

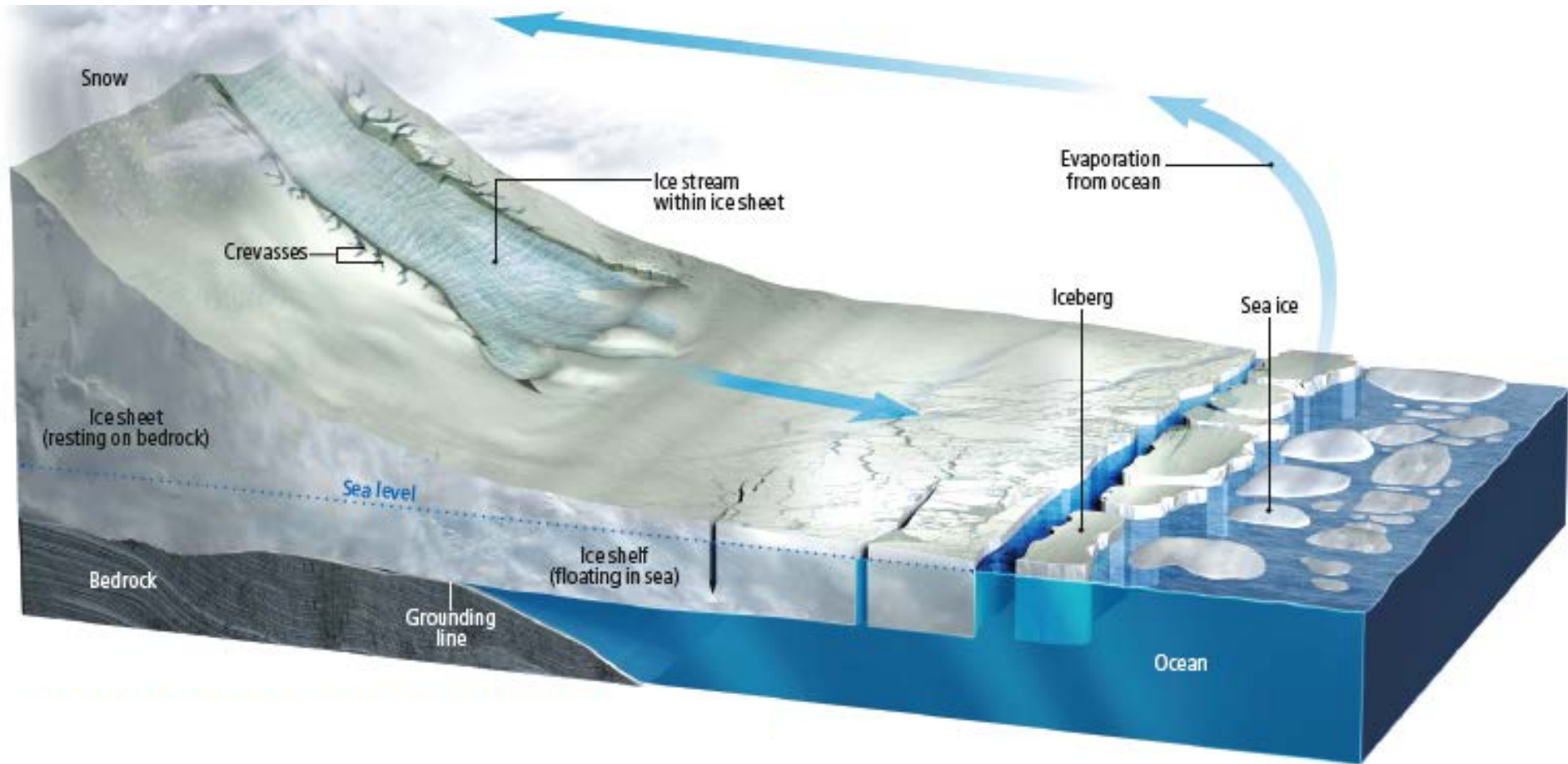
Change in Antarctica What Does it Mean to Us?

Robin E. Bell
Lamont-Doherty Earth Observatory of Columbia University
May 4, 2018

Climate Change and Sea Level Rise

- Ice 1.0 - Types of Ice and Impacts
- Evidence for Ice Sheet Change
- How Does Sea Level Rise – Not Just Ice
- Improving our Projections – Weather Models

