FLORIDA FloodHub
FOR APPLIED RESEARCH AND INNOVATION

UNIVERSITY OF SOUTH FLORIDA
College of MARINE SCIENCE

Resiliency in 2024 and Beyond

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SYMPOSIUM ON FLOODING ADAPTATION

29 NOVEMBER 2024

Florida Flood Hub

OVERVIEW

Represents a first in Florida

Established by the State at the University of South Florida's College of Marine Science

Focus on some of the state's most pressing environmental challenges

Improve flood forecasting and inform science-based policy, planning, and management

Bridge gaps among scientists, policymakers, practitioners, and the public to help communities mitigate and adapt to flooding

Inform resilience — the ability of communities to prepare for, withstand, and rebound from floods and other natural hazards

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Scientific and Technical Workgroups

WORKGROUPS ARE CENTRAL TO THE SUCCESS OF THE FLORIDA FLOOD HUB

Sea Level Rise Workgroup

Rainfall Workgroup

Comprehensive Modeling Workgroup

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Sea Level Rise Workgroup

INITIAL PRODUCTS

Use data underpinning the Federal Task Force report released in 2022

Focus on sea level rise as it affects Florida

Predict changes in sea level from a 2000 baseline

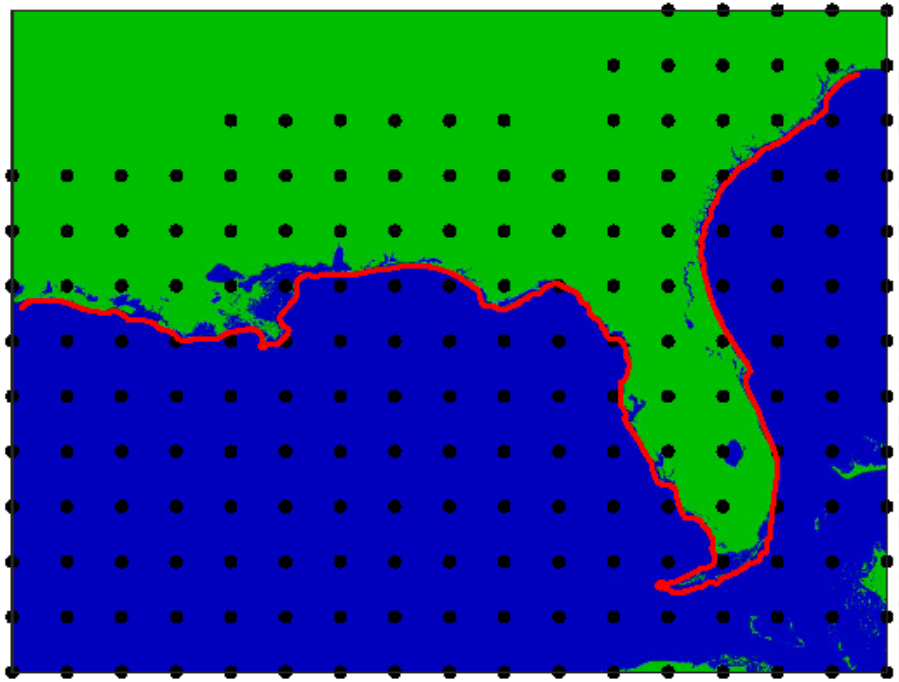
Focus on five sea level rise scenarios and three time horizons

Assess risk = Magnitude of impact × Likelihood of impact

Document increases in sea level for time horizons **(magnitude for risk)**

Incorporate five likely increases in mean global surface air temperatures

Calculate the likelihood of exceeding increases **(likelihood for risk)**



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Sea Level Rise Scenarios for Florida

SEA LEVEL RISE WORKGROUP INITIAL PRODUCTS: **MAGNITUDE FOR RISK**

Table 1: Sea level change relative to 2000 for Florida across four time horizons

Global mean sea level rise scenario	Time horizon			
	2000 – 2020	2000 – 2040	2000 – 2050	2000 – 2070
	----------mm / inches----------			
Low	91 / 3.6	198 / 7.8	251 / 9.9	336 / 13.2
Intermediate low	100 / 3.9	227 / 8.9	293 / 11.5	428 / 16.9
Intermediate	103 / 4.1	245 / 9.6	333 / 13.1	554 / 21.8
Intermediate high	104 / 4.1	272 / 10.7	399 / 15.7	771 / 30.4
High	104 / 4.1	298 / 11.7	459 / 18.1	979 / 38.5

