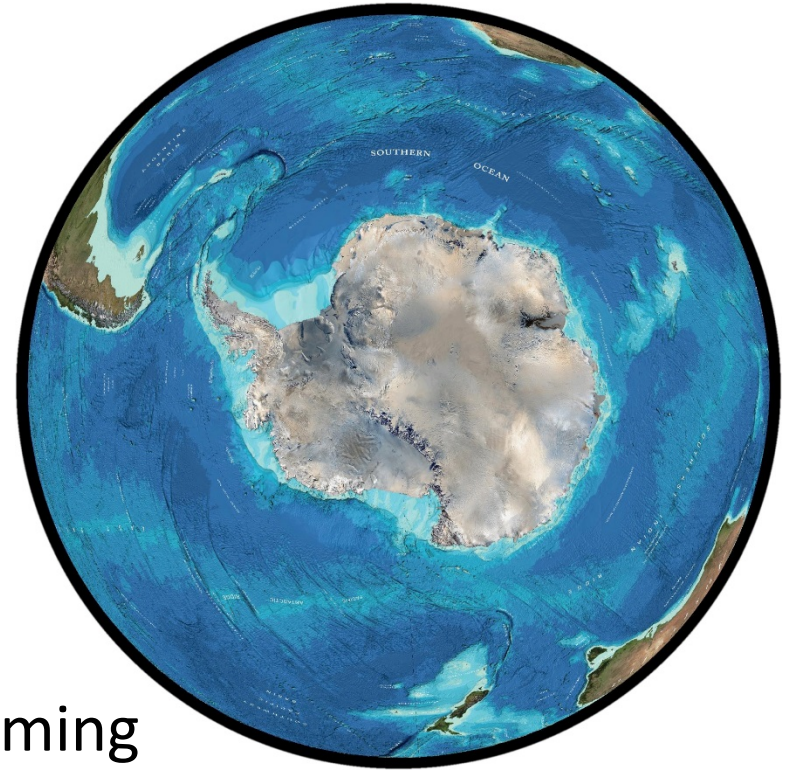
Welcome
One Ocean Report

Agenda



1. Context
   Wendy McGuinness
2. How to Read this Report
   Wendy McGuinness
3. Summary of Findings
   Wendy McGuinness
4. Global Warming is Ocean Warming
   Professor Tim Naish
5. Lines in the Ocean
   Bronwen Golder
6. Sustainable Coastlines
   Sam Judd
7. Questions and Next steps
   Wendy McGuinness

1. Context

How we see our ocean?

This is about representation; whose interests are we protecting?
The answer to this question will determine how we will govern our ocean?

	Autocratic	Democratic
Human-centric	Treasure chest	Public treasure
Ecosystems-centric	National treasure	Planetary treasure

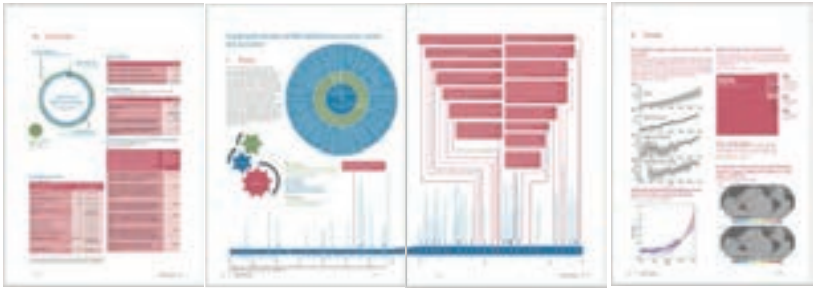
How we govern our ocean?

	One institution	Many institutions
One instrument	Simple framework	Organised framework (under an overarching strategic instrument)
Many instruments	Organised framework (under an overarching strategic institution)	Disorganised complex framework

Structured discussion on ocean management, 27 May 2014

2. How to Read this Report

1. Graphics pages x 4

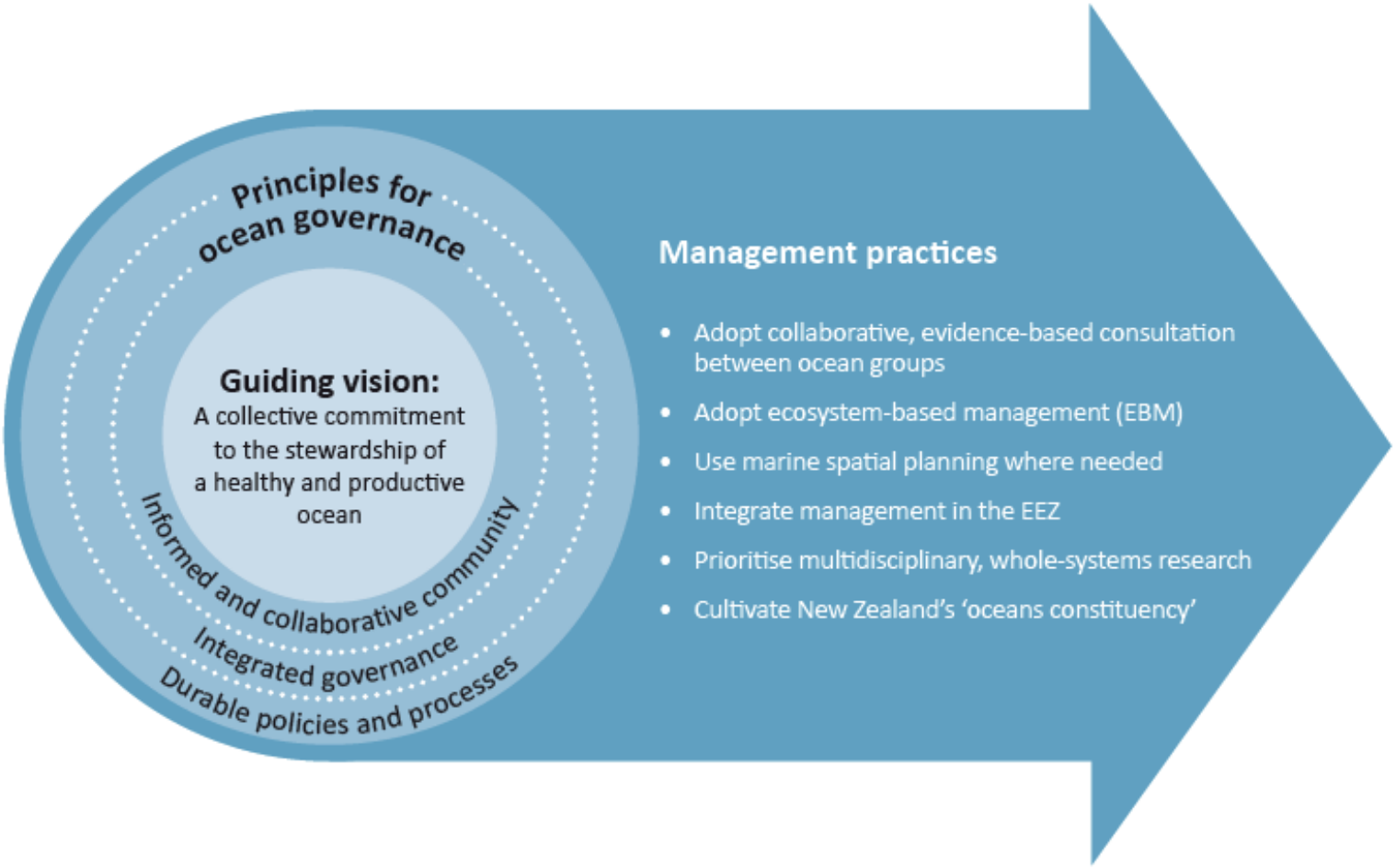


2. Perspectives x 30

3. Report pages x 80

3. Summary of Findings

Figure 9 Framework for One Ocean: Collaborative governance within the community of ocean users, government, conservationists and the public



James Tremlett

James Tremlett
Global Fellows in Marine Conservation, Duke University'

Kia ora from Papua New Guinea. Thanks for coming.

I am writing from Kimbe Bay on the island of New Britain, one of the world's centres of marine biodiversity. I have been working with a small locally-run NGO called Mahonia Na Dari, which means 'Guardians of the Sea' in the Bakovi language of the local Talasea people. Mahonia's main activity is operating a 'marine environmental education program' in the small local schools, where they educate young people in the fundamentals of conservation from pre-school ages through to those about to graduate from high school. They are incredibly successful at doing so: I recently met a class of 15-year-olds with more knowledge of coral reef ecology and conservation than any second-year university student back home. As far as I am aware there is nothing like this program in Aotearoa, and perhaps nowhere else in the world.

Mahonia does all this with very little funding, under conditions that have caused large Western NGOs to pack up and leave the province entirely. Last year, for instance, they had to permanently disconnect from the internet because they could not pay the telecoms bill – but they understand the value of their programs, and keep them running out of sheer bloody-minded persistence. They know the importance of communicating their environmental knowledge to the rest of their society, and it is equally important that we do not forget this responsibility in our corner of the Pacific. It is very easy to get stuck in meaningless discussions around policy, and we need to remember the importance of concrete actions to protect the natural world of which we are a part.

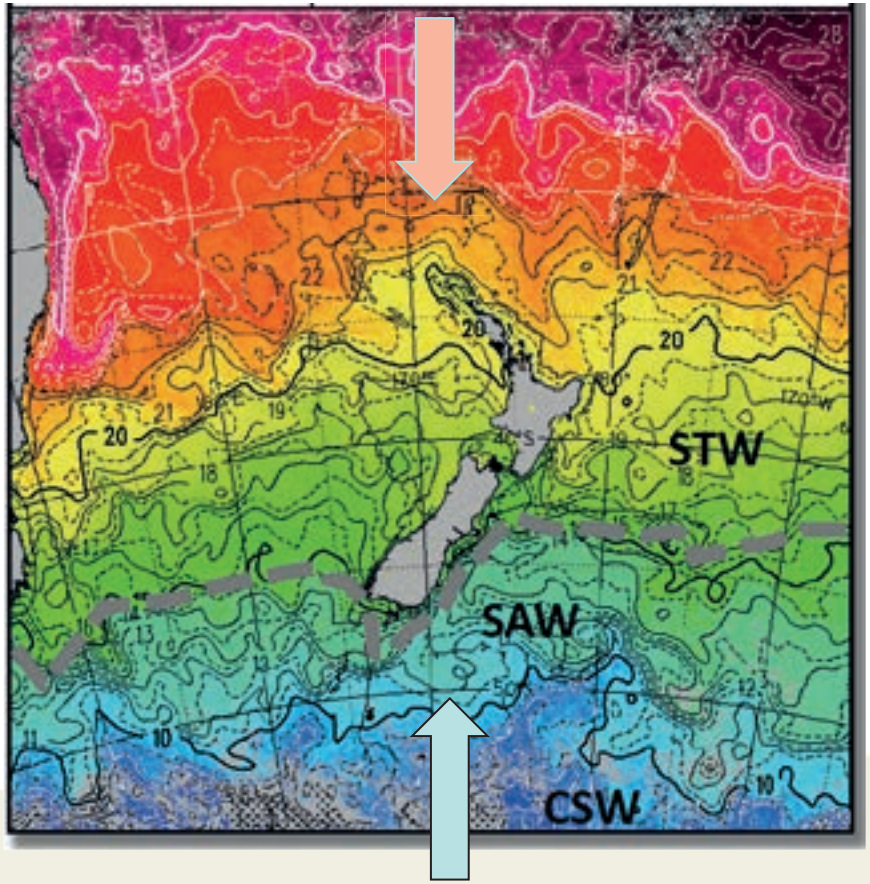
In another sense as well, my time here has emphasised the need for constant vigilance regarding the laws and institutions that govern what is allowed to take place in our oceans. The peoples of PNG are about to be subjected to the world's first industrial deep-sea mining operation, using techniques that have never before been tested on such scale. It is no accident that this experiment is taking place in the waters of a state with limited environmental regulation, and in a country of unparalleled cultural richness but without a well-organised and robust civil society capable of resisting or critiquing such activity on a national level. In Aotearoa we have the privilege of sufficient financial and social resources to allow this critique to occur, and it is a privilege we must exercise to the best of our ability.

Cheers for listening, and enjoy the evening.

