

What Does the Data Say? South Florida Climate Indicators

Tuesday, December 16, 2025
10:50am – 11:05am

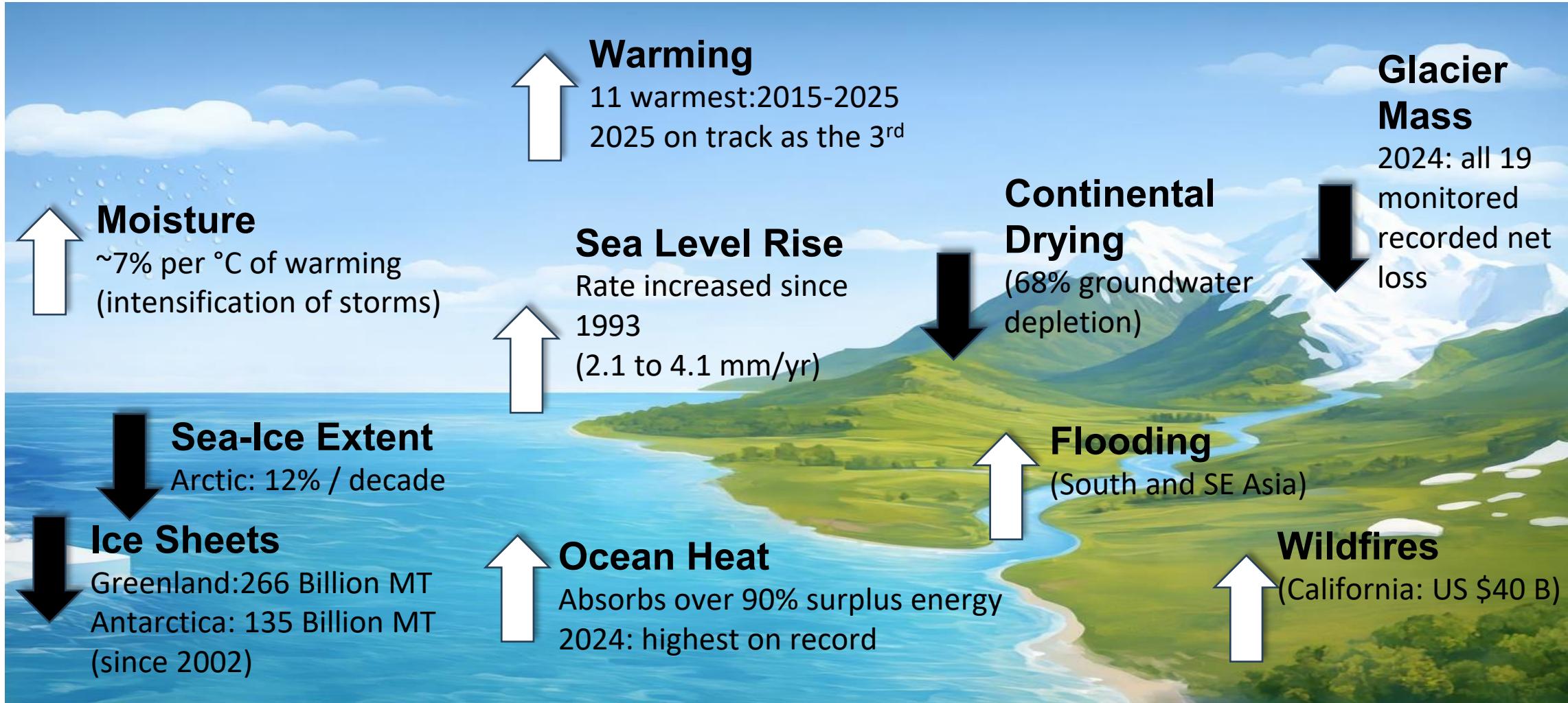
Dr. Jayantha Obeysekera
Director, Sea Level Solutions Center
Institute of Environment
Florida International University

17TH ANNUAL SOUTHEAST FLORIDA CLIMATE LEADERSHIP **SUMMIT**

December 16–17, 2025
West Palm Beach, FL

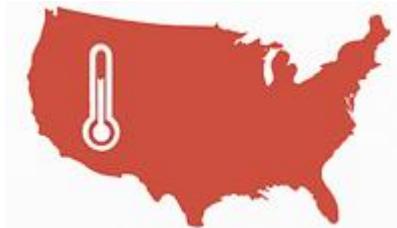
ROOTS OF RESILIENCE:
Cultivating a Sustainable Future

Global: Key Indicators



United States (Based on 5th National Climate Assessment)

Temperature and Heat



- Warming everywhere (especially in Alaska and the North)
- Increasing warm nights
- More frequent heatwaves, longer lasting

Precipitation & Extremes



- Increase in heavy downpours
- Northeast has seen a ~60% increase in top 1%
- Increasing drought severity
- Tropical Cyclones that form are becoming stronger with more rainfall

