The Southeast Coastal Climate Network presents

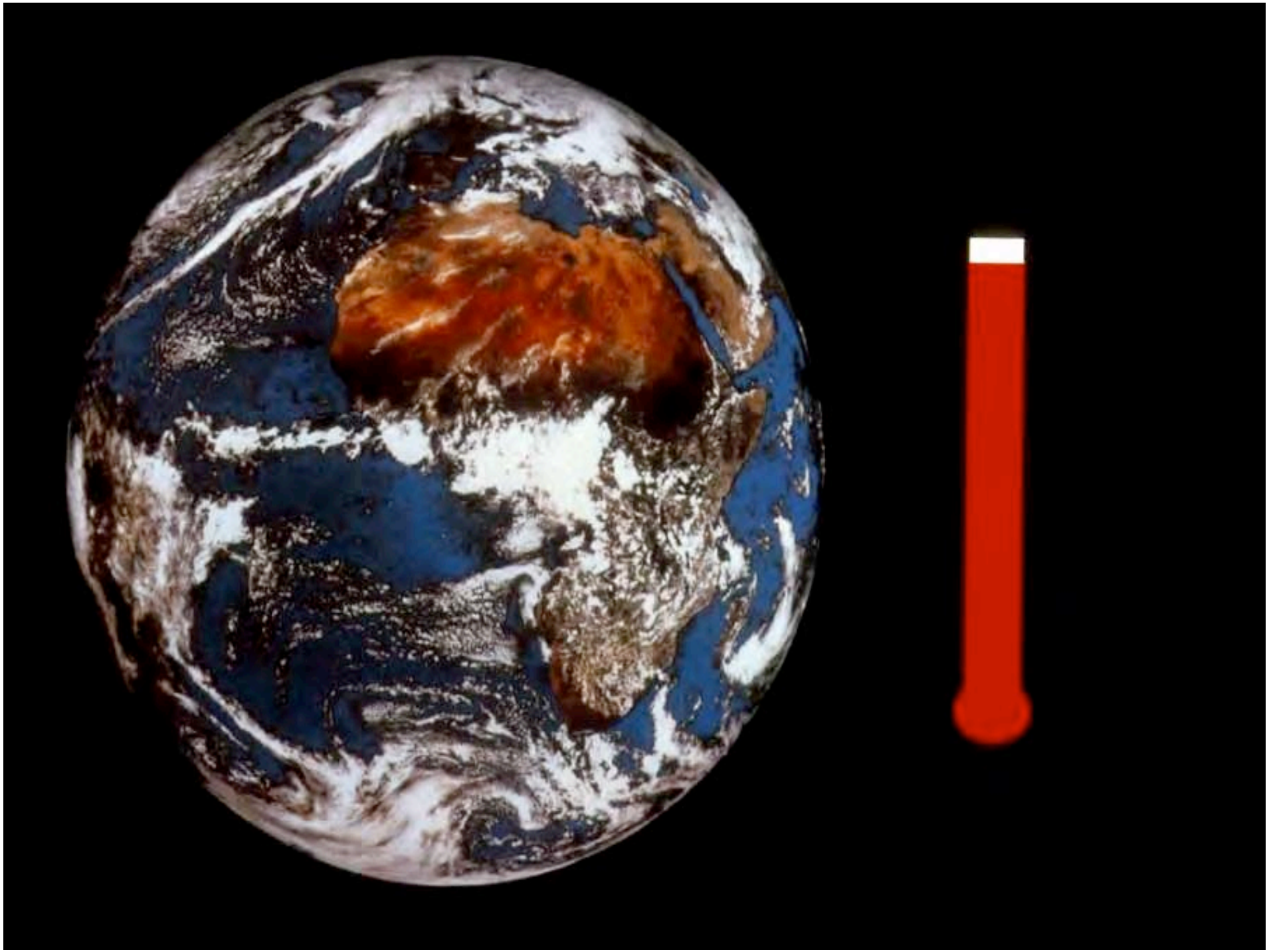
Sea Level Rise Projections and Impacts for the Southeast

