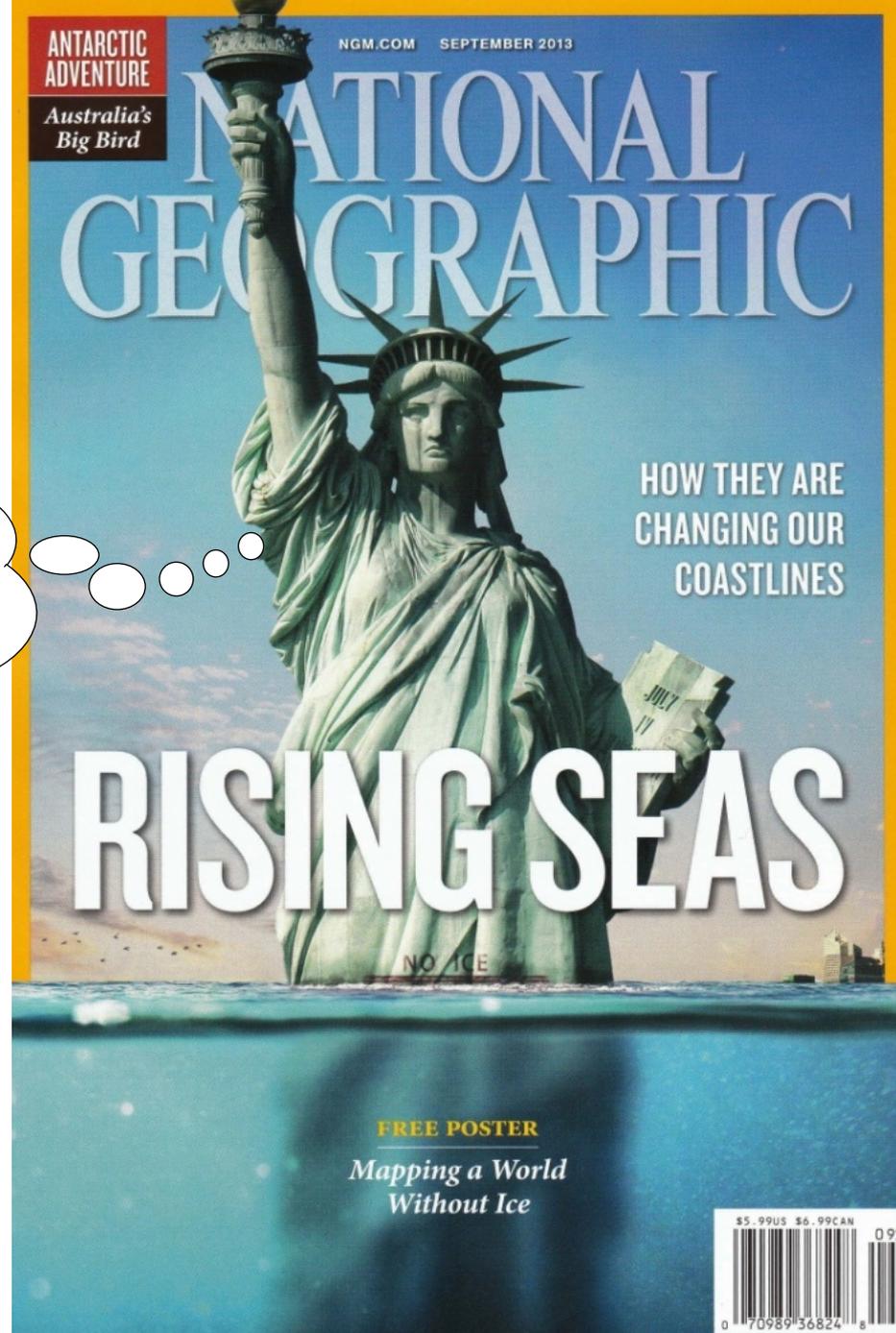


Rising Seas

Should I stay
or should I go?