Wildfires



- Longer fire seasons
- Area burned has increased
- Degrading air quality in regions far downwind

Sea Level Rise, Coastal Change & Ocean Conditions



- Rising relative sea level along much of the coastline
- Increased high-tide flooding
- Marine heatwaves



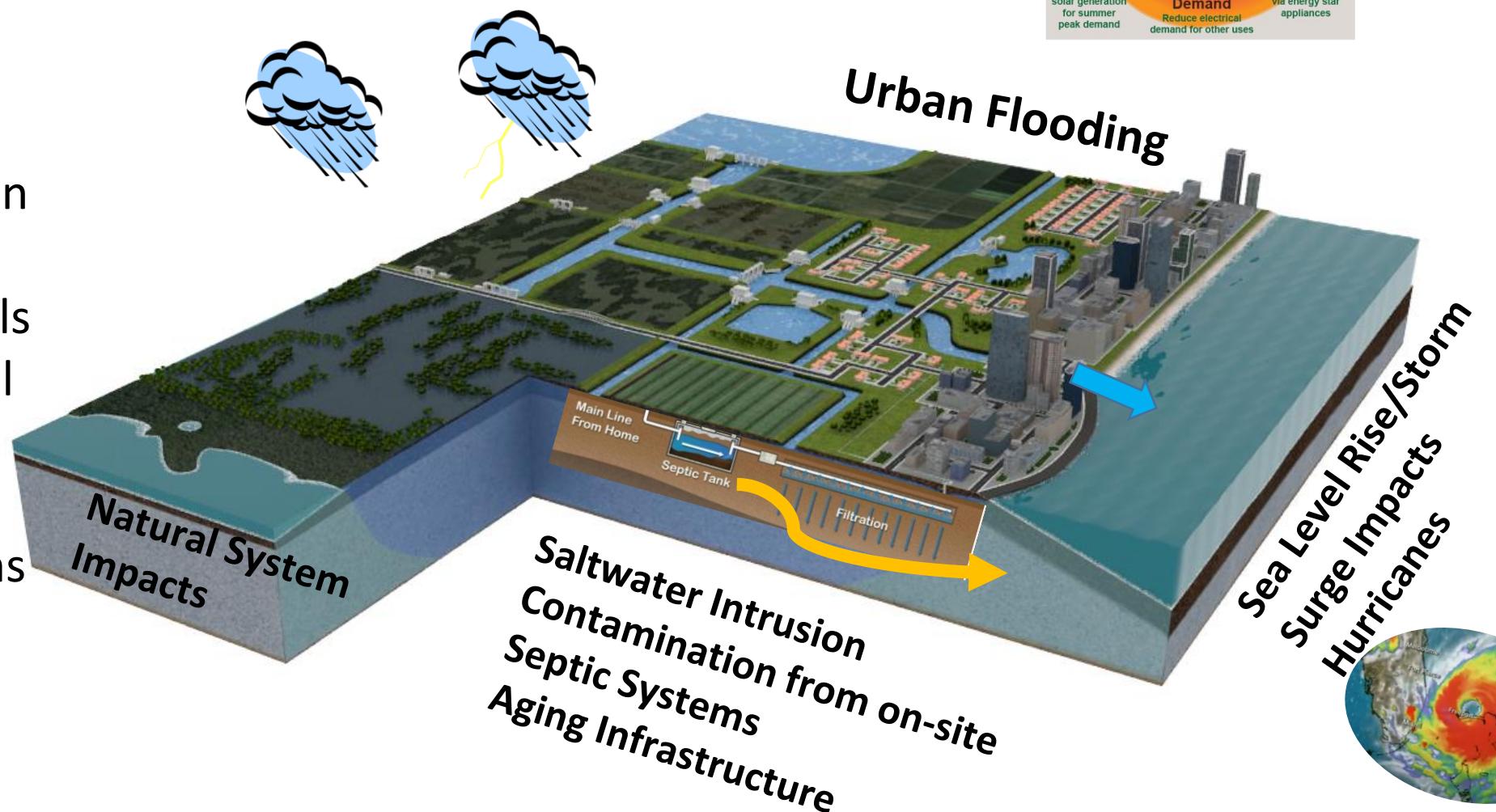
Compact Climate Indicator Report: An effort of co-production

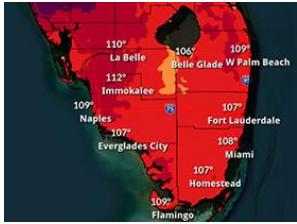
- Tina Batoh-Jenning, City of Boca Raton
- Karina Castillo, Miami-Dade County
- Lauren Evans, Independent Consultant and Staff to the Southeast Florida Regional Climate Change Compact
- Natalie Frendberg, Palm Beach County
- Jane Gilbert, Miami-Dade County (retd.)
- Alannah Irwin, City of Boynton Beach
- Michelle Irizarry-Ortiz, USGS (now @SFWMD)
- Christian Kamrath, Miami-Dade County
- Ben Kirtman, Ph.D., University of Miami
- Paul Linton, Palm Beach County
- Carolina Maran, Ph.D., South Florida Water Management District
- Brian McNoldy, University of Miami
- Jayantha Obeysekera, Ph.D., Florida International University
- Rajendra Sishodia, Ph.D., Broward County
- William Sweet, Ph.D., National Oceanic and Atmospheric Administration
- Tiffany Troxler, Ph.D., Florida International University