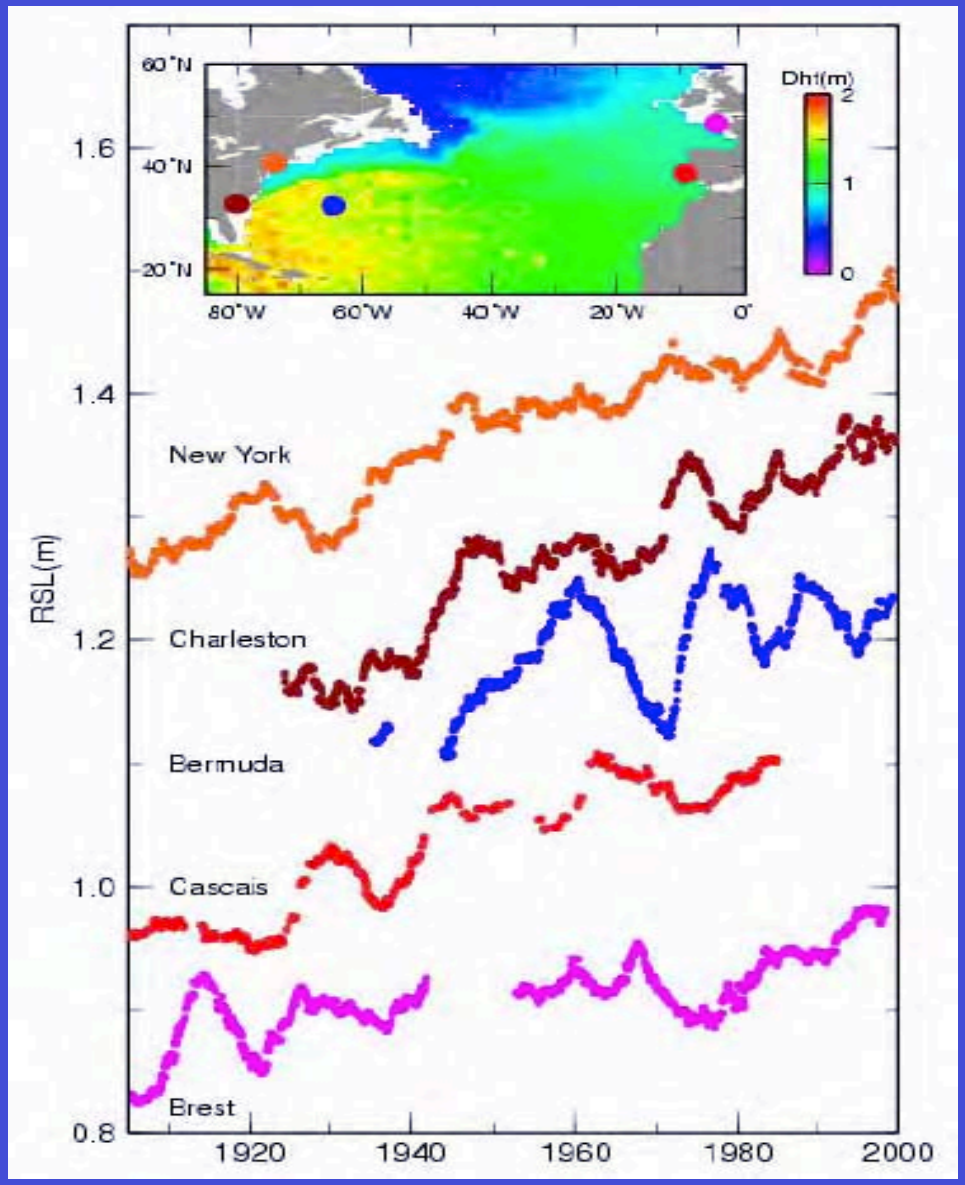
Featuring Dr. Stephen Leatherman

Florida International University

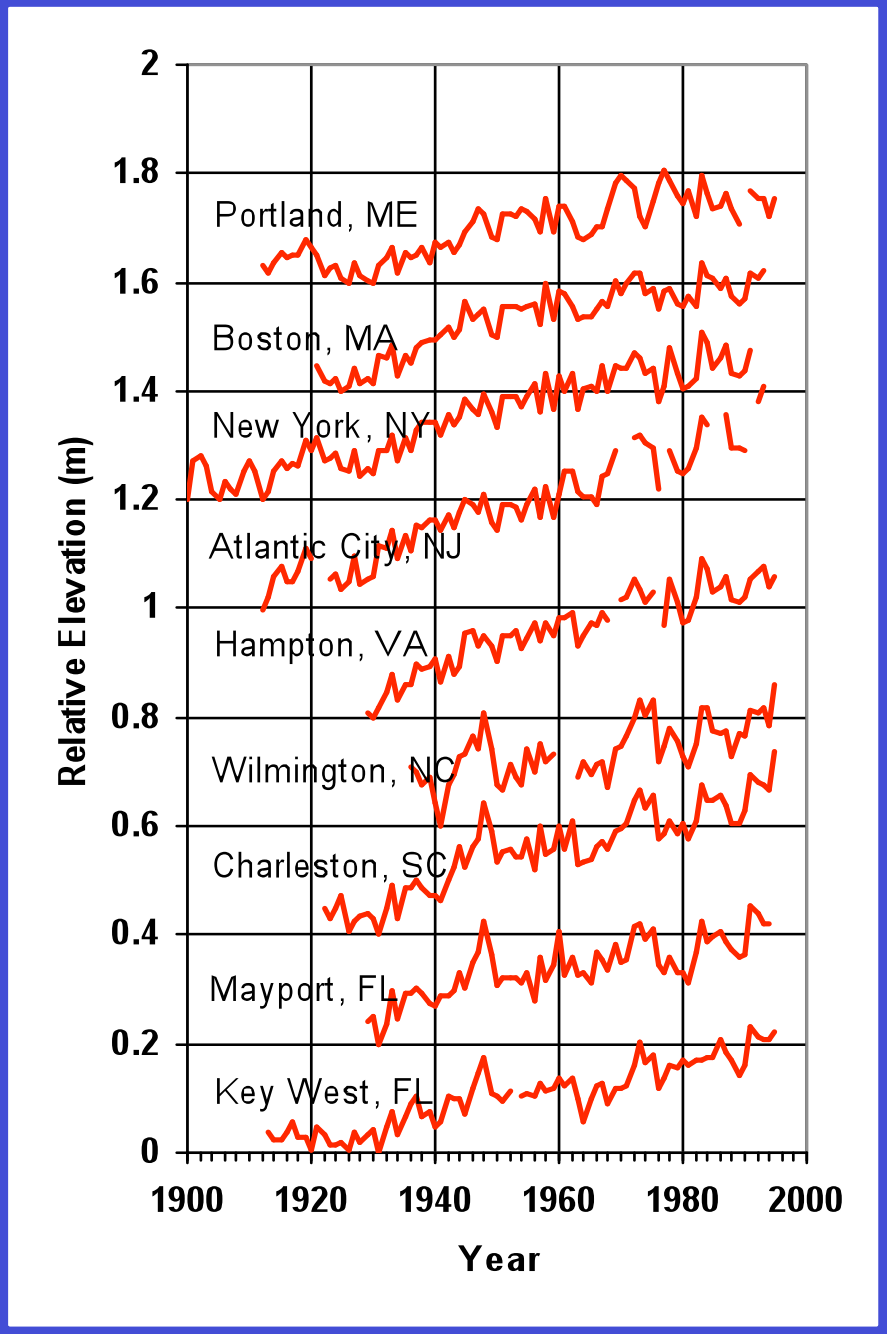
Sea Level Rise and Coastal Impacts

Stephen Leatherman
International Hurricane Research Center
Florida International University
Miami, FL





GIA-corrected 20th century sea level time series from tide gauge sites on the eastern and western margins of the North Atlantic subtropical gyre (Brest, Cascais, and New York, Charleston, respectively) and near the gyre center at Bermuda. Map inset shows the mean surface dynamic topography (0 to 1000 m) and gauge locations.


Relative Elevation (m)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Portland, ME
Boston, MA
New York, NY
Atlantic City, NJ
Hampton, VA
Wilmington, NC
Charleston, SC
Mayport, FL
Key West, FL
1900
1920
1940
1960
1980
2000
Year

WHY DOES SEA LEVEL RISE?