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Exceedance Probabilities

SEA LEVEL RISE WORKGROUP INITIAL PRODUCTS: **LIKELIHOOD FOR RISK**

Table 2: Exceedance probabilities for sea level rise scenarios projected to 2100

Global mean sea level rise scenario	Predicted increase in global mean surface air temperature				
	1.5°C	2.0°C	3.0°C	4.0°C	5.0°C
Low	92%	98%	>99%	>99%	>99%
Intermediate low	37%	50%	82%	97%	>99%
Intermediate	<1%	2%	5%	10%	23%
Intermediate high	<1%	<1%	<1%	1%	2%
High	<1%	<1%	<1%	<1%	<1%

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Sea Level Rise Scenarios for Florida

POTENTIAL APPLICATION: COMBINE LIKELY RISK WITH PLANNING HORIZON TO INFORM RESILIENT APPROACHES

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Examples:

- Transportation (roads and bridges)
- Energy systems (replacement and upgrades)
- Stormwater systems (improved design)
- Shoreline protection (green and gray)
- Other critical assets

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Next Steps

SEA LEVEL RISE WORKGROUP

- Link exceedance probabilities to specific emission pathways and time horizons
- Look at the frequency of occurrence of high tide flooding and other weather related events
- Do a careful quality control and analyses of the regional tide gauge time series
- Explore possible contributions by regional ocean processes

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Changes in Sea Levels at Tide Gauges

NOAA TIDE GAUGE STATION	DATUM	ELEVATIONS ON MEAN SEA LEVEL, 1983-2001 EPOCH (in feet)										<== Reference Year
		1992	2000	2020		2040		2050		2070		<== NOAA 2022 SLR Scenario
				Int-Low	Int	Int-Low	Int	Int-Low	Int	Int-Low	Int	
8720030 Fernandina Beach, FL	MHHW	3.27	3.36	3.69	3.70	4.10	4.16	4.32	4.45	4.76	5.18	
	MSL	0.00	0.09	0.42	0.43	0.83	0.89	1.05	1.18	1.49	1.91	
	MLLW	-3.29	-3.20	-2.87	-2.87	-2.46	-2.40	-2.24	-2.11	-1.80	-1.38	
	NAVD88	0.53	0.62	0.95	0.96	1.36	1.42	1.58	1.71	2.02	2.44	
8720218 Mayport (Bar Pilots Dock), FL	MHHW	2.48	2.57	2.90	2.91	3.31	3.37	3.53	3.66	3.97	4.39	
	MSL	0.00	0.09	0.42	0.43	0.83	0.89	1.05	1.18	1.49	1.91	
	MLLW	-2.47	-2.38	-2.05	-2.05	-1.64	-1.58	-1.42	-1.29	-0.98	-0.56	
	NAVD88	0.52	0.61	0.94	0.95	1.35	1.41	1.57	1.70	2.01	2.43	
8720219 Dames Point, FL	MHHW	1.80	1.89	2.22	2.23	2.63	2.69	2.85	2.98	3.29	3.71	
	MSL	0.00	0.09	0.42	0.43	0.83	0.89	1.05	1.18	1.49	1.91	
	MLLW	-1.86	-1.77	-1.44	-1.44	-1.03	-0.97	-0.81	-0.68	-0.37	0.05	
	NAVD88	0.38	0.47	0.80	0.81	1.21	1.27	1.43	1.56	1.87	2.29	
8720226 Southbank Riverwalk, St Johns River, FL	MHHW	0.89	0.98	1.31	1.32	1.72	1.78	1.94	2.07	2.38	2.80	
	MSL	0.00	0.09	0.42	0.43	0.83	0.89	1.05	1.18	1.49	1.91	
	MLLW	-1.06	-0.97	-0.64	-0.64	-0.23	-0.17	-0.01	0.12	0.43	0.85	
	NAVD88	0.24	0.33	0.66	0.67	1.07	1.13	1.29	1.42	1.73	2.15	
8720357 I-295 Buckman Bridge, FL	MHHW	0.50	0.59	0.92	0.93	1.33	1.39	1.55	1.68	1.99	2.41	
	MSL	0.00	0.09	0.42	0.43	0.83	0.89	1.05	1.18	1.49	1.91	
	MLLW	-0.51	-0.42	-0.09	-0.09	0.32	0.38	0.54	0.67	0.98	1.40	
	NAVD88	0.11	0.20	0.53	0.54	0.94	1.00	1.16	1.29	1.60	2.02	