Southeast Florida At a Glance

Stressors:

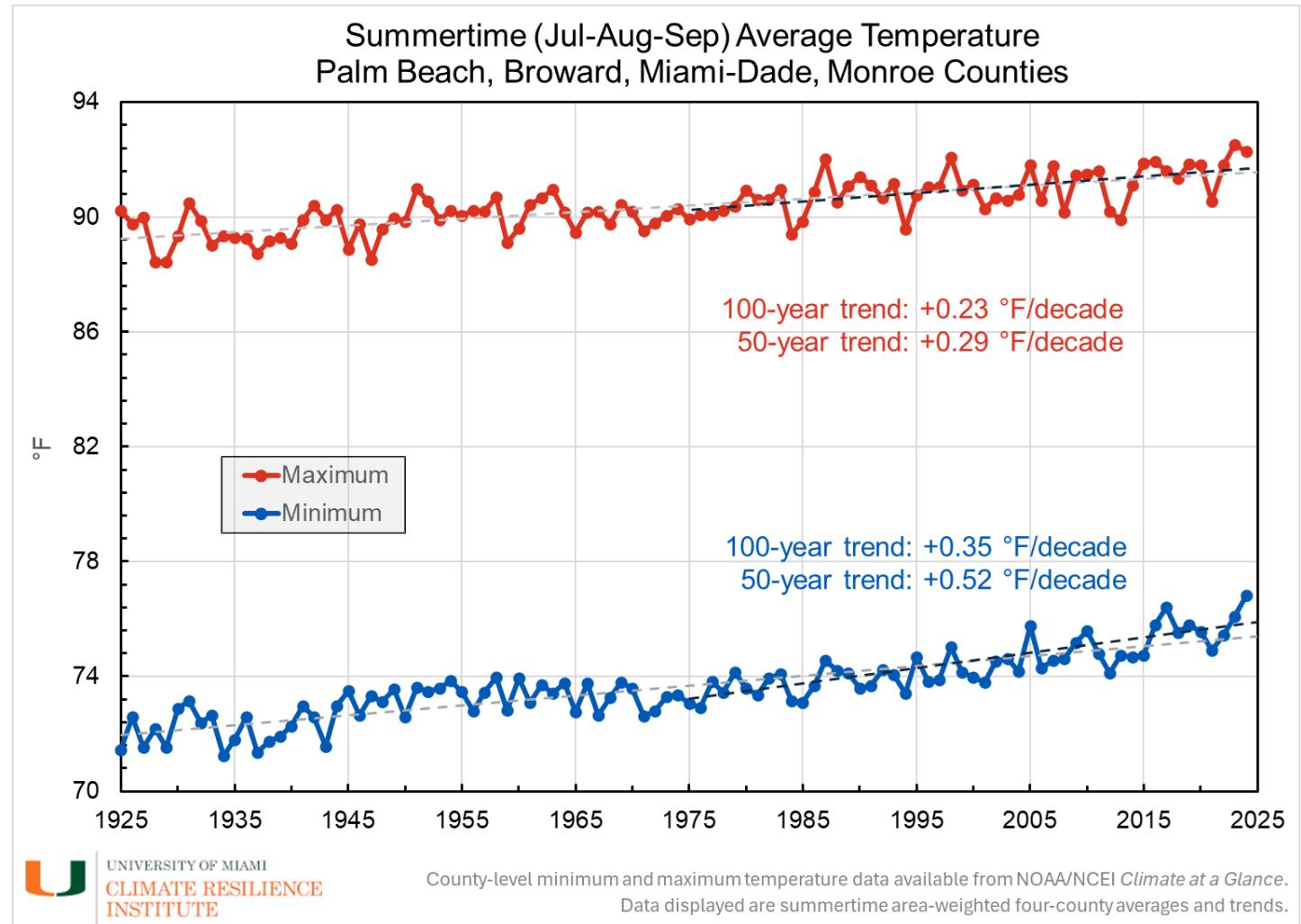
- Rising Temperatures
- Sea Level Rise & Storm Surge
- Saltwater intrusion
- Rising groundwater levels
- Changes in rainfall patterns
 - Fronts
 - Thunderstorms
- Frequency and Magnitude of Hurricanes

