



The South Atlantic today – 500 years after the first global circumnavigation

David Vaughan
British Antarctic Survey



Meanwhile...

- 1520 Henry and Mary
- ...
- 1534 Act of Supremacy

Henry VIII



Catharine of Aragon



Mary Boleyn



Anne Boleyn



The South Atlantic today – remote but crucial



- South Georgia – an island of Renaissance
- South Atlantic – saving us from heat and carbon
- Antarctica – the uncertain future of sea level

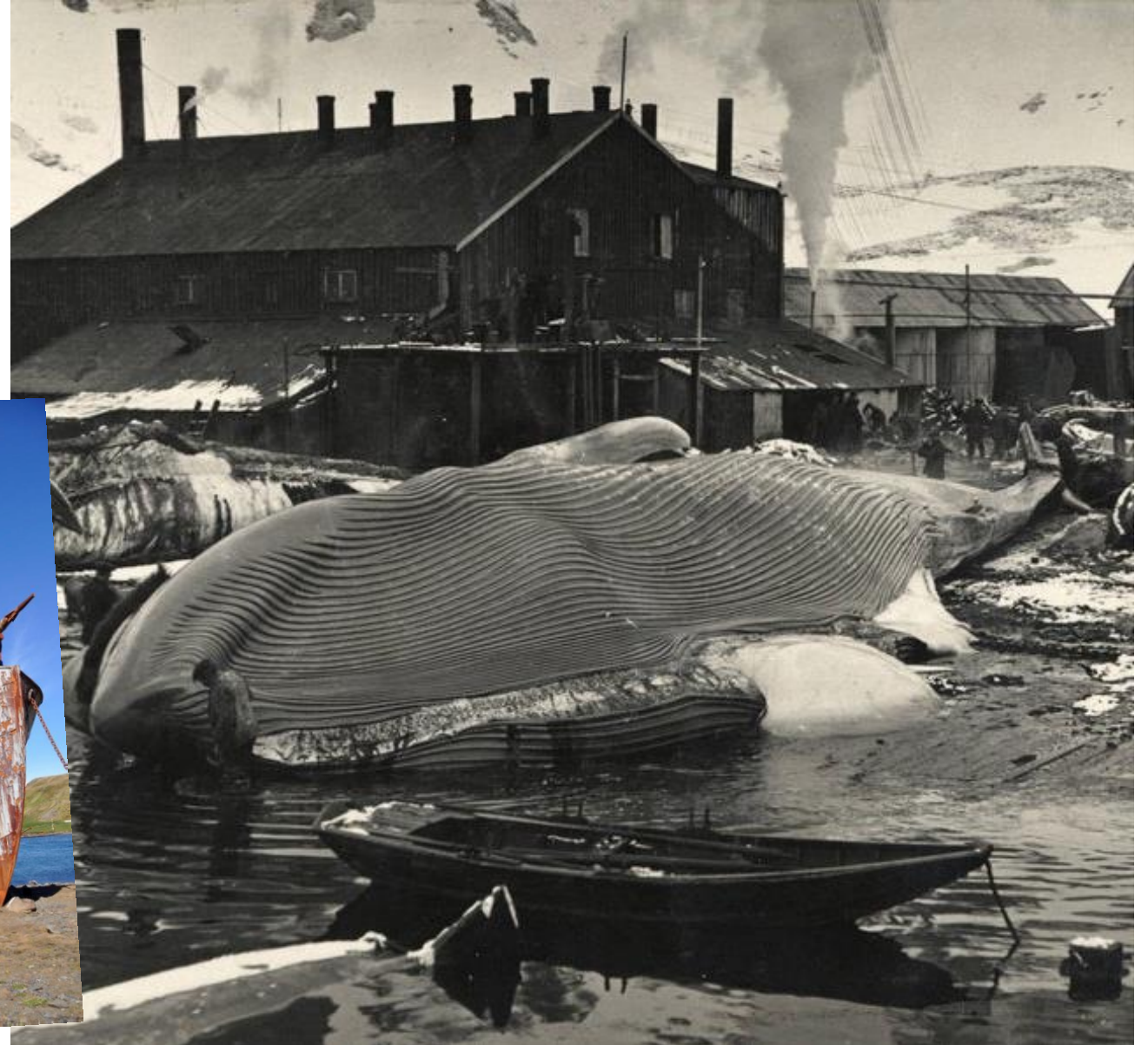
South Georgia – an island Renaissance

- First seen in 1675
Anthony de la Roche
- 165 km x 35 km
- 1300 km from Falkland Islands
- Sub-Antarctic close to the Antarctic Convergence
- Rich in marine and terrestrial biodiversity



South Georgia – an island Renaissance

- Sealing 1788 – ca. 1900
- Whaling 1904 – 1966
- Fishing – to date, managed
- Introduced
 - Rats
 - Reindeer
 - 40 plants species
- Albatross by-catch



South Georgia – an island Renaissance

- Seals - recovering
- Whales - recovering
- Reindeer - eradicated
- Rodents - eradicated
- Birds
 - SG Pipits – recovering
 - Albatross and petrels – recovering slowly
- Fisheries (inc. Krill) – managed



South Georgia – an island Renaissance

- Science questions to be answered?
 - How long will the Ecosystem take to recover
 - ...and to what state?
 - ...will Whales recruit locally, or translocate?
 - ...Where are the albatrosses dying?

