

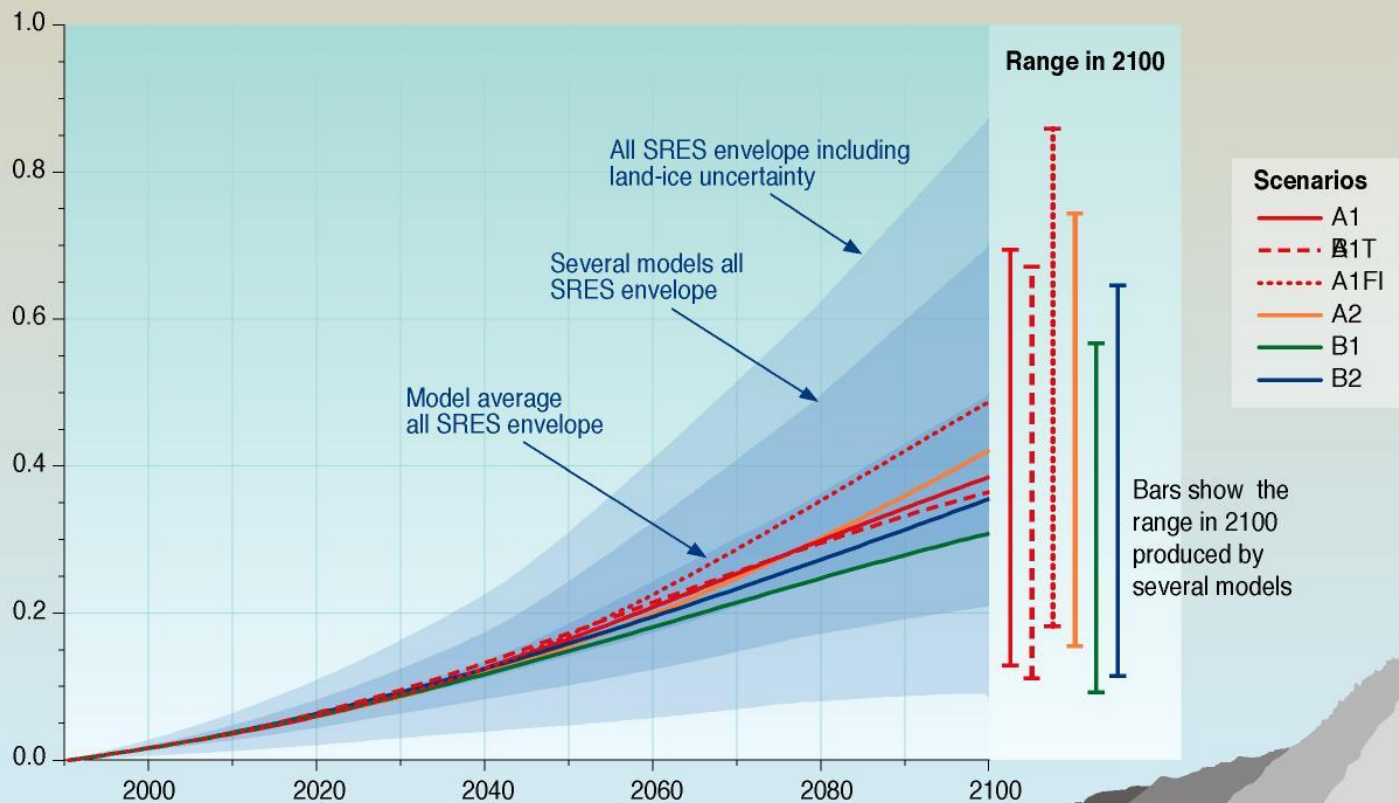
Coastal Geomorphology: Change and Threats