James Tremlett
Author, *Report 10: One Ocean: Principles for the stewardship of a health and productive ocean*

Global warming is ocean warming:
Ocean change around New Zealand

Modern sea surface temperatures



Modern Currents

Tim Naish

Director, Antarctic Research Centre

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Te Whare Wānanga
o te Ūpoko o te Ika a Māui

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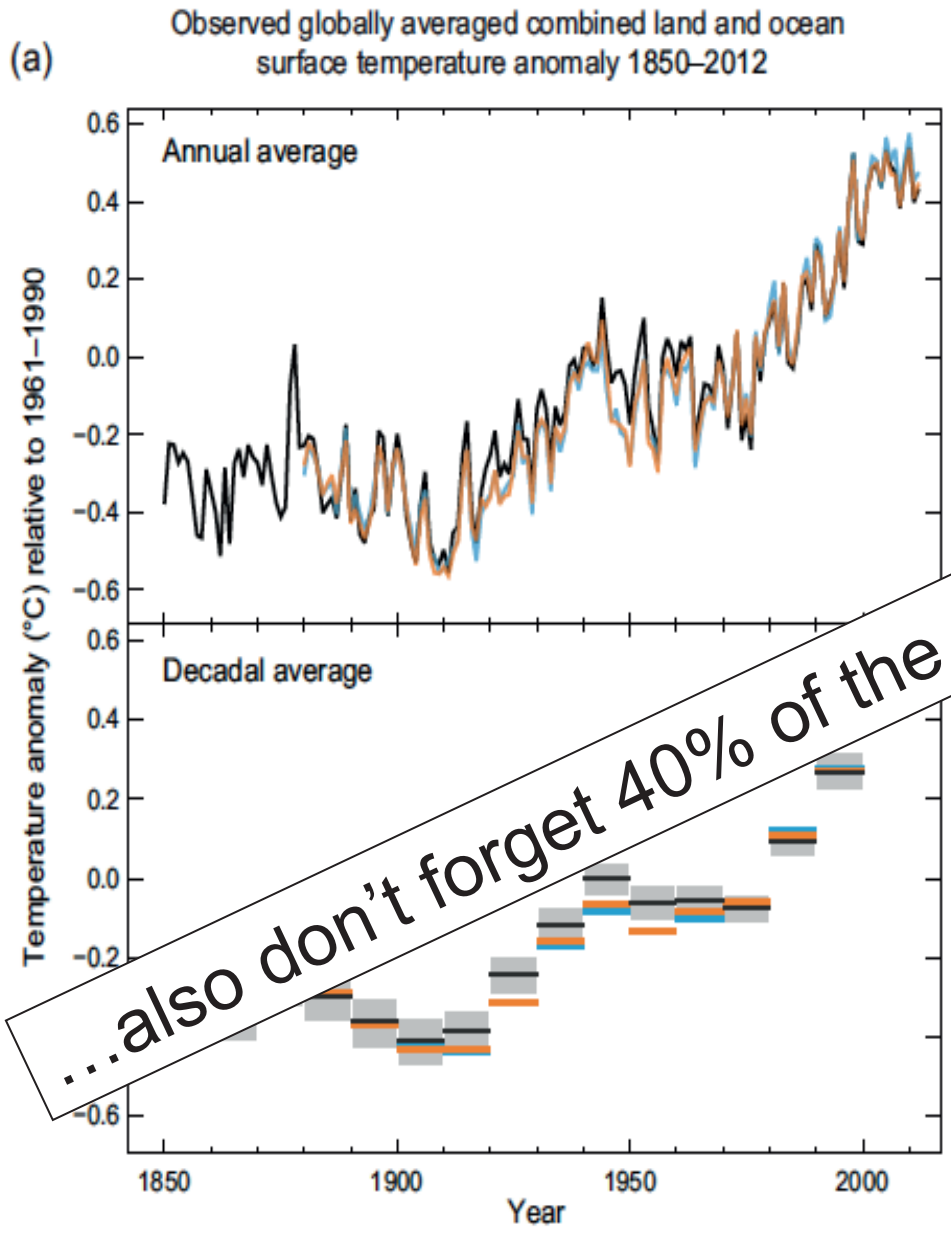
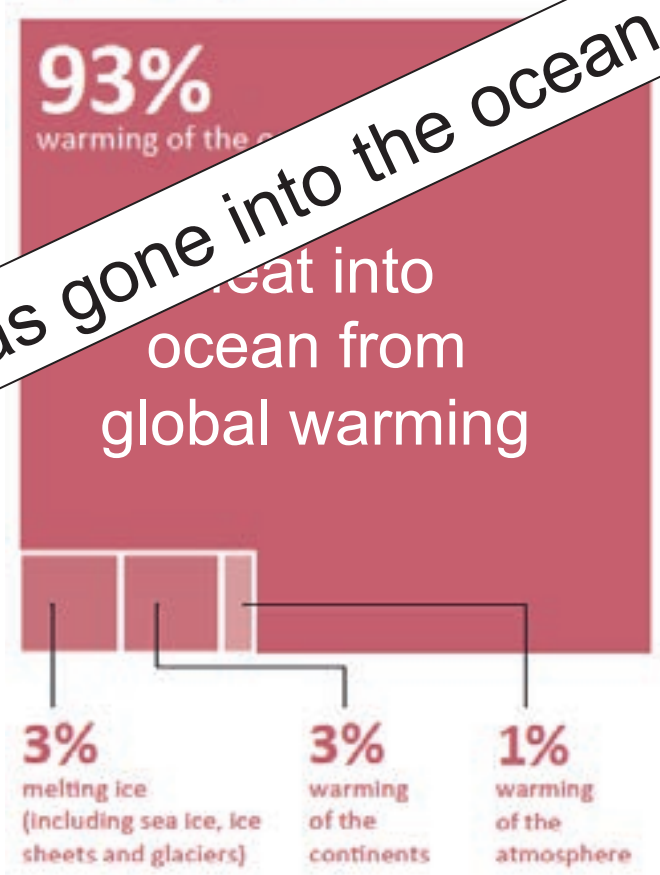
Warming in the climate system is unequivocal!...IPCC 2013

Since 1850



…also don't forget 40% of the CO_2 has gone into the ocean



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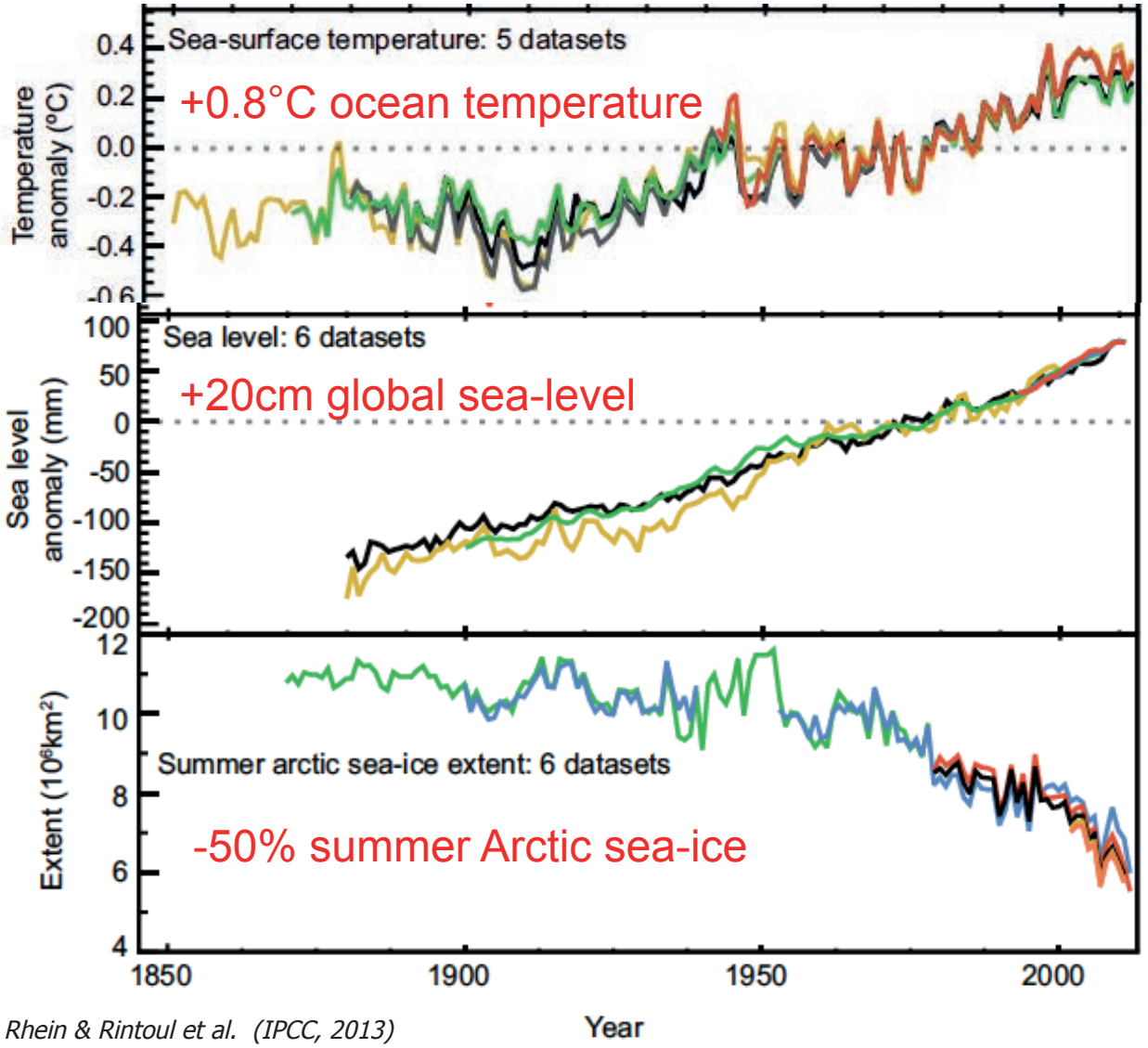
How is the ocean changing during the industrial age?



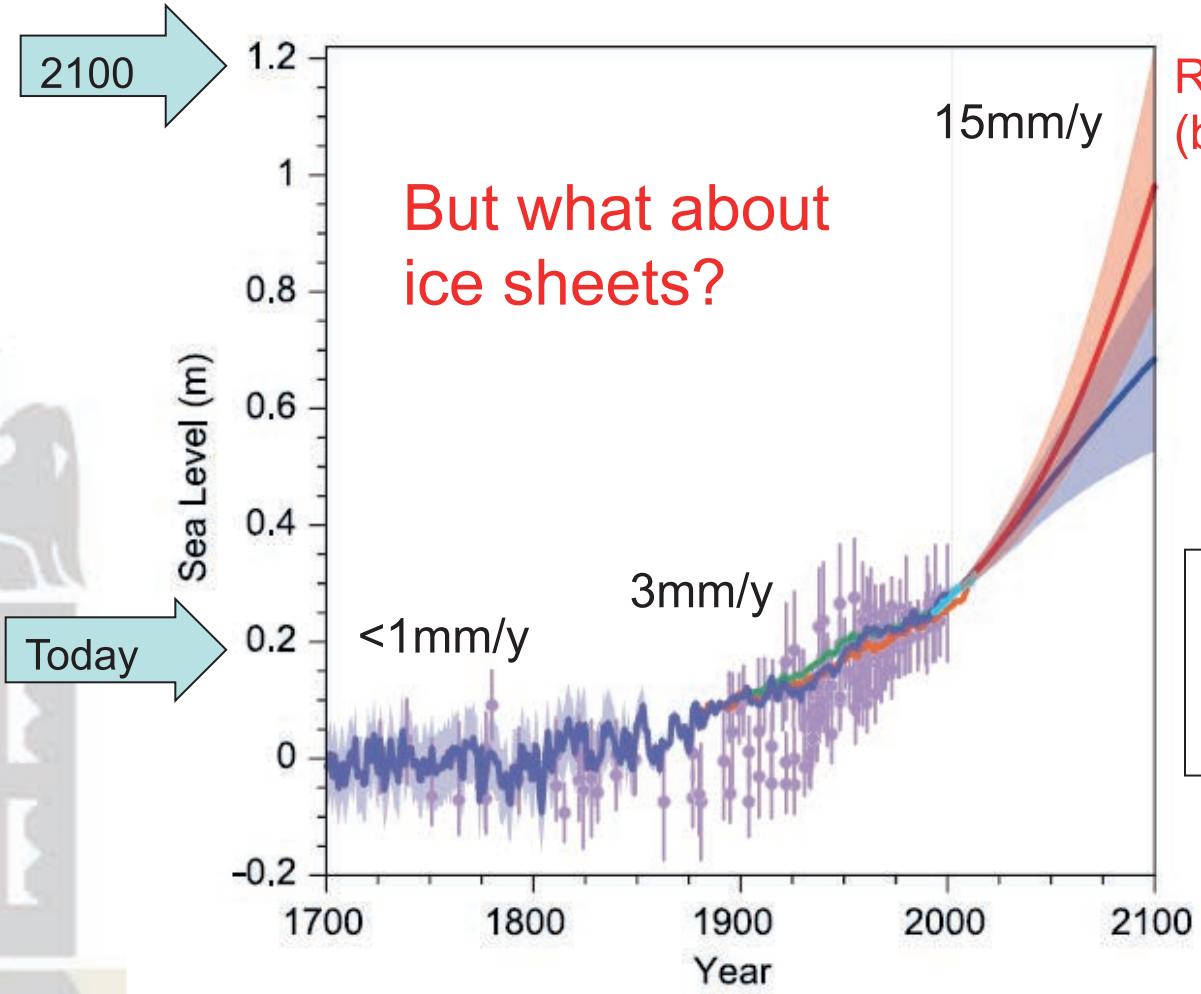
Rhein & Rintoul et al. (IPCC, 2013)

1. The rising tide around NZ

New Zealand is unprepared for the impacts of sea-level rise!

- *How much will the sea-level rise?*
- *How fast will the sea-level rise?*
- *What will be the regional differences in sea-level rise?*
- *What will be the social and economic impacts of sea-level rise?*
- *How will they be managed?*

Year 2100 mean sea-level projections (the “likely” range)



RCP 8.5 (business as usual +4.5°C)

RCP 4.5 (moderate mitigation +3°C)

RCP = representative concentration pathway for different green house gas scenarios

Based on current understanding, 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….IPCC AR5, 2013

Sources listed in Church et al. IPCC (2013)

