Balancing Nature & Management: Humans and the Recovery of Coastal Dunes

Christy Swann, PhD, RCOAST
Trey Cloutier, RCOAST

RCOAST

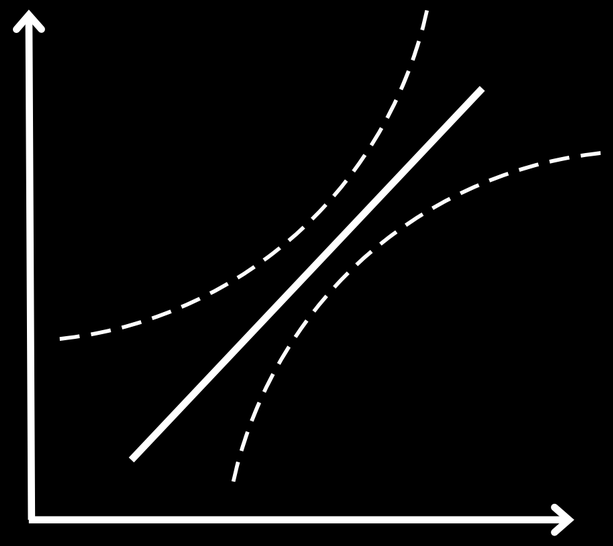
a data company for coastal resilience

OUR MISSION

management decisions + nature makes for
a difficult relationship with our coasts

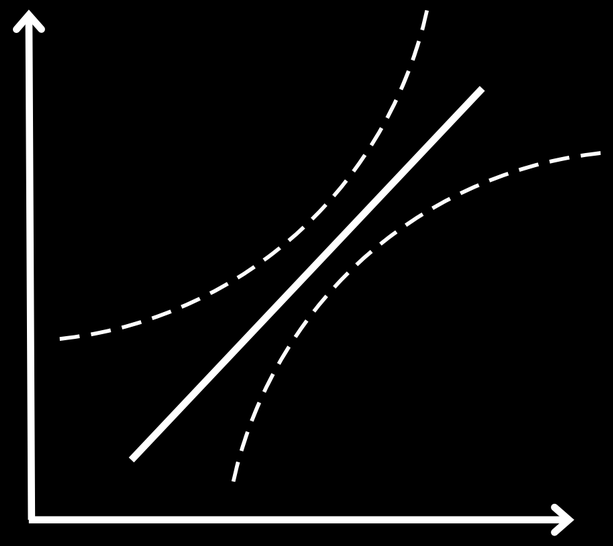
RODANTHE

OUR MISSION



Modeling coastal change is hard

OUR MISSION



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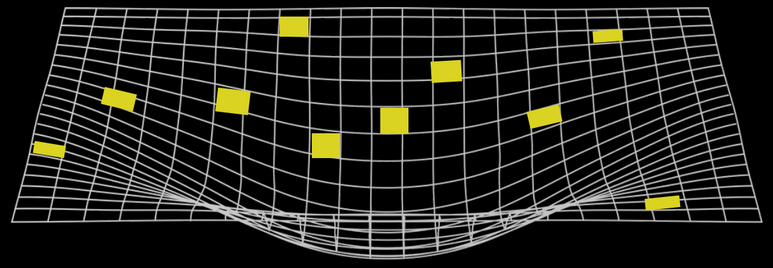
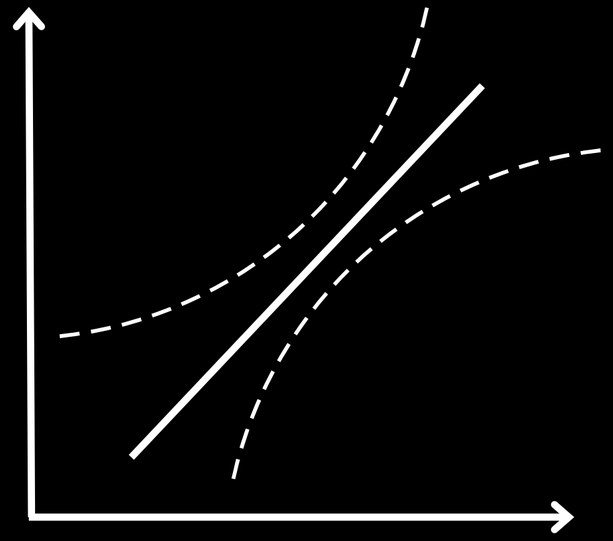


2D & 3D predictions over a 4D problem

OUR MISSION



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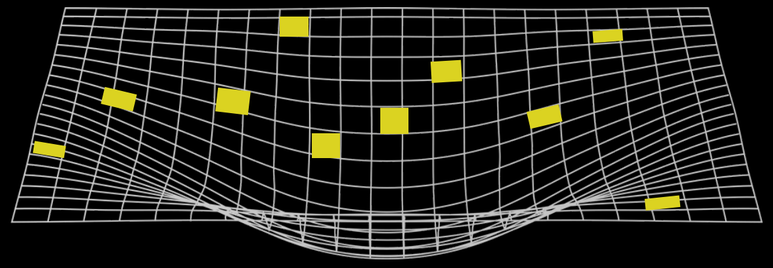