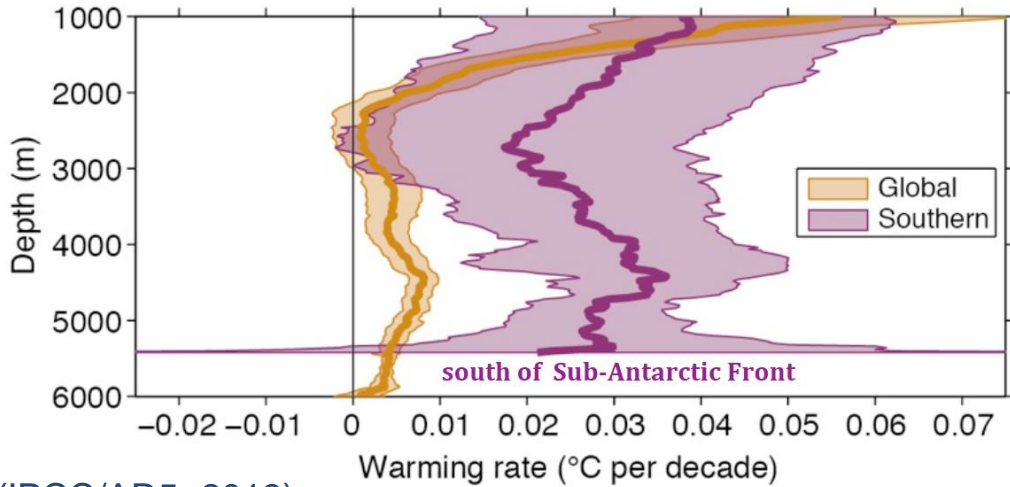


Global heat and Carbon uptake - ORCHESTRA

Ocean Regulation of Climate by Heat and Carbon Sequestration and Transports (ORCHESTRA)

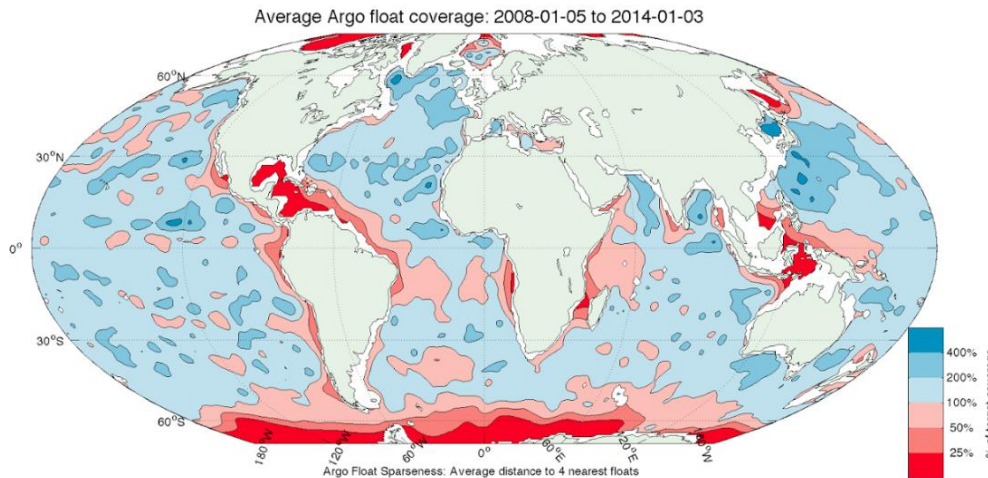


Global heat and Carbon uptake - ORCHESTRA

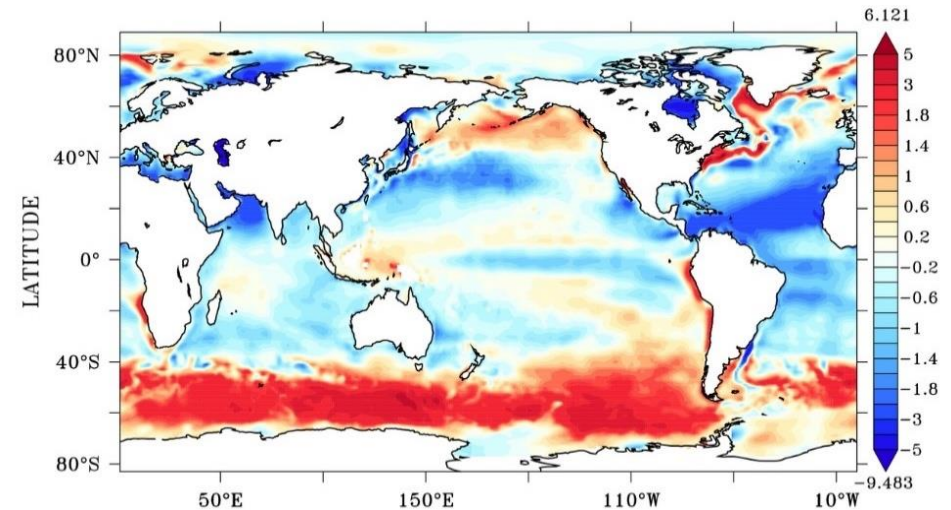


The Southern Ocean is responsible for ~40% of oceanic uptake of anthropogenic carbon, and >75% of the heat uptake.

(IPCC/AR5, 2013)