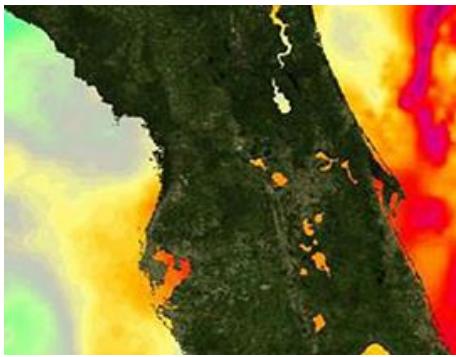




Temperature

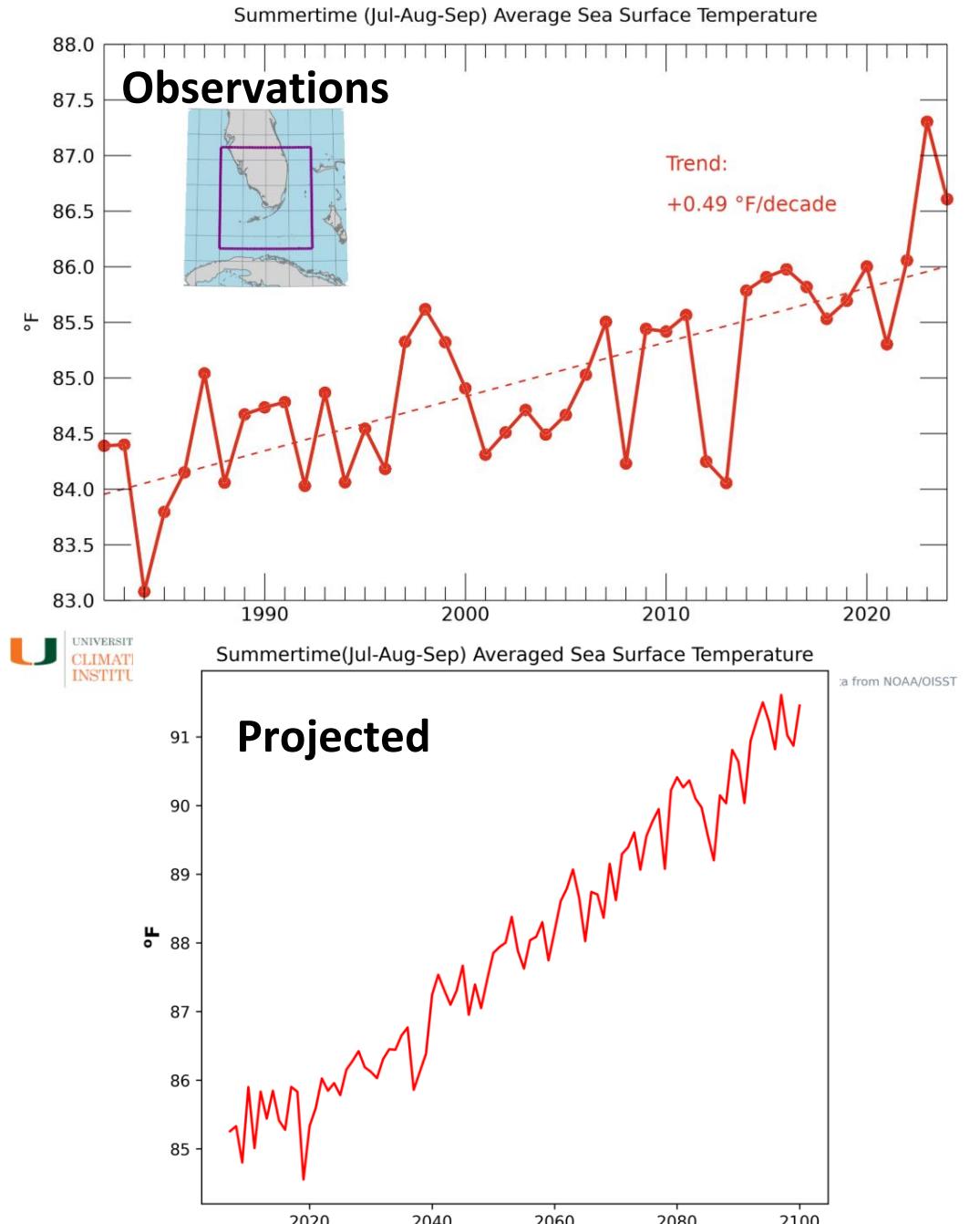
- Steadily warming daytime high temperature
 - about 0.3 °F per decade in the past 50 years
- Nighttime temperatures are increasing even more noticeably
 - About 0.5 °F per decade in the last 50 years
- Region's nights are heating up faster than its days





Sea Surface Temperature

- Southeast Florida's sea surface temperatures are rising rapidly—about 0.5 °F per decade, driving record marine heat events, widespread coral bleaching (including the severe 2023 event)
- Long-term NOAA OISST data shows warming oceans closely mirror rising overnight minimum air temperatures, indicating that hotter surrounding waters are strongly influencing South Florida's nighttime heat