Components of the Global Ice System

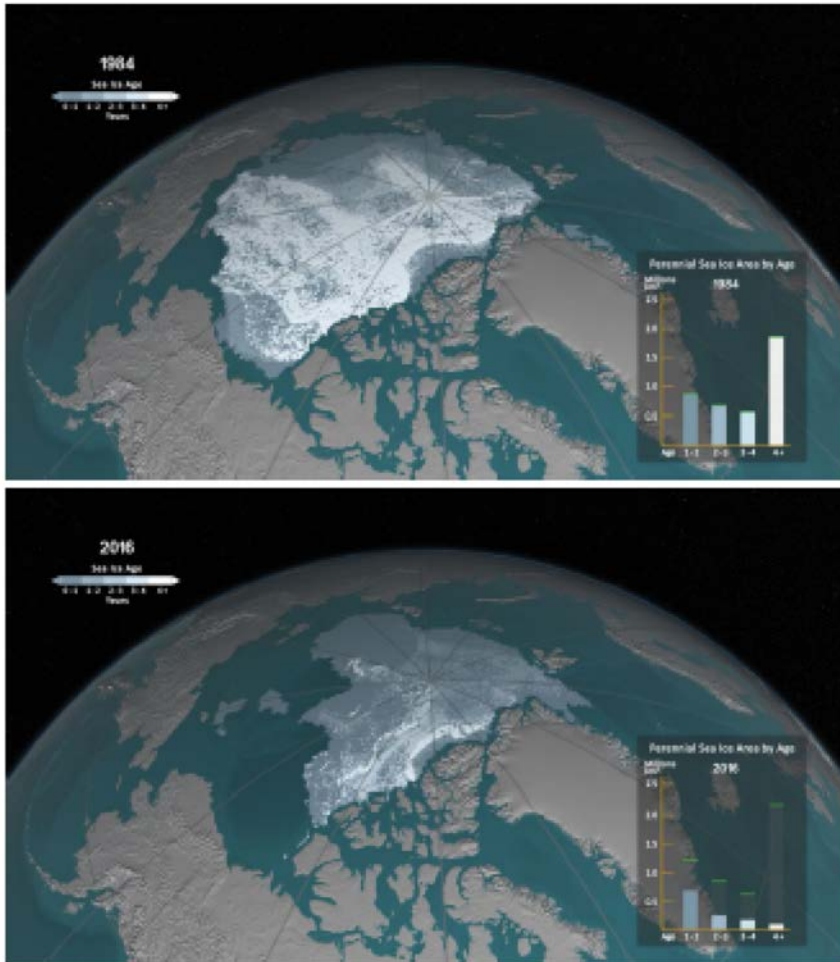


The Unquiet Ice, Scientific American Bell, Feb. 2008

Ice Sheet 1.0

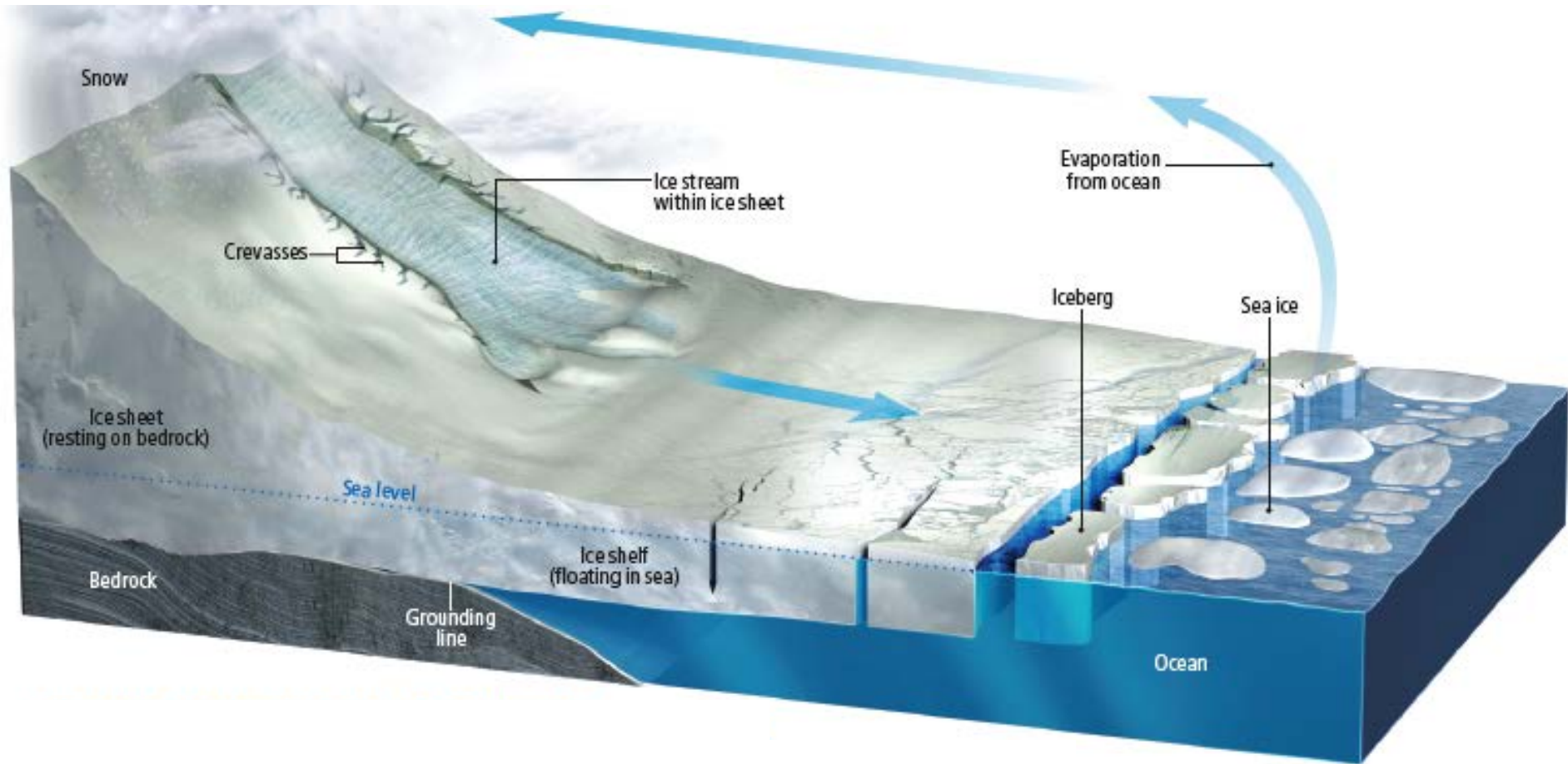
There is Less Arctic Sea Ice in the Summer