Norbert P. Psuty

Rutgers University

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

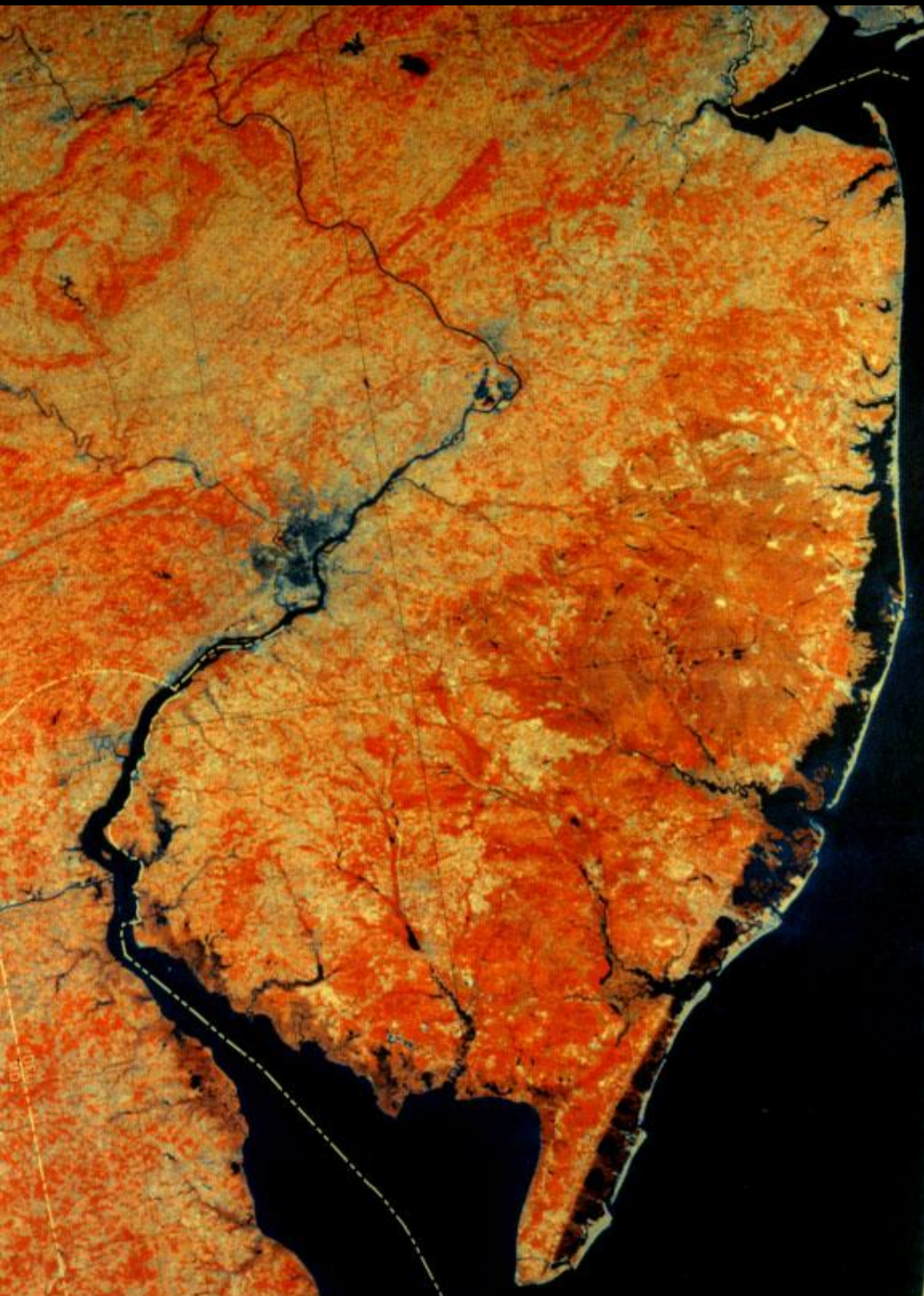
Sea level rise (metres)



