path from Brazil to Antarctica. The path is a blue line with arrows pointing south, starting from a green square in Brazil and ending at a blue square in Antarctica. The map includes labels for Peru, Bolivia, Brasil, Paraguay / Paraguái, Chile, and Argentina. Map controls like zoom in (+), zoom out (-), and globe are visible.



Case Study 1: Happywhale - Feedback



Alba - HW-MN1300329

<https://happywhale.com/individual/6504?view=map>



Oreo - HW-MN1300481

<https://happywhale.com/individual/6376?view=map>



Raven - HW-MN1300482

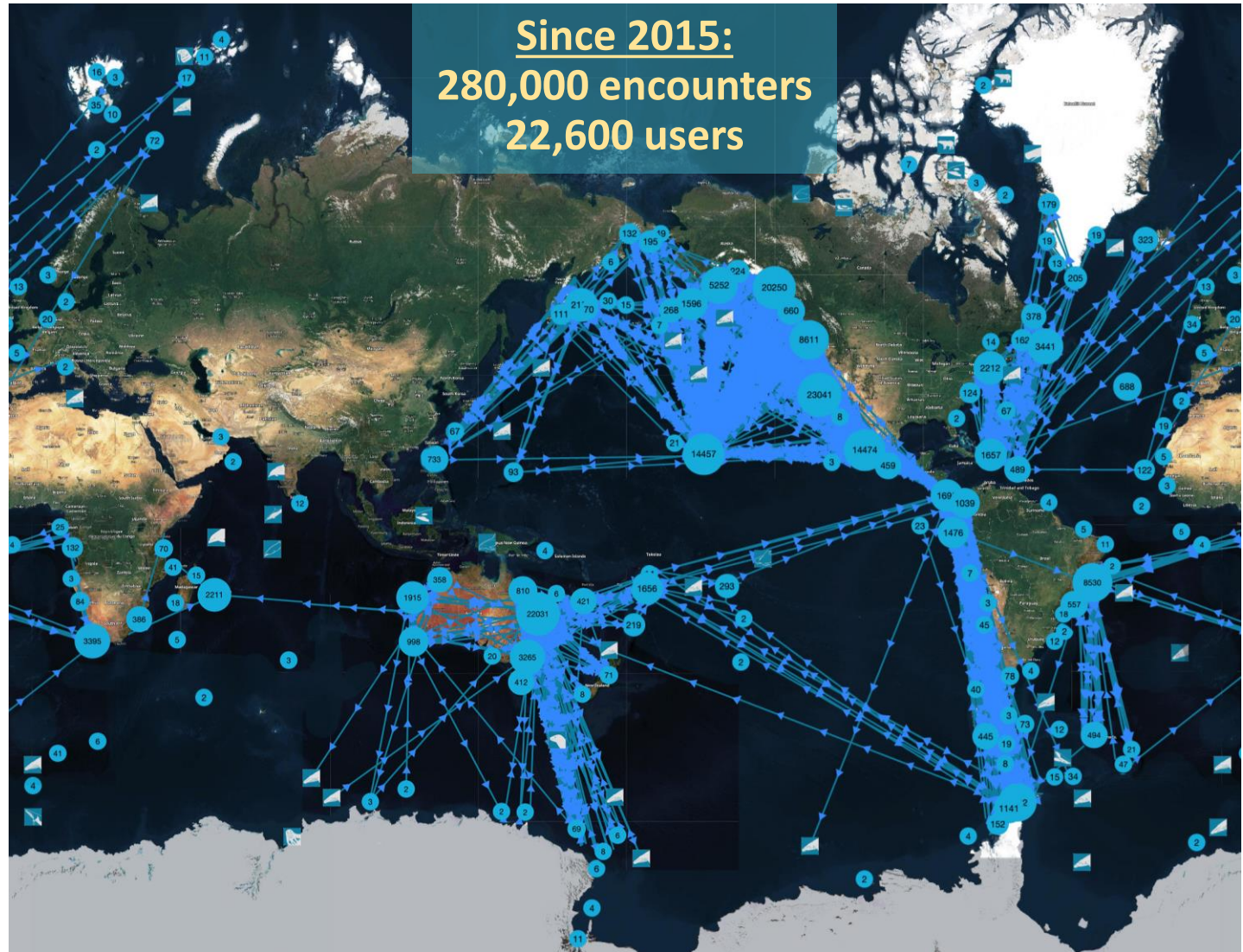
<https://happywhale.com/individual/6377?view=map>