- **ADDITION OF MELT WATER FROM MOUNTAIN GLACIERS**
- **OCEAN THERMAL EXPANSION**
- **MELT WATER FROM GREENLAND AND ANTACTICA**

IMPORTANCE OF SEA LEVEL RISE

- **primary climate change indicator,**
- **good historical records,**
- **provides constraints on climate models,**
- **drives coastal processes**

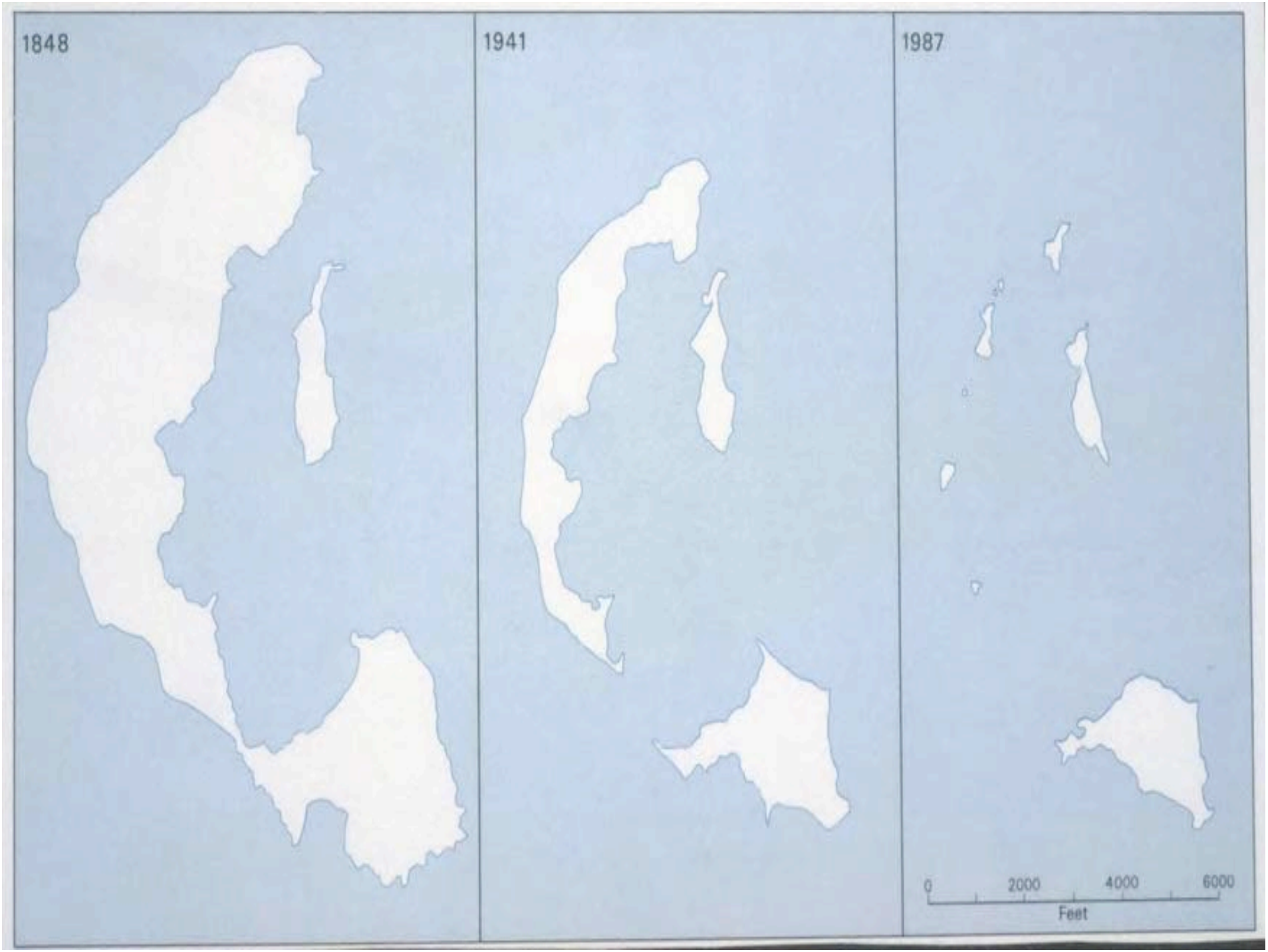
EFFECTS OF SEA LEVEL RISE

- **Inundation of low-lying areas**
- **Erosion of beaches and bluffs**
- **Salt intrusion into aquifers and surface waters**
- **Higher water tables**
- **Increased flooding and storm damage**


BIRRA


Bangladesh
India
Ganges R.
India
Calcutta
1 M
1 M
Chittagong
Mouths of the Ganges
Bay of Bengal
Burma