Delavane Turner
Connecting the Dots
April 18, 2014



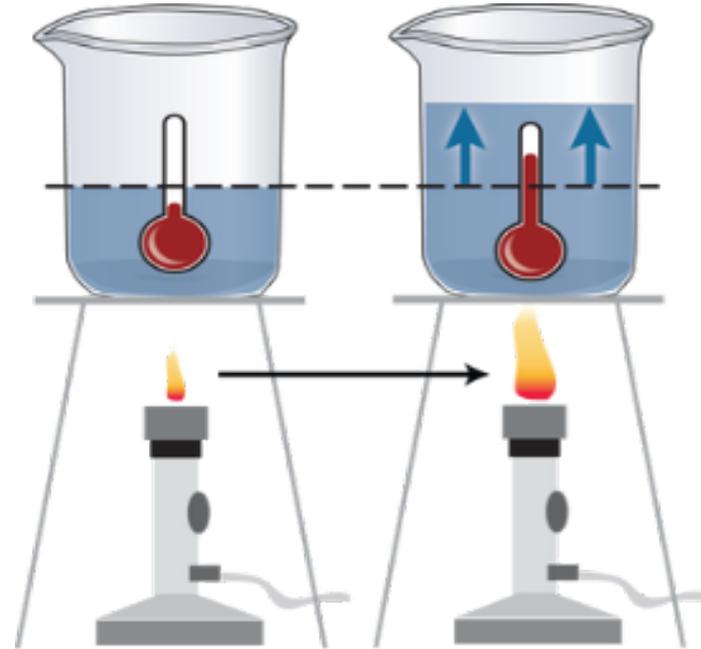
Overview

- What causes sea level rise?
- How high is sea level expected to rise?
- What should we be worried about?
- What can we do about it?
- Group discussion – strategies and issues for areas like NYC, San Francisco, and Bangladesh

What causes sea level rise (SLR)?

Global SLR = change in sea surface height worldwide

1. Thermal expansion



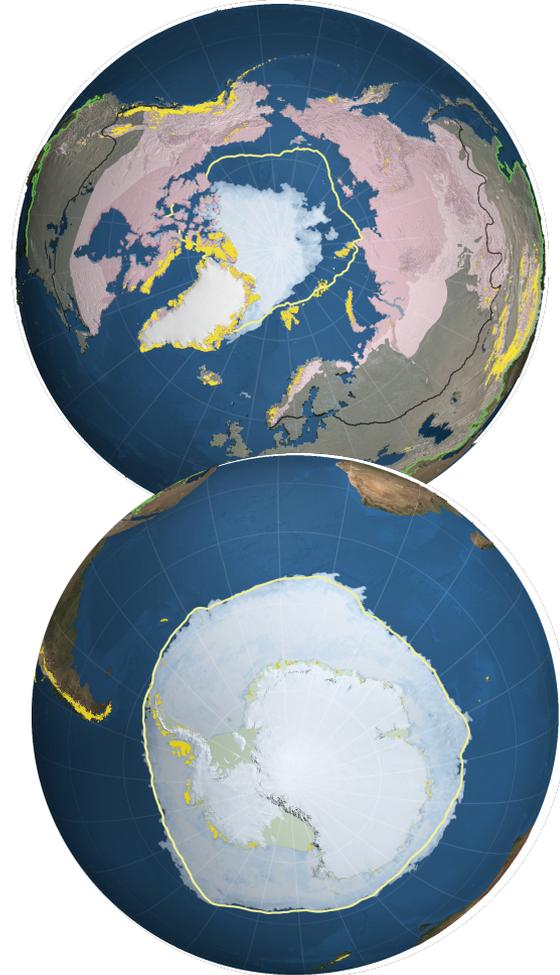
What causes sea level rise (SLR)?

Global SLR = change in sea surface height worldwide

1. Thermal expansion

2. Land ice

- Glaciers: 0.26m total
- Ice sheets
 - Greenland: 7.2m total
 - West Antarctic: 3.3-5m total
 - East Antarctic: 53 m total



What causes sea level rise (SLR)?