Nick - HW-MN1300327

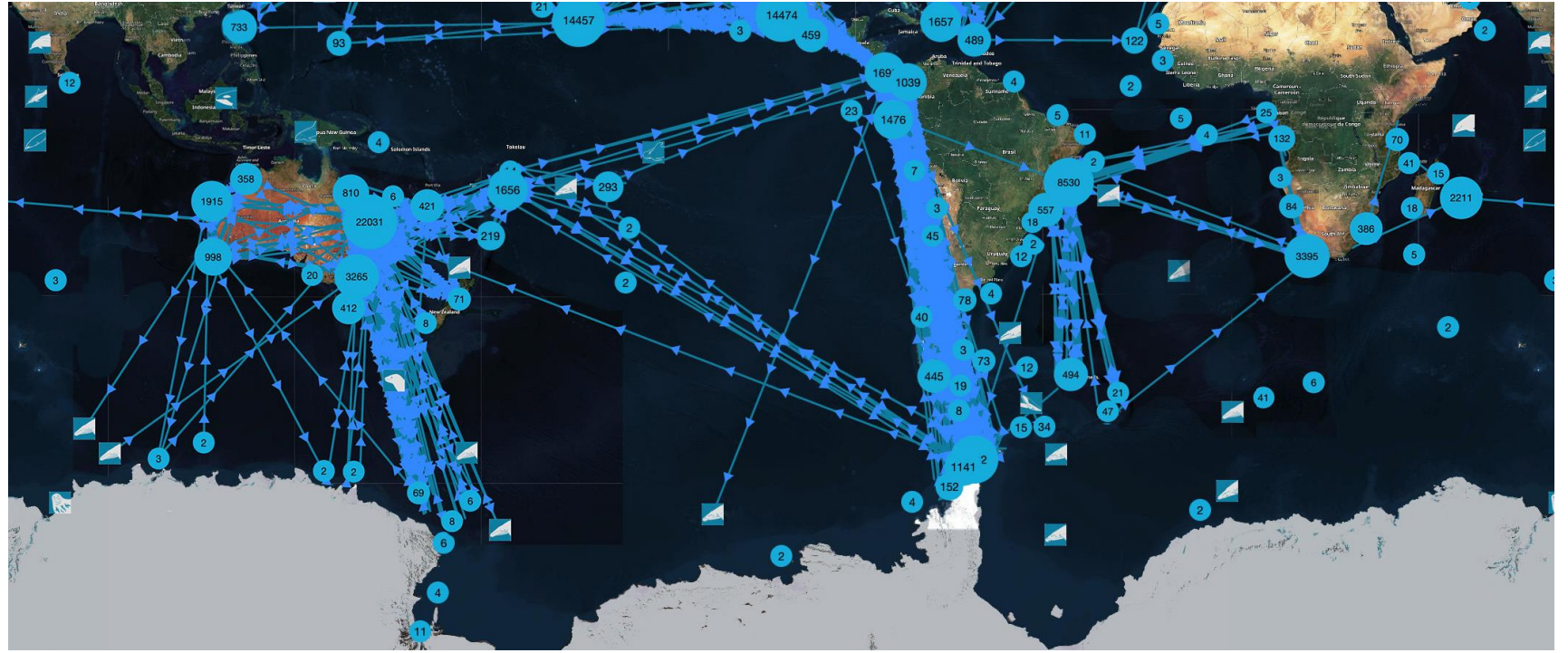
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Case Study 1: Happywhale



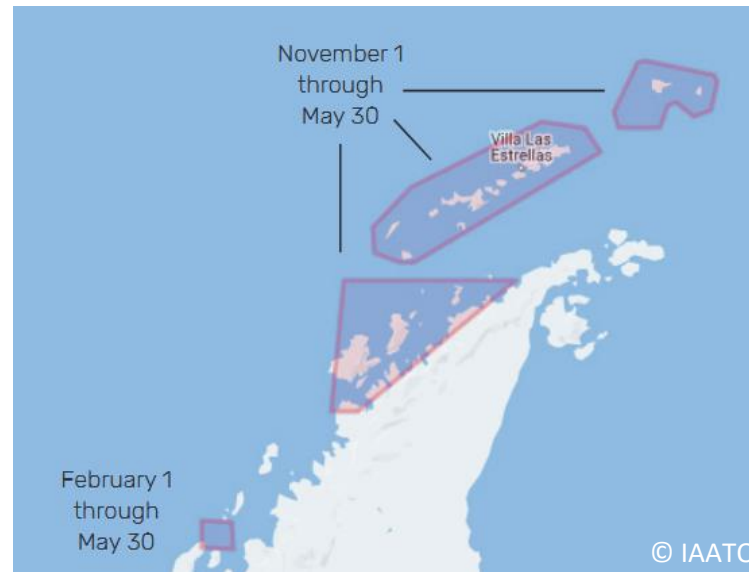
Case Study 1: Happywhale

- Antarctic Humpback whale catalogue
 - 2015: 700 individuals
 - 2022: > 6000 individuals