WG1 TS FIGURE 24



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Coastal Diversity

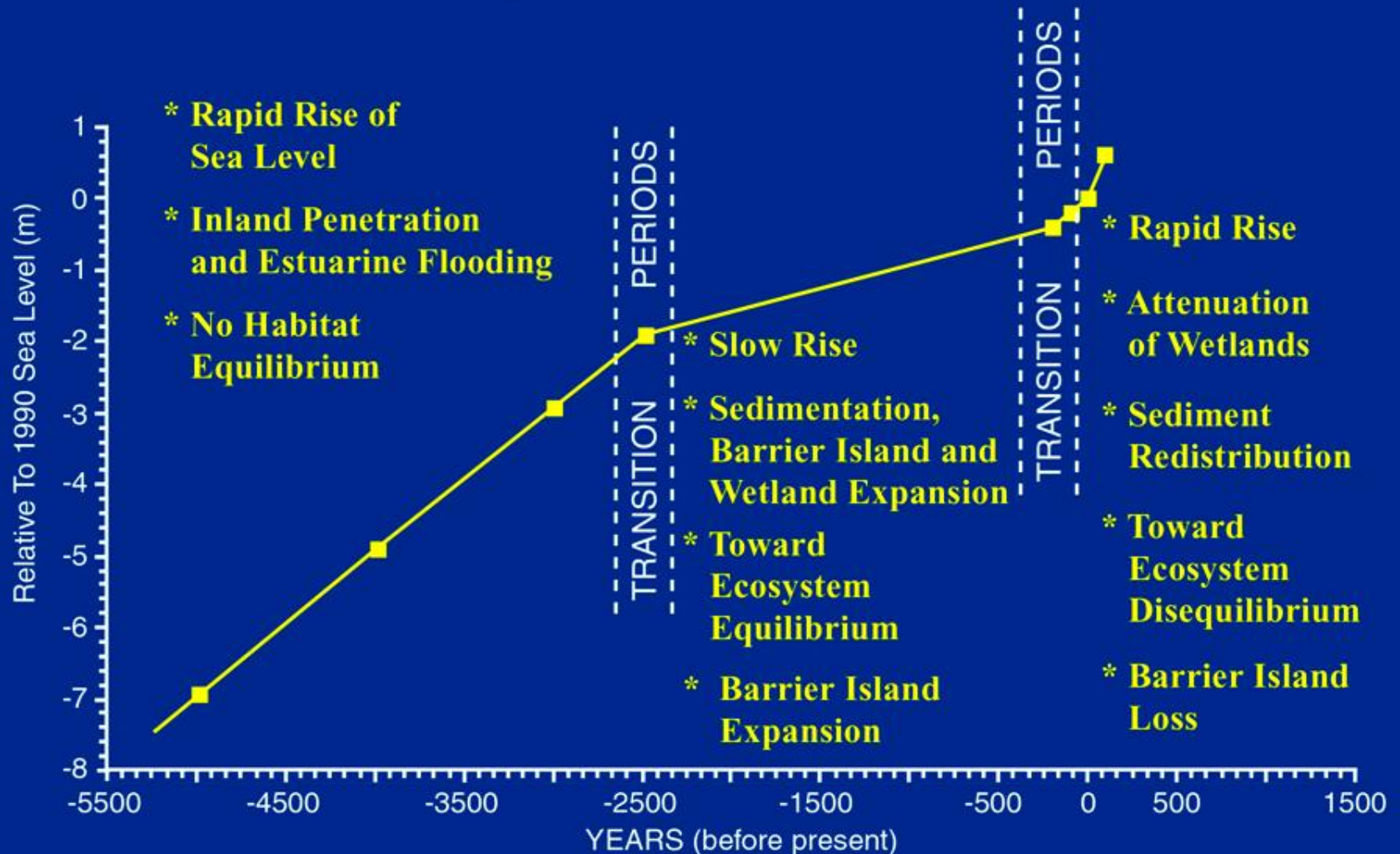
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Barrier Islands
and Headlands