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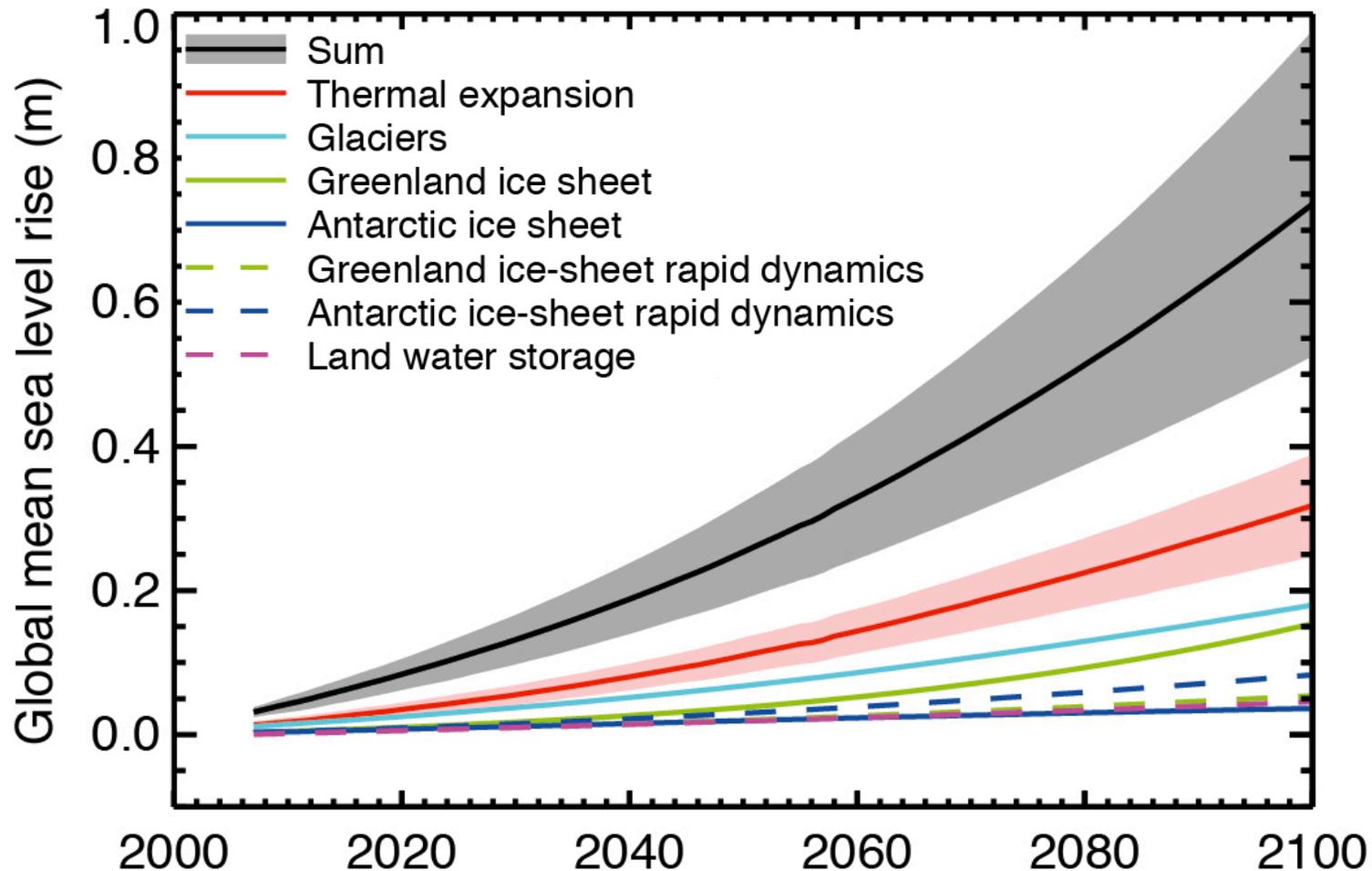
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3. Land water storage
groundwater ends up in oceans