Multiyear Sea Ice Has Declined Dramatically



National Climate
Assessment Vol 1

Components of the Global Ice System



The Unquiet Ice, Scientific American Bell, Feb. 2008

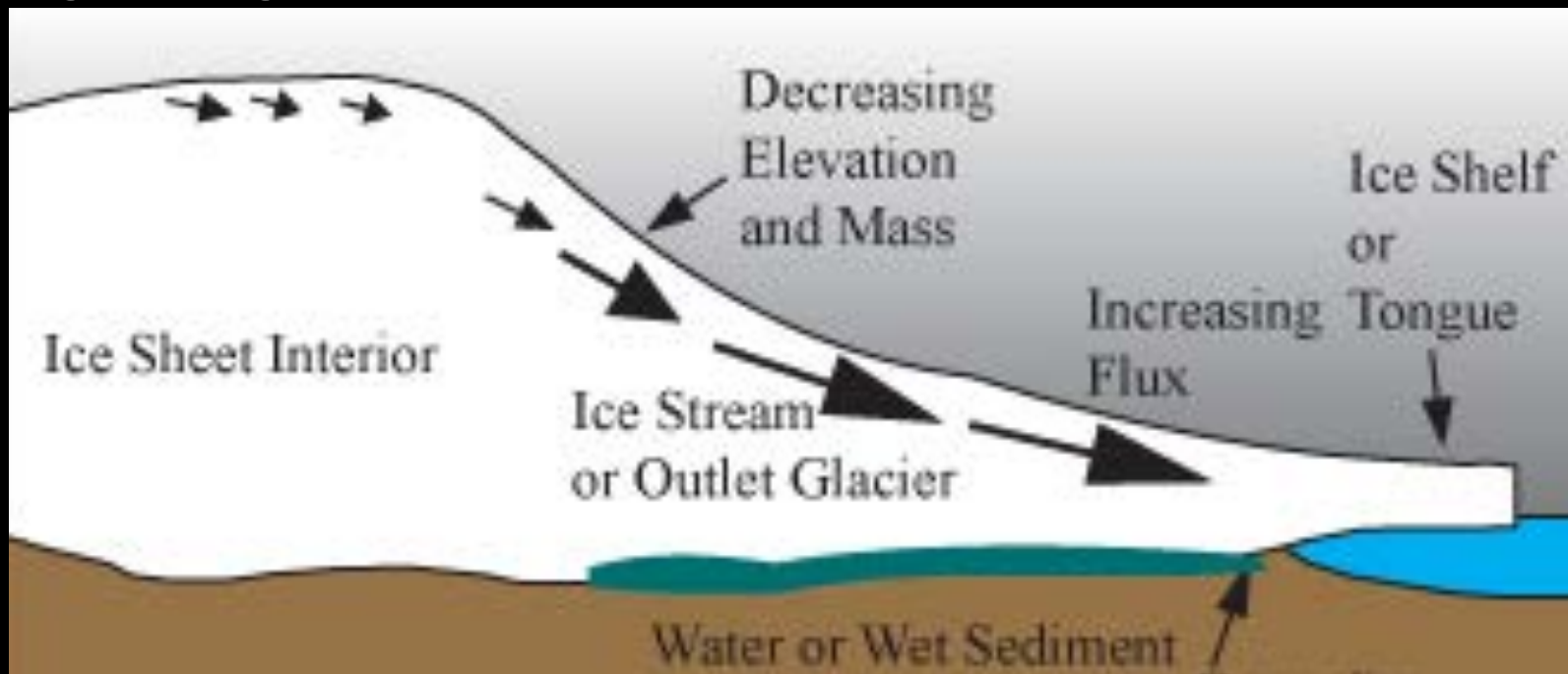
Ice Sheet 1.0

How to Put Water in the Ocean



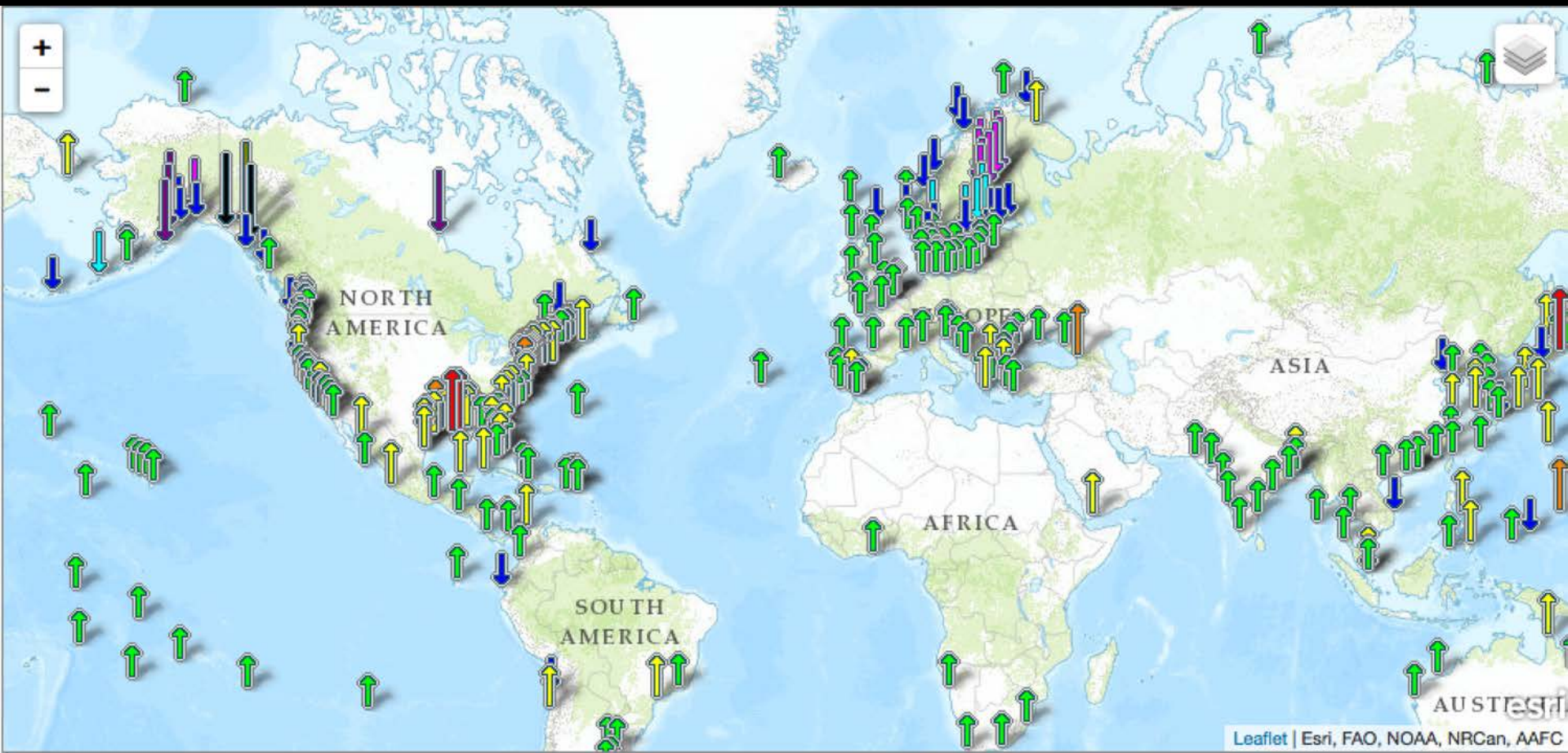