Argo float coverage, % of target



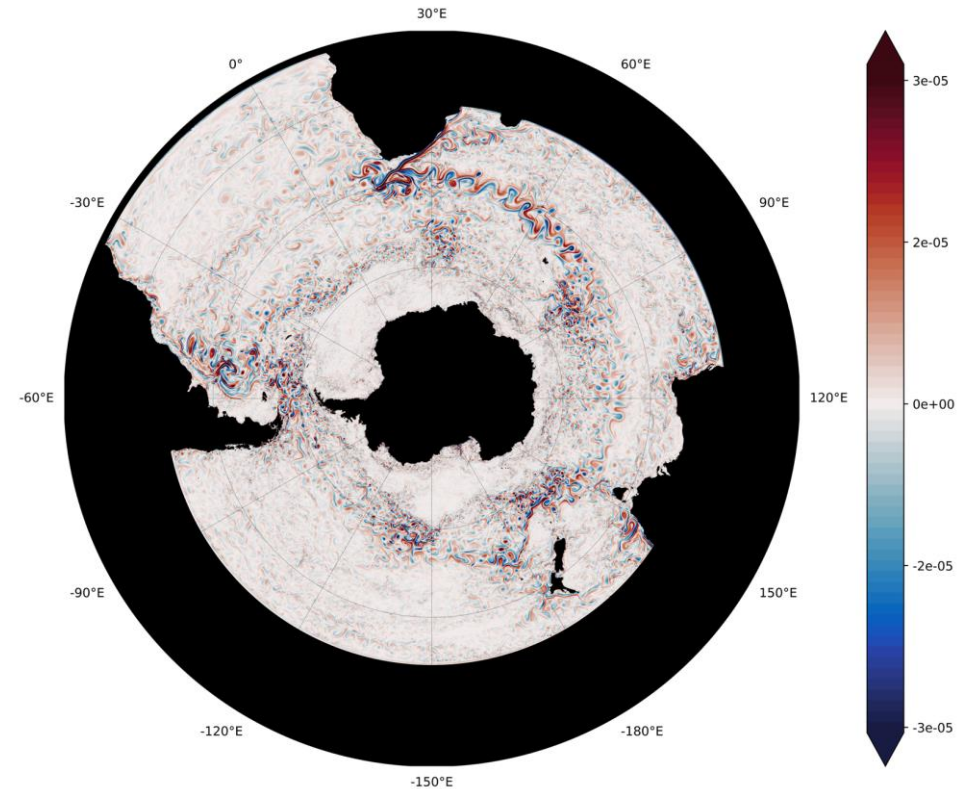
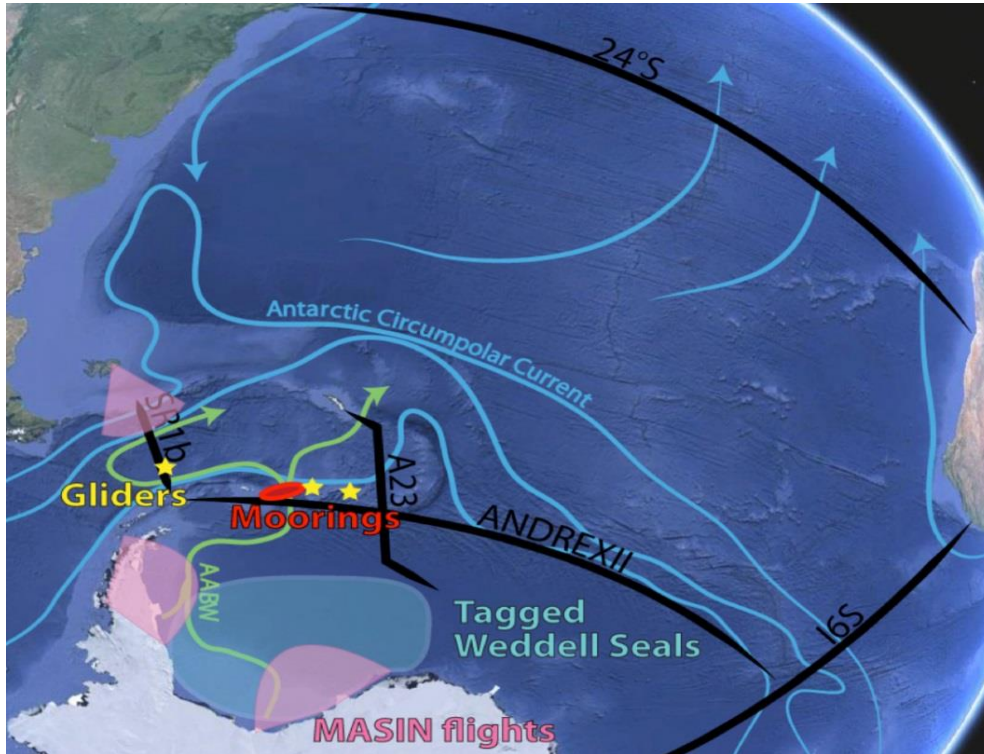
And is hard to get right in models!

But is the world's biggest data desert

Global heat and Carbon uptake - ORCHESTRA



NERC
SCIENCE OF THE
ENVIRONMENT



POLAR SCIENCE
FOR PLANET EARTH

British
Antarctic Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Future of global sea level - ITGC