HEAT INDEX



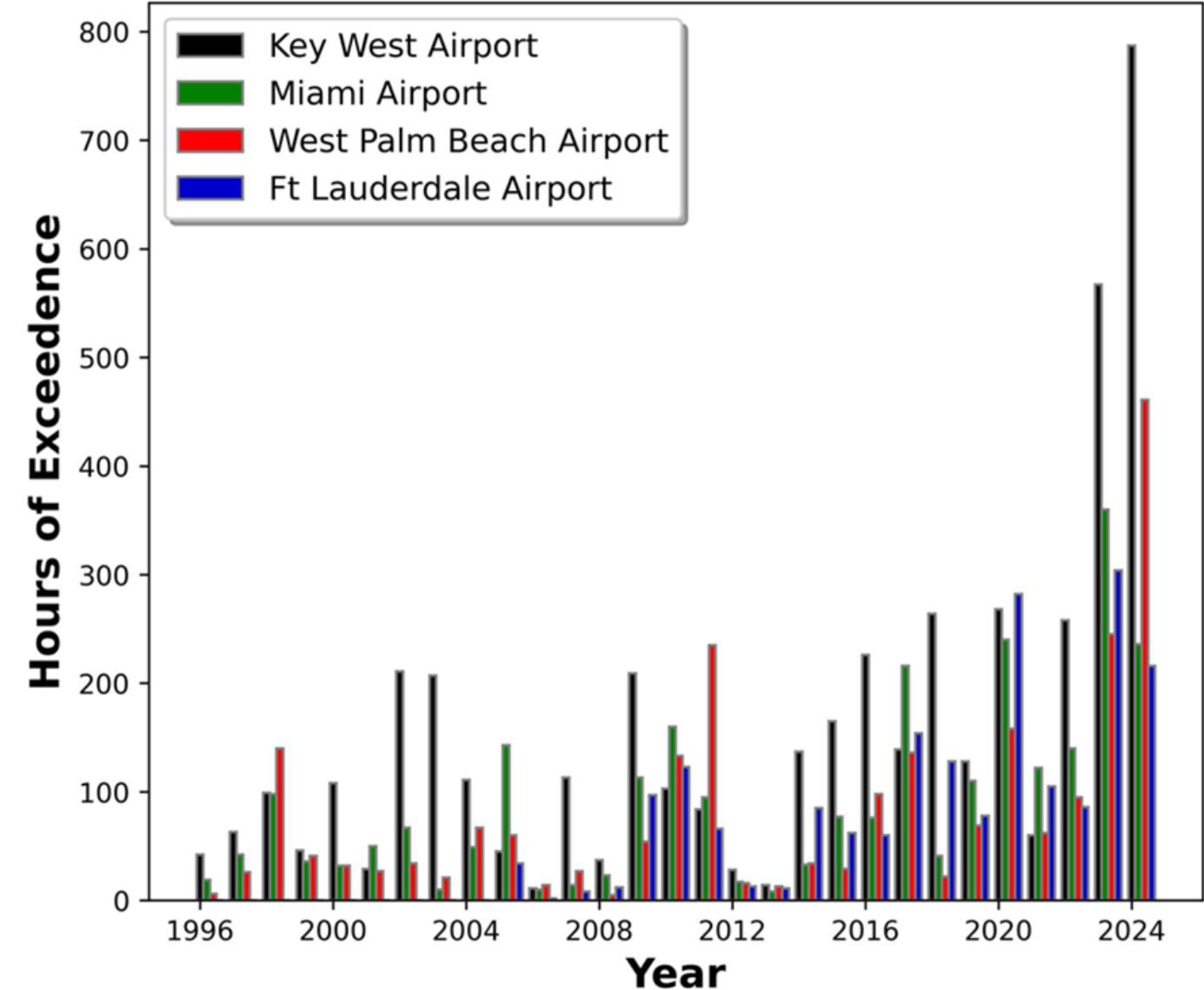
TEMPERATURE
+ HUMIDITY

| TEMPERATURE | HUMIDITY | HEAT INDEX |
|-------------|----------|------------|
| 90°F | 50% | 93°F |
| 95°F | 65% | 118°F |
| 100°F | 80% | 127°F |

Heat Index

- Miami-Dade and Broward are piloting updated heat advisory thresholds based on local climate and health data
- New criteria: 105°F (Heat Advisory) and 110°F (Excessive Heat Warning) for at least two hours
- Projected Heat Index over 100 °F increases up to 200 days by 2100