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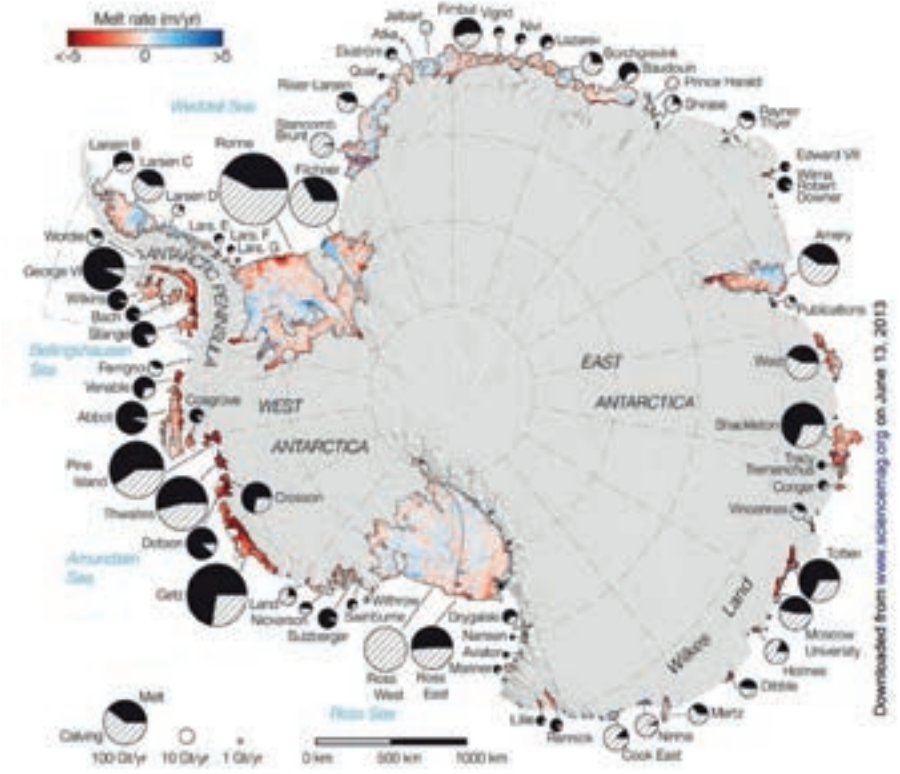
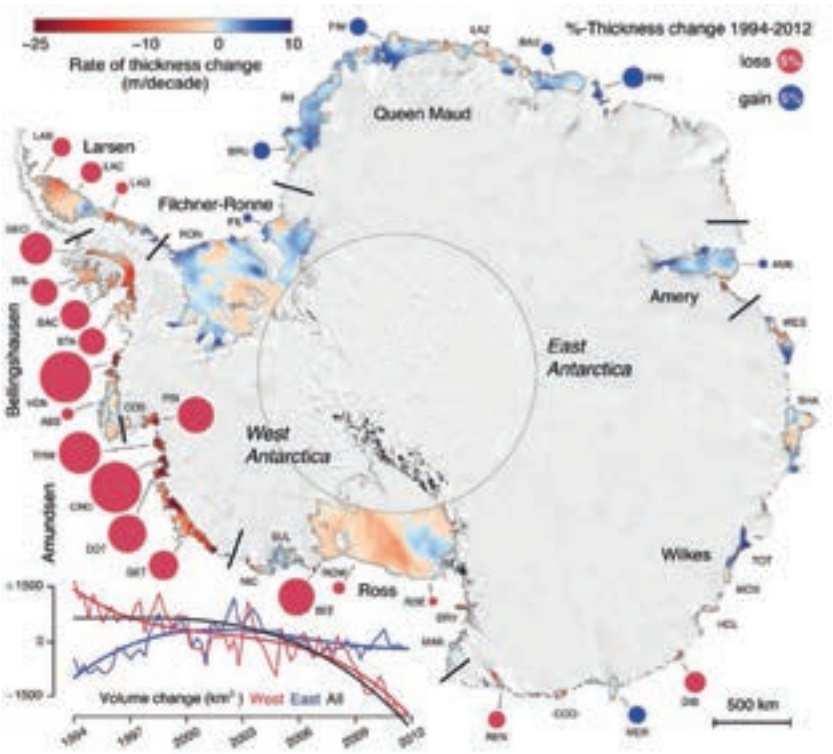
The single biggest uncertainty – *Antarctic ice melt is accelerating*

Ice sheets (sit on land)



Ice shelves (float on ocean)

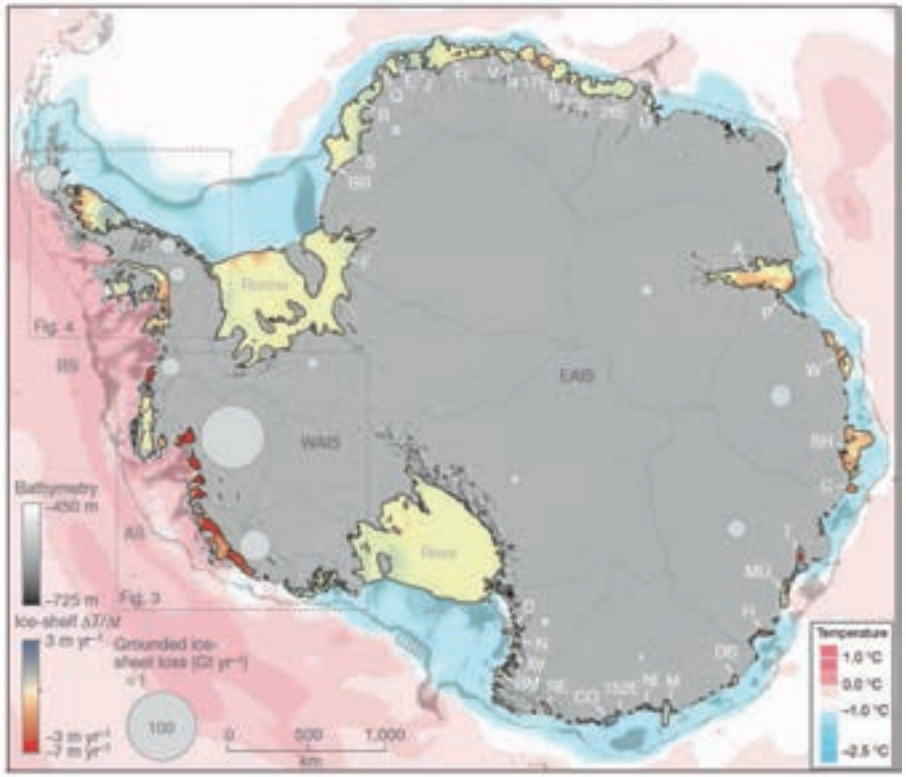


Paolo et al. (2015)

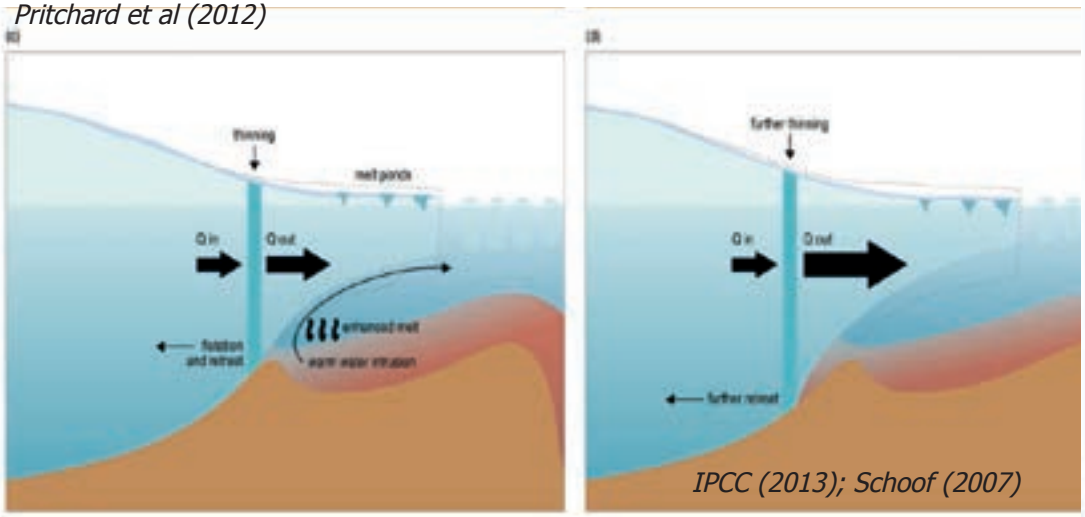
Rignot et al. (2013)

Sources listed in Church et al. IPCC (2013)

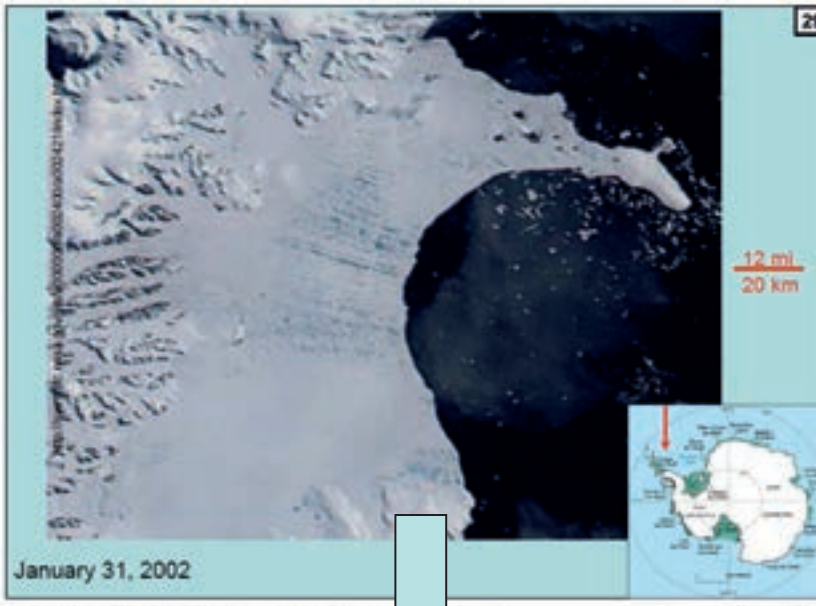
Warming oceans could cause rapid & runaway retreat

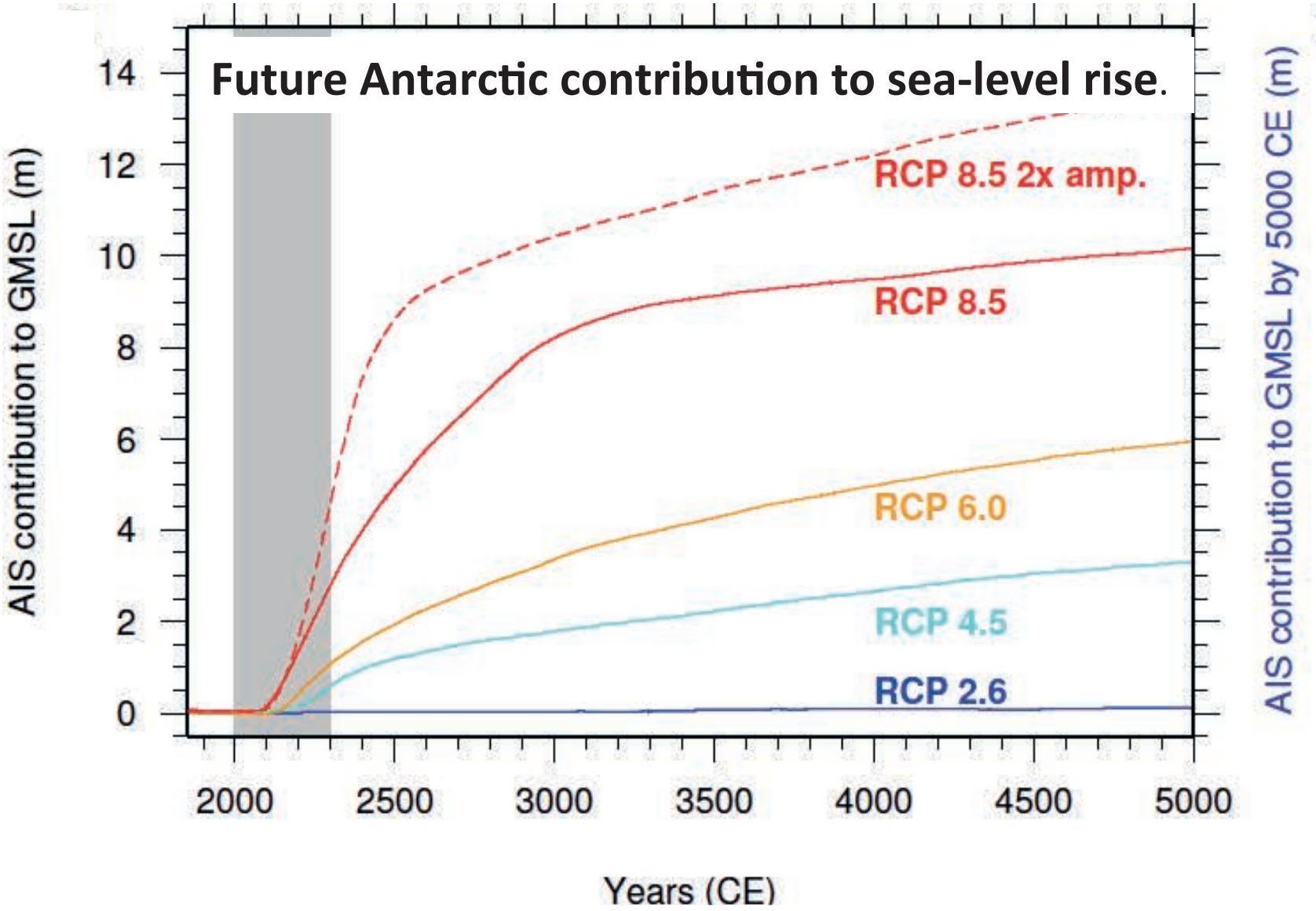


Pritchard et al (2012)



IPCC (2013); Schoof (2007)





Take home: Antarctic ice sheet contribution to SLR currently under estimated by IPCC

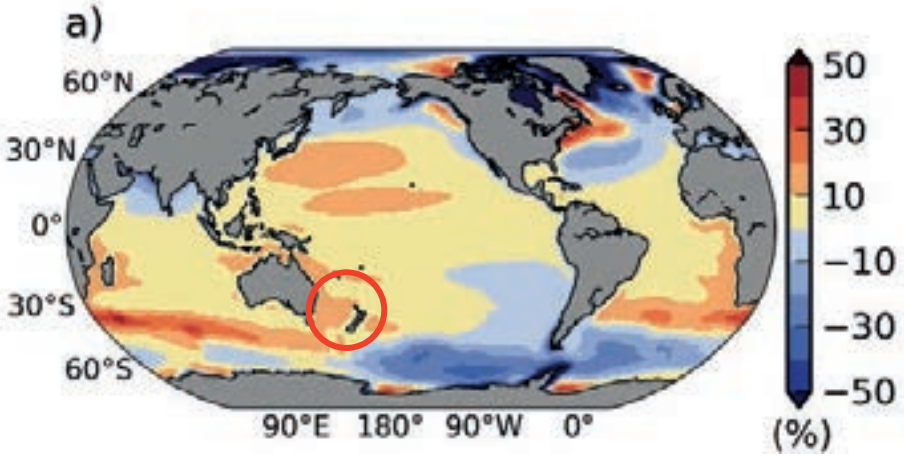
- 30-70cm by 2100, 3m by 2300, 12m by 5000. +2°C is the threshold for irreversible loss