Thwaites Glacier

The International Thwaites Glacier Collaboration



UK Research
and Innovation



British
Antarctic Survey



Future of global sea level - ITGC



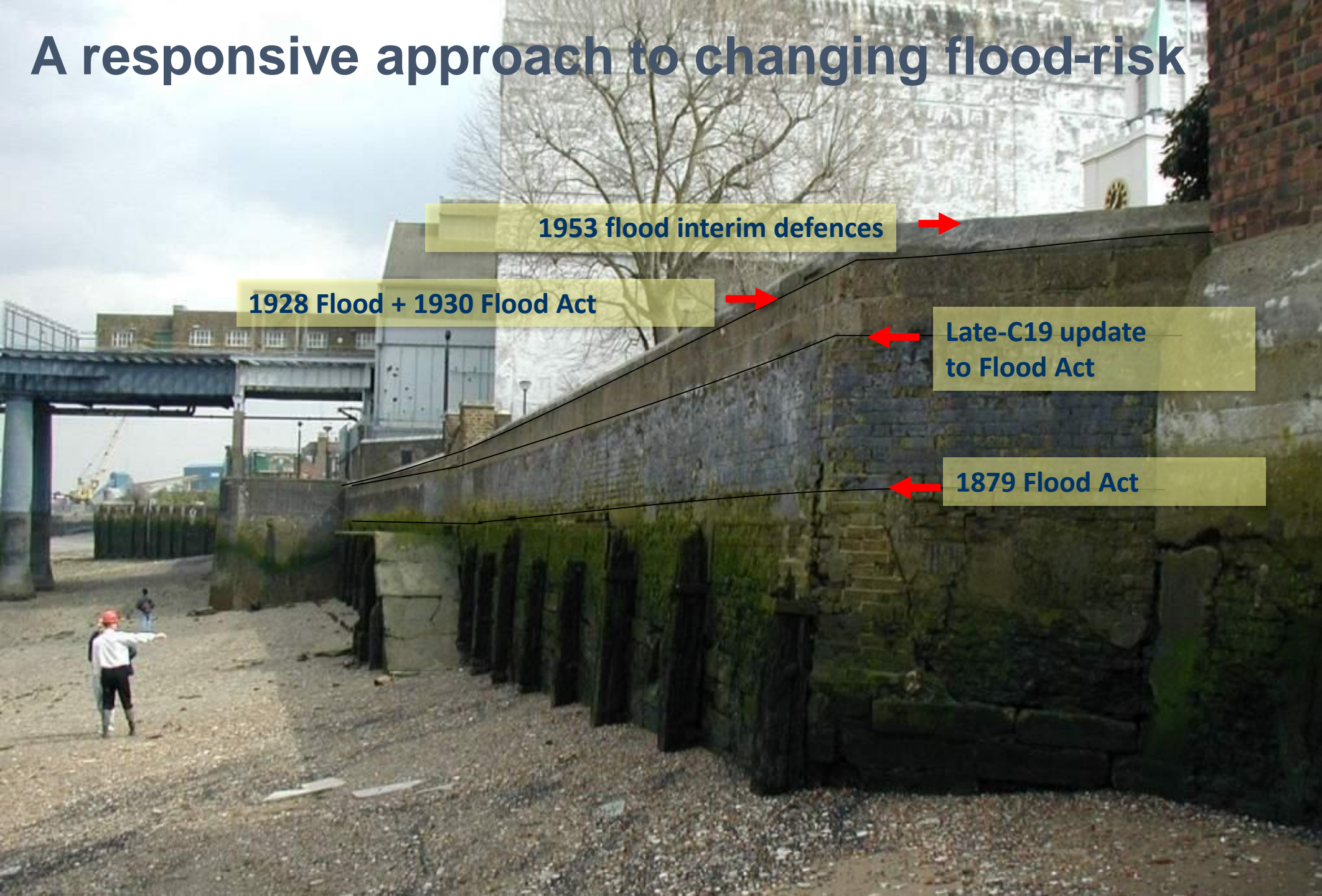
Dawlish, 2014

Copyright, Newsflare

Future of global sea level - ITGC



A responsive approach to changing flood-risk