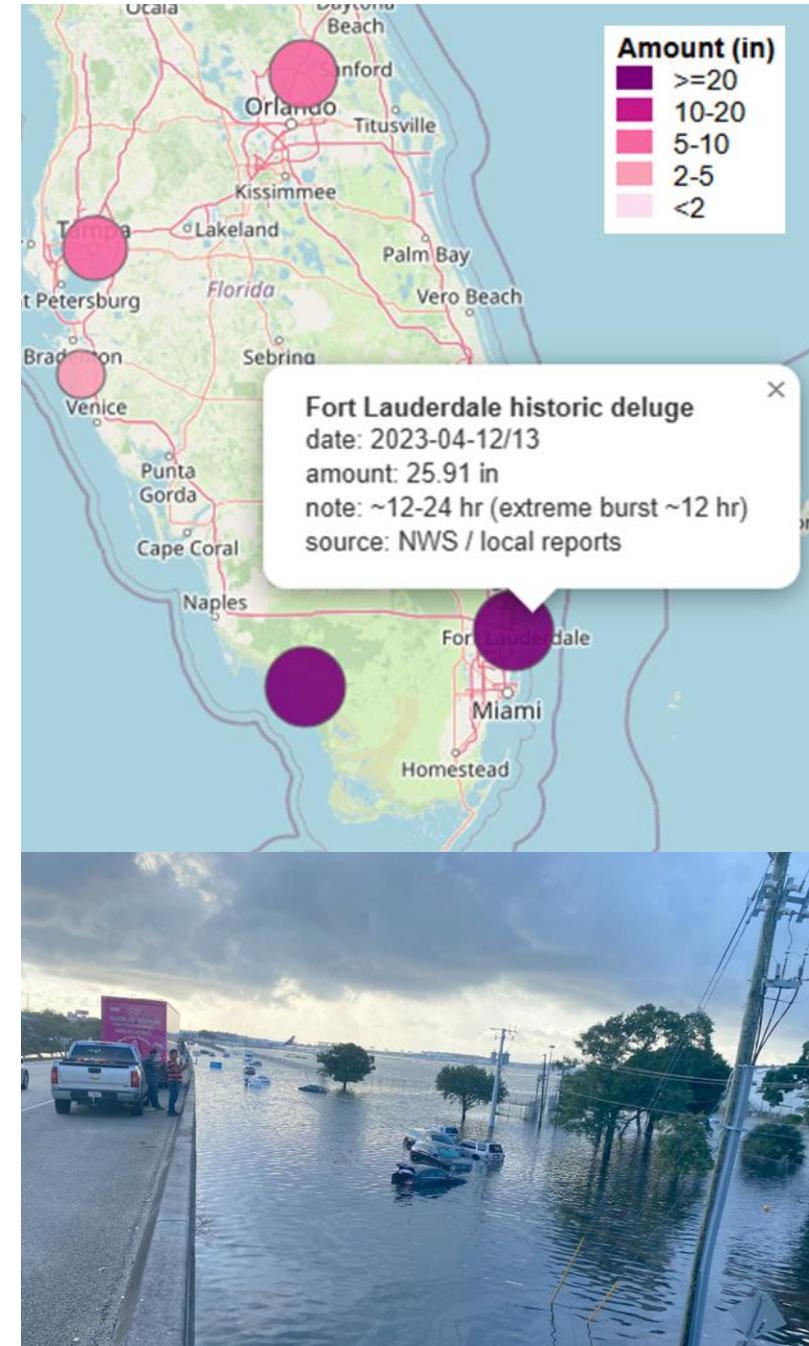
MJJAS Hours of Heat Index Exceedence: 100F