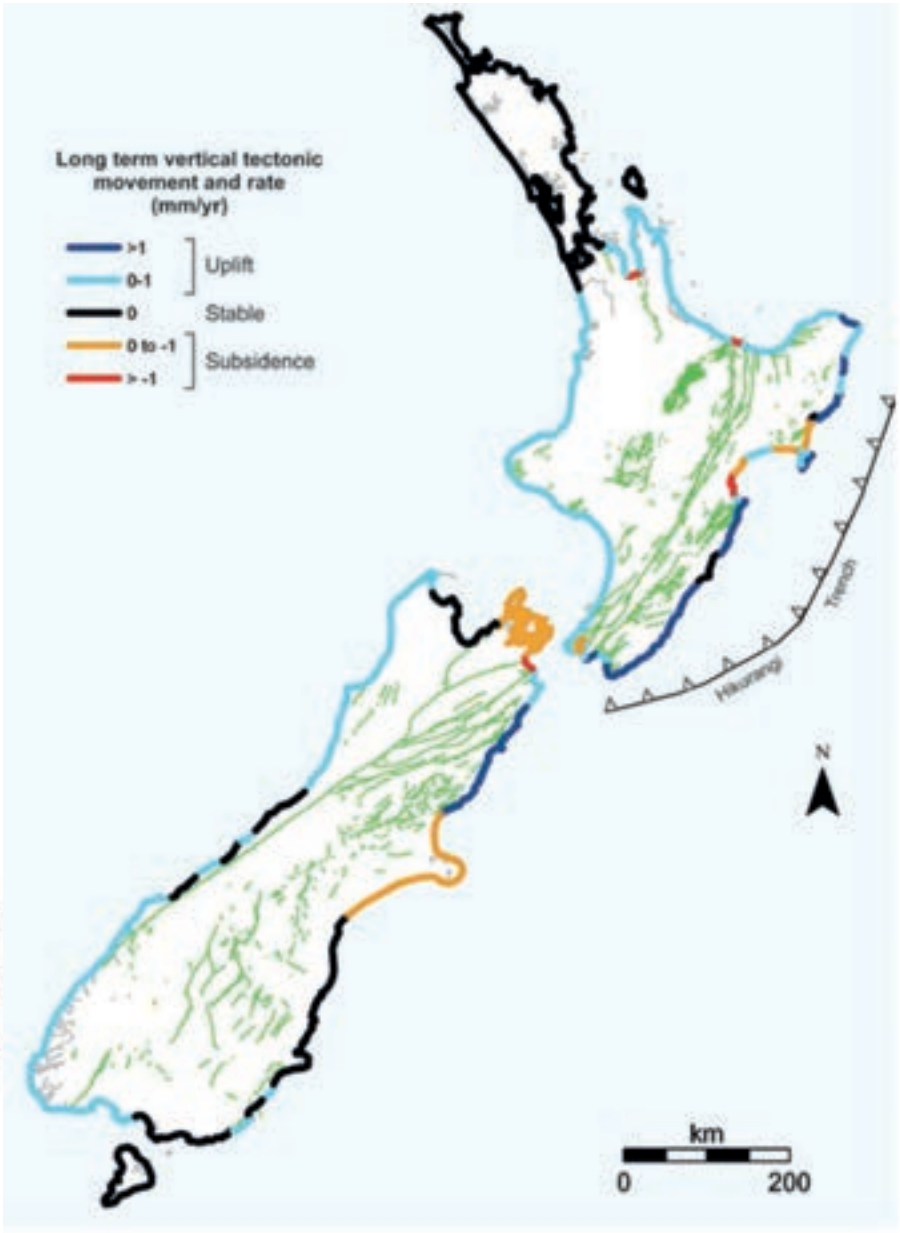
DeConto et al., in review Nature; Golledge et al., in review Nature

Our coastlines are not stable

Sea-level does not rise evenly…

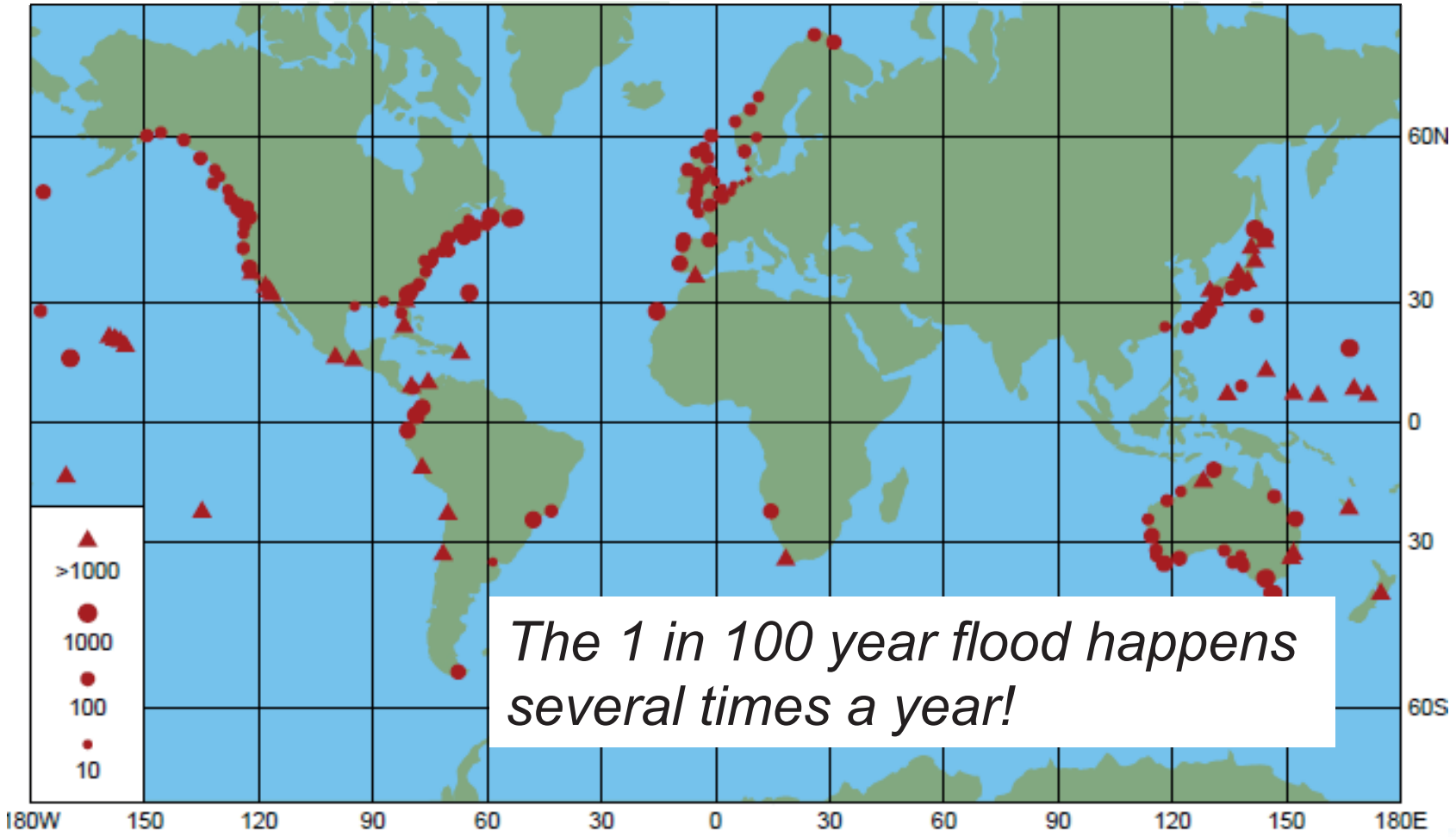
NZ will get 10% more than global average
= ~+1.1m by 2100






+1m of sea-level rise in downtown Wellington
Courtesy of WCC

The frequency of coastal inundation world-wide increases by a multiplier of 100 to 1000 times +50cm by 2100



The 1 in 100 year flood happens several times a year!

(IPCC AR5 2013

2. Coastal Inundation

Island Bay, Wellington, New Zealand, June 2013

Katherine Mansfield House destroyed. Day's Bay, Wellington, New Zealand, June 2013

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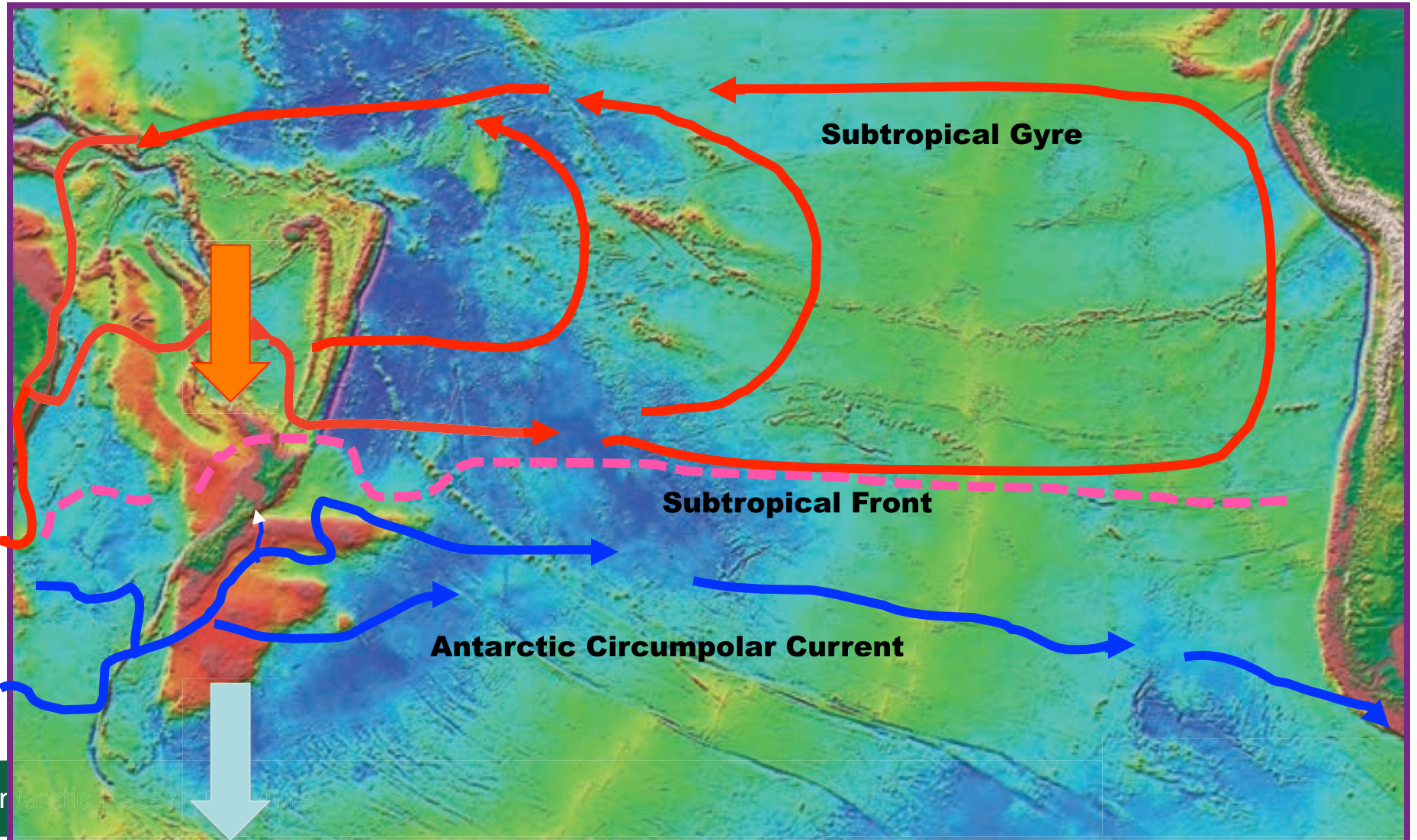
3. Currents of change around NZ

New Zealand is unprepared for ocean change

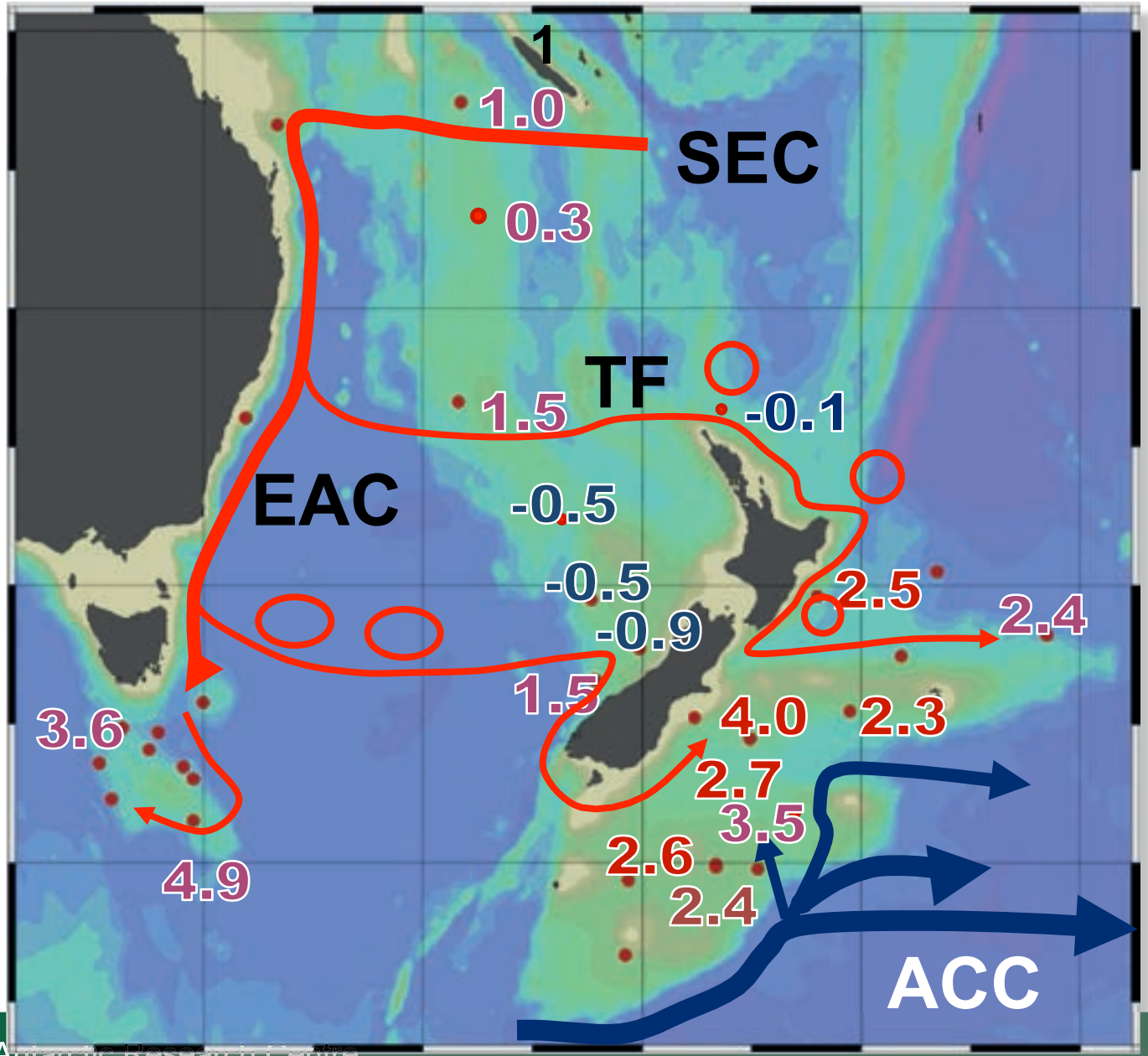
- How will ocean currents change?
- How much, how fast and where will the ocean warm?
- How will ocean change affect our climate?
- How will ocean change affect marine ecosystems?
- What will be the impact of ocean acidification?
- What will be the social and economic impacts?