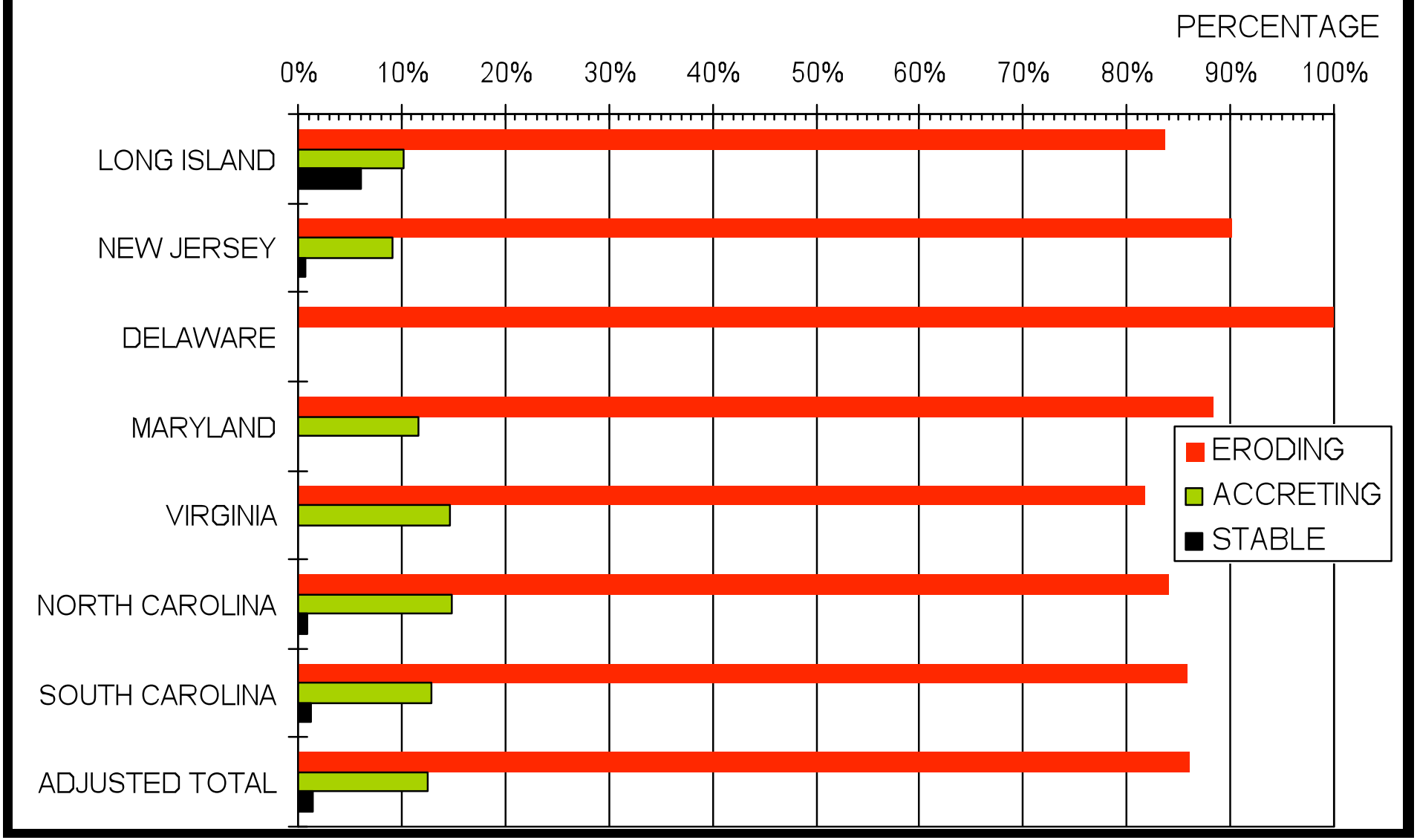

TILGHMAN I.
Tangier Island
HOOPER I.
BLOODSWORTH I.
DEAL I.
SOUTH MARSH I.
St. George Island
Pt. Lookout
SMITH I.
Smith Pt.
TANGIER I.
Windmill Pt.
OWYNN I.
New Pt. Comfort
Cape Charles
FISHERMAN I.
Cape Henry