Precipitation

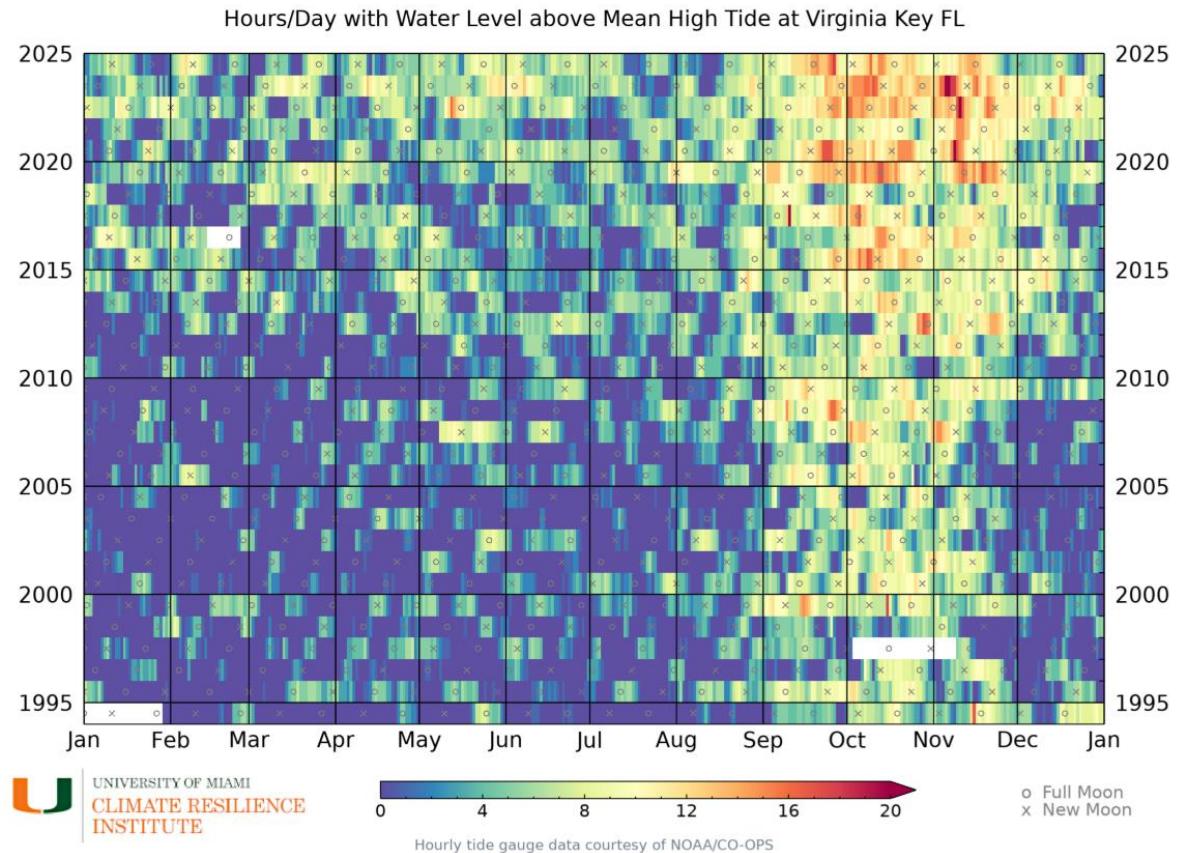
- No clear long-term trends in annual or seasonal totals, though moderate rainfall events (≥ 1 inch/day) have become more frequent since about 1980 across major airport stations
- Limited sub-daily observations is a hindrance to research
- Globally and in Southeast Florida, extreme rainfall is intensifying with warming ($\sim 7\%$ per $^{\circ}\text{C}$)
- Agencies like USGS, SFWMD, and the Florida Flood Hub have developed “change factors” (about 10 to 20% increase by 2100)



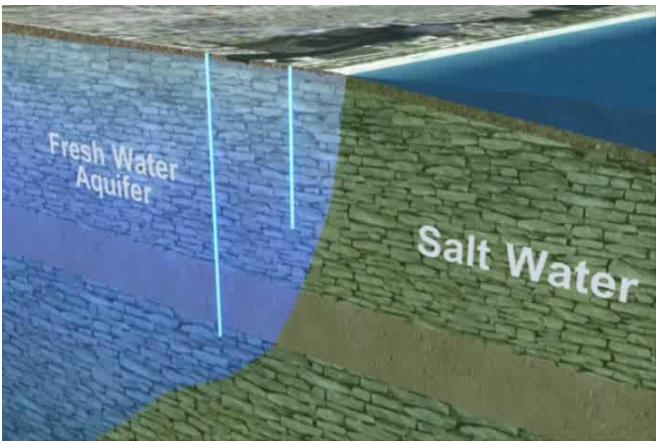


Sea Level Rise & High Tide Flooding

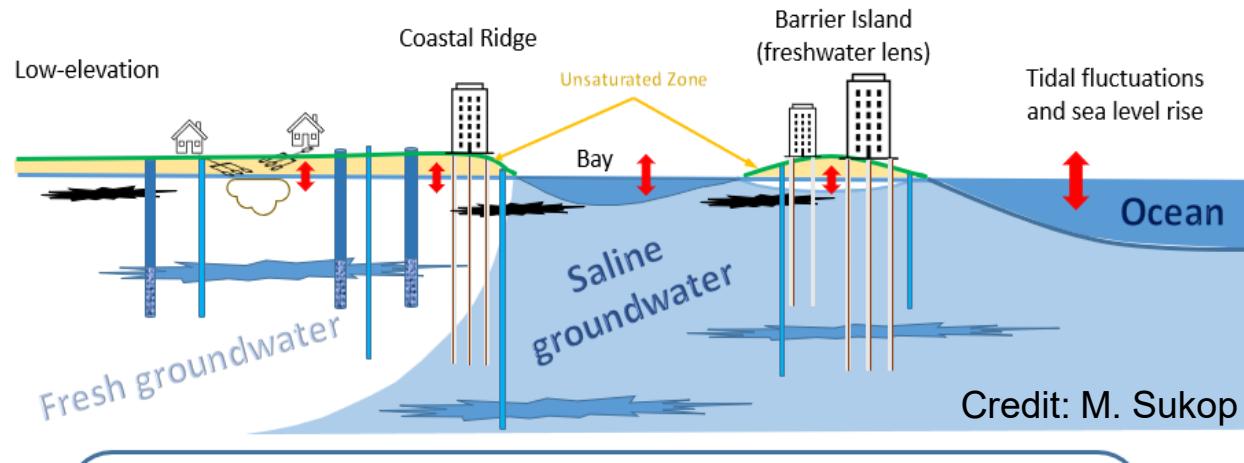
- NOAA tide gauges show a consistent rise in sea level across Southeast Florida, 1–2 inches per decade including about 6 inches at Key West since 2000
- Rapid increase observed from 2012 to 2023
- Southeast Florida's 2019 unified sea level rise projection, still recommended for planning, anticipates roughly 10–17 inches by 2040, 21–54 inches by 2070, and 40–136 inches by 2120