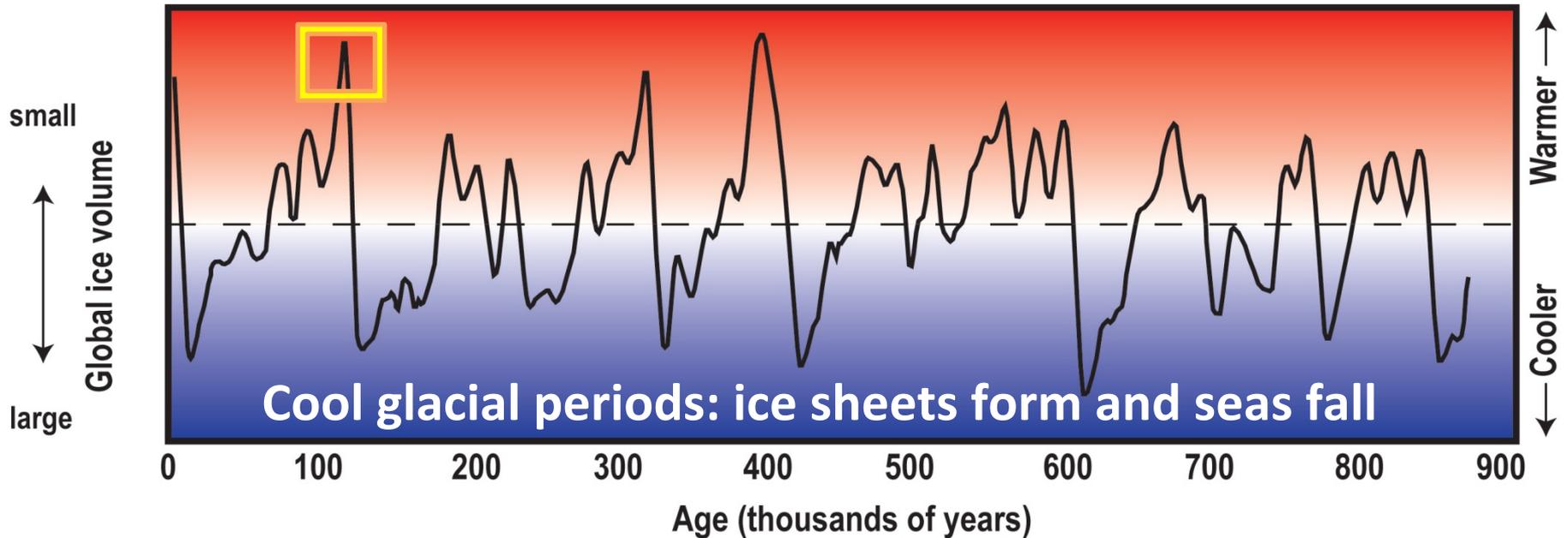
Global SLR in 2100 projected to be 50cm–1m for highest emissions scenario

RCP8.5



Global SLR in 2100 projected to be 50cm–1m for highest emissions scenario

Warm interglacial periods: ice sheets melt and seas rise



What causes sea level rise (SLR)?

Relative sea level = land height minus sea surface

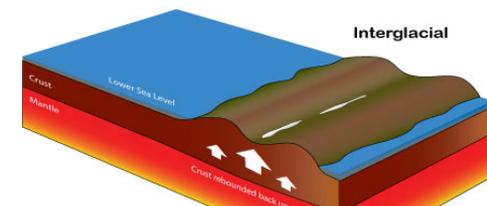
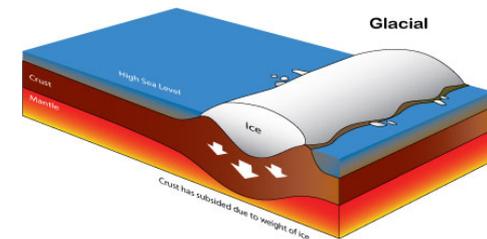
Change in sea surface height