Case Study 1: Happywhale

- Contribution to science & management
 - > 30 papers published
 - Whale Slow Down Zones to avoid ship-strikes

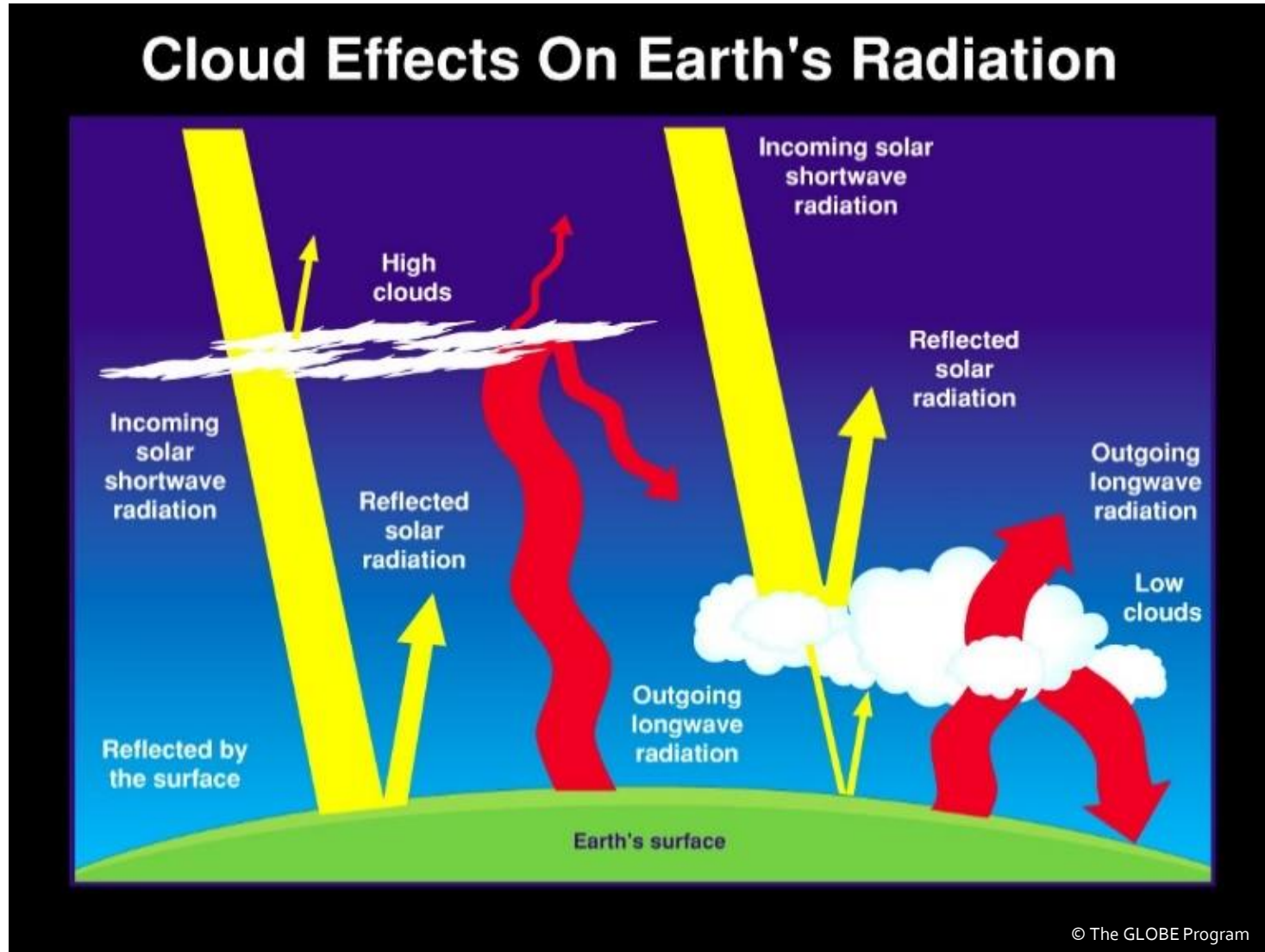