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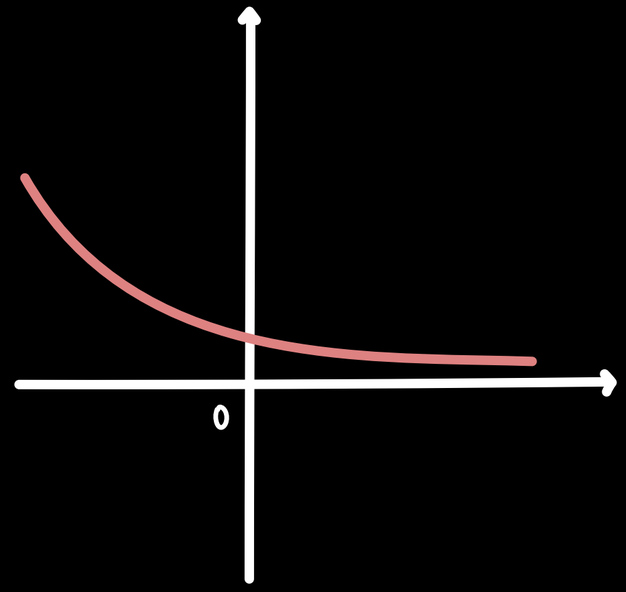
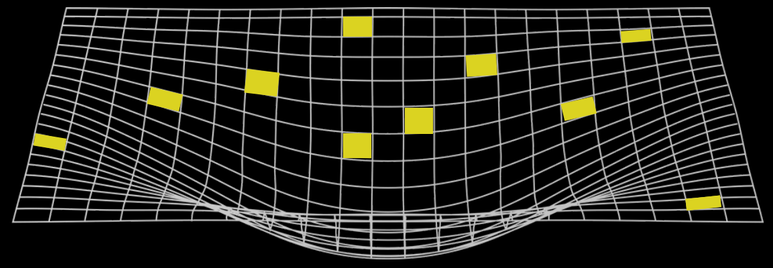


Collecting data is expensive (time & money)

OUR MISSION



What mitigation works, and where?

OUR MISSION

to build a 3D Mitigation Library of what mitigation works and where

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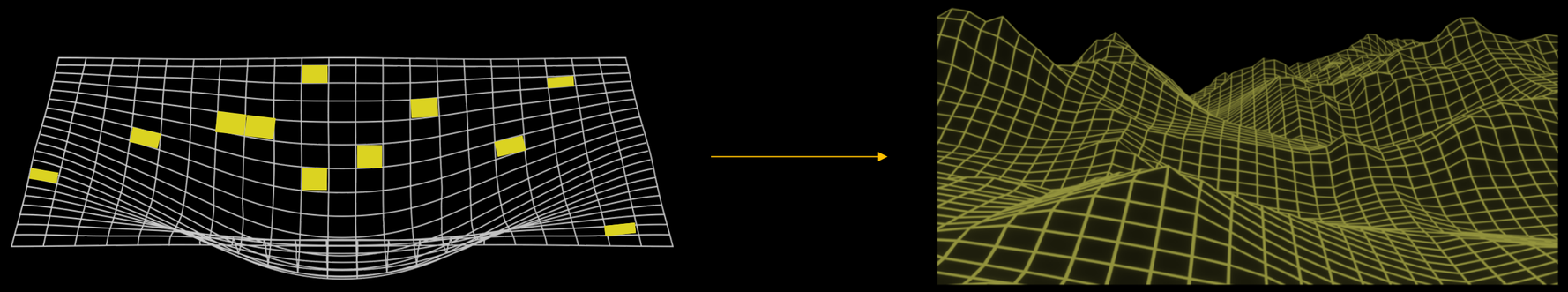

OUR 3D LIBRARY

Repeat
LiDAR &
RGB Data

Feature
Classification

Volumetric
Change
Detection

Winds
Waves
Tides
Precip
Vegetation

Mitigation
Performance
Metrics

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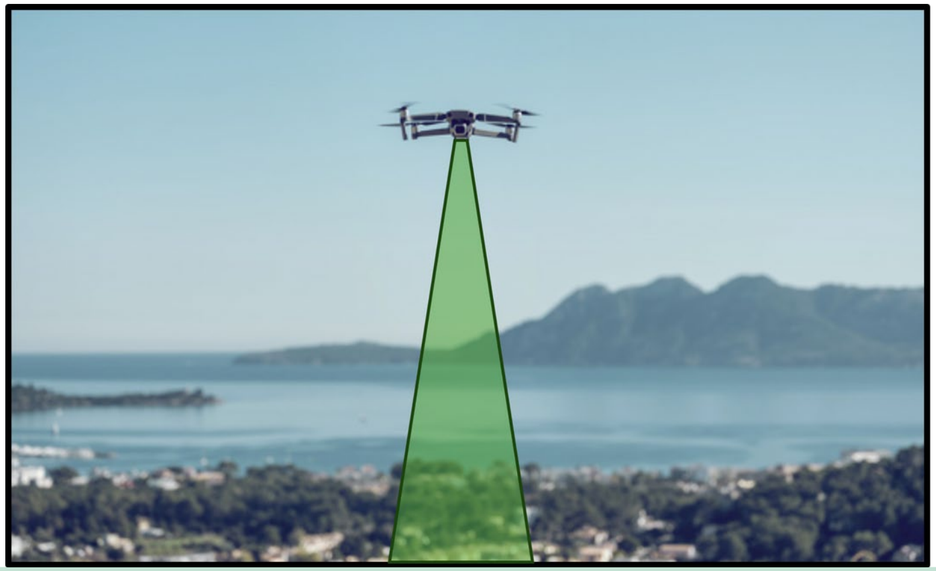
3D MITIGATION LIBRARY