- Tides, currents
- Gravitational field effects

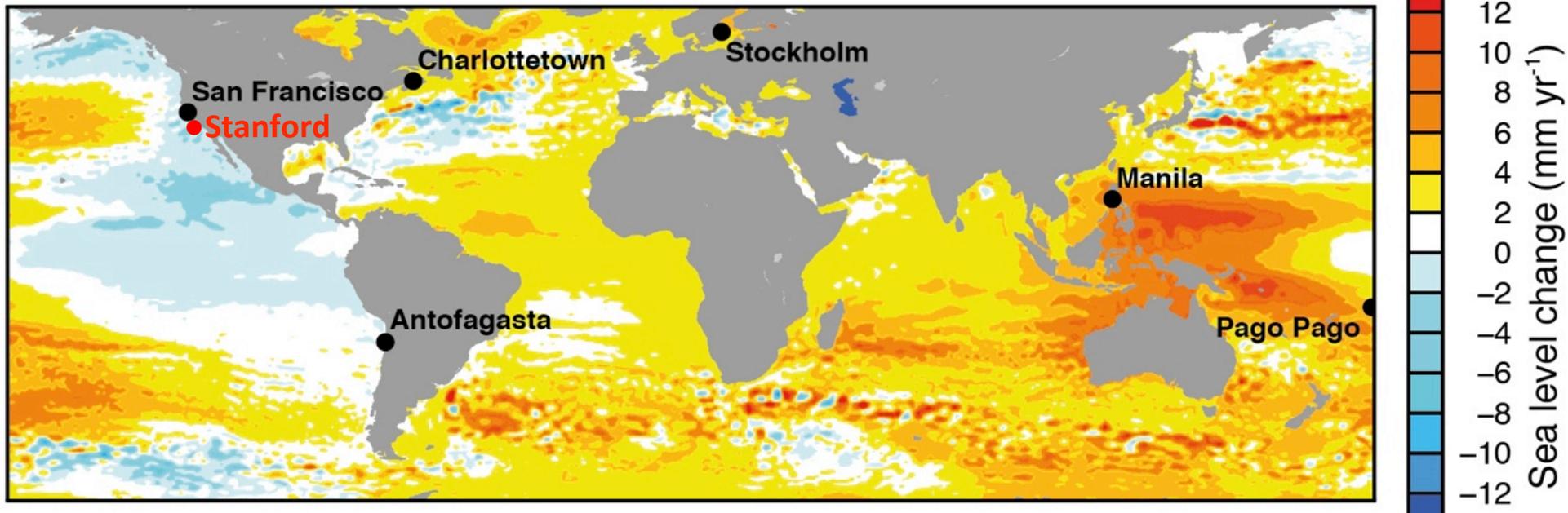


Vertical land motion

- Land subsidence: sediment compaction or extraction
- Isostasy: land deformation from ice weight
- Tectonics: earthquake or uplift