-

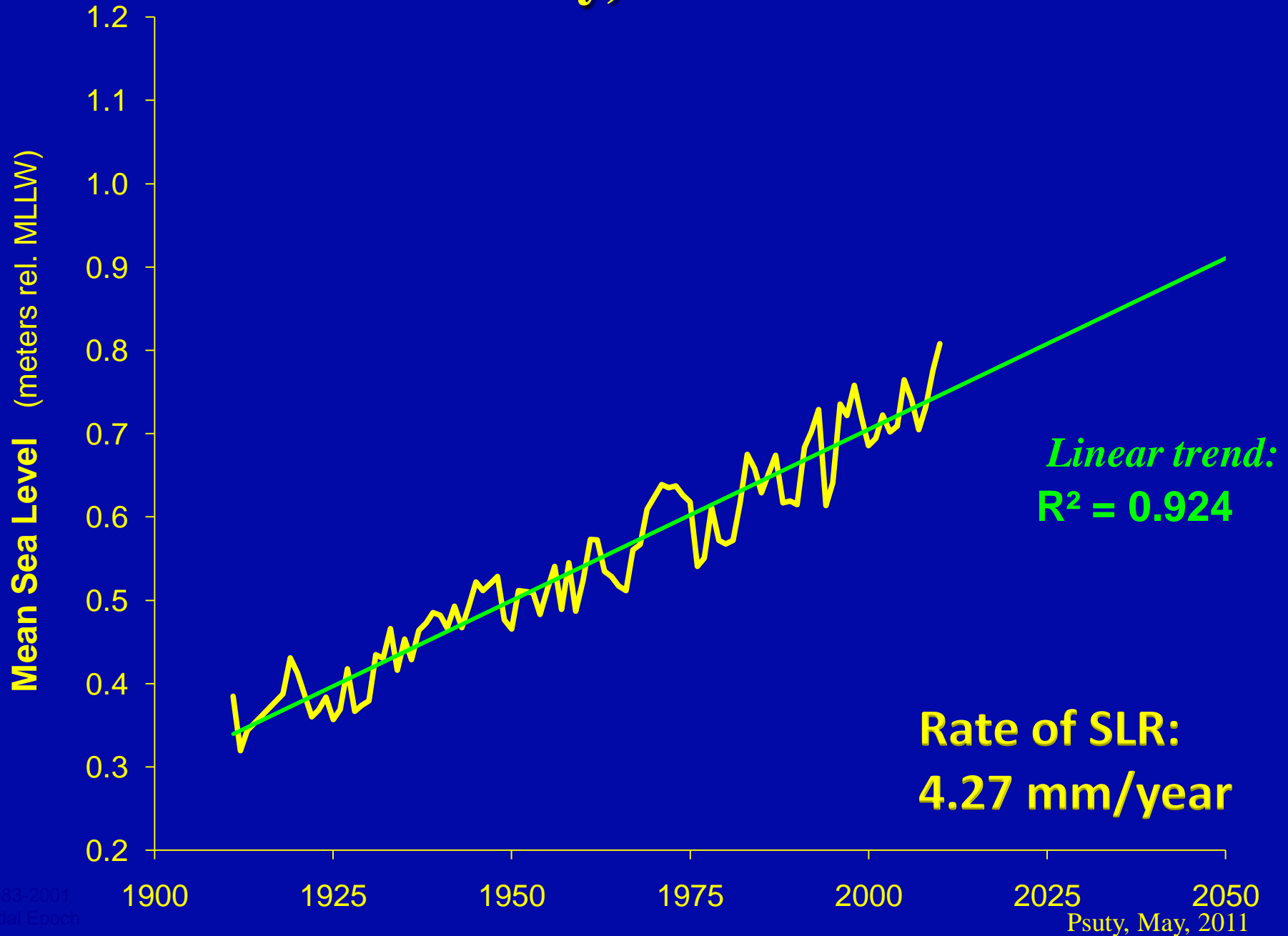
Coastal
Watersheds

Recent Geological Context

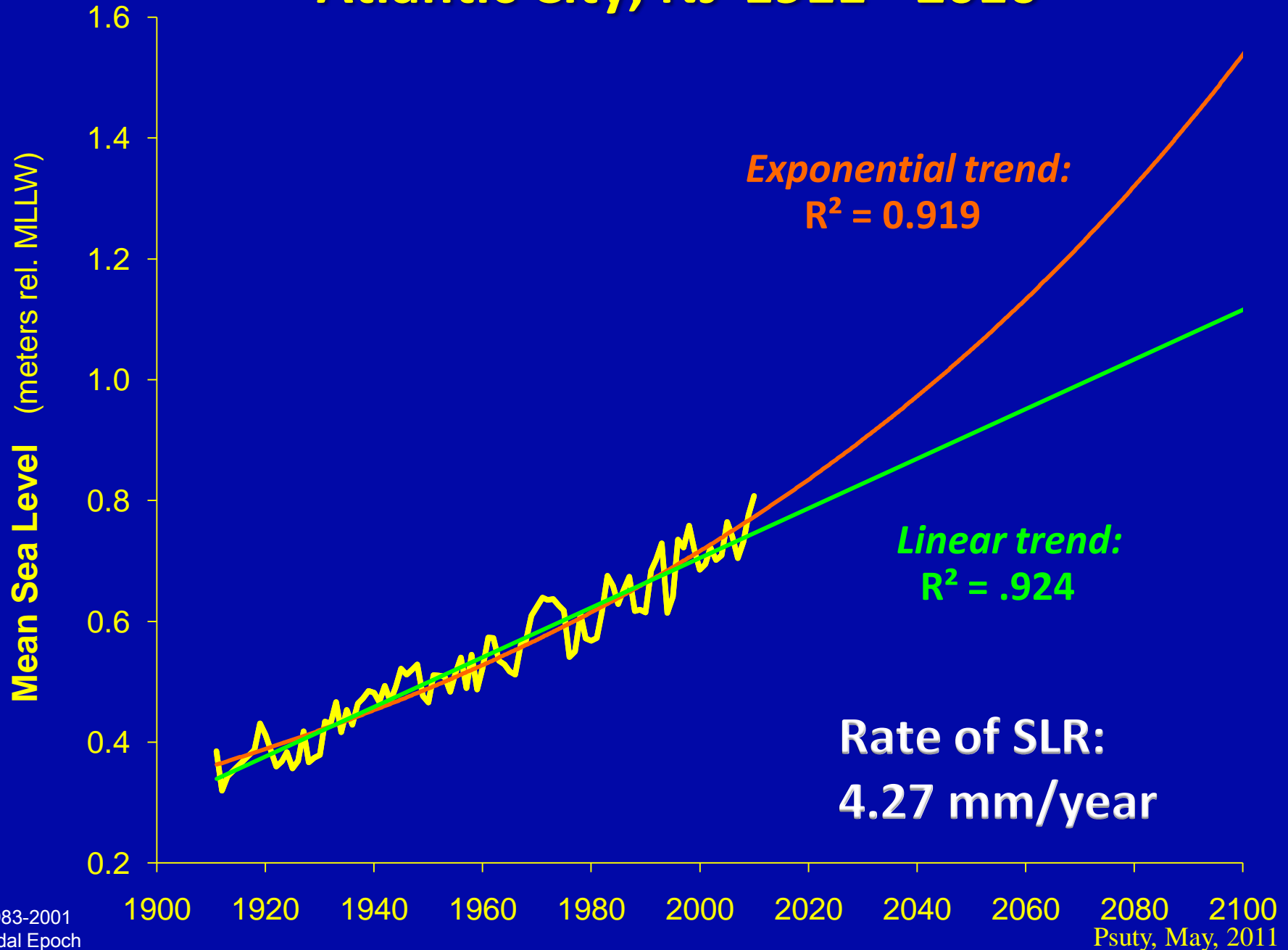


Atlantic City, NJ

1911 - 2010



Atlantic City, NJ 1911 - 2010



A map of the Eastern United States coastline, showing the Atlantic Ocean to the east and the landmasses of the United States to the west. Red dotted lines connect specific coastal locations to a list of historical sea level rise (SLR) rates. The locations listed are Battery, NY; Sandy Hook, NJ; Atlantic City, NJ; Philadelphia, PA; Lewes, DE; Annapolis, MD; Washington, DC; Hampton Roads, VA; Portsmouth, VA; and Wilmington, NC. The SLR rates are given in millimeters per year (mm/yr).

Historic SLR (mm/yr)

Battery, NY 2.7

Sandy Hook, NJ 4.0

Atlantic City, NJ 4.3

Philadelphia, PA 2.6

Lewes, DE 3.1

Annapolis, MD 3.6

Washington, DC 3.2

Hampton Roads, VA 4.3

Portsmouth, VA 3.7

Wilmington, NC 1.9

Scale Domain of Geomorphology

**Process
Geomorphology**

Sediment
Transport Rates

**SEDIMENT
BUDGETS**

**Quaternary
Geomorphology**

Environmental
Reconstruction

TIME:	Seconds	Hours	Days	Months	Years	Decades	Centuries	Millennia
LENGTH:	Millimeters		Meters		Kilometers		100s-1000s Kilometers	