3 Signals of Change in the Ice Sheets

- Moving Faster
- Getting Lower
- Losing Weight



Ile de Goree
Senegal



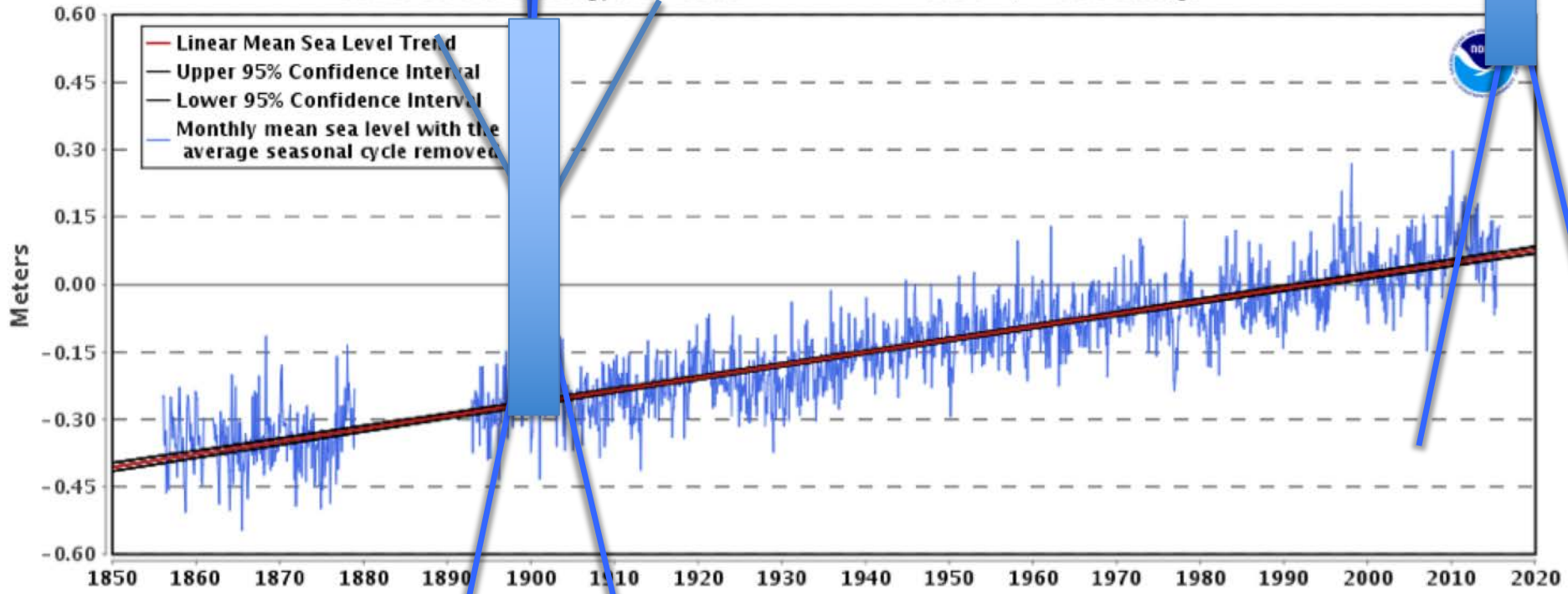




Mean Sea Level Trend 8518750 The Battery, New York

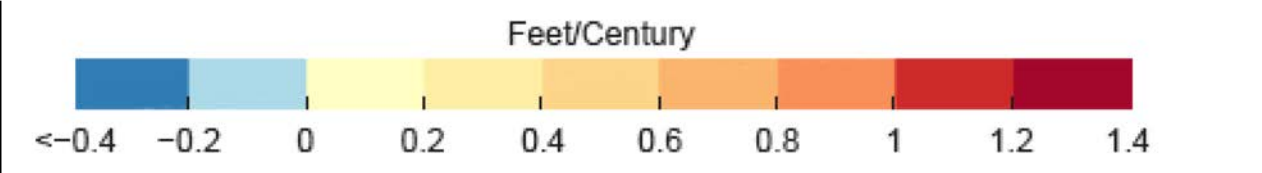
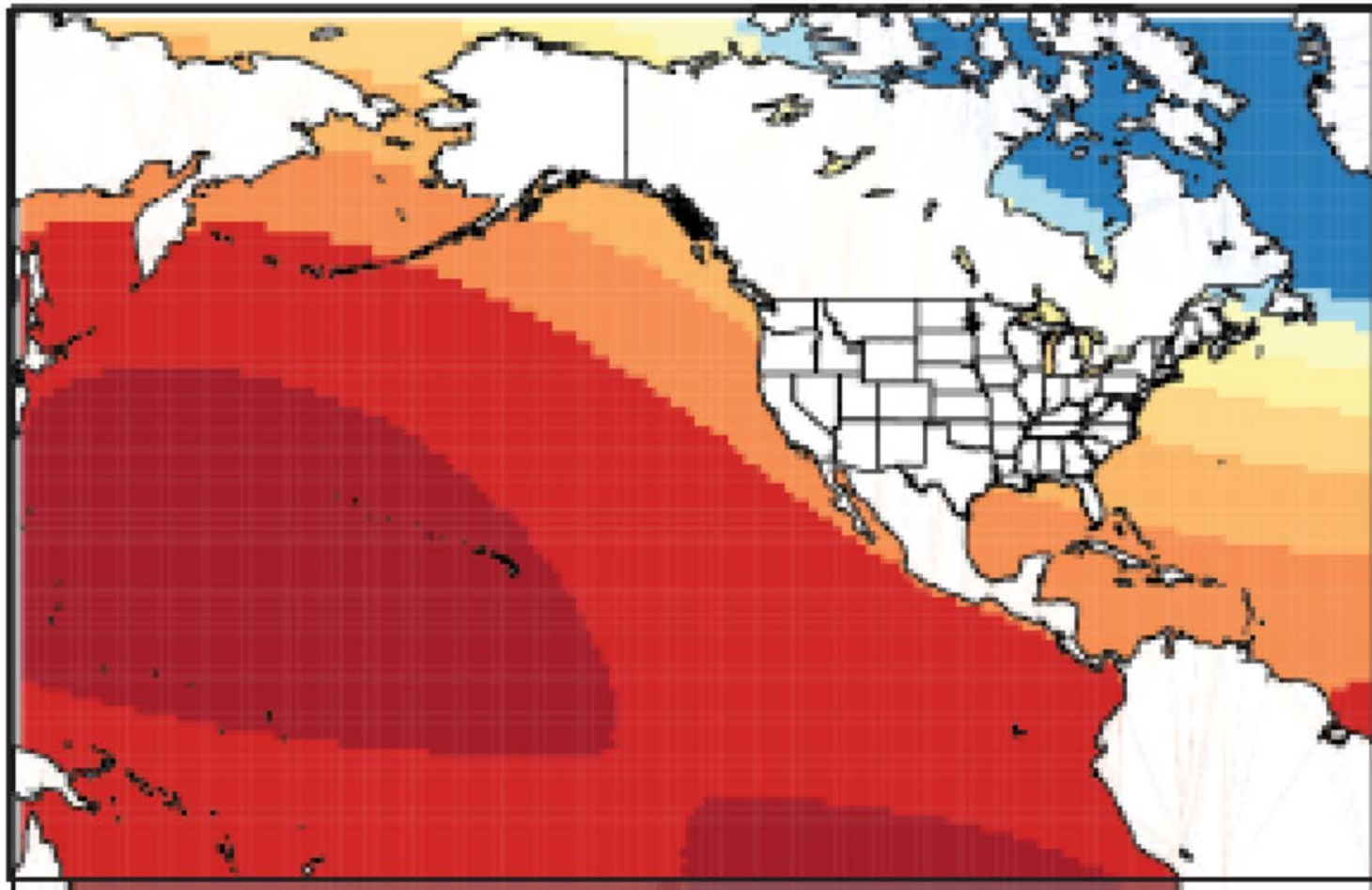
8518750 The Battery, New York