Increased heat transport from the

Decreased influence from the Antarctic



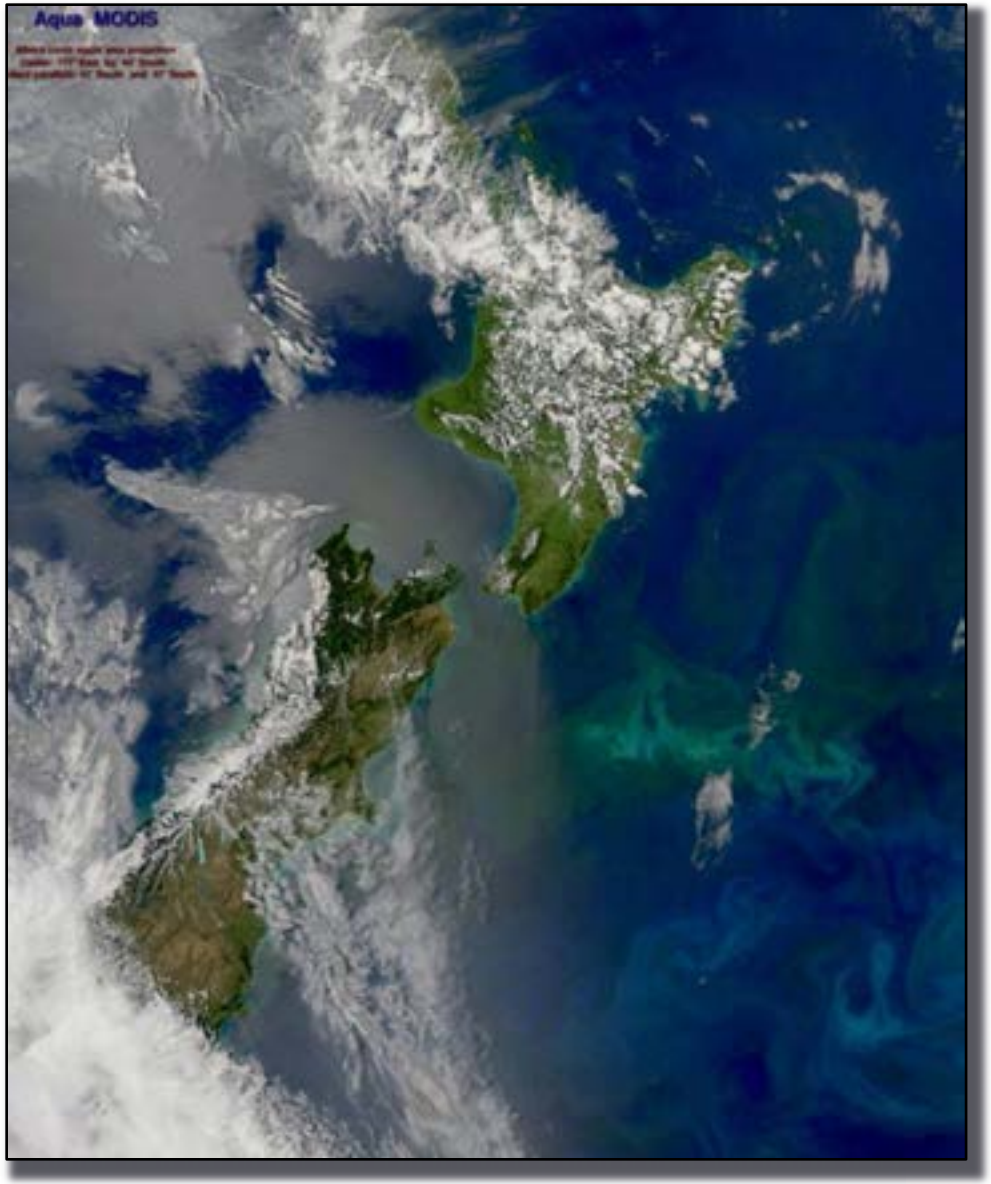
4. Increased Heat - last time world was 1-2°C warmer



125,000 years ago

- **>1°C warmer in subtropical inflow**
- **Warmer S. Tasman consistent with regional winds forcing EAC south.**
- **Strong trans-Tasman inflow to NZ from south.**
- **Also warming near ACC, consistent with heat from S. Ocean**

5. Are the plankton responding?

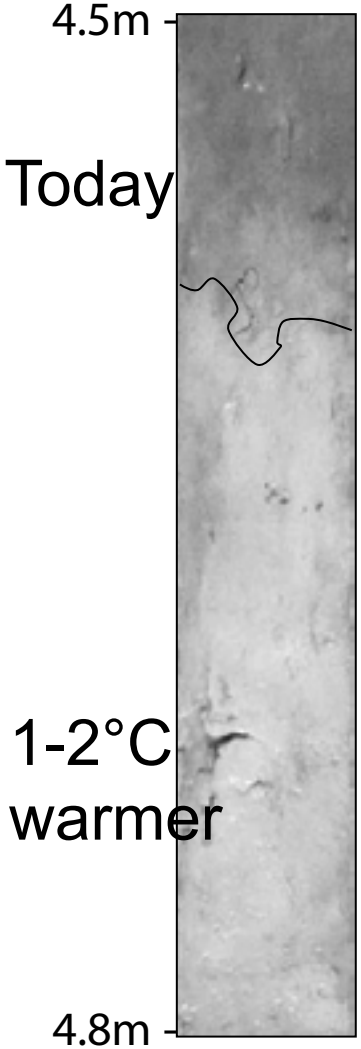


Source: Aqua MODIS, NASA.

- The ocean off eastern South Island has phytoplankton blooms (particularly coccolithophorids). The fossils of these floating plants form chalk as found in the White Cliffs of Dover.

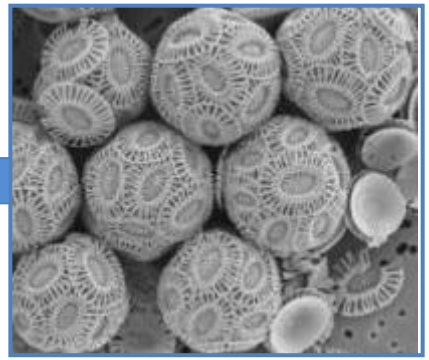
- There is no evidence that the present blooms are more frequent than normal, but their occurrence is consistent with a warmer ocean as confirmed by geological samples from the seabed.

6. The base of the food web changes in a warmer ocean



Sediment core

Animal plankton (zooplankton)



Plant plankton (coccolithophorids)

- Sediment cores from the seabed of Campbell Plateau show alternating layers of grey and white mud.
- Grey layers are composed mainly of zooplankton shells and white layers are composed mainly of coccolithophoridsas seen in today's blooms
- These distinct types of plankton were formed under different ocean conditions.
- The switch to coccolithophorids occurred when ocean temperatures were 1 to 1.5 °C warmer than now.

7. Take home messages

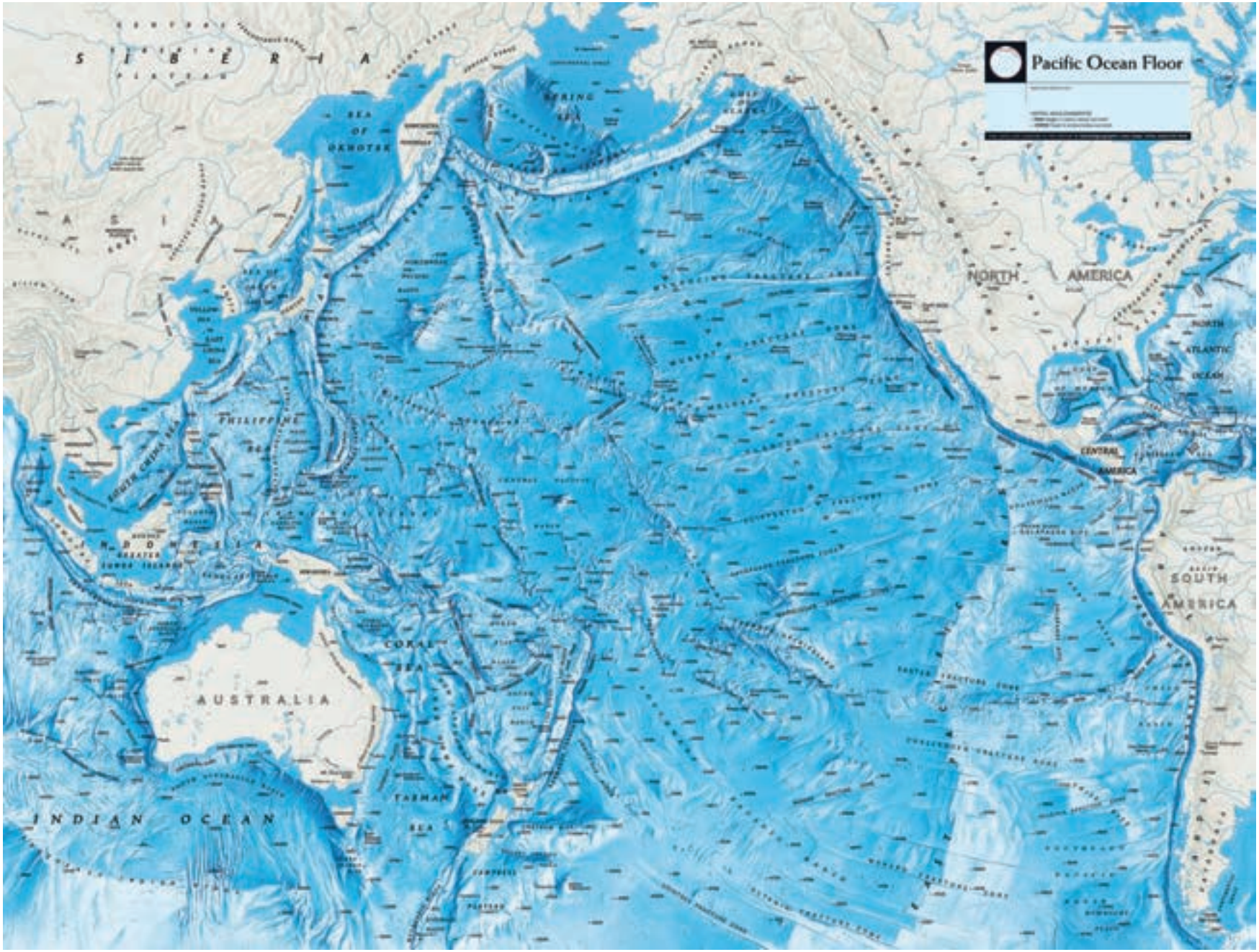
1. Sea-level rise from a warming ocean and polar ice sheet melting will cause significant disruption to NZ over the coming century. We are woefully under-prepared for anticipating and managing the impacts of this sea-level rise.

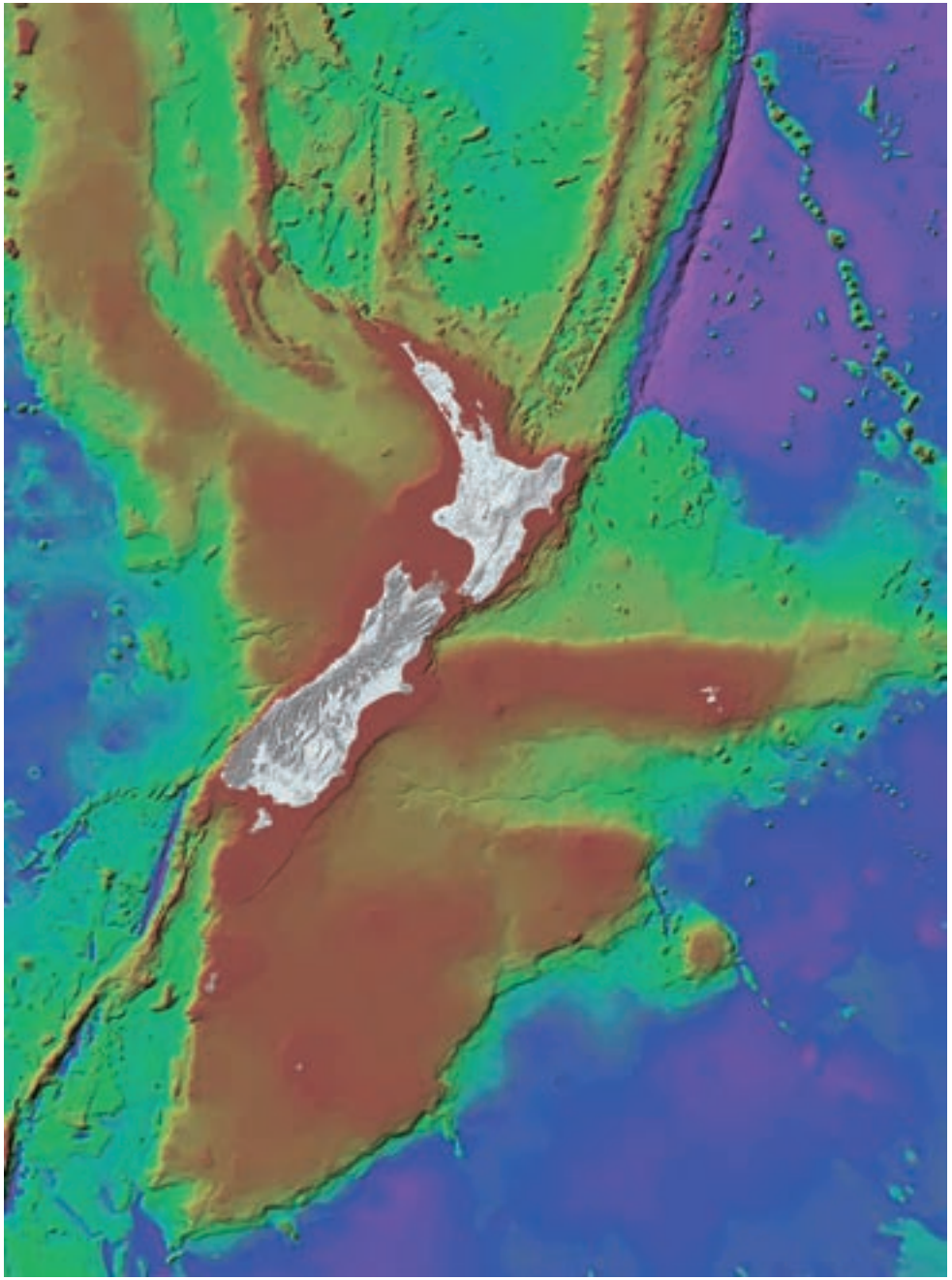
2. Increased influence from subtropical water masses and ocean acidification over the New Zealand region will have profound impacts on marine species distribution, including primary productivity at the base of the food web.