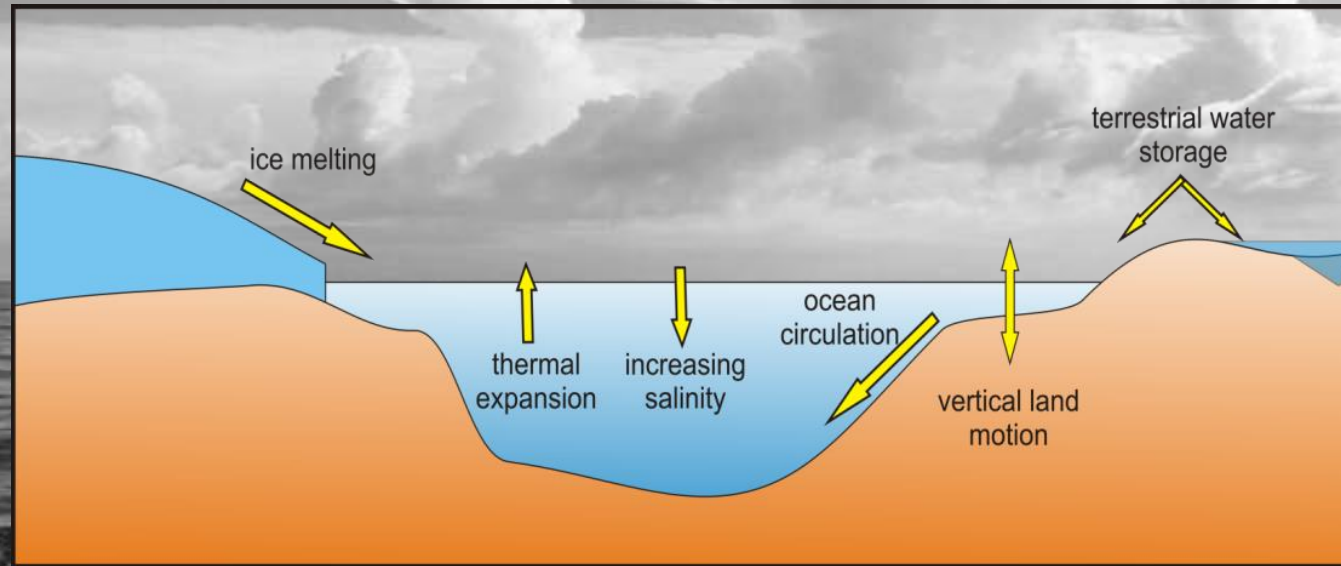
1953 flood interim defences

1928 Flood + 1930 Flood Act

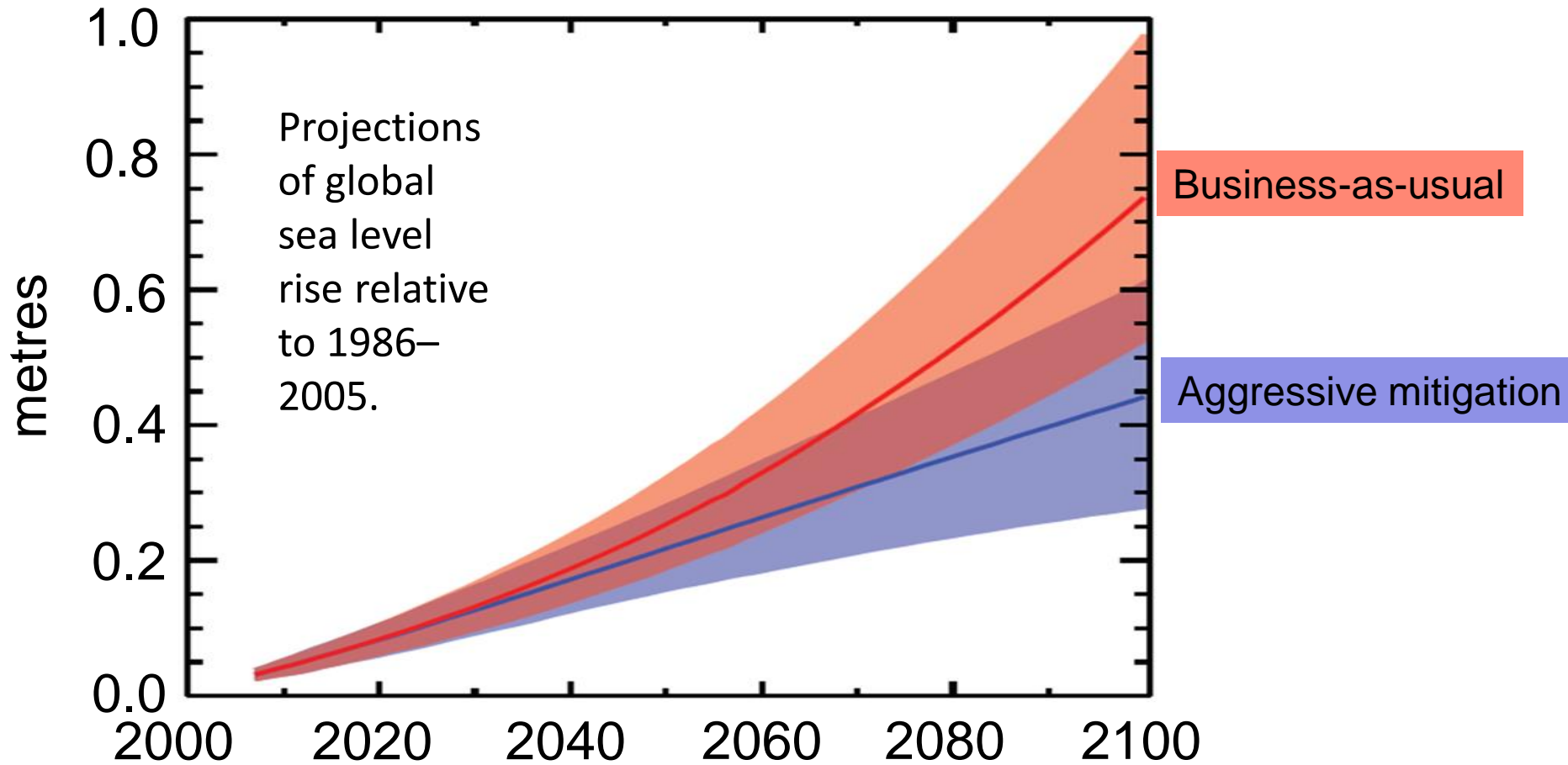
Late-C19 update
to Flood Act

1879 Flood Act

Causes of sea-level



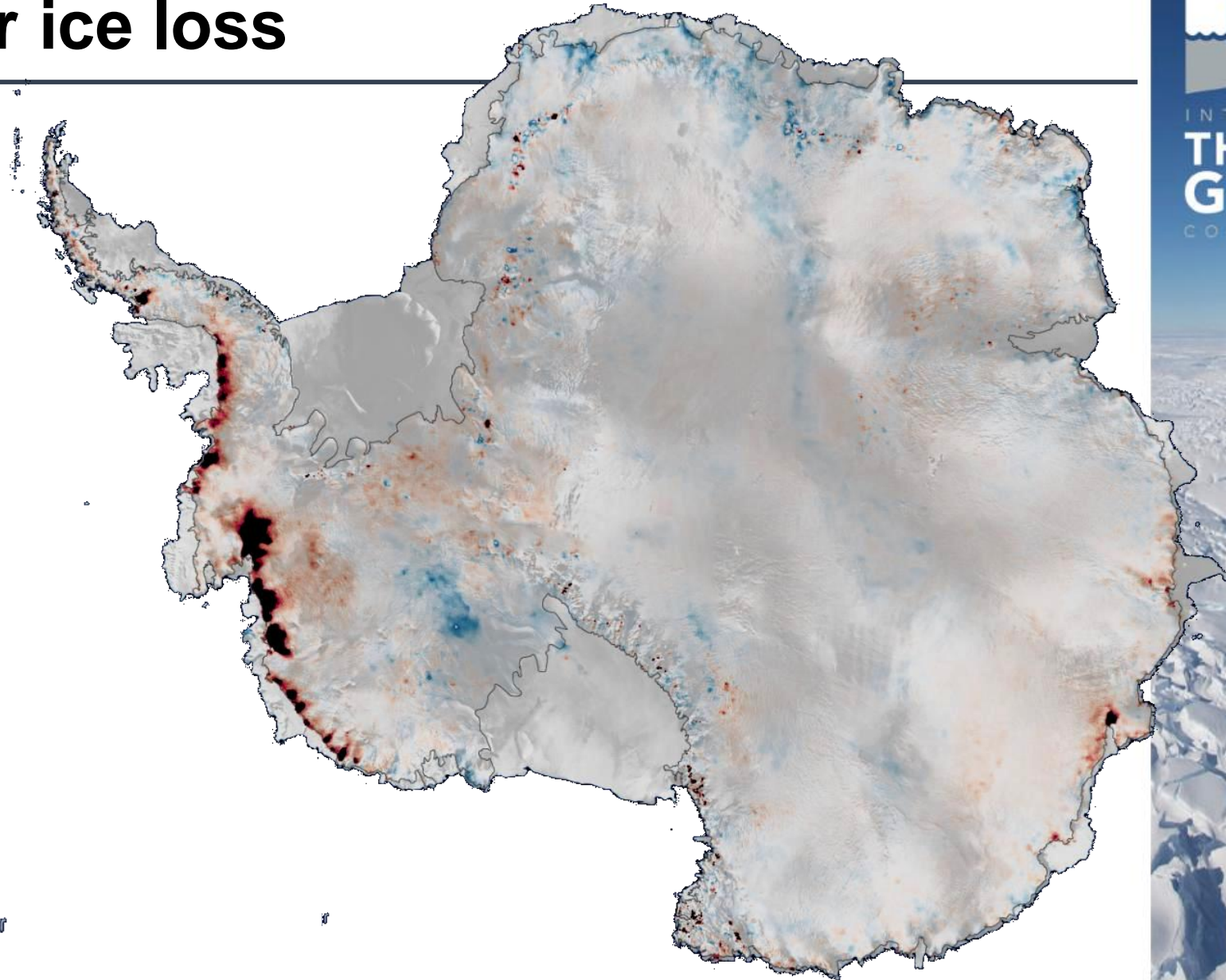
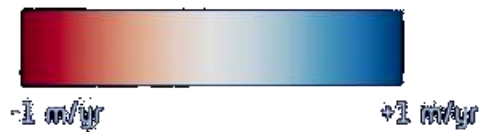
IPCC AR5 2013 sea-level projections