2.84 +/- 0.09 mm/yr



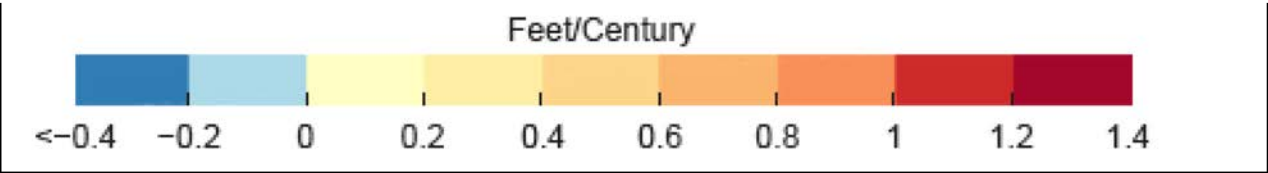
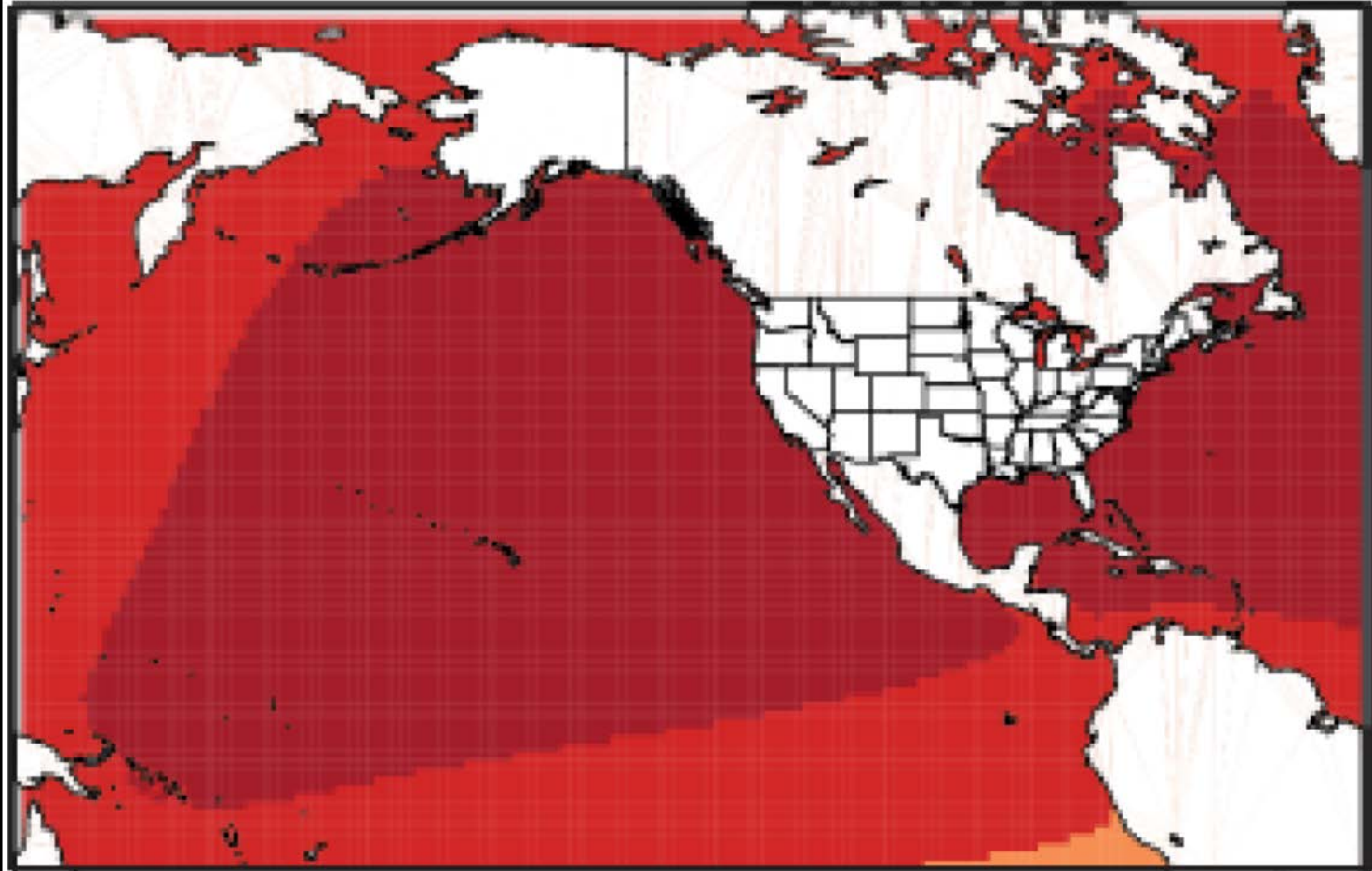
But the Ocean is not a Bathtub





National Climate
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Gravitational Attraction of Ice Sheets
Greenland influences Miami less than
New York



National Climate Assessment Vol 1

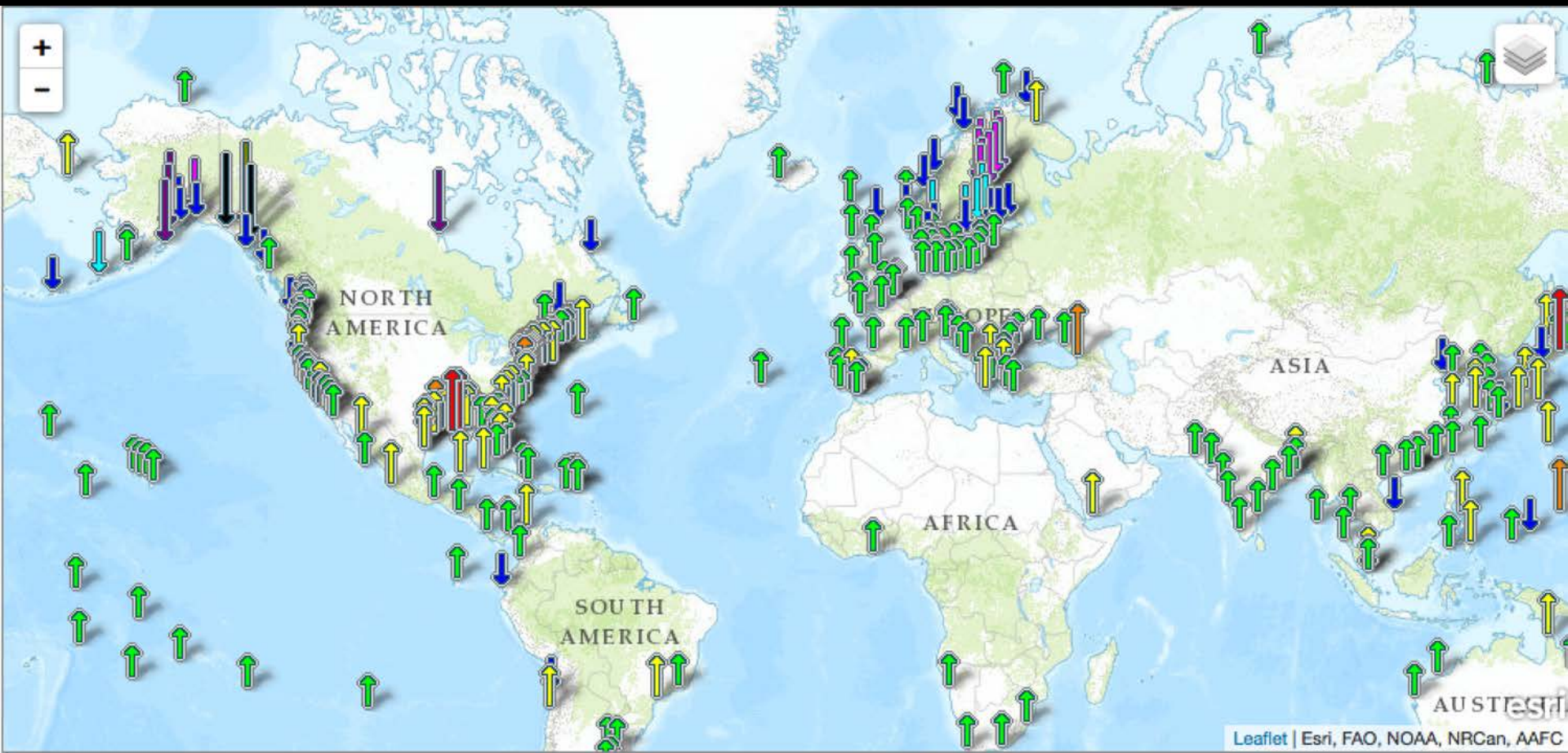
Gravitational Attraction of Ice Sheets
West Antarctica influences New York
more than Greenland