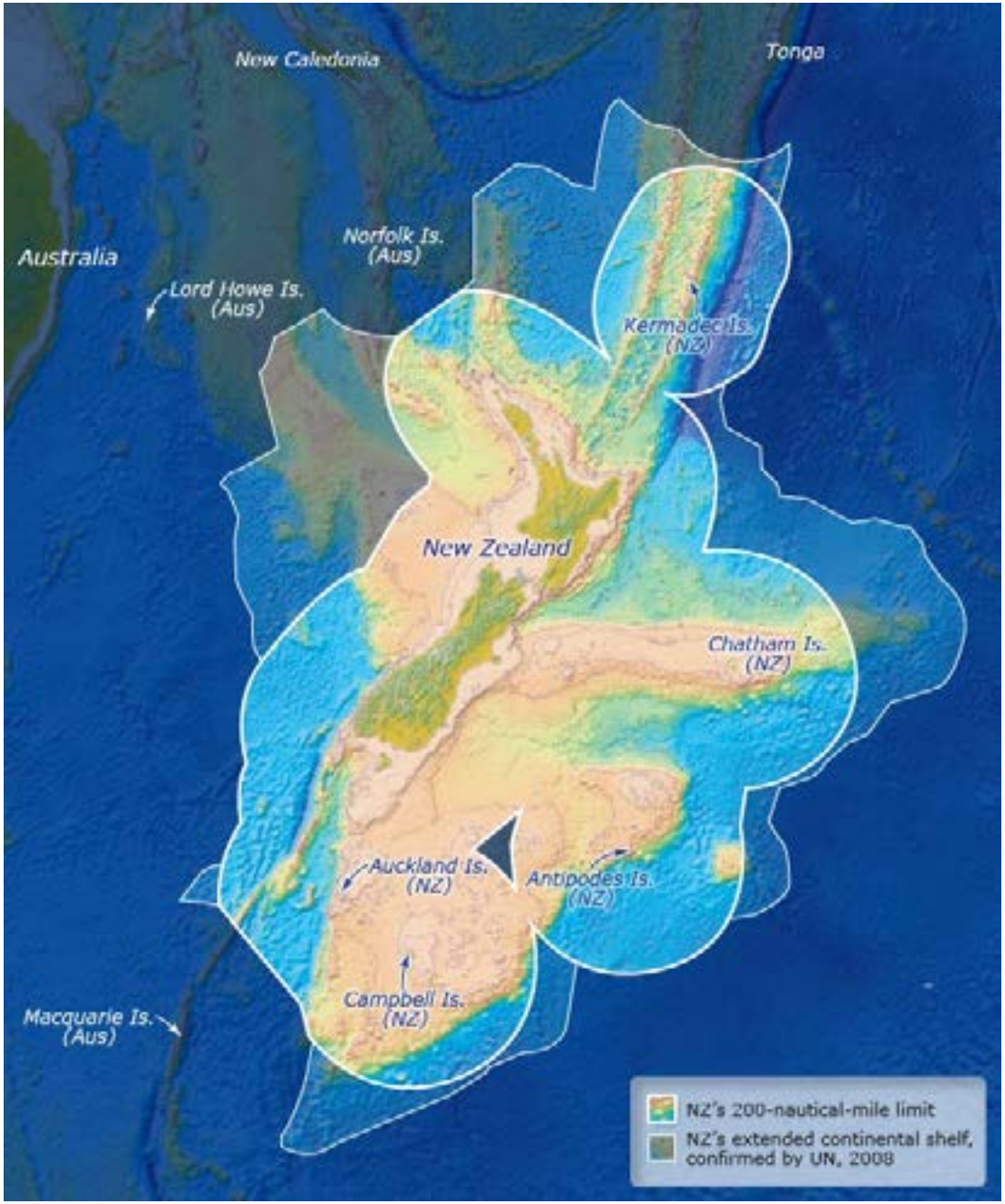
3. NZ's ocean estate is large and we have very little information on how the physical and biological changes are occurring, will continue to occur and what impact they will have environmentally, ecologically and economically.

