Assessing Atlantic Hurricane Damage
Using Satellite Imagery and Pixel Analysis

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2021 CSUREMM Program
Final Presentation

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Hurricanes

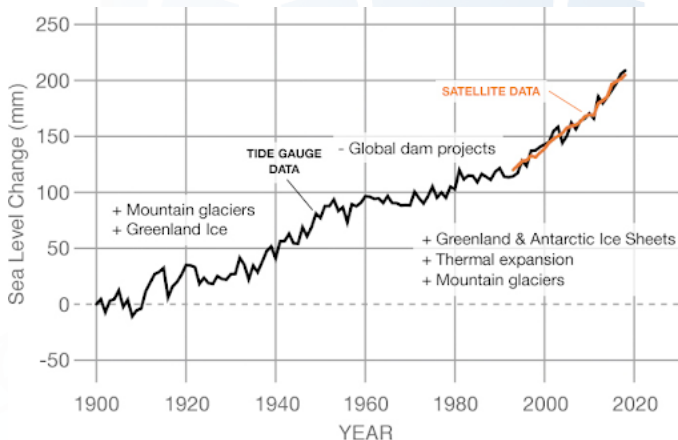Figure: NOAA, Hurricane Irma and Jose hitting the Caribbean, 2017

Sea Level Rise

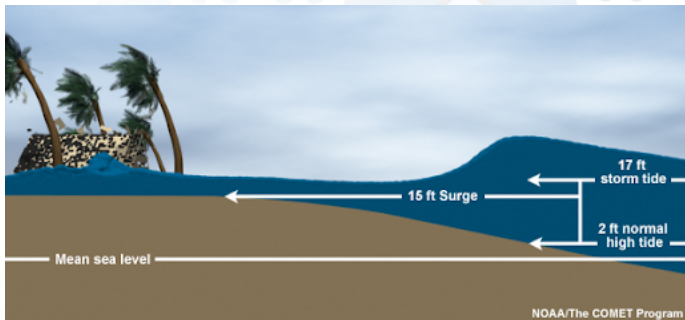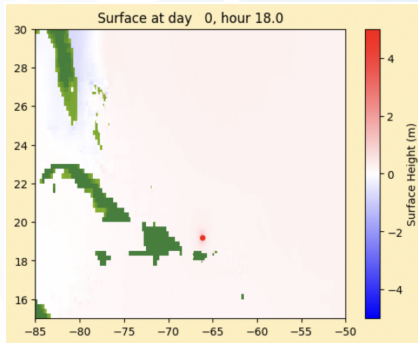Figure: NASA Climate, Sea Level Rise