1848
1941
1987
0
2000
4000
6000
Feet

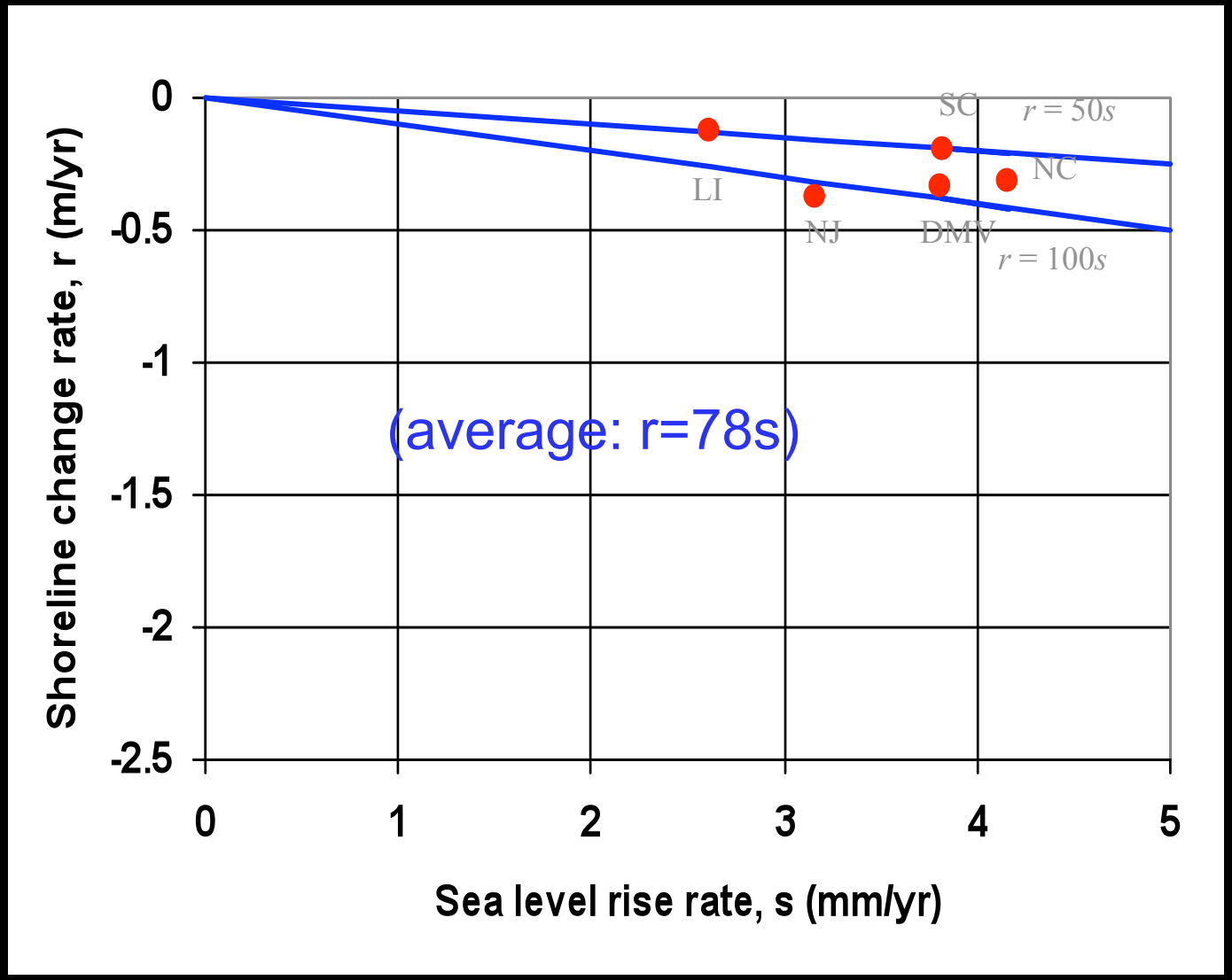

FOR SALE
824-5231


SOONER OR LATER SOMEONE WILL HAVE TO DO
SOMETHING ABOUT BEACH EROSION
IT'S YO
HOUS

Coastal State-by-State Summary of Shoreline Behavior



Sea level rise underlying driver of coastal erosion

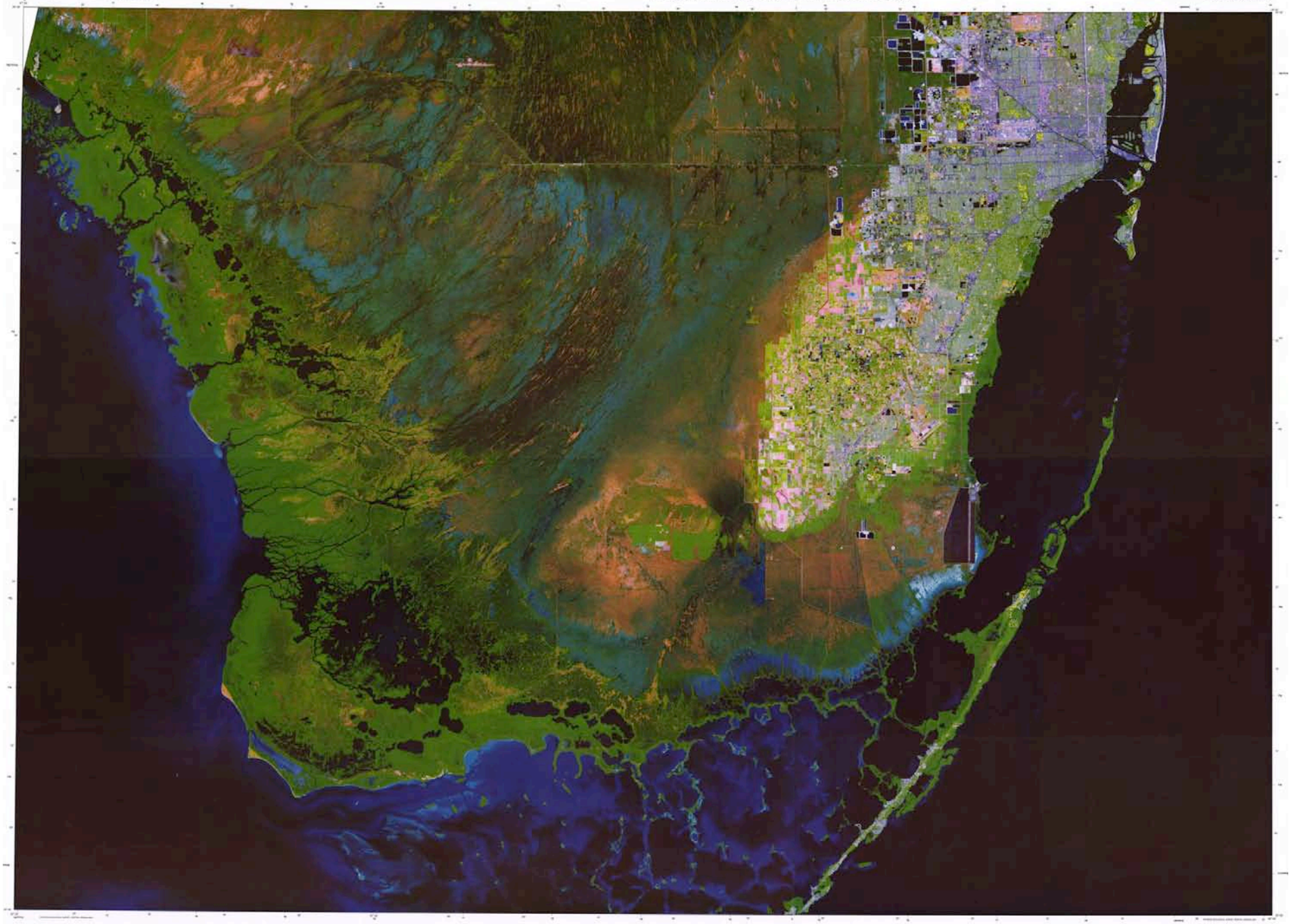


Coastal Vulnerability