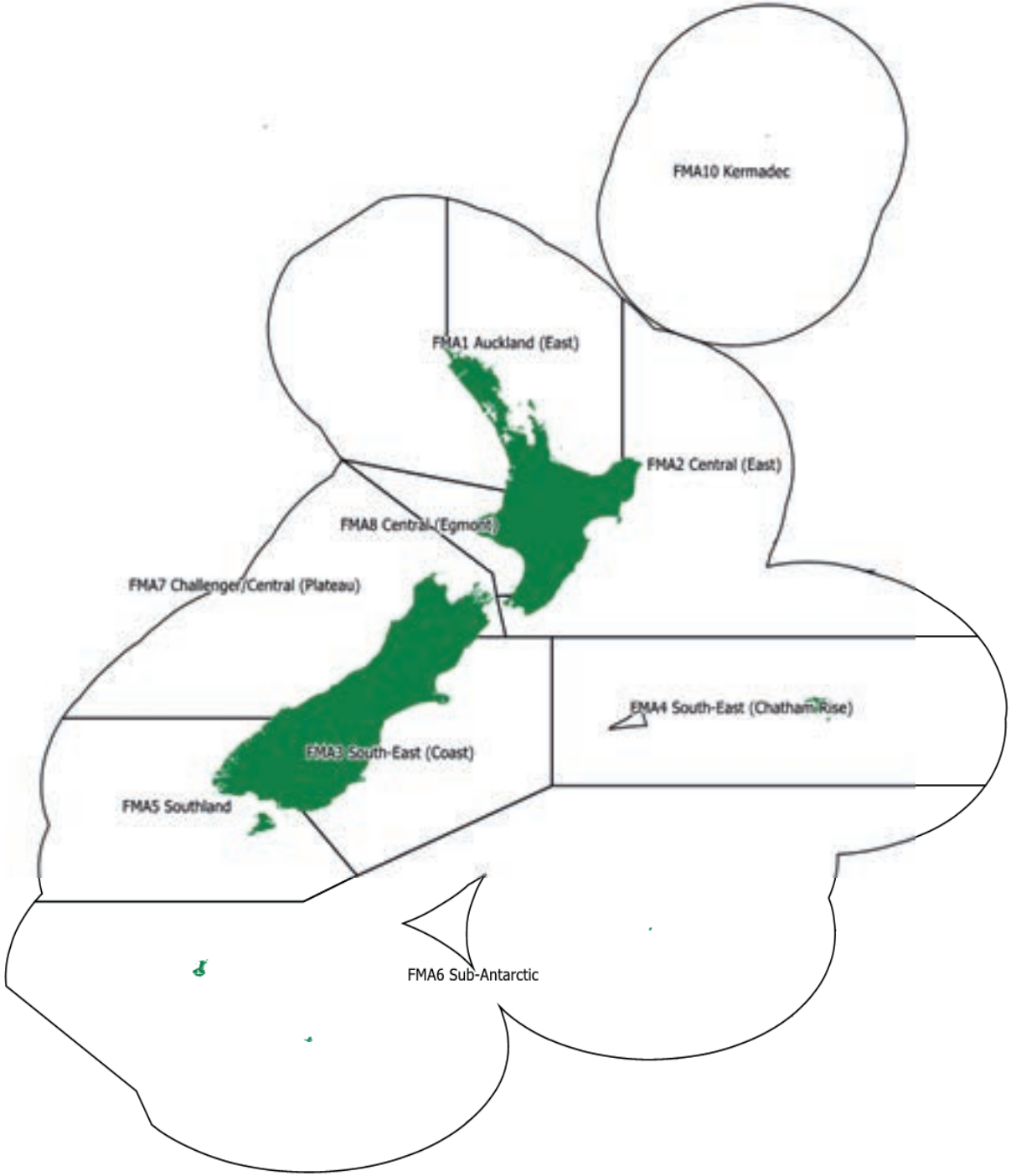
Lines in the Ocean

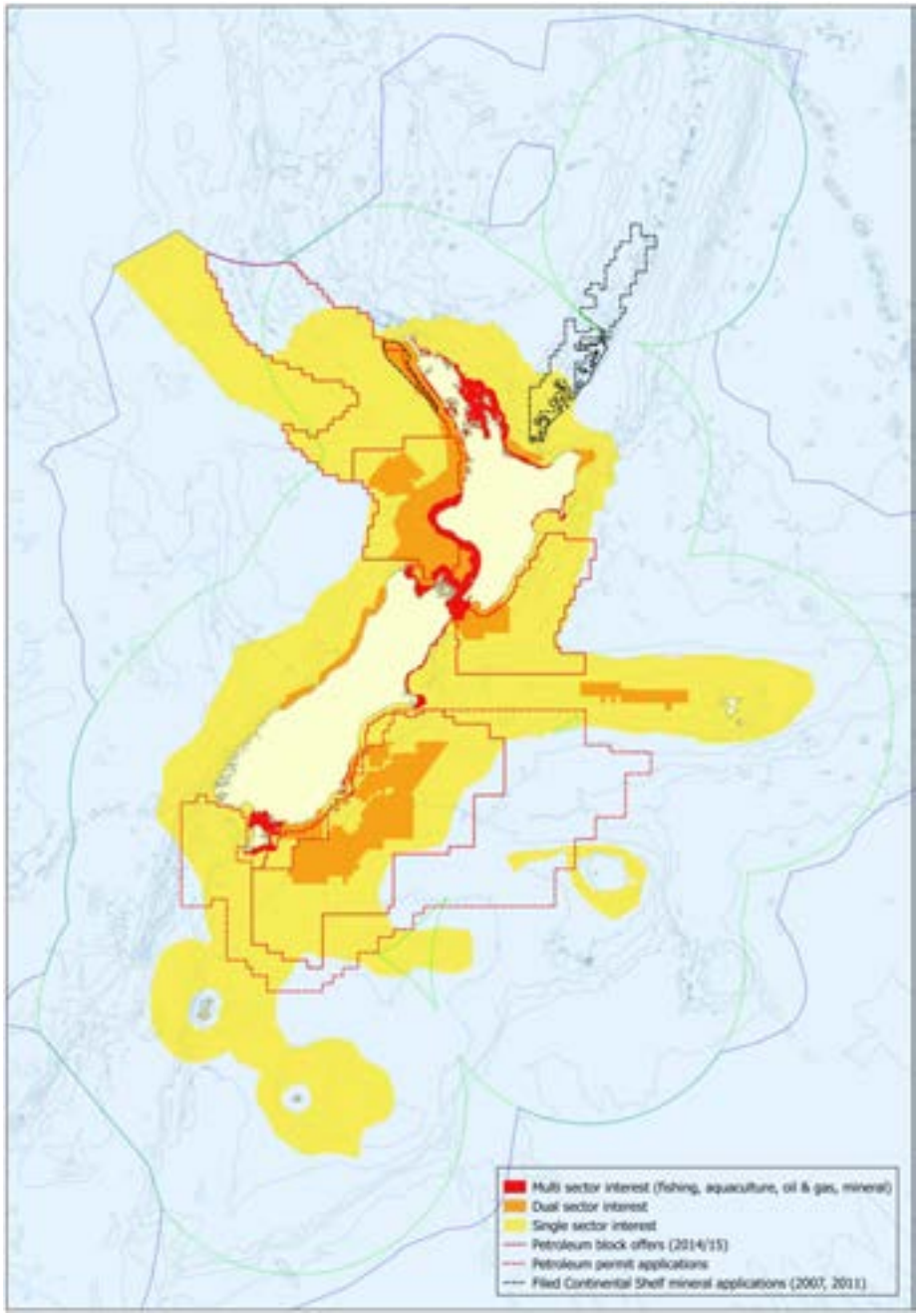
Bronwen Golder

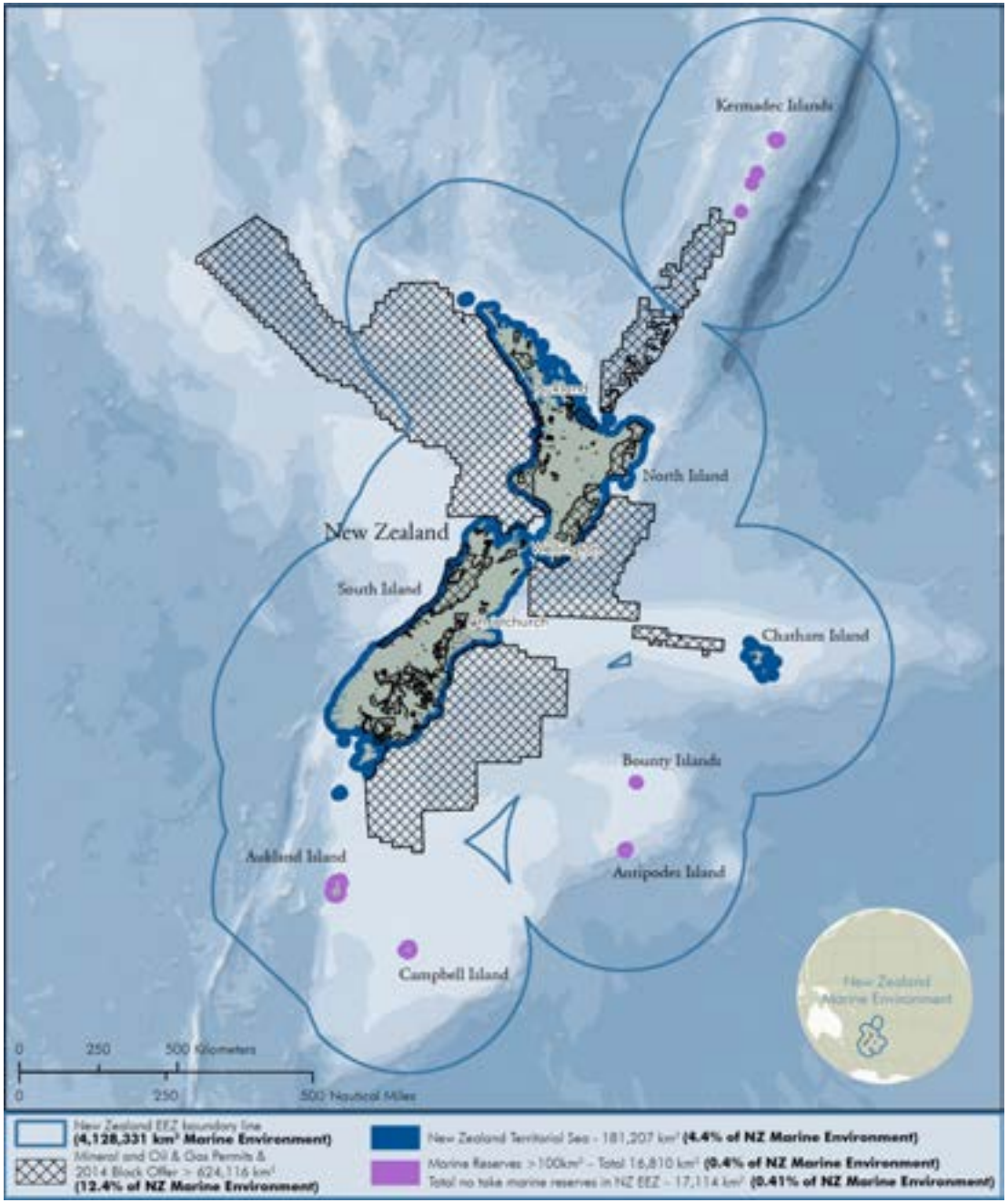

Pacific Ocean Floor
SIBERIA
PLATEAU
SEA OF OKHOTSK
BERING SEA
ASIA
NORTH AMERICA
NORTH ATLANTIC OCEAN
PHILIPPINE
SOUTH CHINA SEA
CENTRAL AMERICA
INDONESIA
GREATER SUNDA ISLANDS
SOUTH AMERICA
CORAL SEA
AUSTRALIA
TASMAN SEA
INDIAN OCEAN

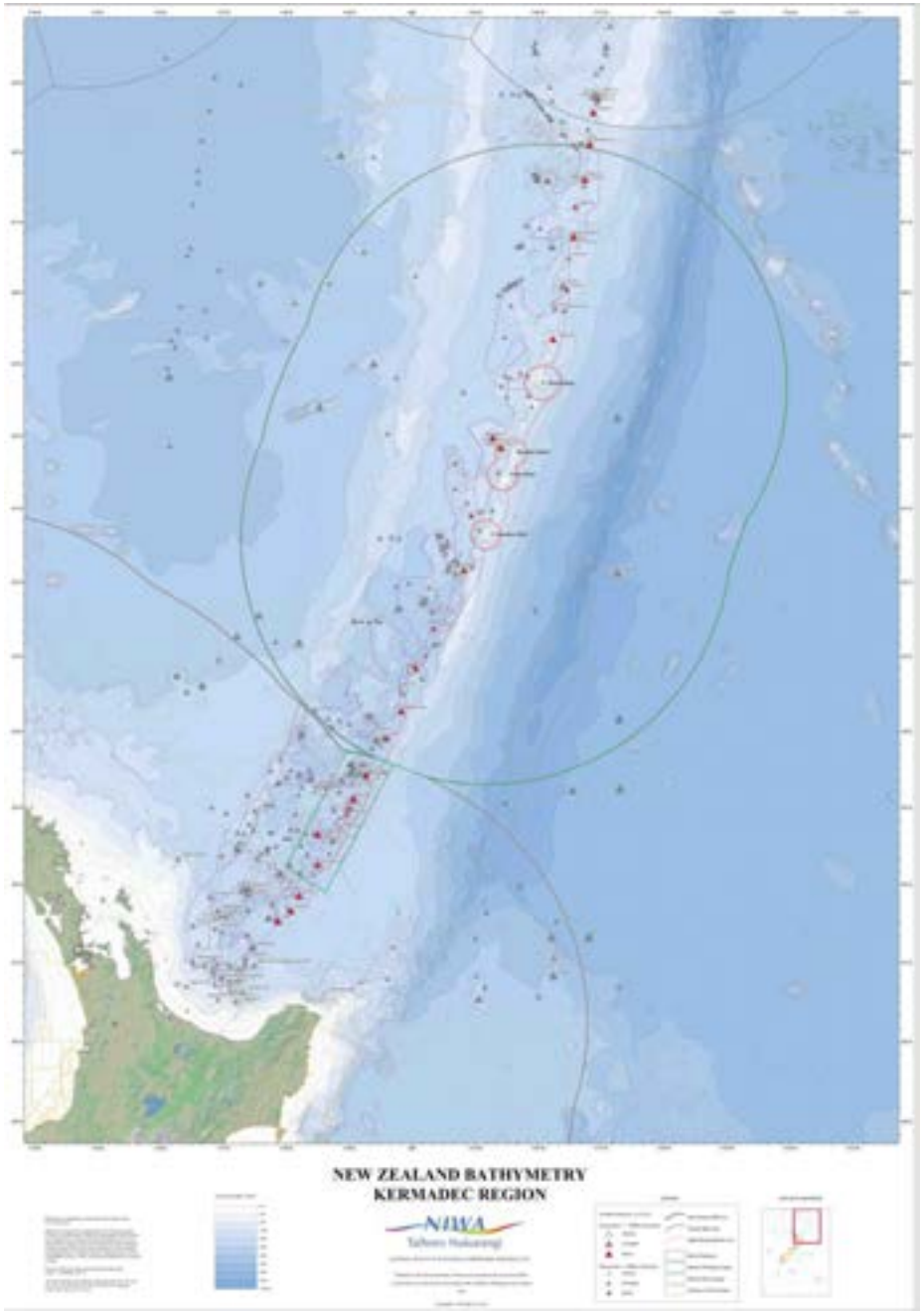


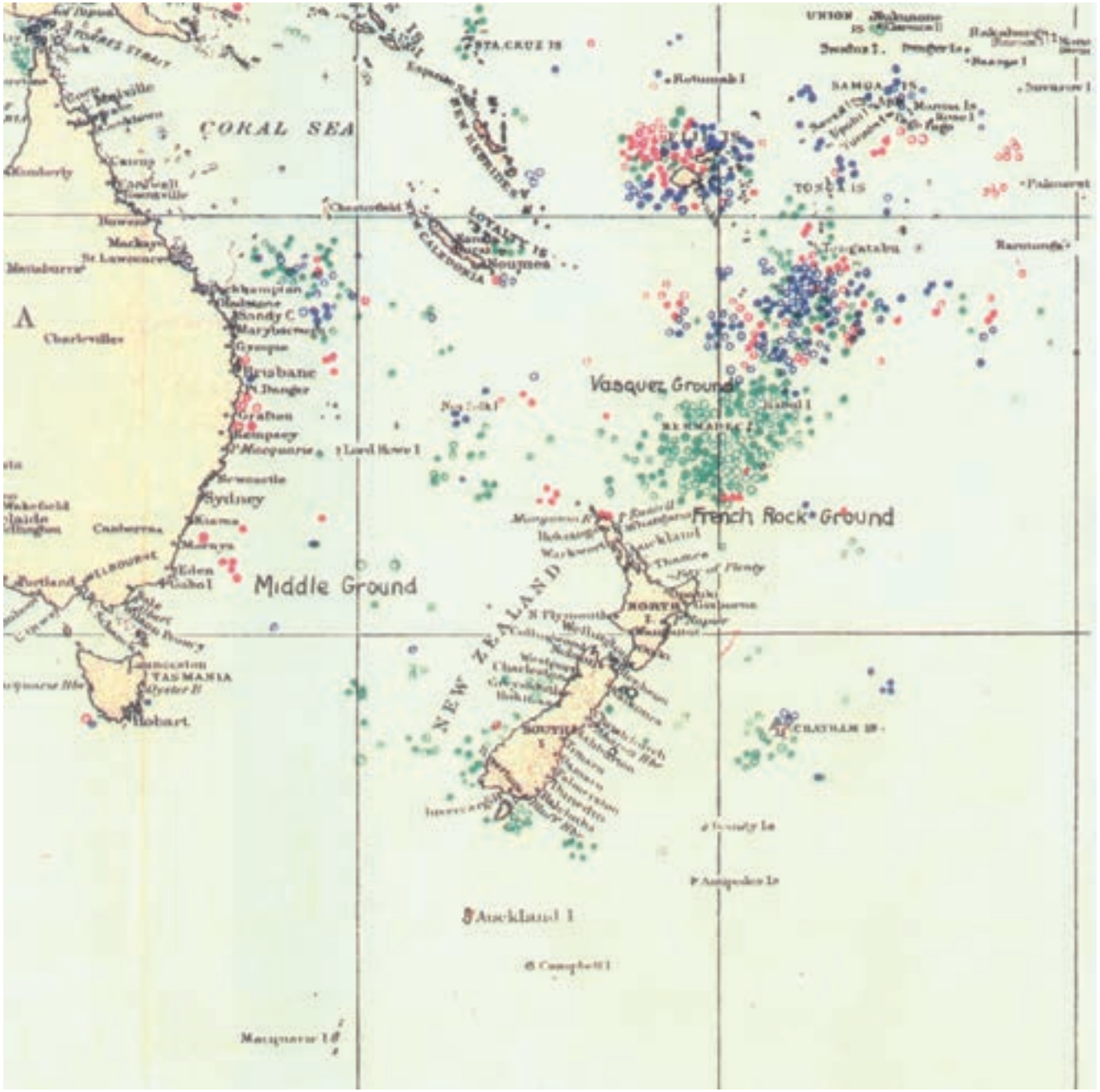

New Caledonia
Tonga
Australia
Norfolk Is. (Aus)
Lord Howe Is. (Aus)
Kermadec Is. (NZ)
New Zealand
Chatham Is. (NZ)
Auckland Is. (NZ)
Antipodes Is. (NZ)
Campbell Is. (NZ)
Macquarie Is. (Aus)
NZ's 200-nautical-mile limit
NZ's extended continental shelf, confirmed by UN, 2008

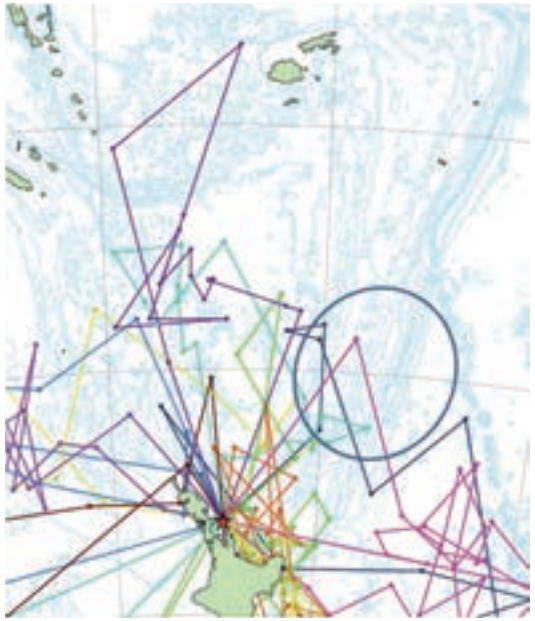

FMA10 Kermadec
FMA1 Auckland (East)
FMA2 Central (East)
FMA8 Central (Egmont)
FMA7 Challenger/Central (Plateau)
FMA4 South-East (Chatham Rise)
FMA3 South-East (Coast)
FMA5 Southland
FMA6 Sub-Antarctic


Multi sector interest (fishing, aquaculture, oil & gas, mineral)
Dual sector interest
Single sector interest
Petroleum block offers (2014/15)
Petroleum permit applications
Filed Continental Shelf mineral applications (2007, 2011)

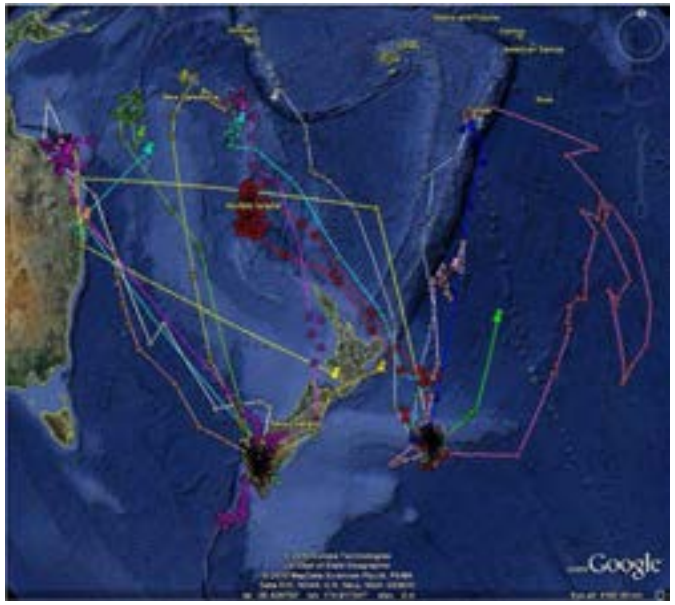

Kermadec Islands
North Island
New Zealand
South Island
Christchurch
Chatham Island
Bounty Islands
Auckland Island
Antipodes Island
Campbell Island
New Zealand Marine Environment
0 250 500 Kilometers
0 250 500 Nautical Miles
New Zealand EEZ boundary line
(4,128,331 km² Marine Environment)
Mineral and Oil & Gas Permits &
2014 Block Offer = 624,116 km²
(12.4% of NZ Marine Environment)
New Zealand Territorial Sea - 181,207 km² (4.4% of NZ Marine Environment)
Marine Reserves >100km² - Total 16,810 km² (0.4% of NZ Marine Environment)
Total no take marine reserves in NZ EEZ - 17,114 km² (0.41% of NZ Marine Environment)