we **collect** and **analyze**
data of mitigation change



3D MITIGATION LIBRARY

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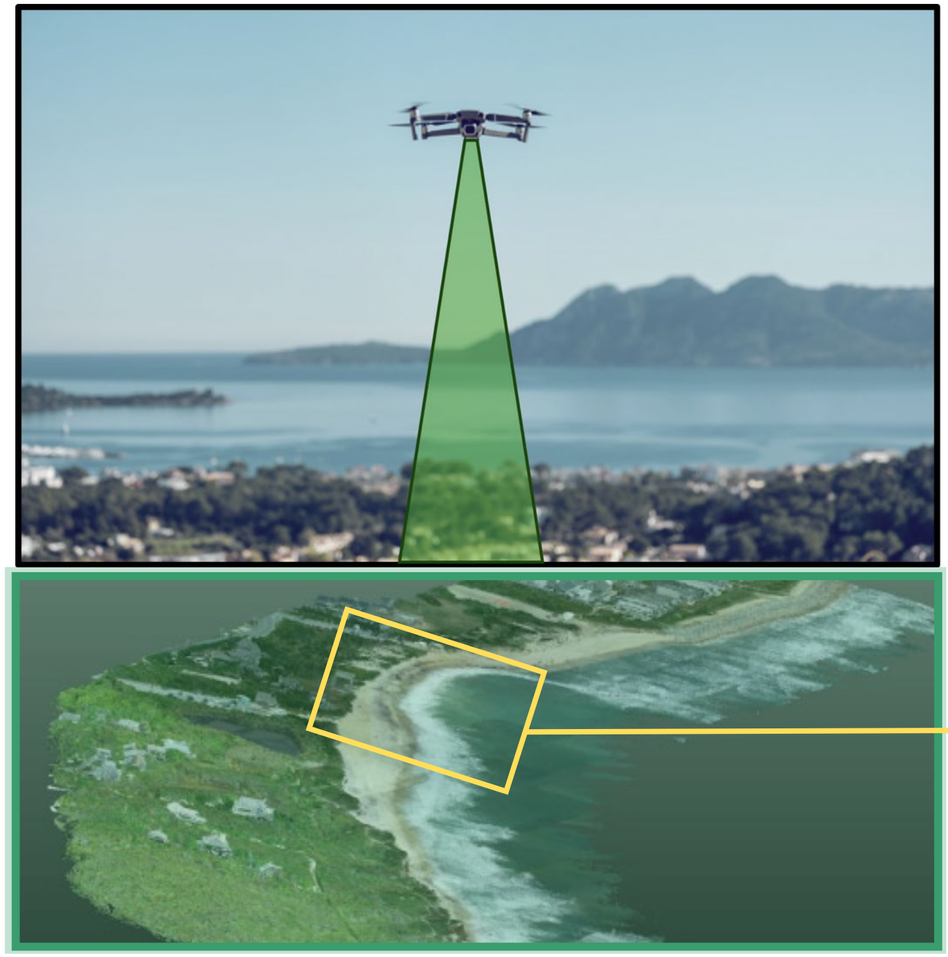
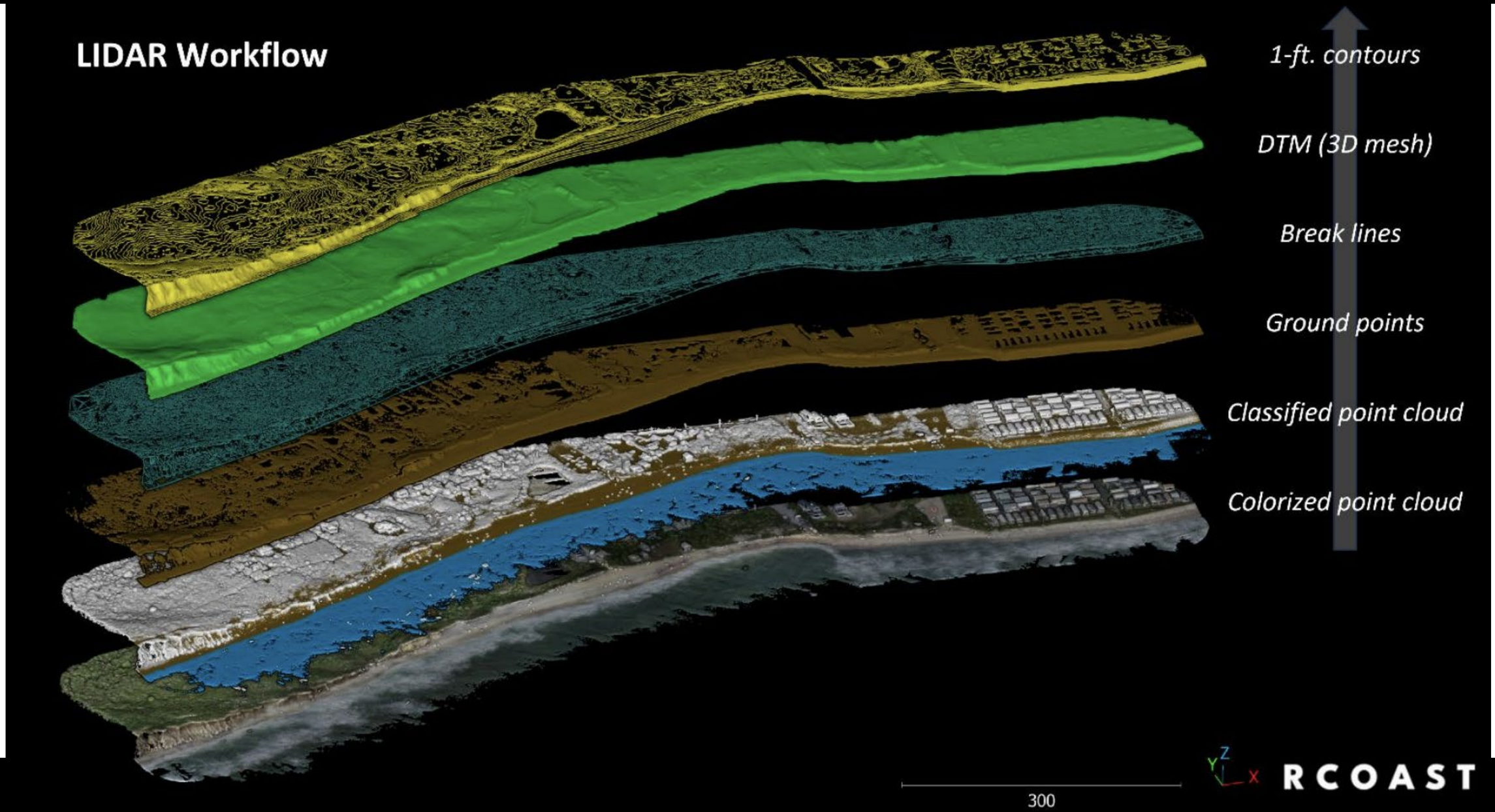