USGS U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

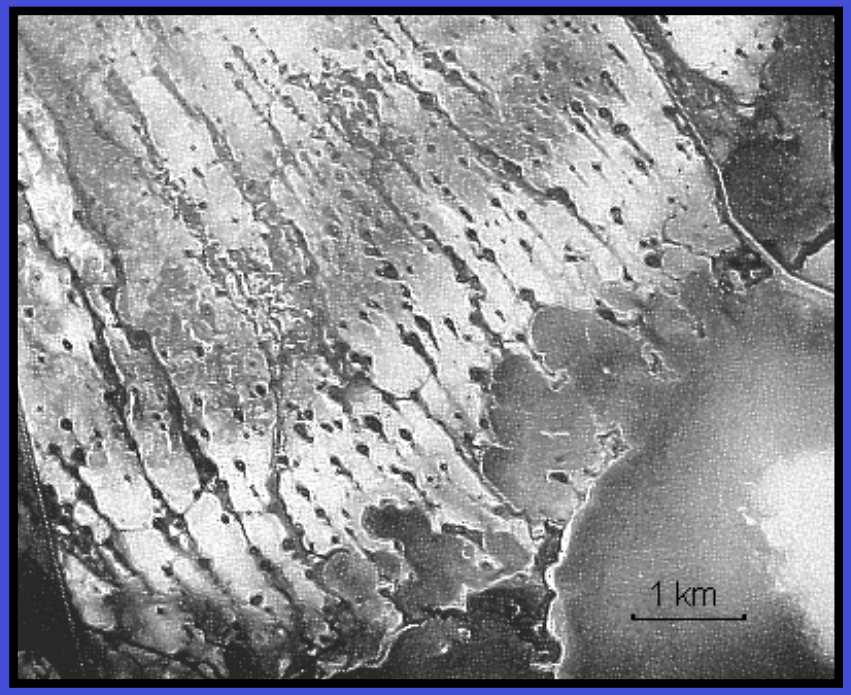
SOUTH FLORIDA EVERGLADES

SOUTH FLORIDA
SATELLITE IMAGE MAP

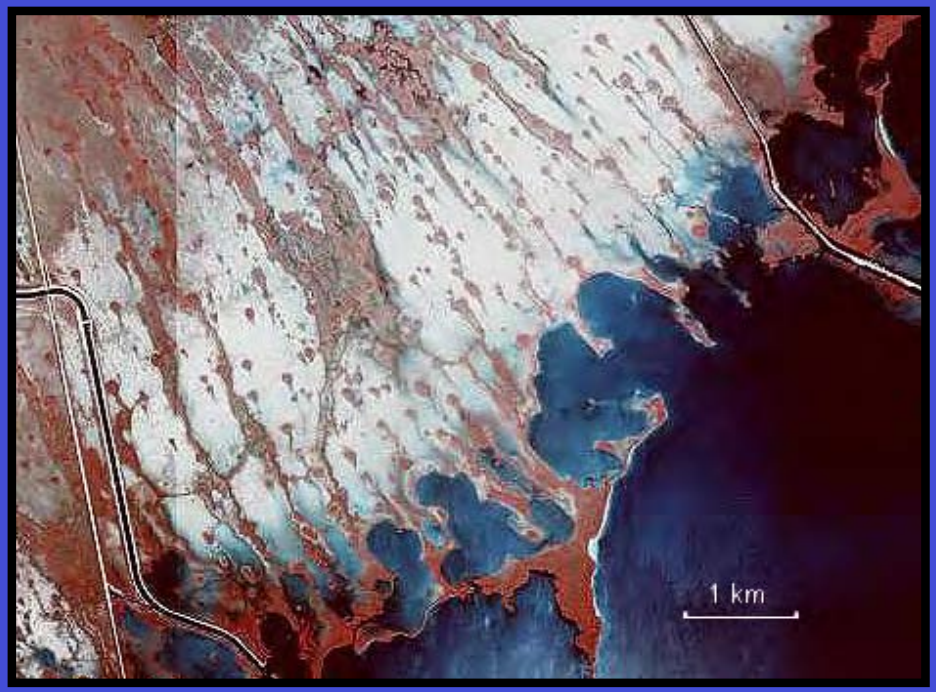


Sea level rise and water management in the C-111 Basin (Southeast Saline Everglades)

The "white zone",
north of Barnes Sound, 1940



Same area, 1991



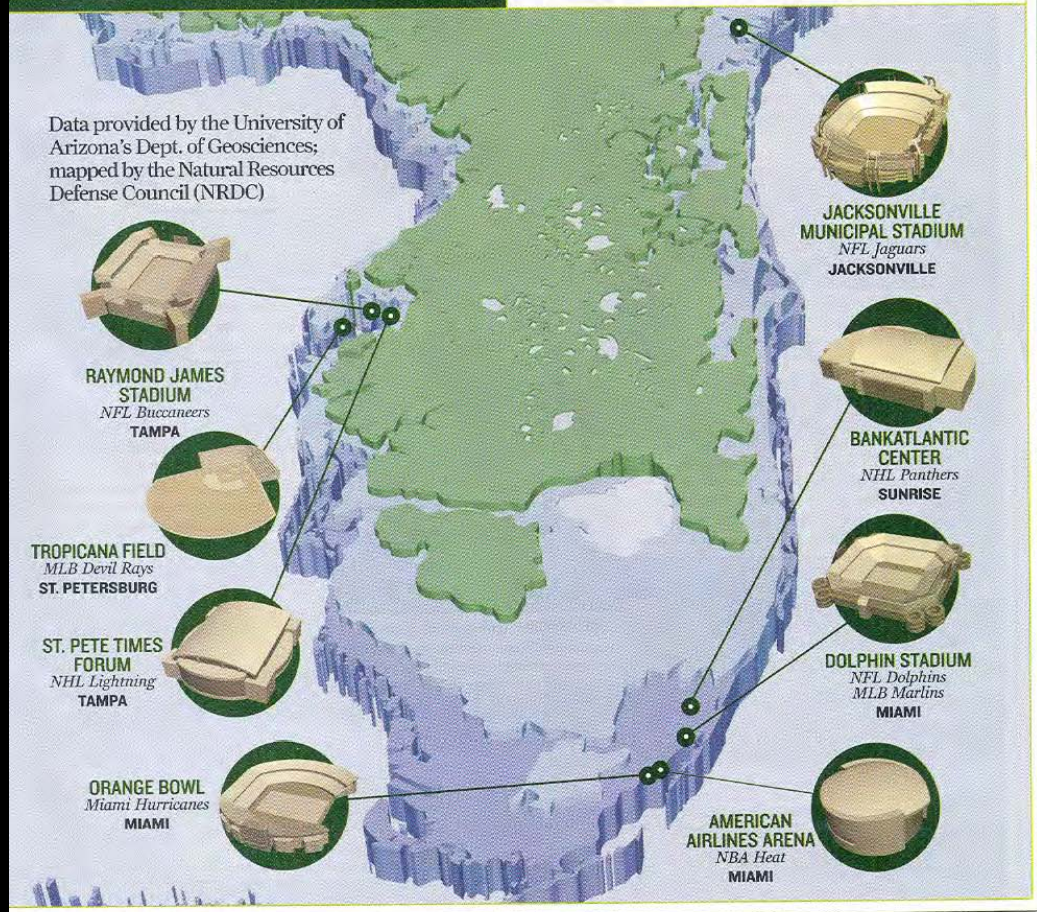
WHAT IF. . . ?