NEW ZEALAND BATHYMETRY
KERMADEC REGION
NIWA
Taihoro Nukurangi

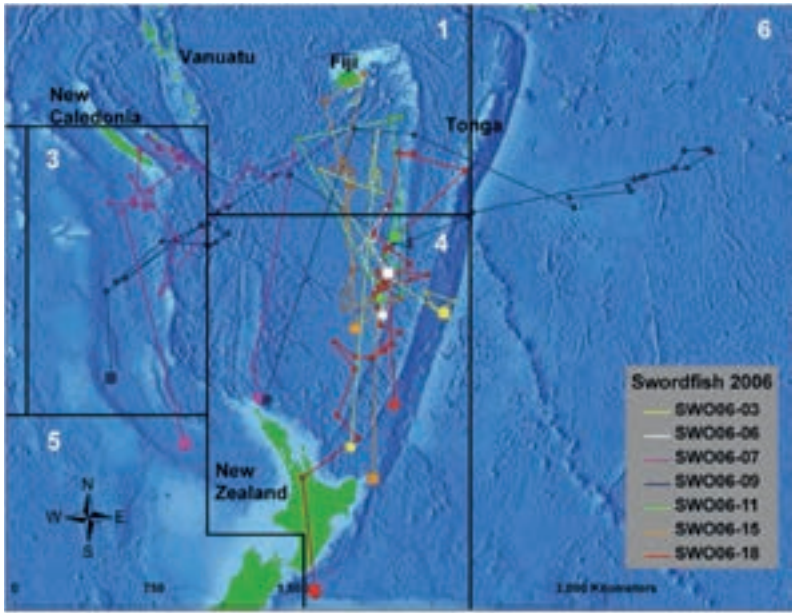

CORAL SEA
Vasquez Ground
French Rock Ground
Middle Ground
NEW ZEALAND
Brisbane
Sydney
Canberra
Hobart
TASMANIA
Auckland I
Macquarie I



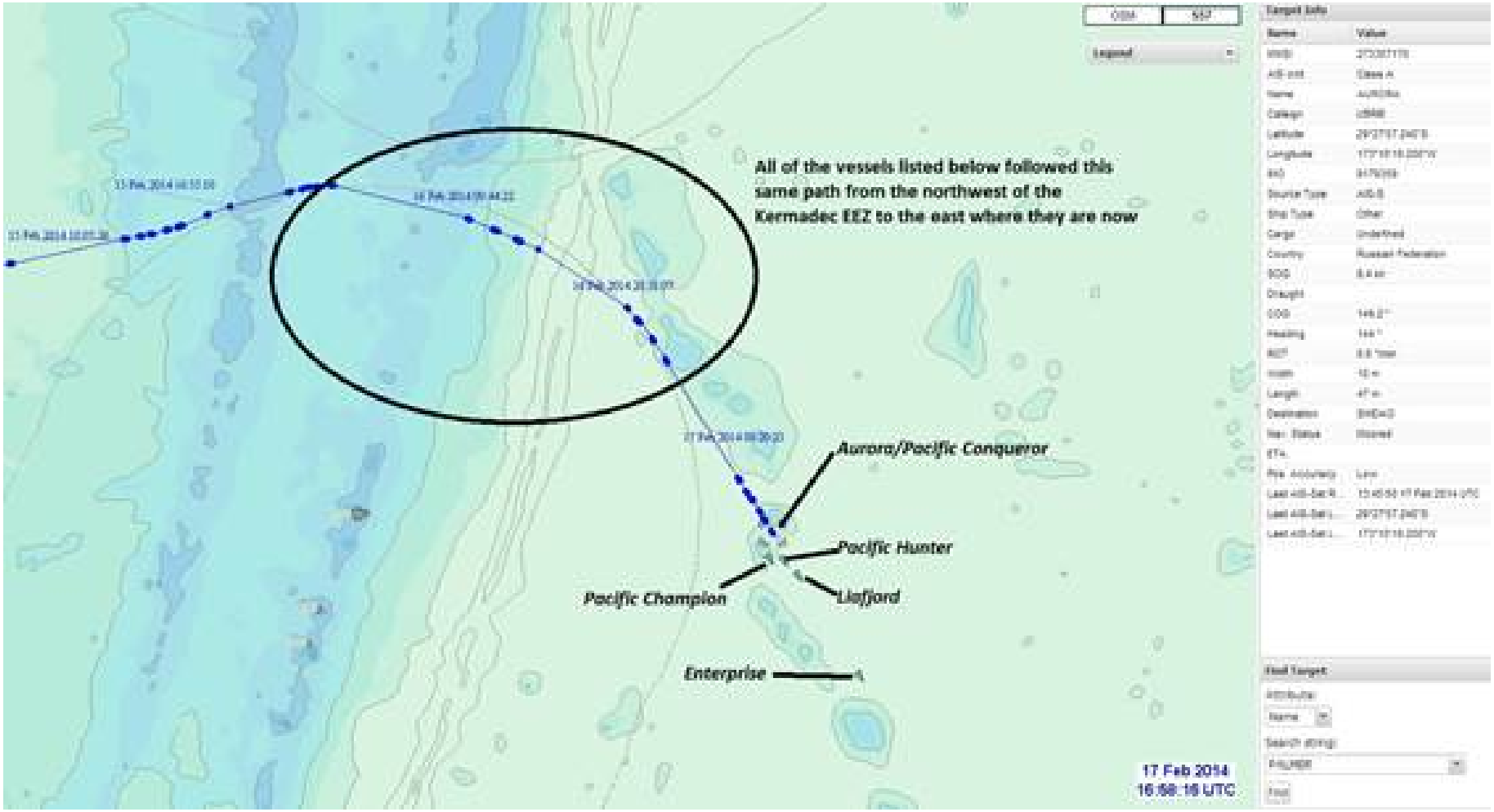
Black petrel



Great white shark



Swordfish


All of the vessels listed below followed this same path from the northwest of the Kermadec EEZ to the east where they are now
Aurora/Pacific Conqueror
Pacific Hunter
Pacific Champion
Lialjord
Enterprise
17 Feb 2014
16:59:16 UTC


© 2014 POLYNESIAN VOYAGING SOCIETY
PHOTO: ʻŌiwi TV • PHOTOGRAPHER: JUSTYN AH CHONG

sustainable
coastlines

Sam Judd

42,457

Event participants

1,032,055

Litres of rubbish

19,934

Trees planted

110,407

Presentation attendees

Impacts since 2009. Now let's scale this up.

sustainable coastlines


LOVE
YOUR
COAST


LOVE
YOUR
WATER


dunq

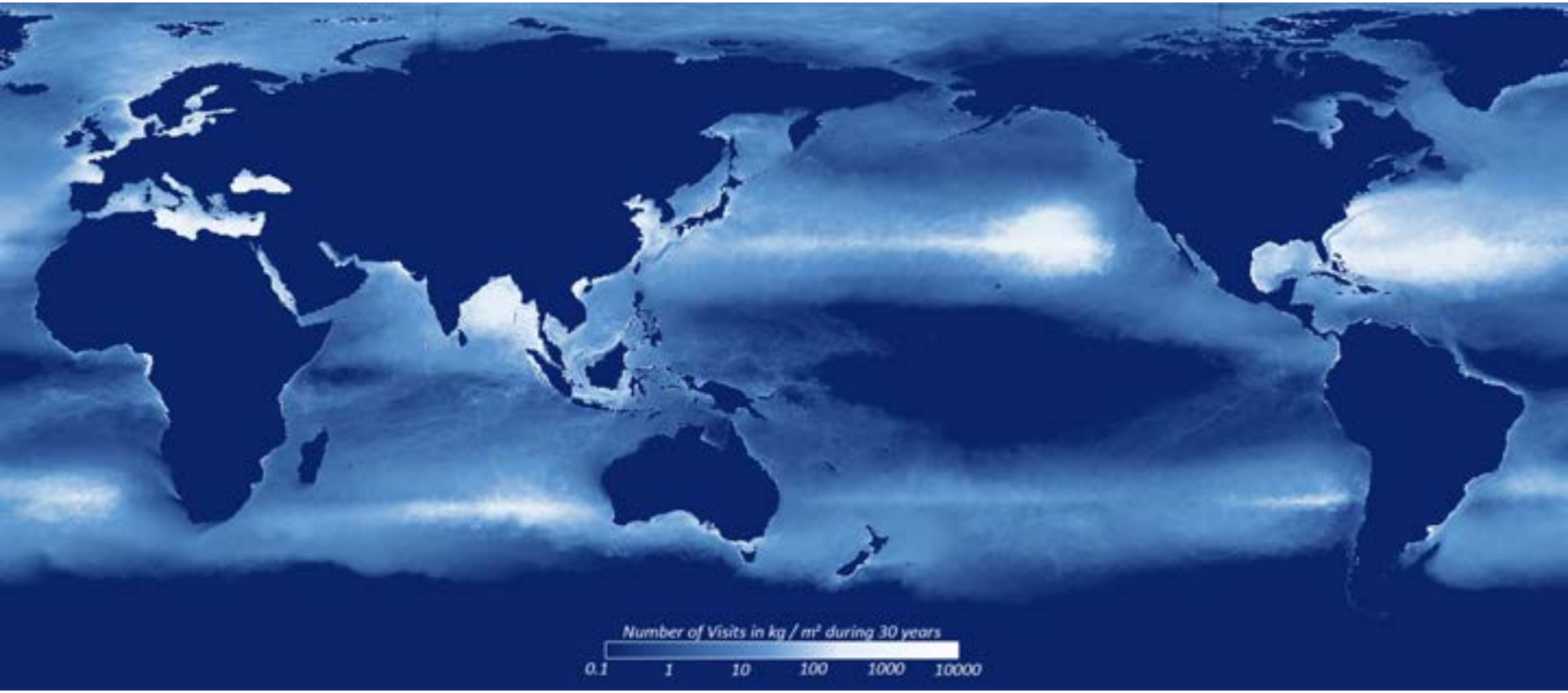
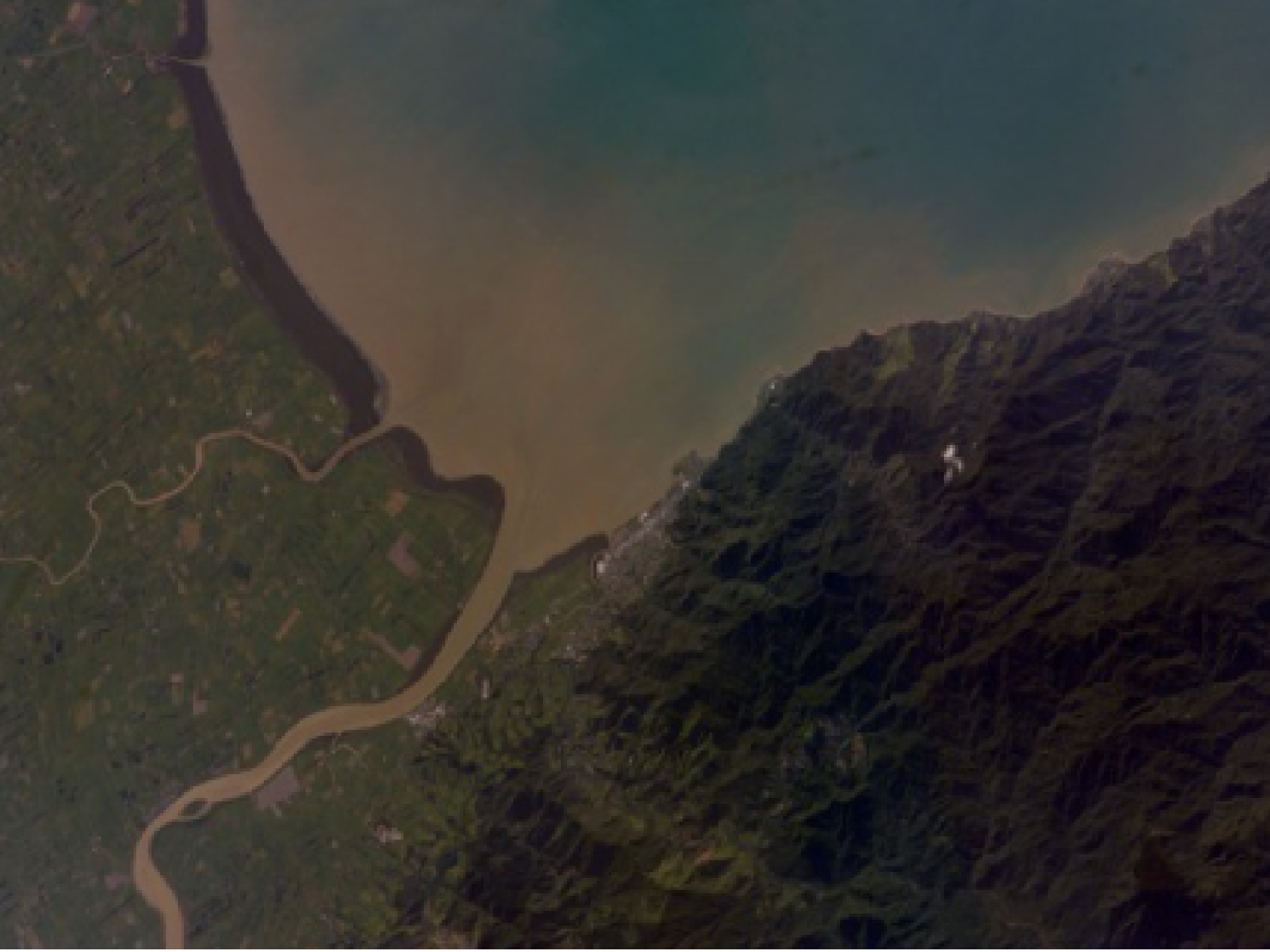

Number of Visits in kg / m² during 30 years
0.1
1
10
100
1000
10000

Image courtesy of Chris Jordan and Kopeikin Gallery, Los Angeles, **www.chrisjordan.com**



7. Questions and Next steps