we **measure the performance** of **mitigation** by **repeat** scanning and **continuous** observation

recurring 3D Data (3 scans per year) & **continuous satellite** observation

- 3D topography using LiDAR
- wind, waves, tides, precipitation, total water level, vegetation
- storm frequency
- latest flood models
- flood history
- change over time

LIDAR + CLASSIFICATION



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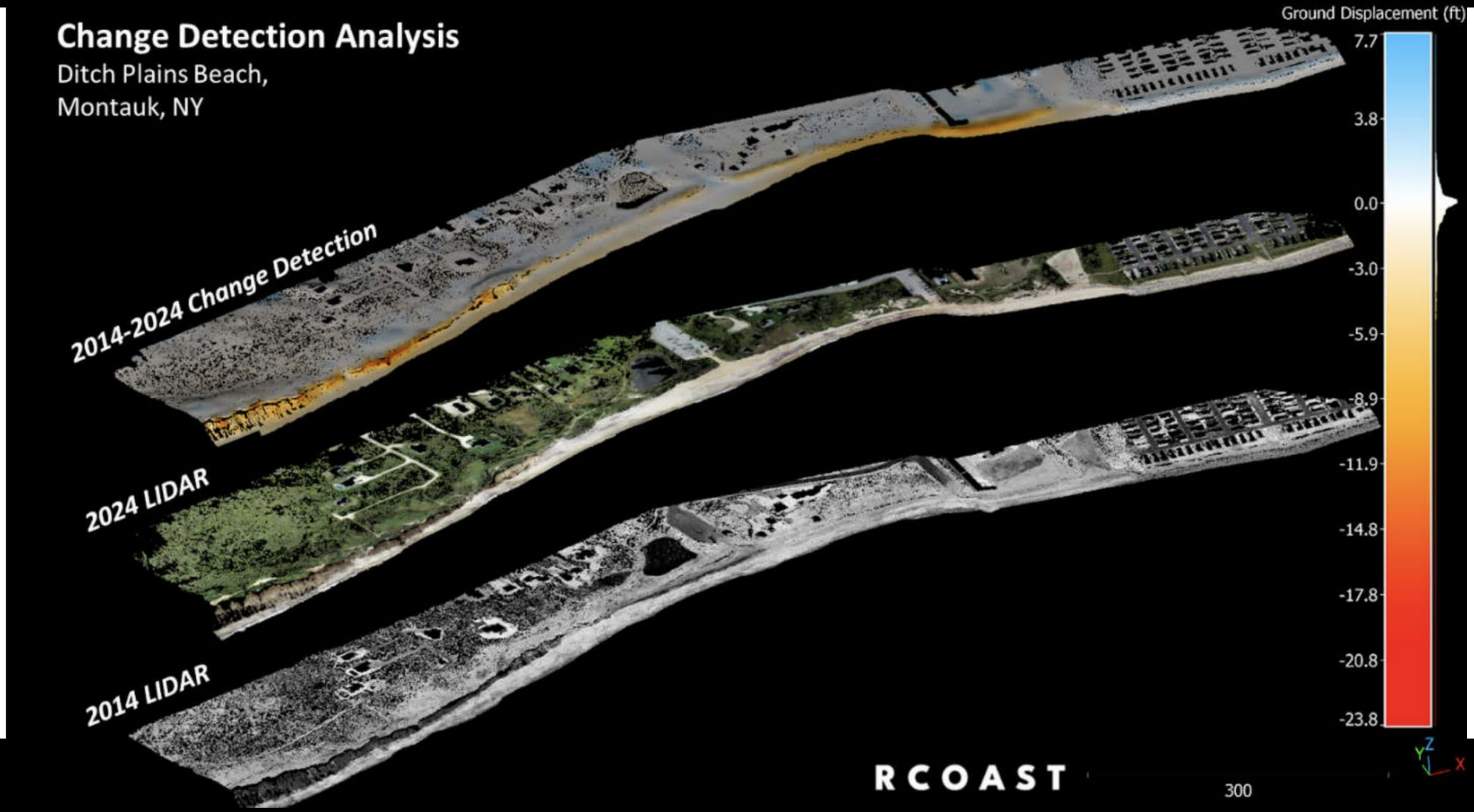
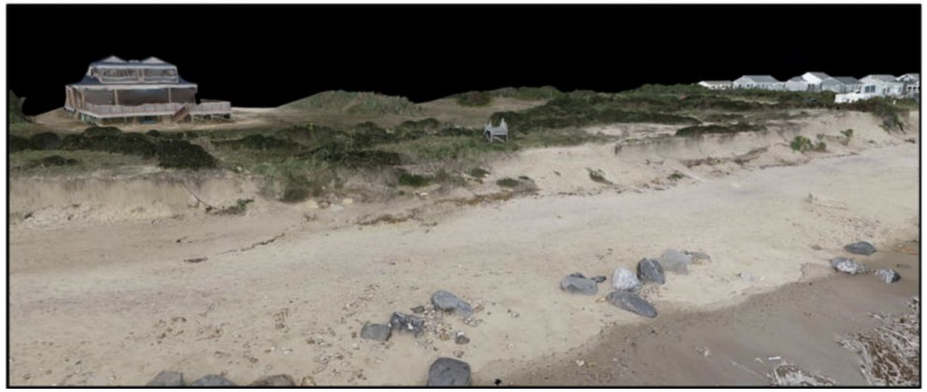