Antarctic Peninsula

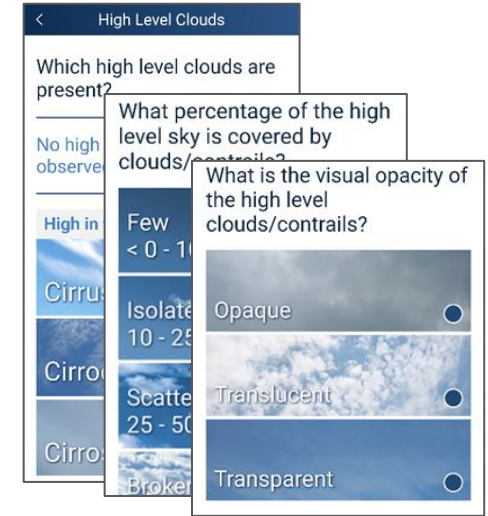
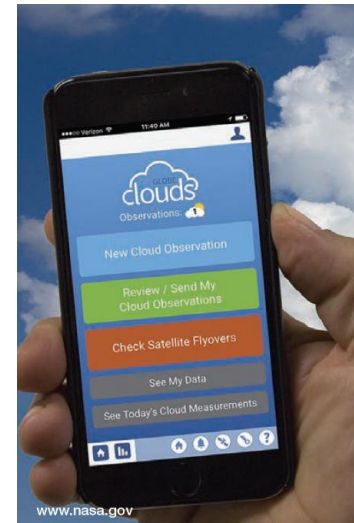
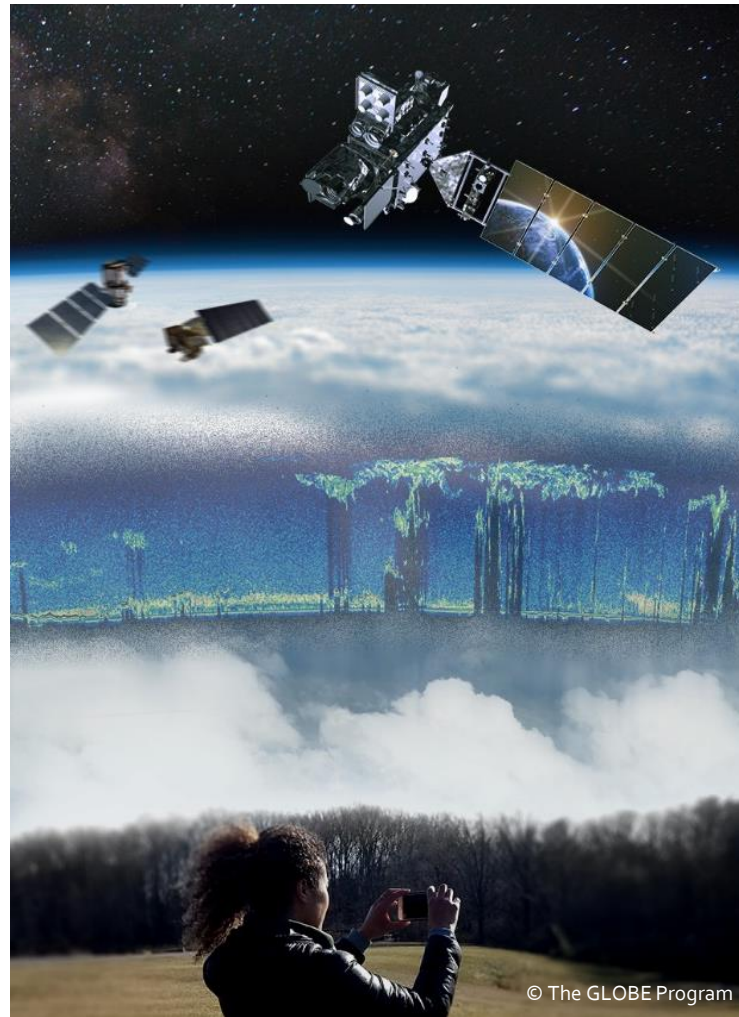
Case Study 2: GLOBE Clouds