“only the collapse of marine-based sectors of the Antarctic ice sheet, if initiated, could cause global mean sea level to rise substantially above the *likely* range during the 21st century...

Thwaites Glacier ice loss

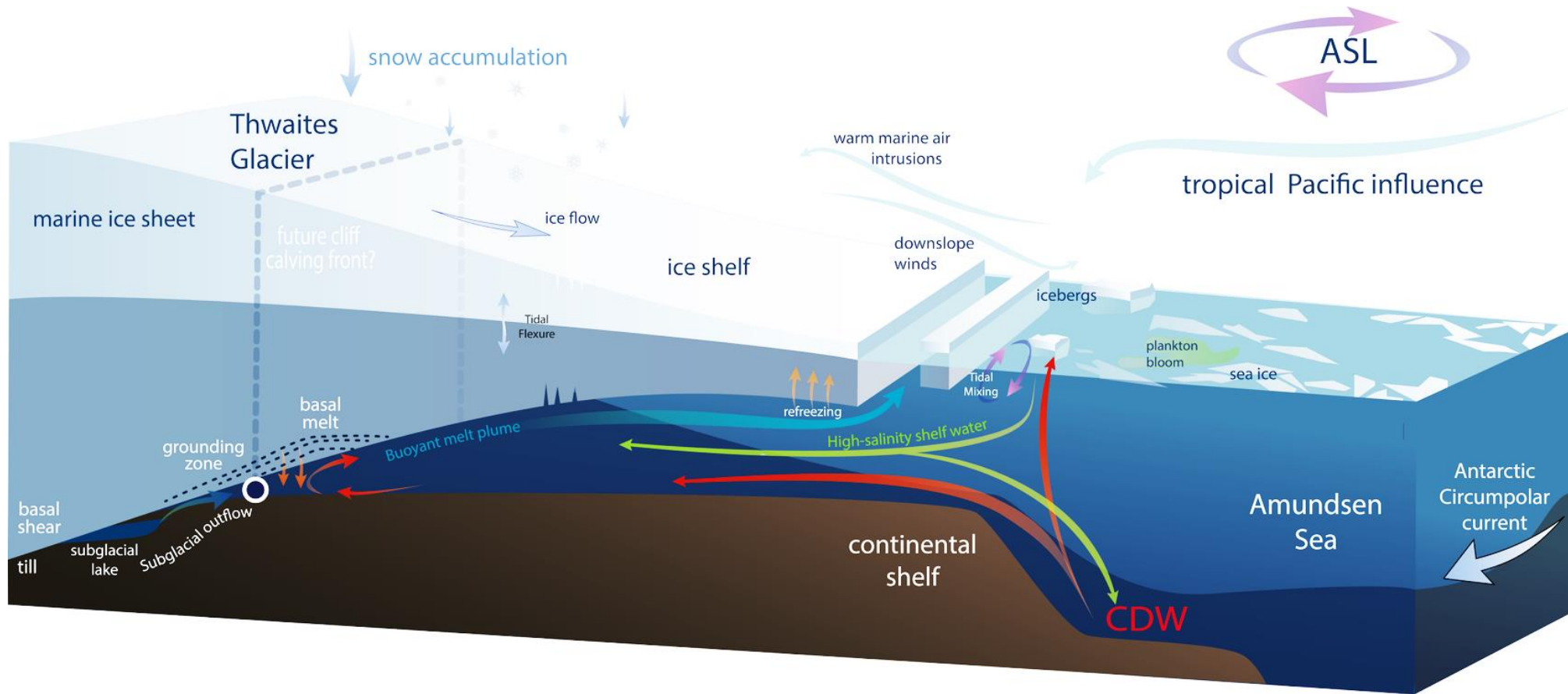
Cryosat (2010 – 2013)