RGB 3D MODEL + CLASSIFICATION



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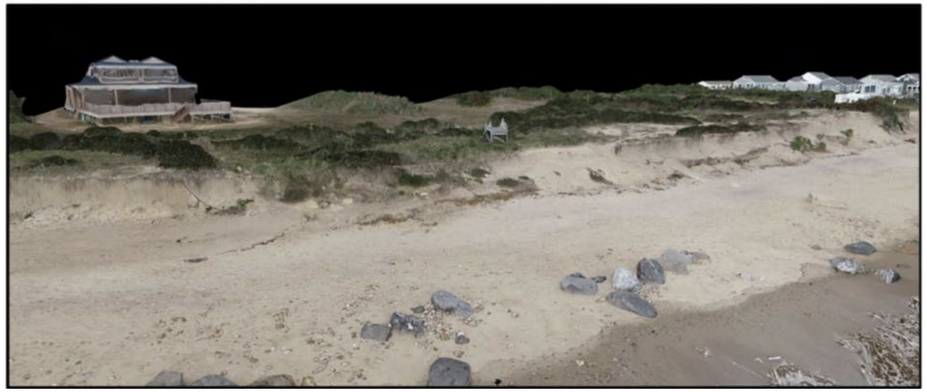

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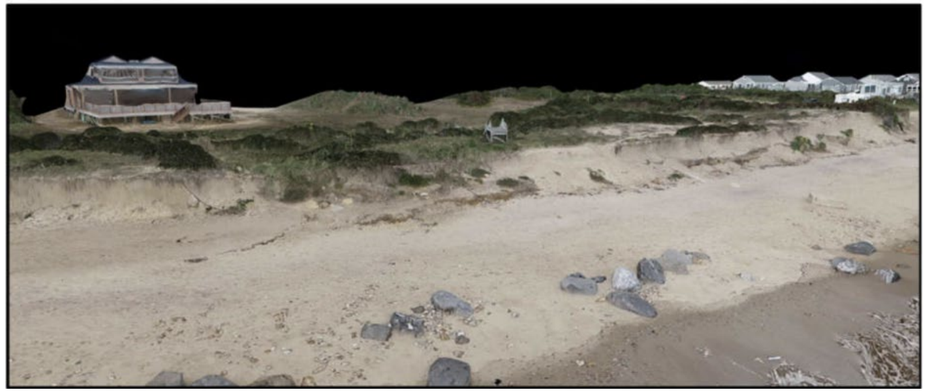
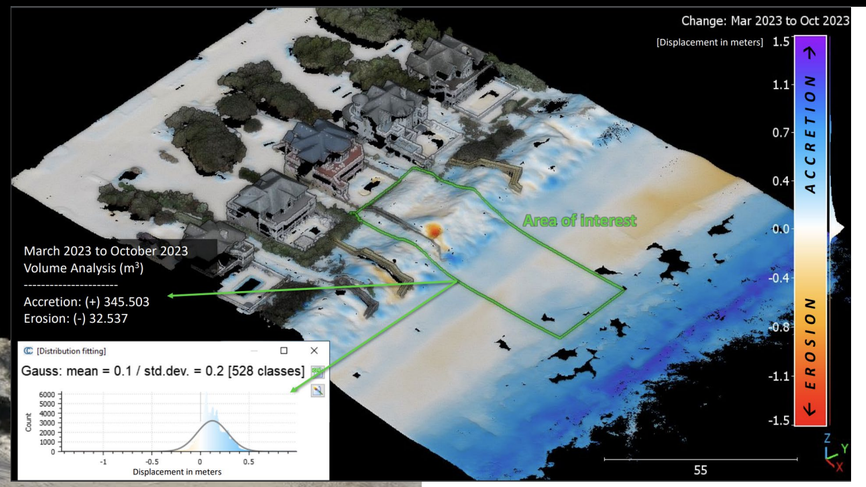