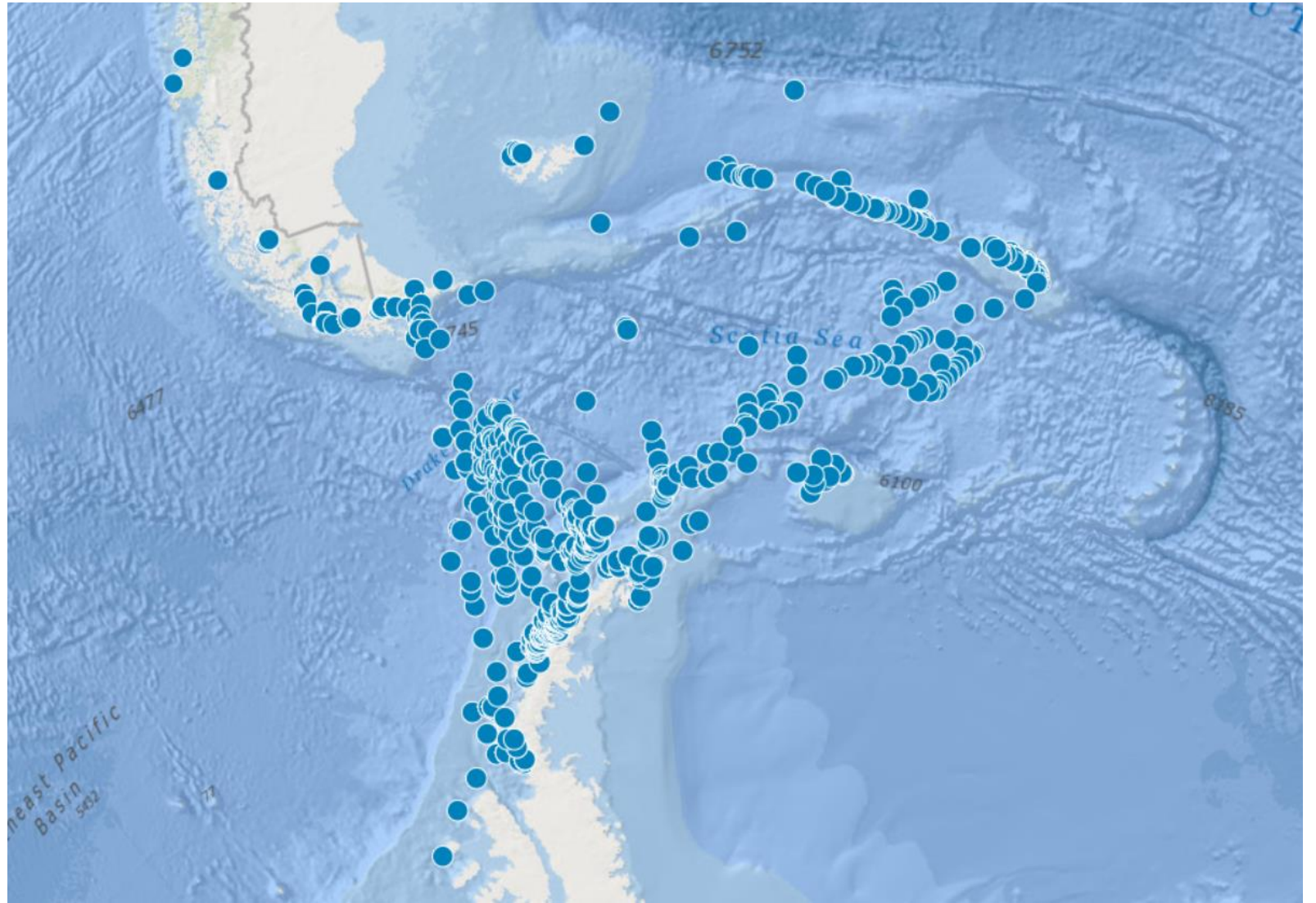
Case Study 2: GLOBE Clouds















Case Study 2: GLOBE Clouds



Case Study 2: GLOBE Clouds



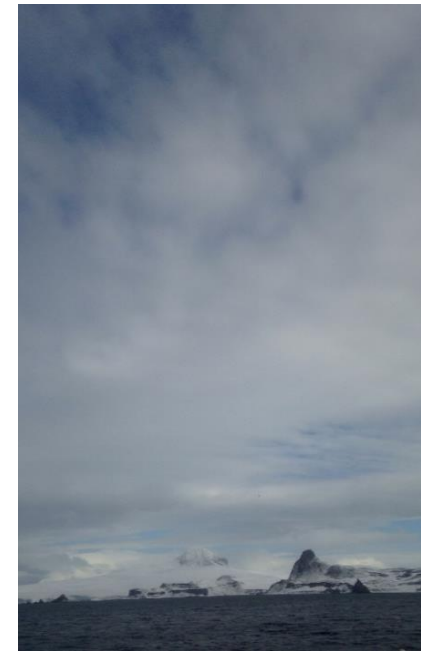
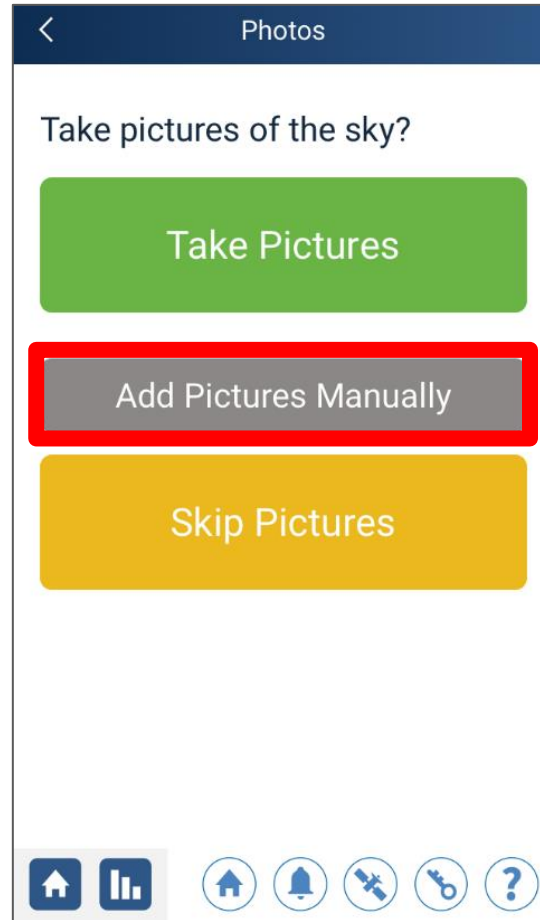
Case Study 2: GLOBE Clouds - Feedback

 NASA Cloud Observation and Satellite Match				
Satellite	(Understanding the Satellite Match)	Terra	NOAA20	Your Observation
Universal Date/Time	2023-09-10	20:15	20:17	20:14
Latitude Range		68.14 to 68.94	68.09 to 68.89	Latitude 68.485400
Longitude Range		-111.26 to -110.46	-111.47 to -110.67	Longitude -110.985300
Total Cloud Cover		Overcast 100.00%	Overcast 98.40%	Overcast (>90%)
H I G H	Cloud Cover Cloud Altitude Cloud Phase Cloud Opacity	Overcast 96.27% 6.95 (km) Mixed 244.61 (K) Translucent	Broken 79.61% 6.81 (km) Mixed 245.88 (K) Translucent	 Cirrus  Cirrocumulus  Cirrostratus Overcast (>90%) Transparent