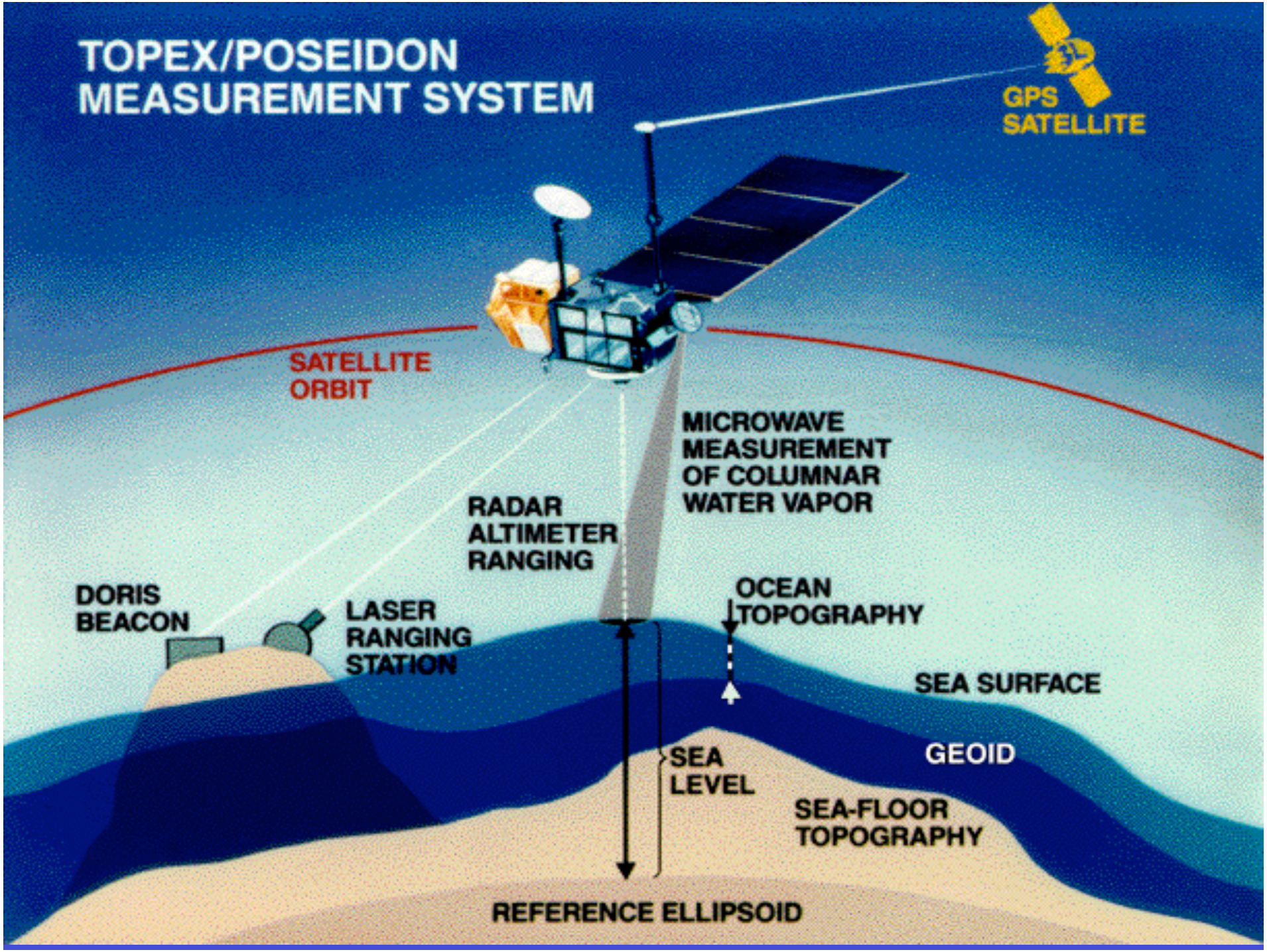
A warmer day might have robbed Willie Mays of immortality

VIC WERTZ'S BLAST would have been gone in just about any other ballpark. But the Polo Grounds' expansive centerfield gave Willie Mays room to run down the 460-foot shot in Game I of the 1954 World Series. As it happened, the Giants went on to sweep the Series. According to newspaper accounts, it was 76° on Coogan's Bluff that late September day when Mays made his over-the-shoulder grab. By the calculations of University of Illinois physicist Alan Nathan, had it been 77° (and according to the Intergovernmental Panel on Climate Change, the Earth is on average 1.17° warmer than it was in '54) the ball would have traveled two inches farther in the less-dense air and thus might have glanced off the edge of Mays's outstretched glove. *—David Epstein*

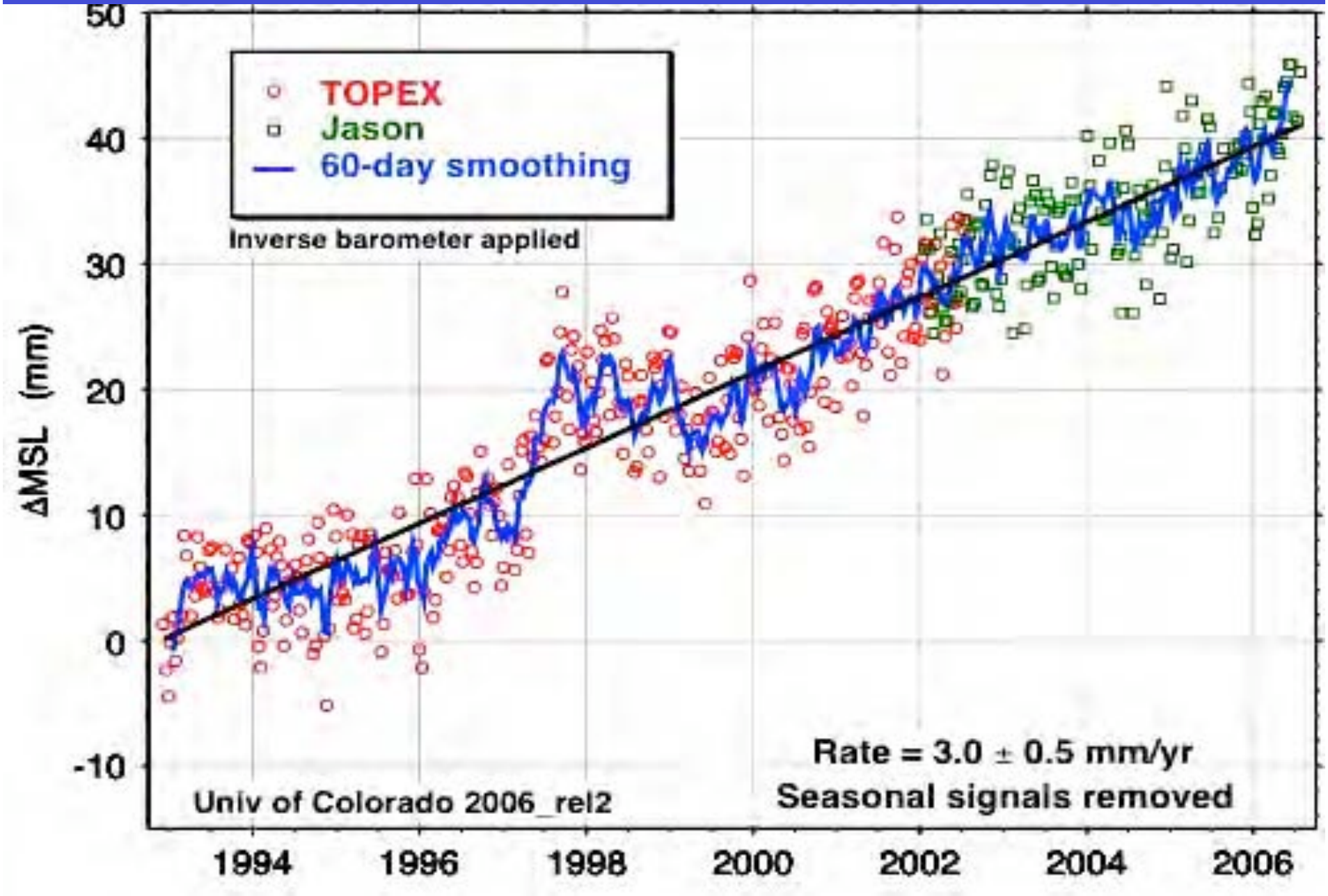
Because of the melting of glaciers and polar ice, and because water expands as it warms, oceans are rising. Researchers expect an increase of up to a meter by 2100, enough to drown wetlands. In the last year and a half, scientists have noticed that once indestructible ice sheets on Greenland and Antarctica have begun to creep toward the sea. If we continue to spew greenhouse gases as we are, the Earth could become five degrees warmer this century. The last time Earth was that warm, three million years ago, sea level stood 80 feet higher than it does now. Scientists don't foresee such a rise for centuries, but they agree that a damaging change in sea level will occur by 2100.