MITIGATION OVER TIME



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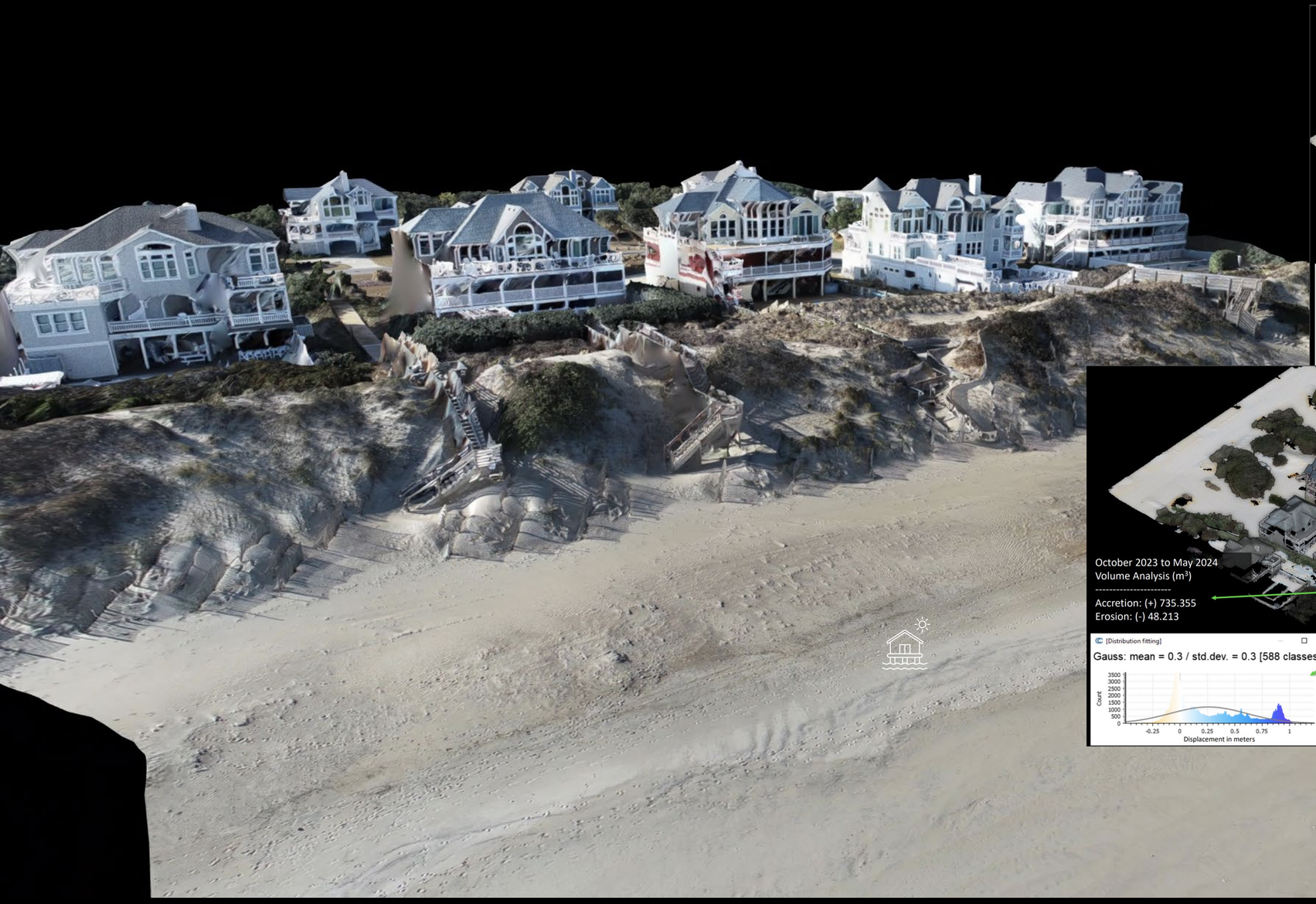
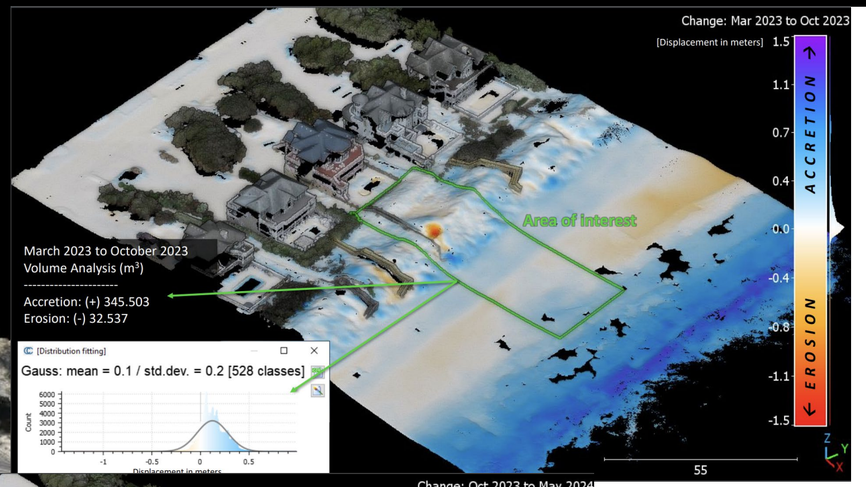
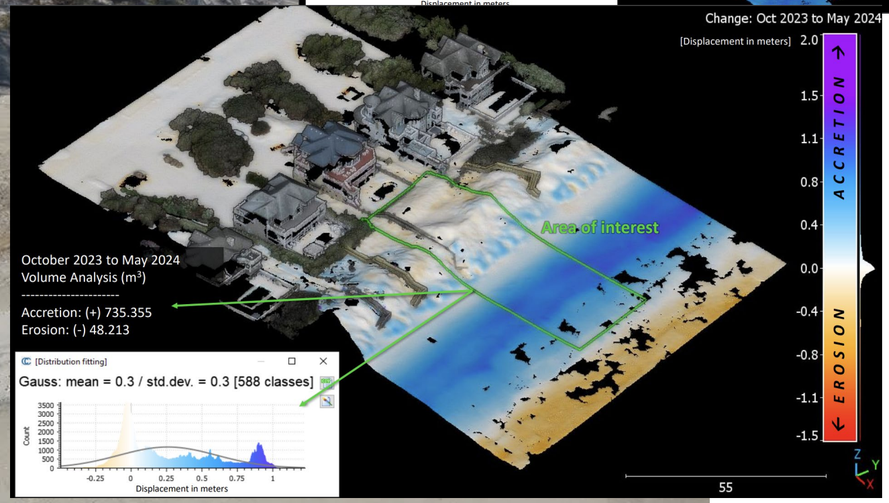
MITIGATION OVER TIME