	M I D	Cloud Cover Cloud Altitude Cloud Phase Cloud Opacity	Few (3.73%) 4.03 (km) Water 261.02 (K) Translucent	Isolated 18.79% 4 (km) Mixed 261.06 (K) Translucent
	L O W	Cloud Cover Cloud Altitude Cloud Phase Cloud Opacity		
Corresponding NASA Satellite Images. Click to view image ---->				Sky Visibility : no report Sky Color : no report <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> North  </div> <div style="text-align: center;"> East  </div> <div style="text-align: center;"> South  </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> West  </div> <div style="text-align: center;"> Up  </div> <div style="text-align: center;"> Down  </div> </div>

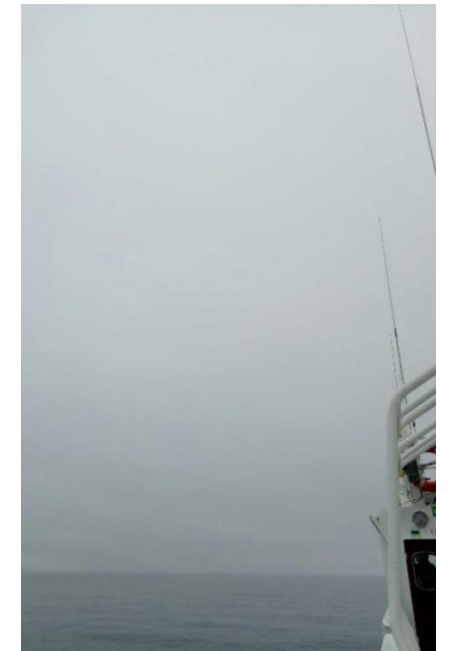


Case Study 2: GLOBE Clouds

- Changes to methodology of data collection



Stratus



Fog

Case Study 3: Beetles vs Stones



Case Study 3: Beetles vs Stones

WiFi Call 11:24

Quit BE Beet...