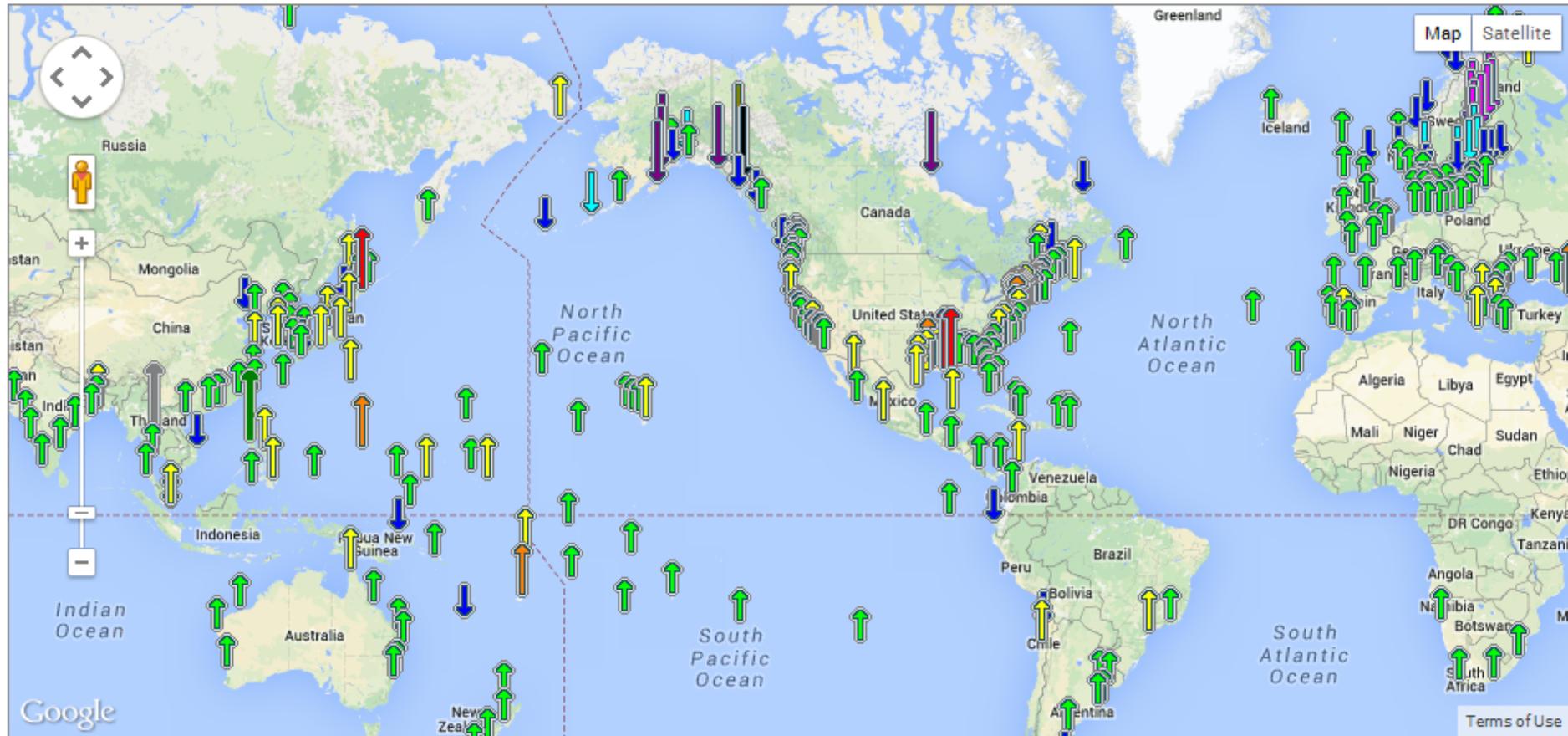


Local sea level rise (SLR) differs widely



Relative sea level trends map

www.tidesandcurrents.noaa.gov/sltrends



What should we be worried about?