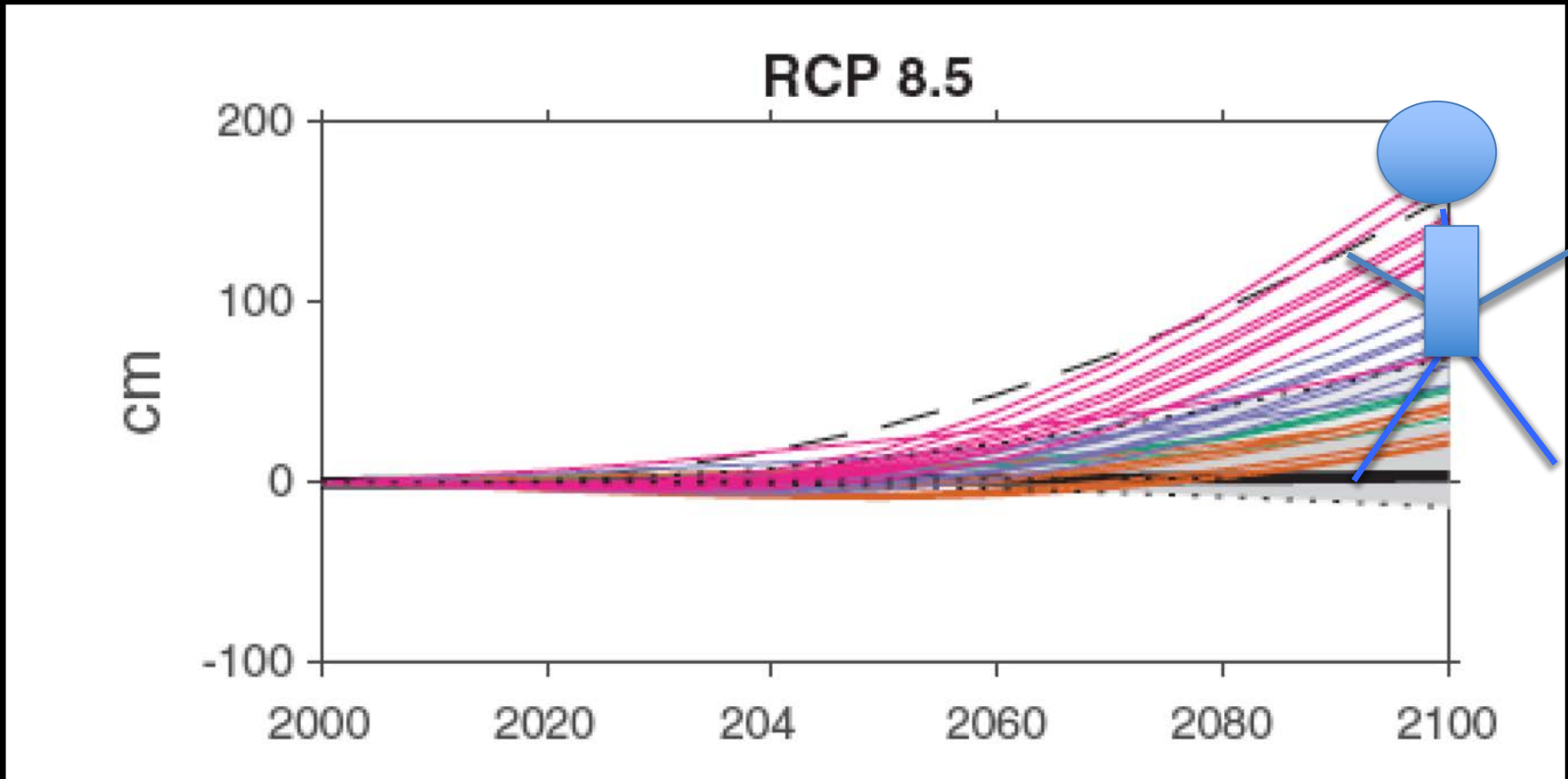


Yes Sandy
Made Us
Rebuild
Differently
Stony Point,
NY

Not Just Ice Land Sinks or Bounces

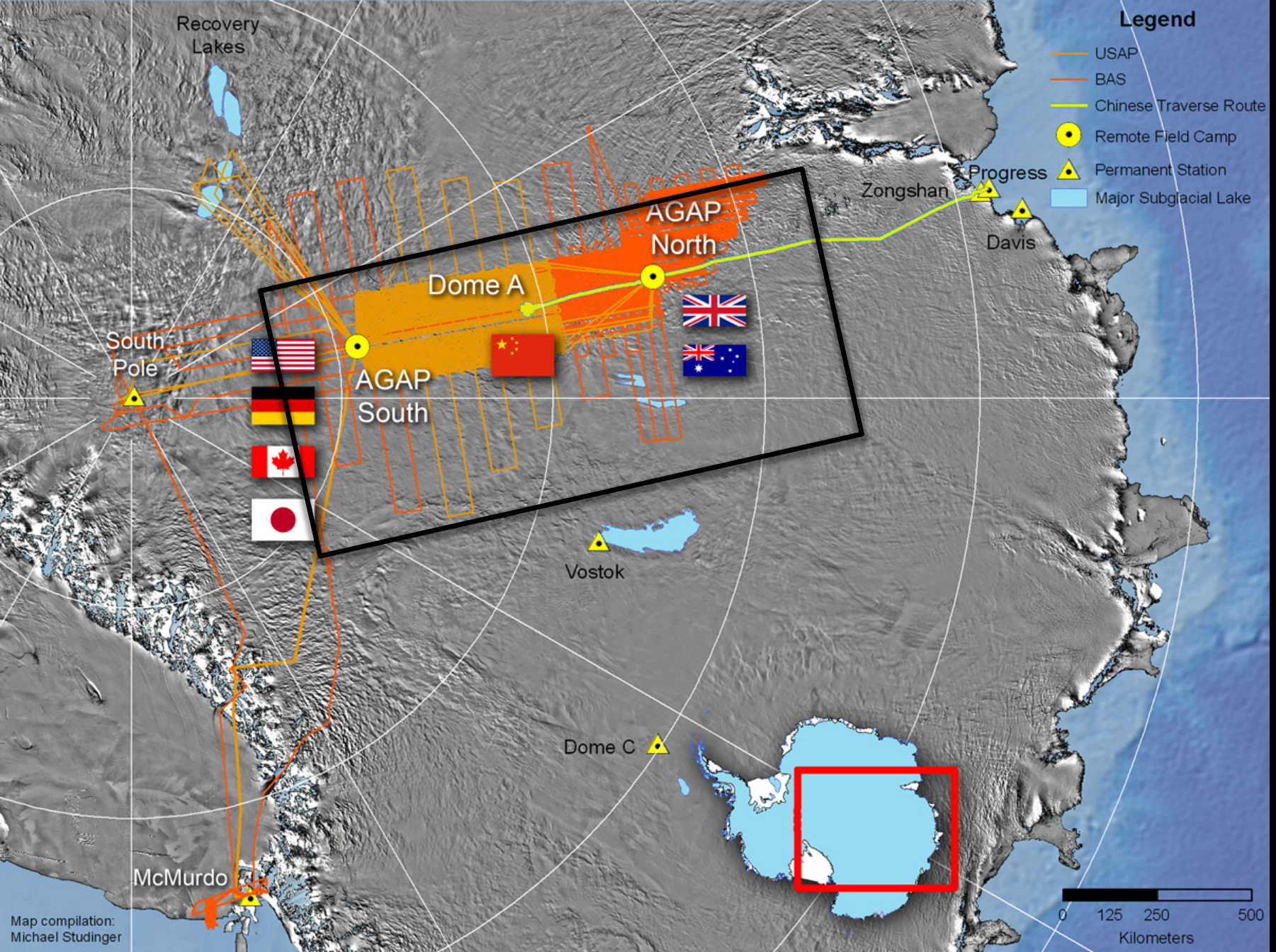






Range of Sea Level Predictions for next 82 years

Kopp et al 2017

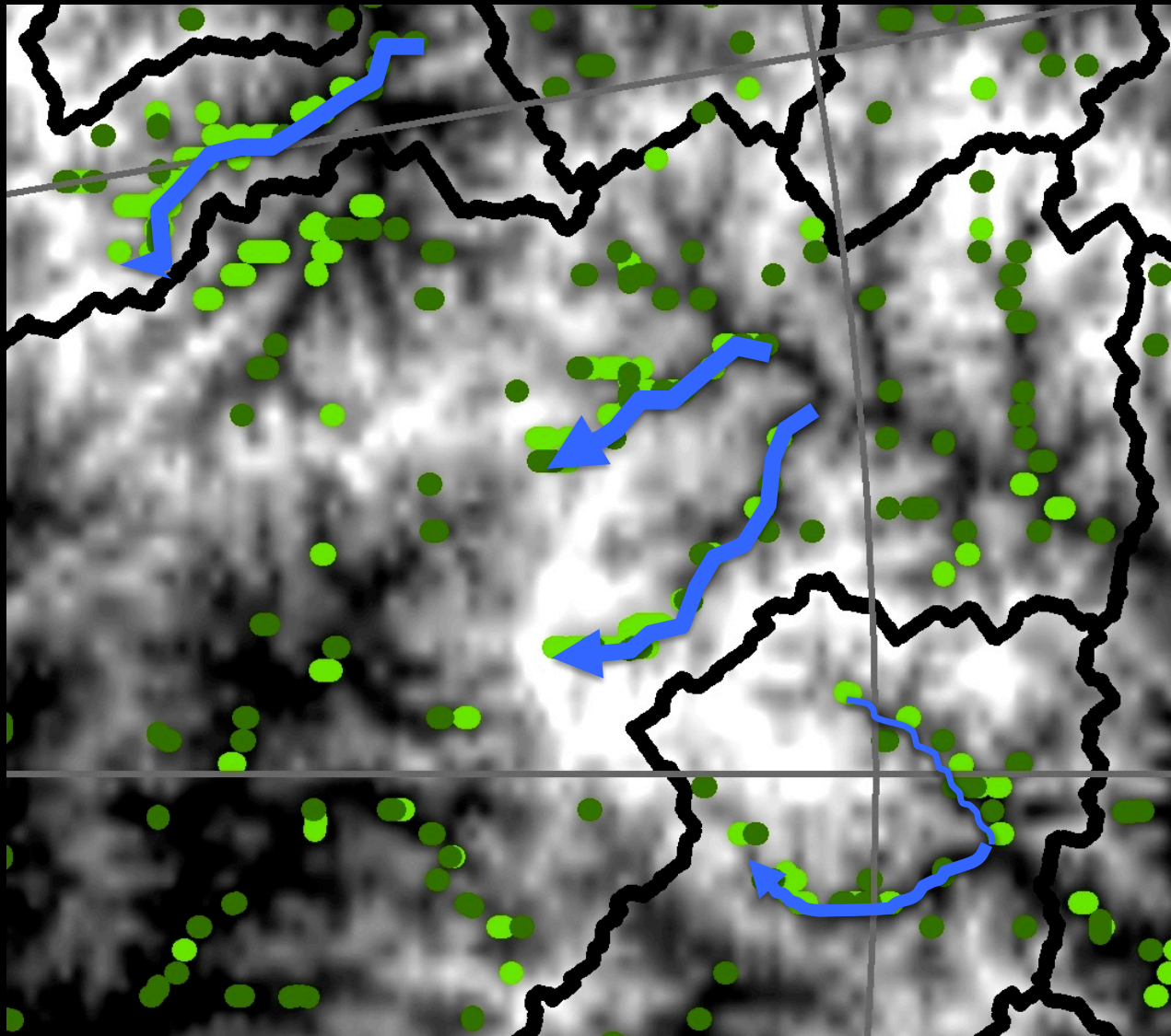


Lamont-Doherty Earth Observatory