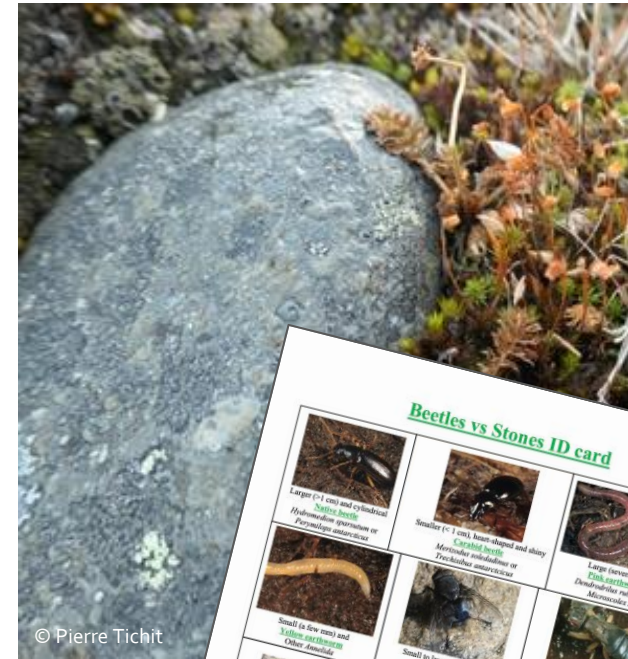
Prev Next

BeetleVsStones_survey_form

Found anything exciting?!