Storm Surges

Figure: NOAA, Storm Surge Overview

Hurricane Paths

Figure: NOAA, Storm Surge Overview

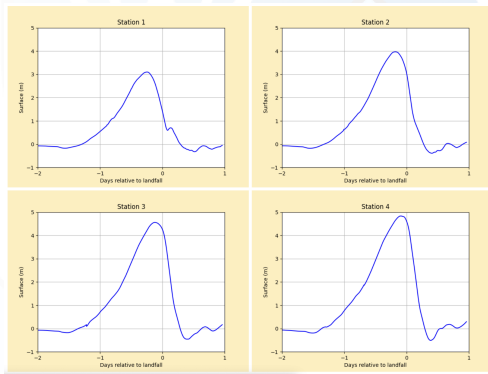# Satellite Images

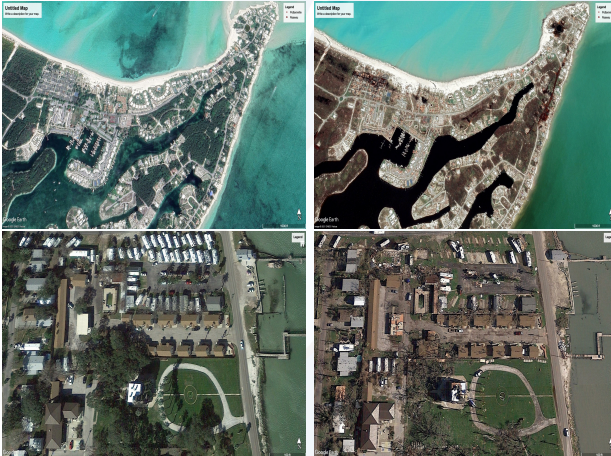# Clawpack Simulations

Shallow Water Equations

$$h_t + (hu)_x = 0$$
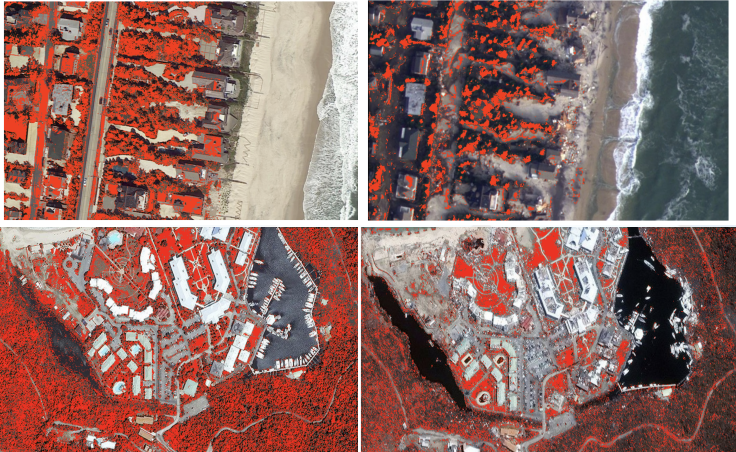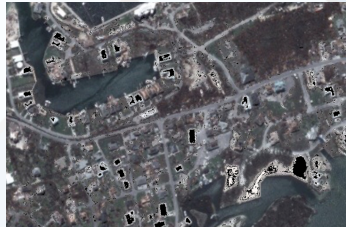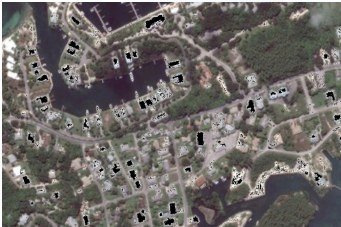$$(hu)_t + (hu^2 + \tfrac{1}{2}gh^2)_x = -ghb_x$$
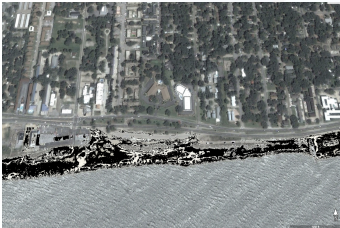
The Storm Surge Simulation
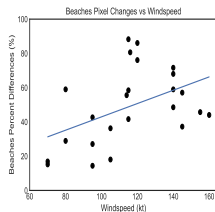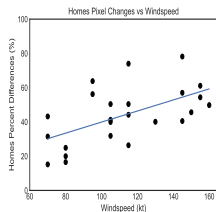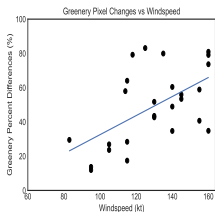
Normalization

Greenery Pixel Analysis

Homes Pixel Analysis
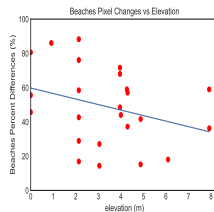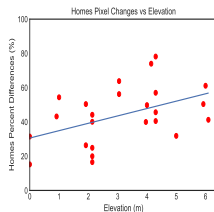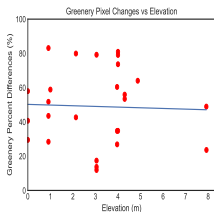
Beaches Pixel Analysis

Damage vs Windspeed

F-Test P-Values

Greenery Pixel Changes vs Windspeed : 0.0397
Homes Pixel Changes vs Windspeed : 0.00367
Beaches Pixel Changes vs Windspeed : 0.0253
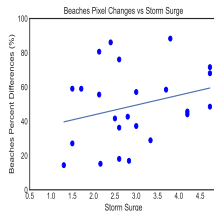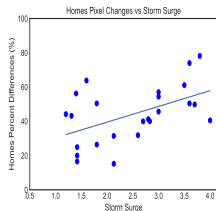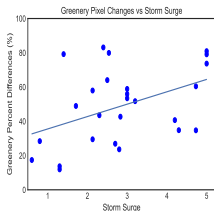
Damage vs Altitude

F-Test P-Values

Greenery Pixel Changes vs Elevation : 0.531

Homes Pixel Changes vs Elevation : 0.0246

Beaches Pixel Changes vs Elevation : 0.141
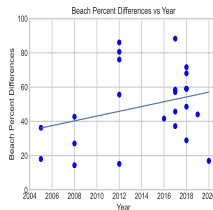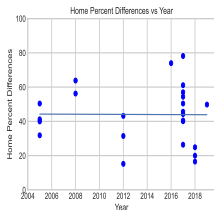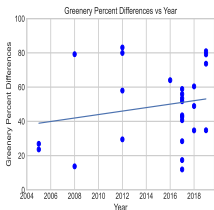
Damage vs Storm Surge
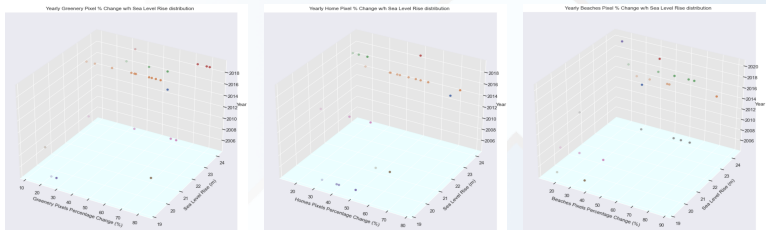

F-Test P-Values

Greenery Pixel Changes vs Storm Surge : 0.007700
Homes Pixel Changes vs Storm Surge : 0.0118
Beaches Pixel Changes vs Storm Surge : 0.202

Yearly Percent Differences

Yearly Sea Level Rise on Damage

Future Work