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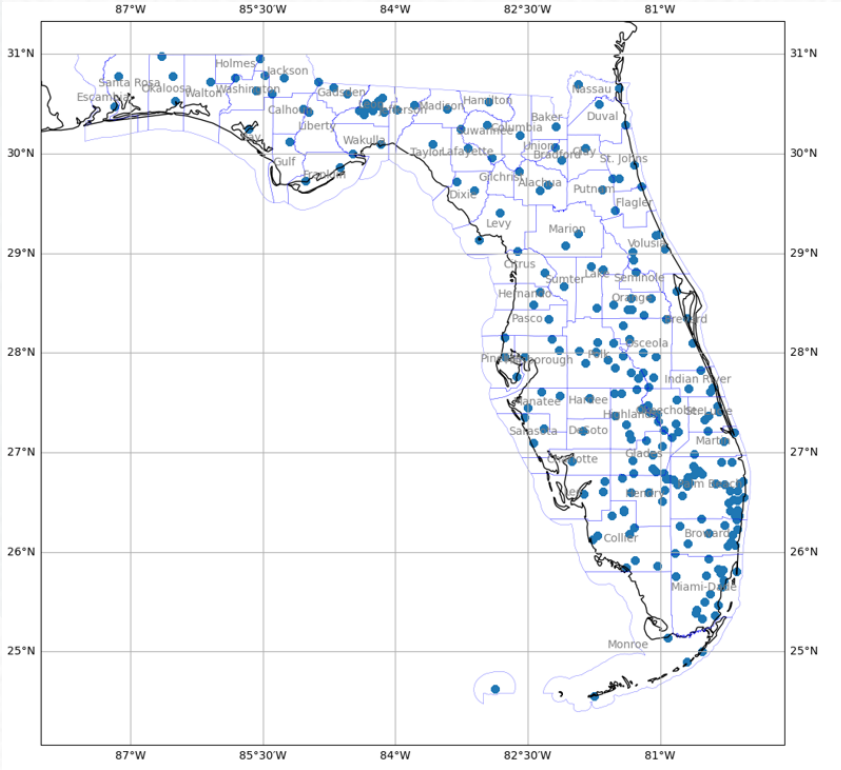
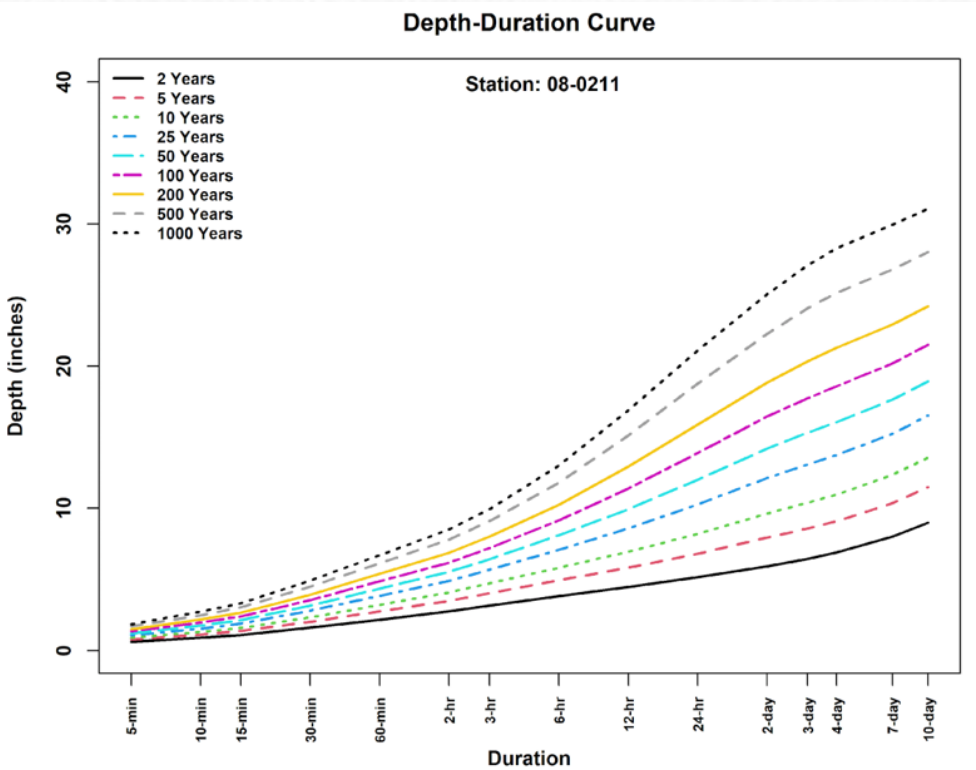
Change Factors for Design Storms