Displacement and Evolution



Sand-Sharing Zone



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Beach and Dune Displacement

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Sediment Budget Impacts

beach budget versus dune budget



Negative Sediment Budget



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Marsh edge transfer



Marsh deterioration

habitat loss





Low lying access
Clearance under bridges
Evacuation routes

Mean sea level

bayside vulnerability

Static Land Use

Dynamic Coastal System



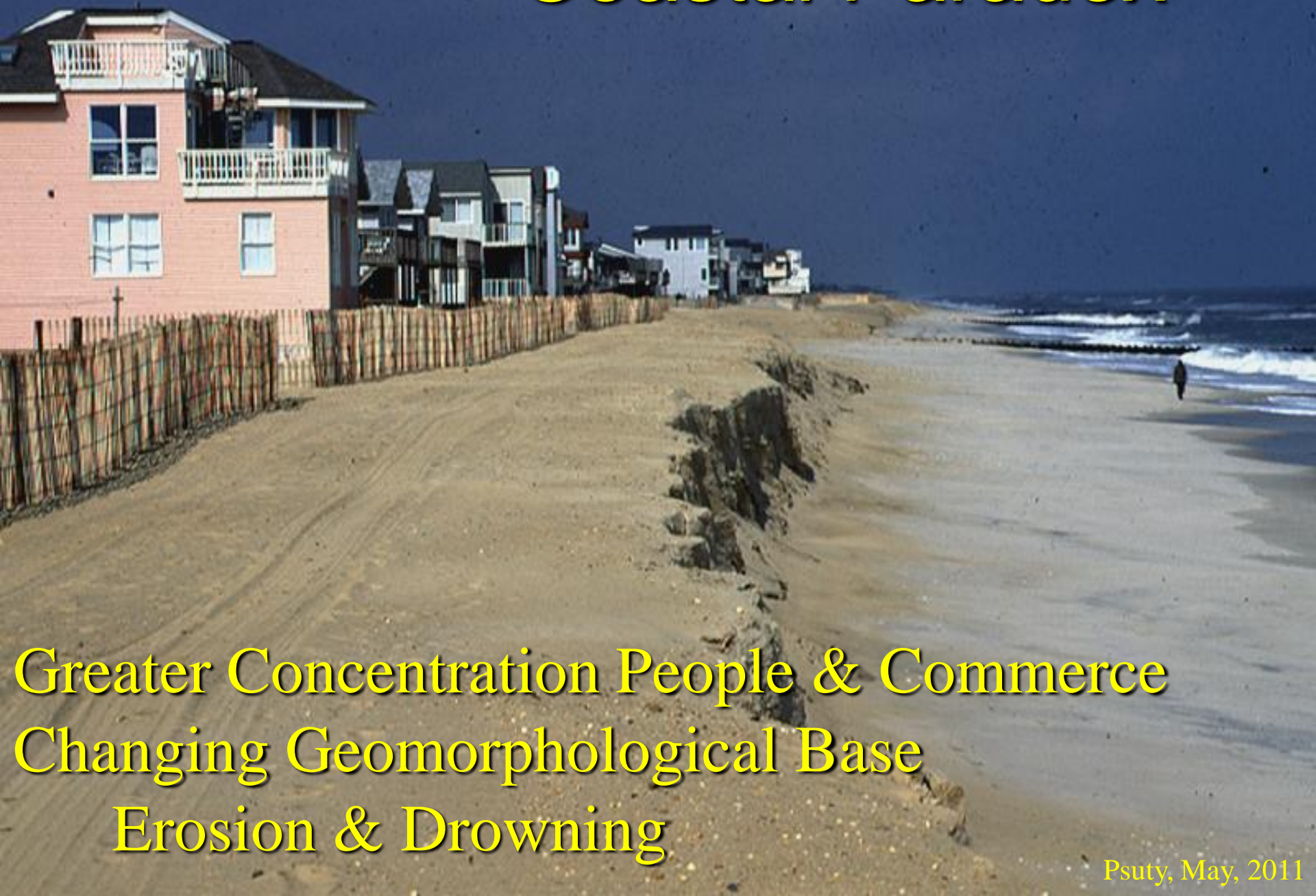
An aerial photograph of a coastal town. In the foreground, a sandy beach is crowded with people. Behind the beach is a dense residential area with many houses. A prominent white water tower stands out in the middle ground. The town is bordered by a large body of water, possibly a bay or estuary, with marshy areas and some industrial or commercial structures in the distance. The sky is clear and blue.