+ Add Branch

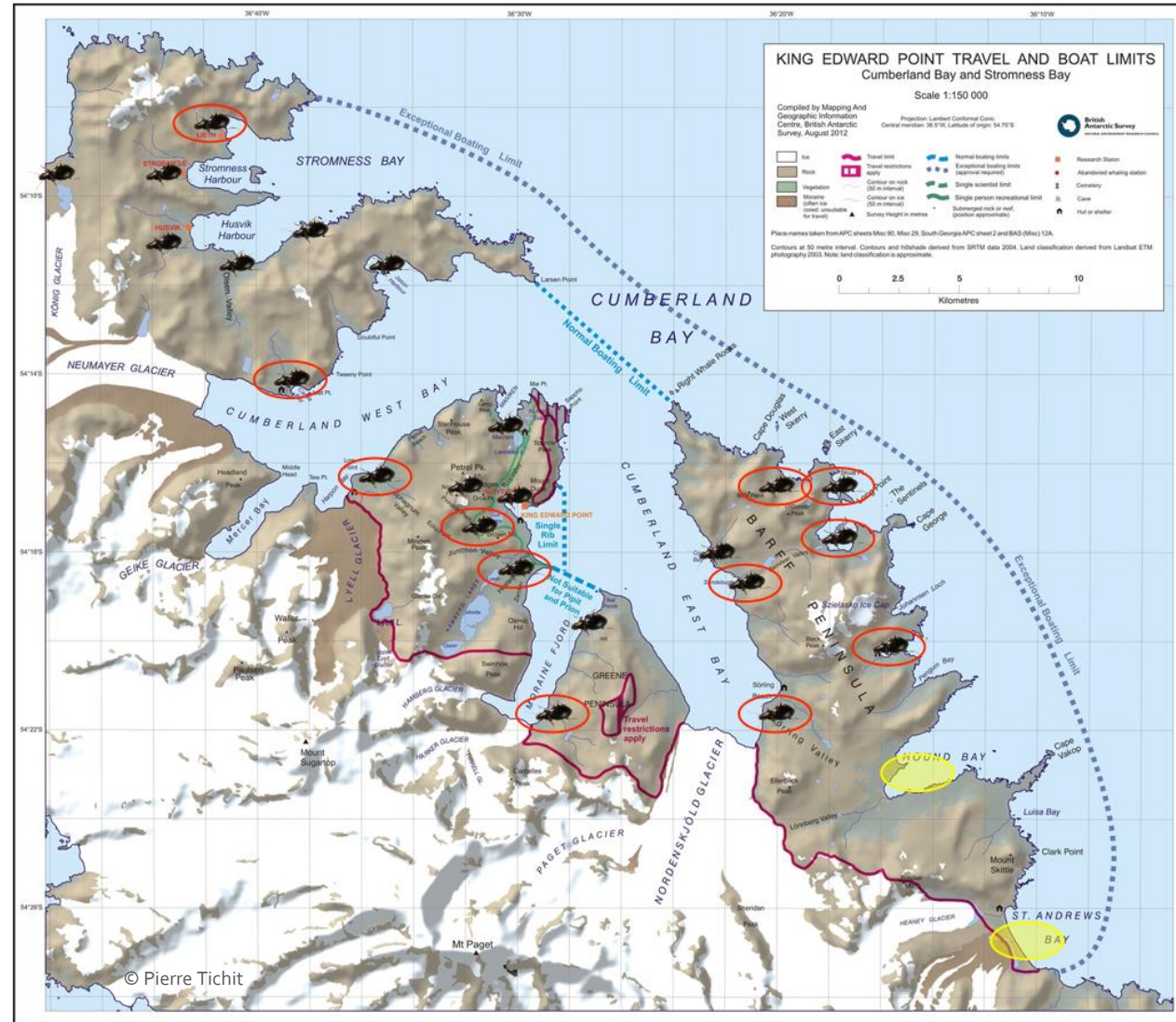
No entries found



Beetles vs Stones ID card

<p>Larger (> 1 cm) and cylindrical Large beetle <i>Hydrophilus piceus</i> or <i>Psephenops nitens</i></p>	<p>Smaller (< 1 cm), bean-shaped and shiny Carabid beetle <i>Meloidae ruficollis</i> or <i>Psephenops nitens</i></p>	<p>Large (several cm) Centipede <i>Chilodactylus rubellus</i> or <i>Microdactylus sp.</i></p>
<p>Small (a few mm) and yellowish Small centipede Other <i>Centipede</i></p>	<p>Small to large (2 mm to a few cm) Winged fly (4-5 species)</p>	<p>Jumpy, flat and by the stone Winkler fly <i>Amblyopoda sp.</i></p>
<p>Small (< 2 mm) wasp-like Wasp-like insect (2-3 species)</p>	<p>Ant-like Winkler fly <i>Erimopora meyeri</i></p>	<p>Larva with small legs or legs Small larva</p>
<p>Large (> 5 mm) and usually dark Large beetle (4 species)</p>	<p>Very small (< 1 mm), red-brown and often running fast Small insect (many species)</p>	<p>Very small (< 2 mm) and jumpy Small insect (many species)</p>
<p>Other invertebrates not listed here!</p>	<p>Nothing at all? Negative data is also valuable!</p>	

Case Study 3: Beetles vs Stones



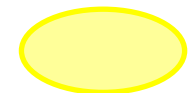
Invasive beetles:



Present before 2022



Present 2022-2023



Absent 2022-2023

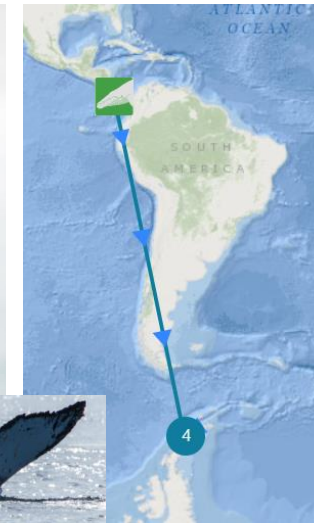


Success story

- Simple
 - Easy & robust data protocol
 - Easy to use & affordable equipment
- Education & learning opportunities
- Feedback
- Advance scientific knowledge



© Polar Latitudes



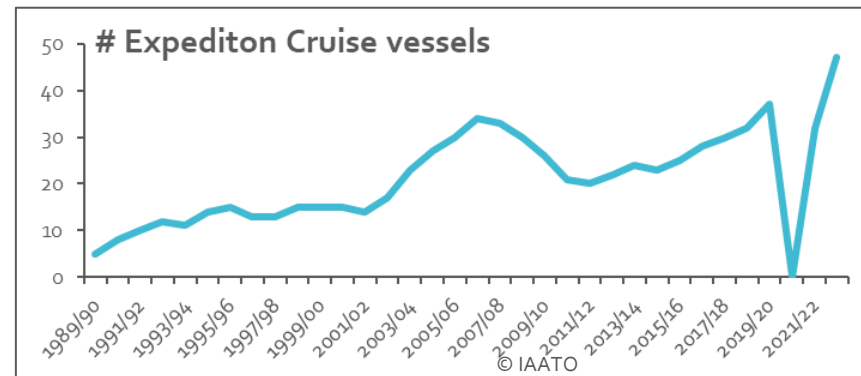
Limitations

- Project complexity
 - Specialized data protocols
 - Extended time for data collection
 - Extensive/delicate equipment
- Not suitable for all project topics
- Only visited sites are surveyed



Opportunities

- Unique platforms of opportunity
 - Large amount of data collection possible
 - Extended spatial & temporal coverage
 - Reduced costs
- General willingness of operators, guides and travellers to make positive impact
- Contribute to protection of Antarctica together



THANK YOU - Questions?