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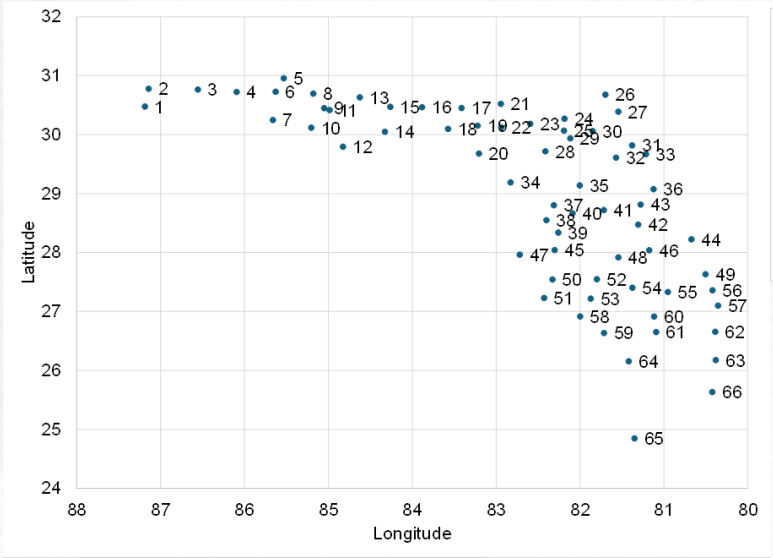
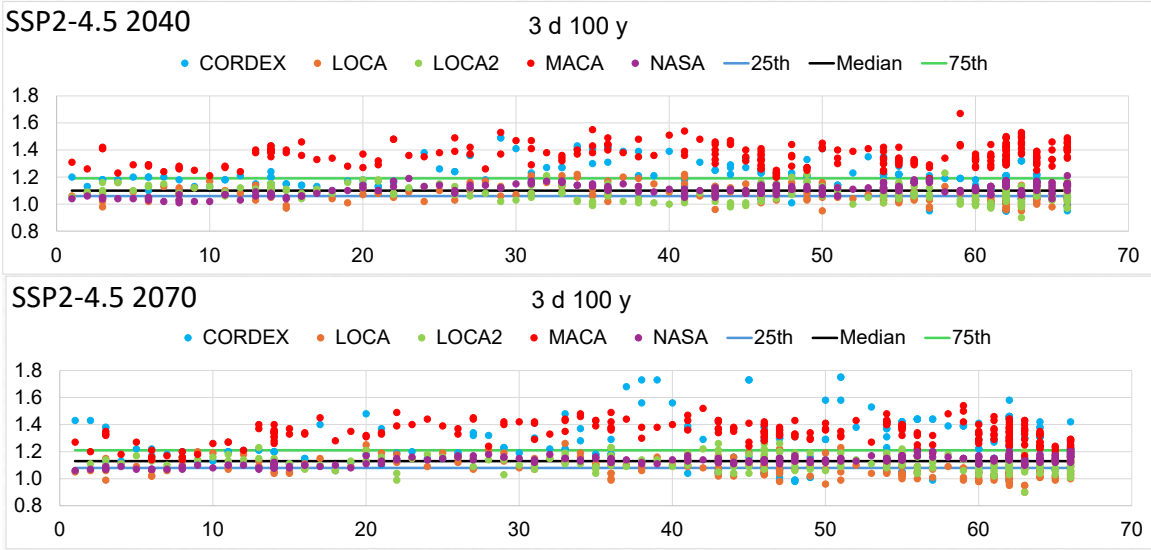
Evaluate Models and Potential Spatial Patterns