Low Elevation

High Population

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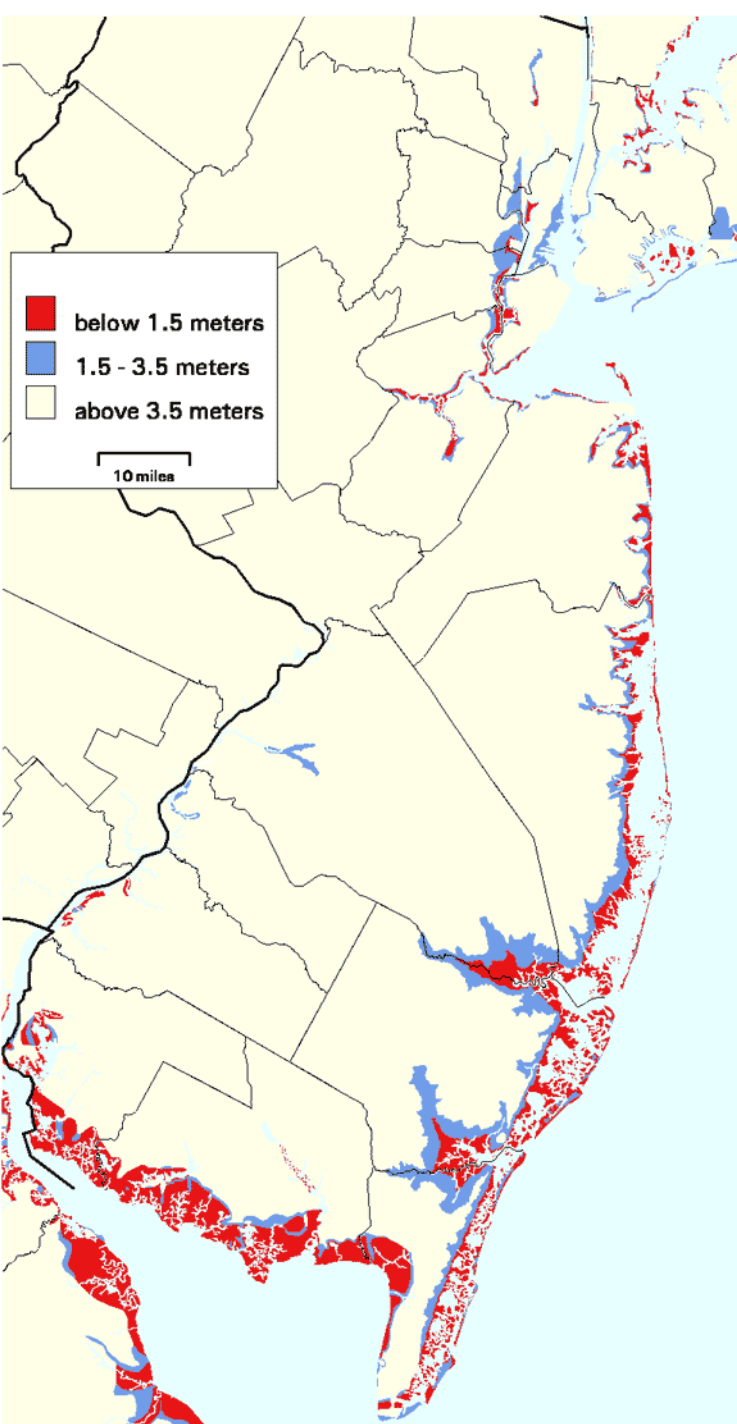
Coastal Paradox



Greater Concentration People & Commerce
Changing Geomorphological Base
Erosion & Drowning



Sediment Budget



- Vectors of change
- Areas at risk

<http://www.epa.gov/globalwarming/publications/impacts/sealevel/maps/maps.html>

- Sea-Level Rise has been driving changes (negative sediment budget) and will continue to change the coastal environment.
- Knowledge of the magnitudes and directions of change are essential to decision-making.

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Sea-Level Rise in New Jersey

(are we getting wet, yet??)

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