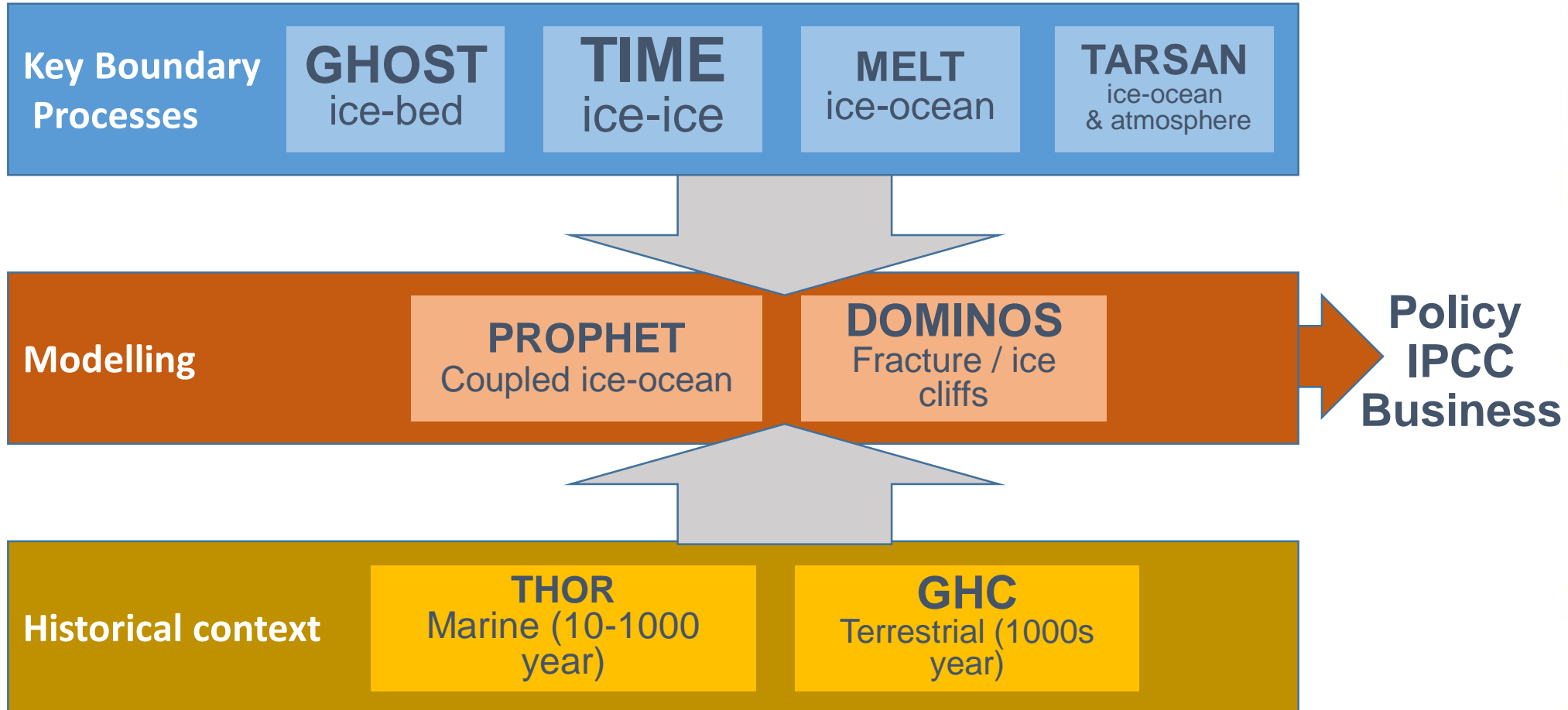
McMillan et al., 2014



Why Thwaites?