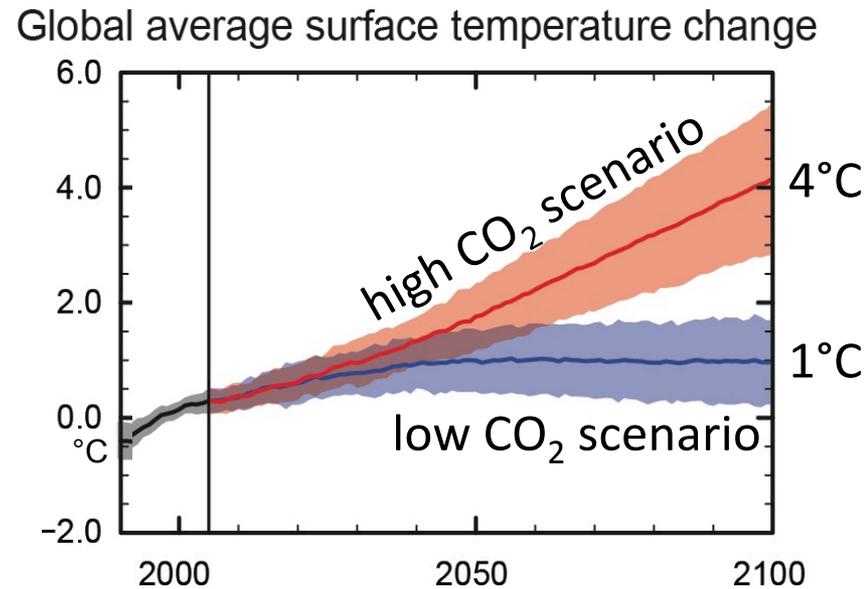
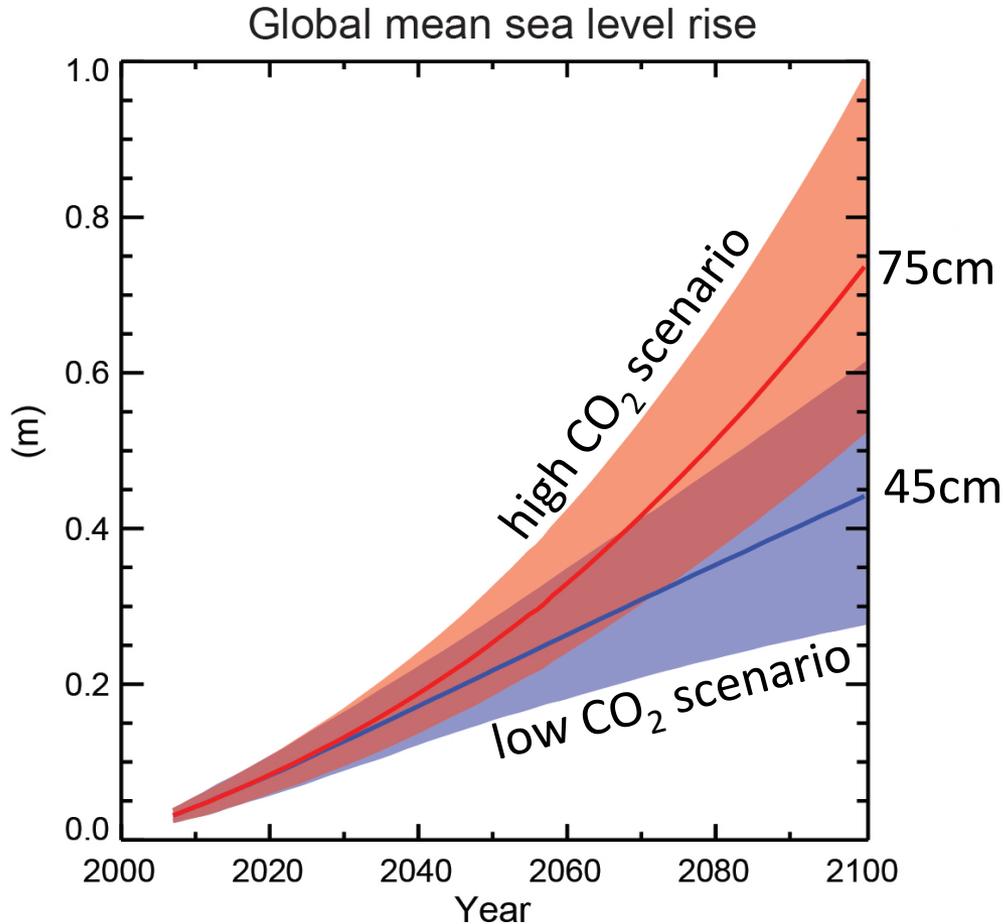
Impacts from SLR

- Inundate low-lying land & capital
- Salinity intrusion to water resources
- Accelerate coastal erosion
- Threaten wetlands
- Exacerbate coastal storms and flooding



What can we do about it?

Mitigate climate change?



What can we do about it?

Adaptation methods



Retreat – abandon homes



Accommodate – elevate homes



Accommodate – float homes



Protect – sea wall



Protect – Thames Barrier



Protect – Rotterdam floodgates

Case studies for group discussion: What places do we save?



New York vs New Jersey?
Continue to rebuild?



SF Bay?
Floodgates could prevent inundation



Miami?
Few protection options



Bangladesh & island nations?
Migration issue

Thank you!