Global warming is also leading to more dramatic swings in the weather in some areas. Since the early 20th century, the amount of rain dropped in the biggest 1% of storms each year has risen 20%. A warming planet doesn't create hurricanes, but it does make them stronger and last longer. Tropical storms become more powerful over a warmer Gulf, turning a category 4 storm,

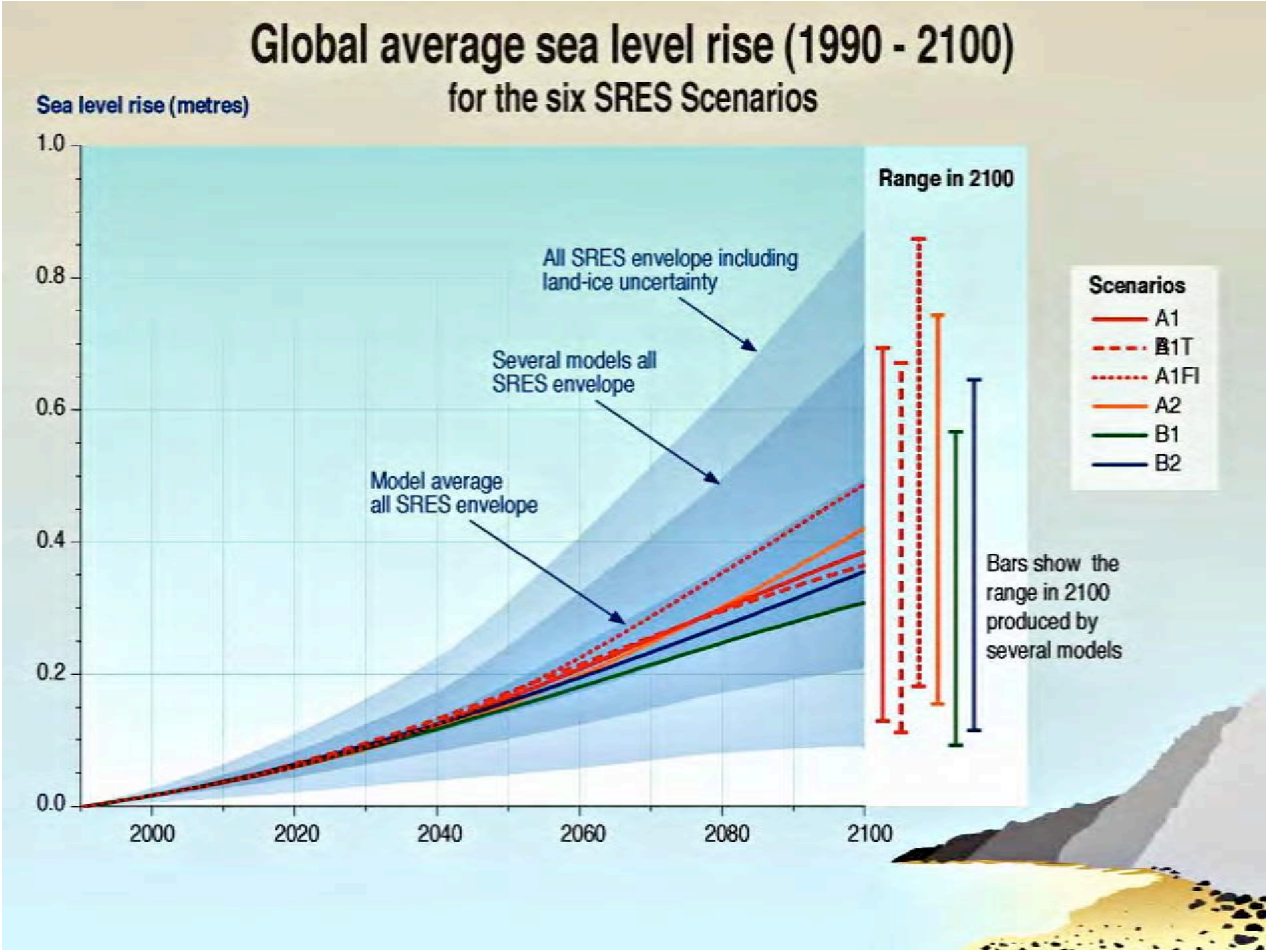



TOPEX/POSEIDON
MEASUREMENT SYSTEM
GPS
SATELLITE
SATELLITE
ORBIT
MICROWAVE
MEASUREMENT
OF COLUMNAR
WATER VAPOR
RADAR
ALTIMETER
RANGING
DORIS
BEACON
LASER
RANGING
STATION
OCEAN
TOPOGRAPHY
SEA SURFACE
GEOID
SEA
LEVEL
SEA-FLOOR
TOPOGRAPHY
REFERENCE ELLIPSOID

Global Mean Sea Level from Altimetry



Global average sea level rise (1990 - 2100)
for the six SRES Scenarios



The Southeast Coastal Climate Network is dedicated to fostering regional leadership in mitigating and adapting to the challenge of global warming.

The Network promotes protection of the Southeast's uniquely vulnerable coastal resources by increasing local, state, and national awareness of the threats and opportunities posed by global warming.

Interested in joining? Email Toni Reale at toni@cleanenergy.org