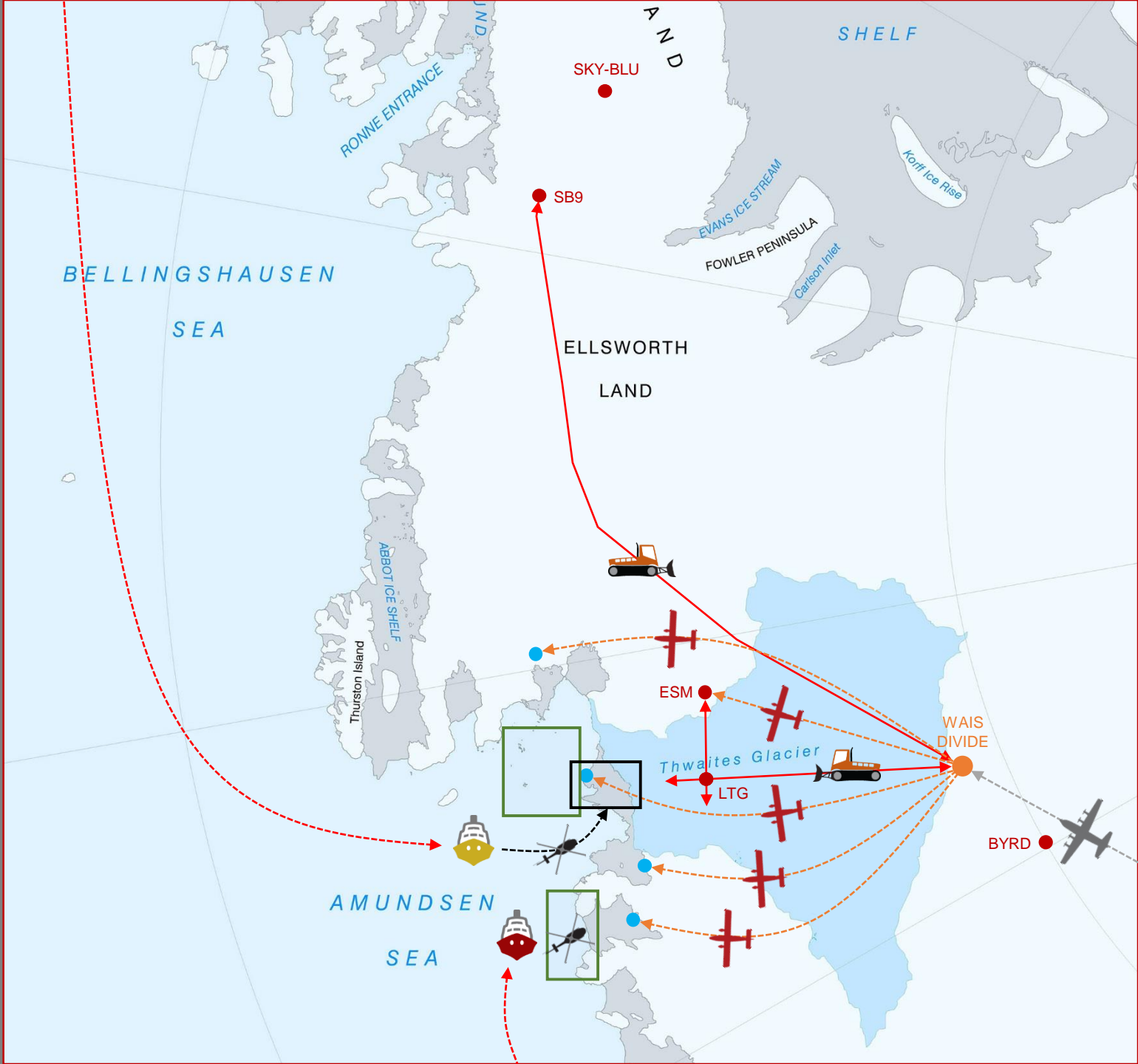
ITGC projects







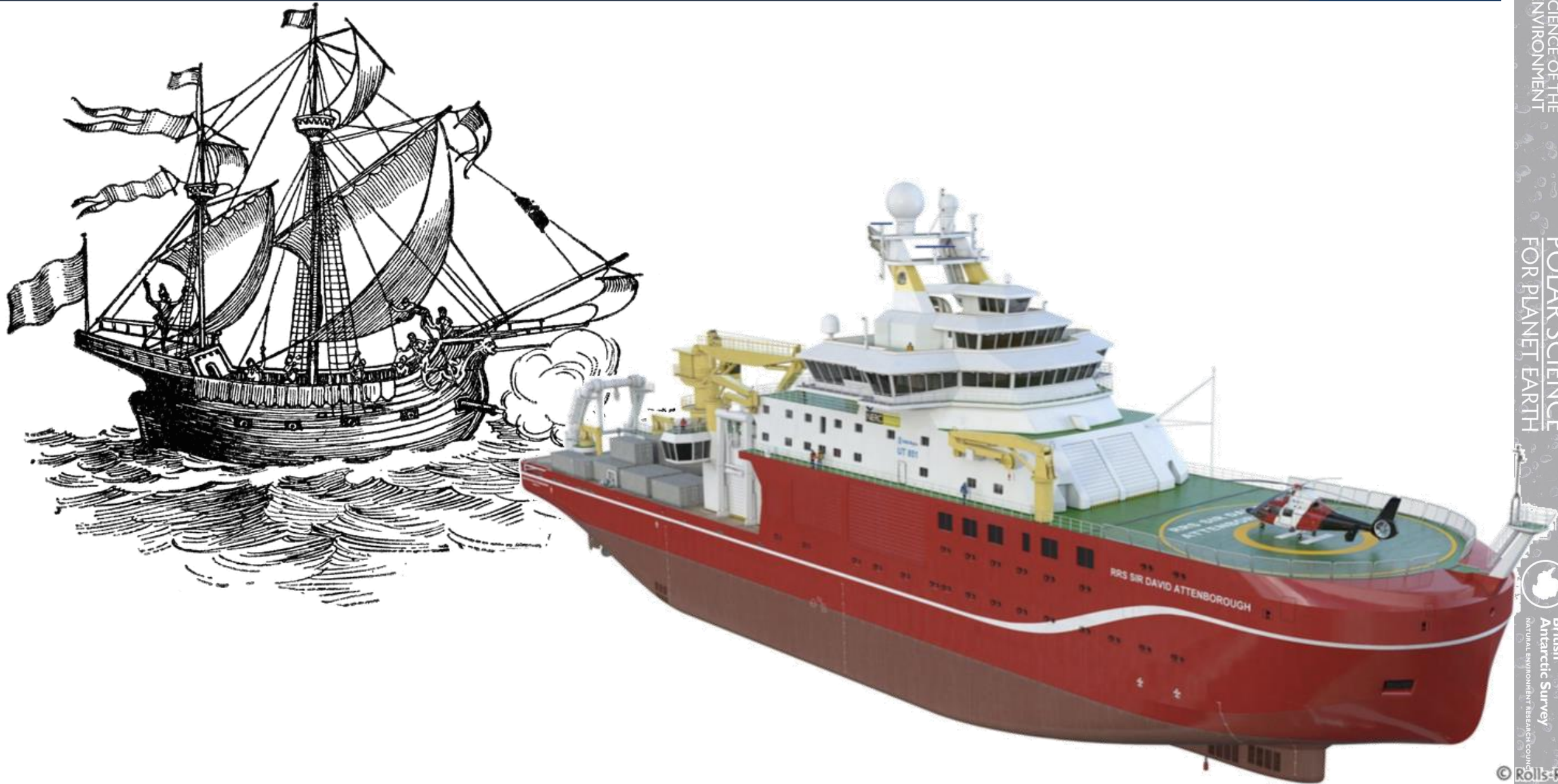
ALL OF YEAR 2 2019-20



The ITGC Team Leaders



Finally... The Vittoria vs. RRS Sir David Attenborough



A new era of Scientific cooperation

- With Europe once again troubled, science can lead the way...
- “Magellans not Henrys”



A new era of Scientific cooperation?

- Face up to the impact we caused without regrets, and do what we can to make things better --
South Georgia
- Understand the Earth System as a whole, not as a set of countries or system existing in isolation --
ORCHESTRA
- Collaborating to address the key questions that affect the lives and livelihoods -- ITGC

Thank you / Obrigado

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