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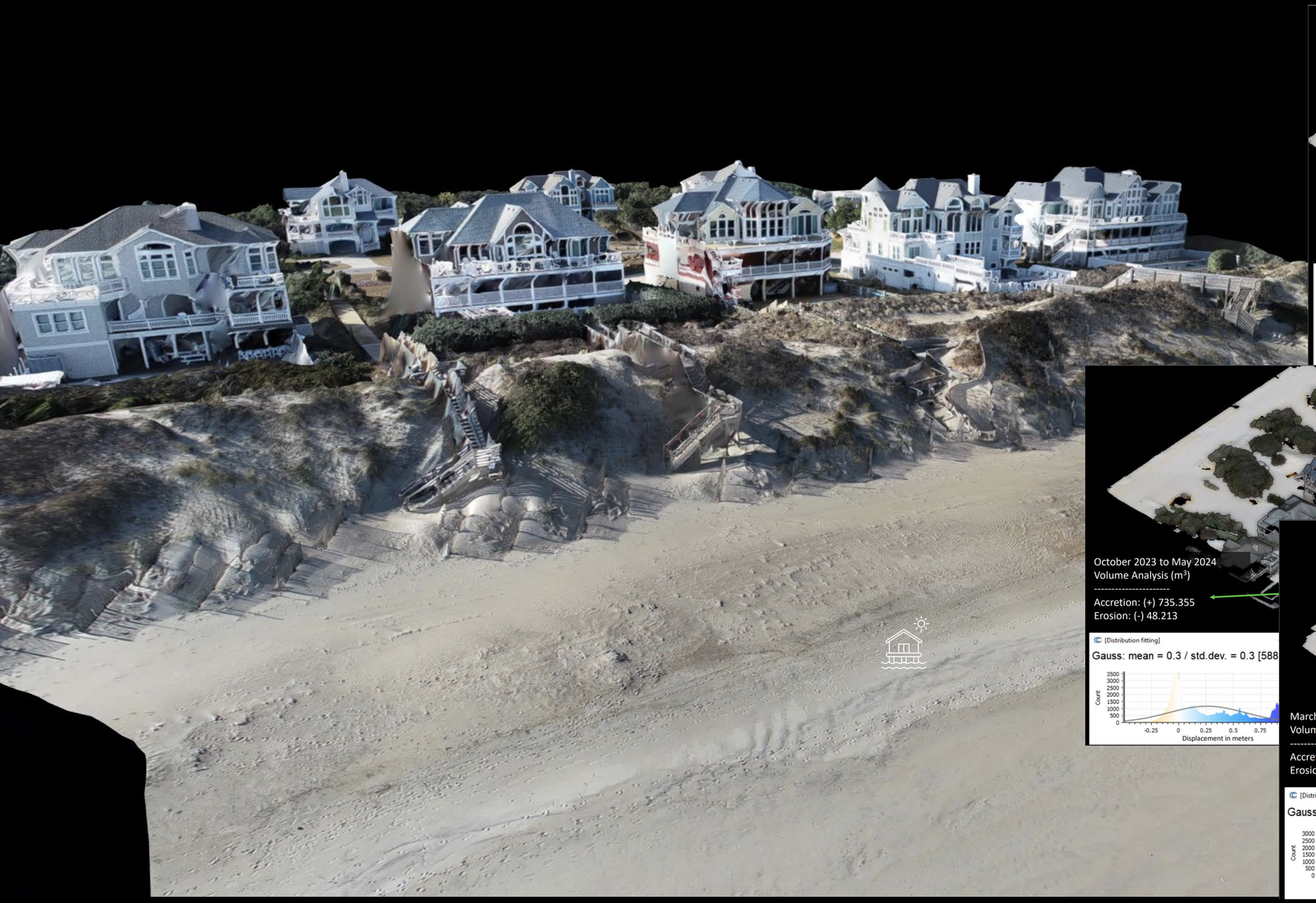