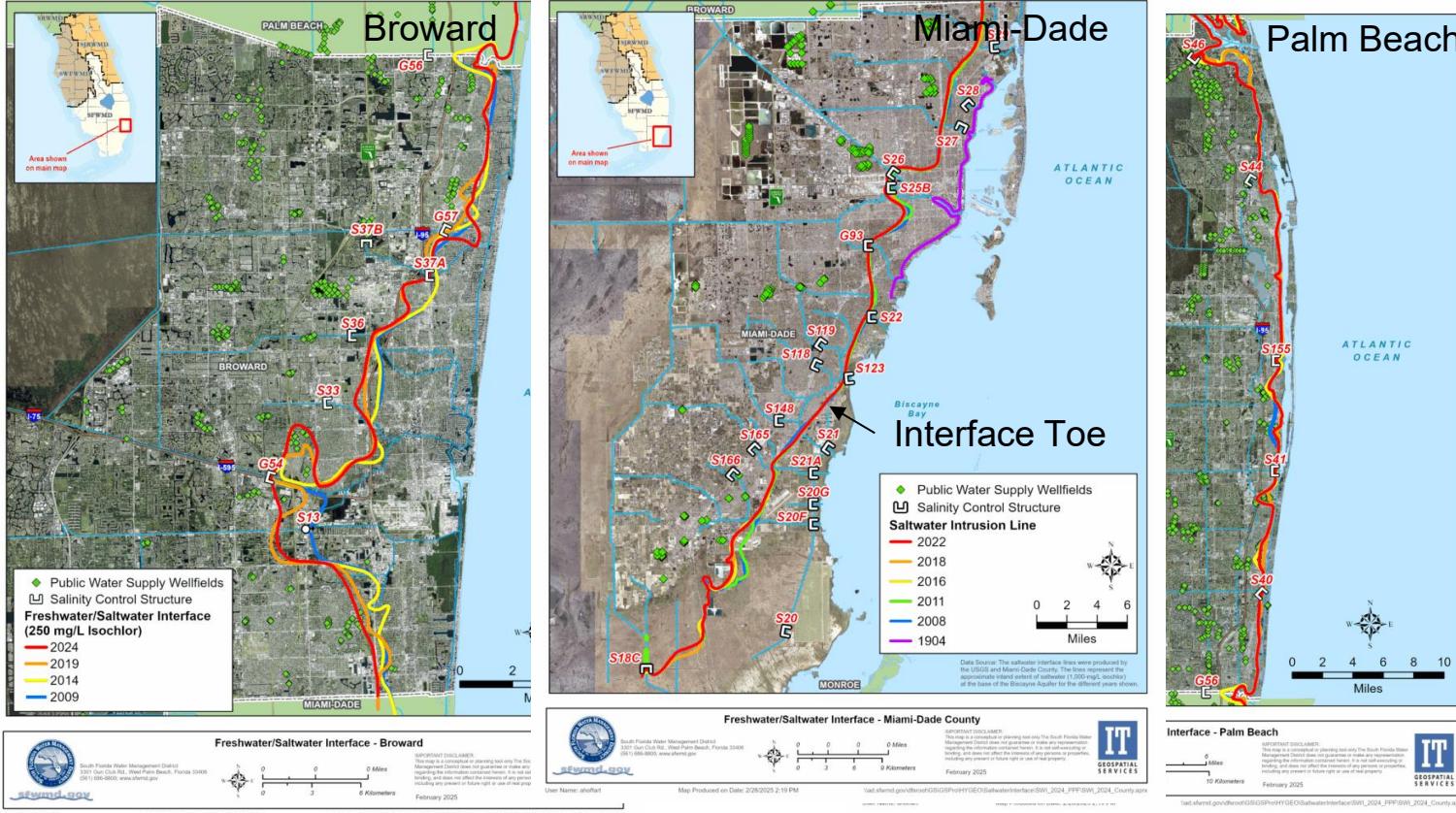
UNIVERSITY OF MIAMI
CLIMATE RESILIENCE
INSTITUTE



Saltwater Intrusion



- Saltwater intrusion in Southeast Florida is advancing inland threatening drinking water supplies
- SFWMD and USGS regularly map the saltwater interface and provide tools tracking water-level and salinity trends



Key Takeaways

Consistent trends at Global, National, and Regional scales

Compact is playing an important role in assessing current climate trends based on data as a planning tool

Region faces significant climate hazards and risks, most trending in the wrong direction, underscoring the need to continue investment in resilience