COLUMBIA UNIVERSITY | EARTH INSTITUTE

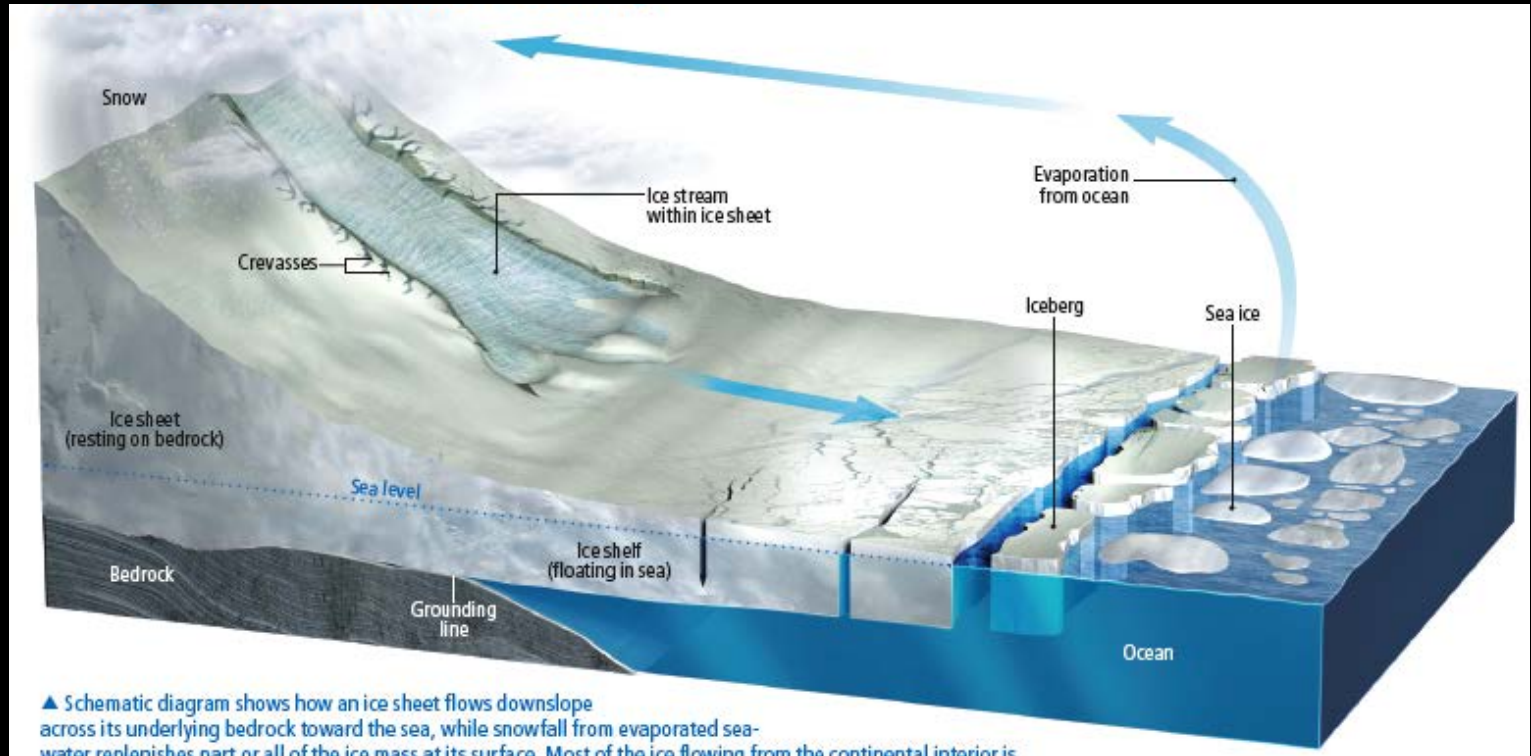


INTERNATIONAL 2007  2008
POLAR YEAR



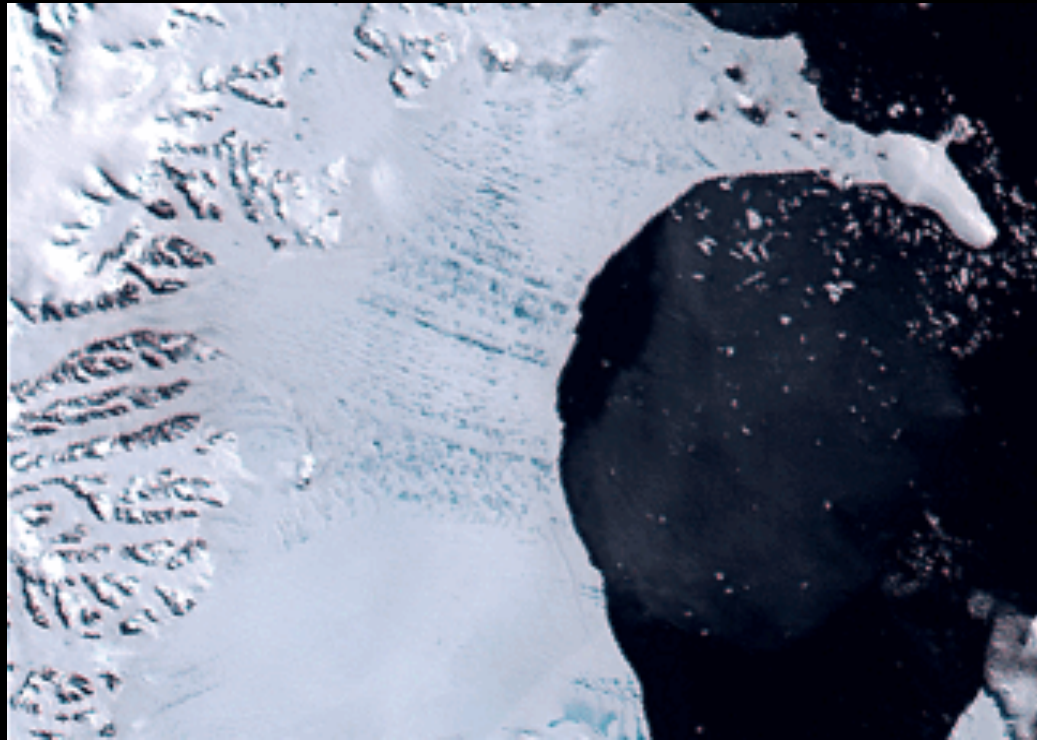


Warming World Warmer Atmosphere Warmer Oceans More Melt



The Unquiet Ice, Scientific American Bell, Feb. 2008

Water Triggers Ice Shelf Collapse



2014

Surface River Drains Ponds— No Collapse



As We Look to the Future

Looking to the Future Requires Answers to Questions:
Improving our Projections
Satellite let us know Change is Happening

For Scientists Only Way to Get These Answers is

To Get Up Close and Personal

Much Left to Discover

The Poles Matter for Our Communities