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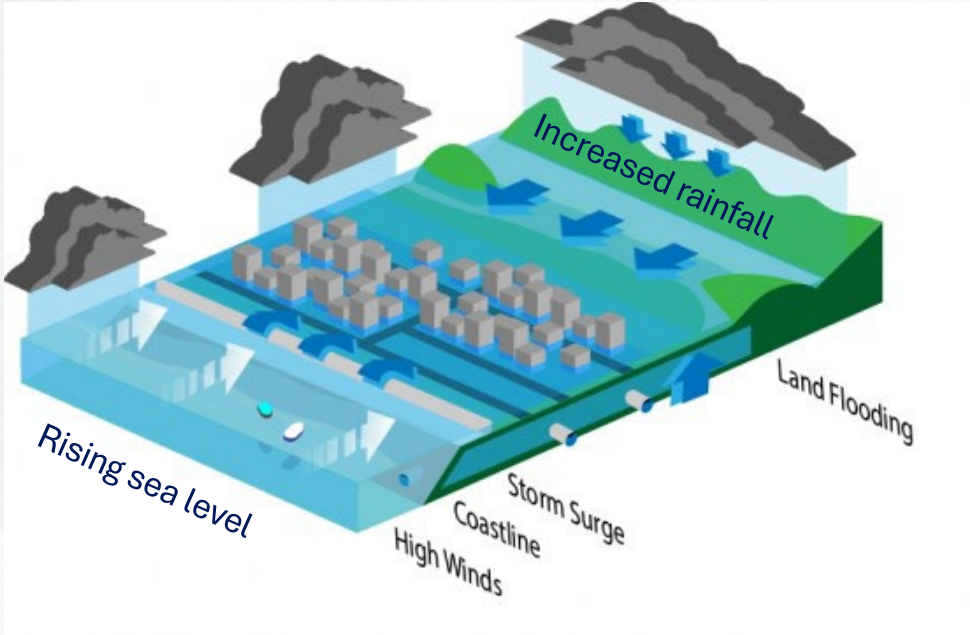
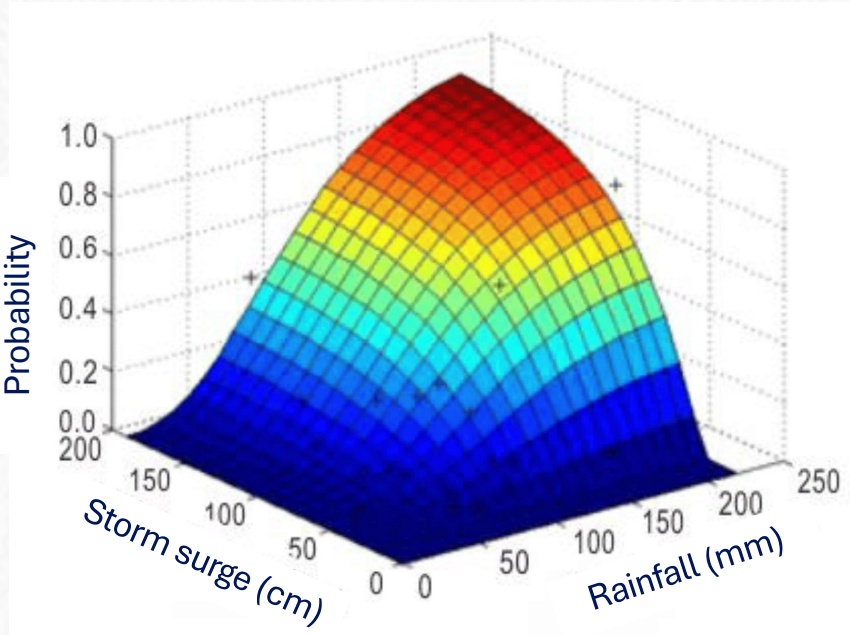
Predict Compound Flooding





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Questions?

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