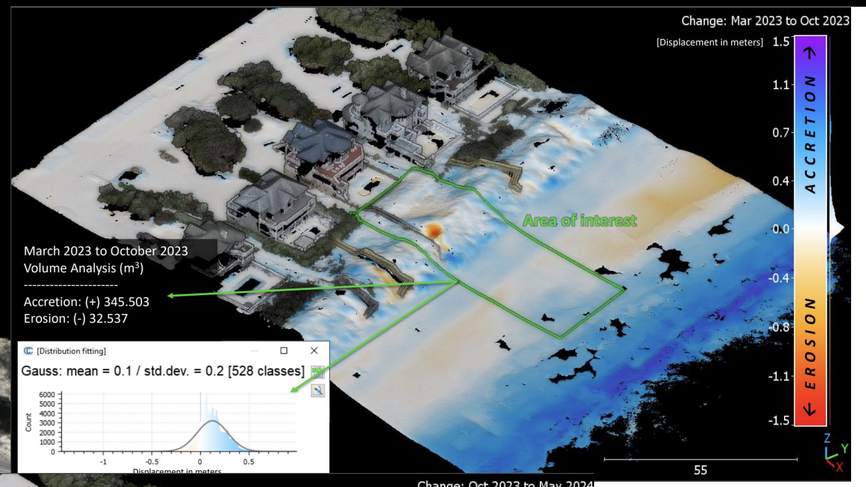

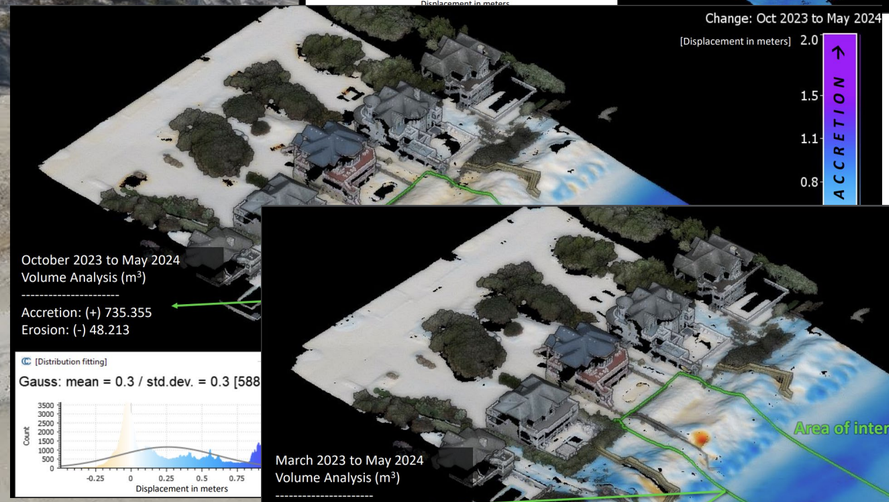

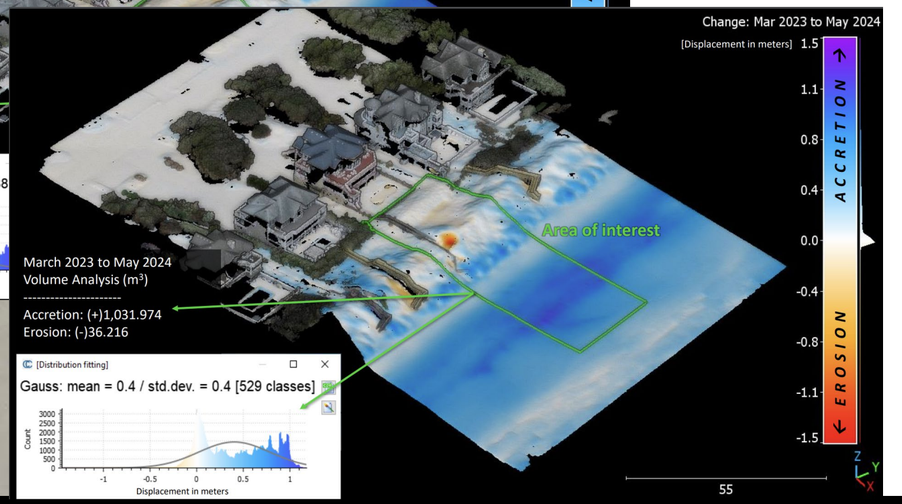

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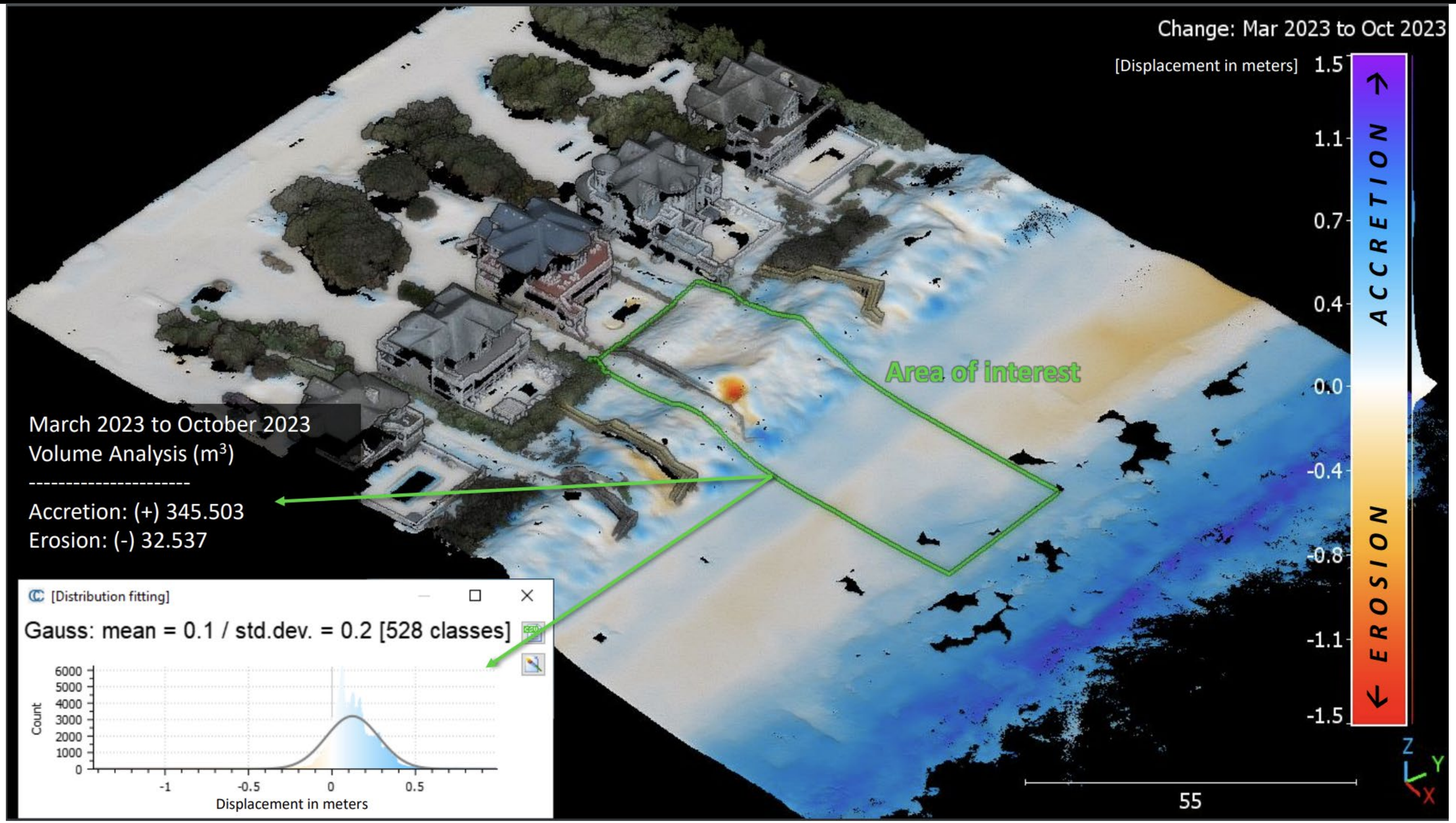

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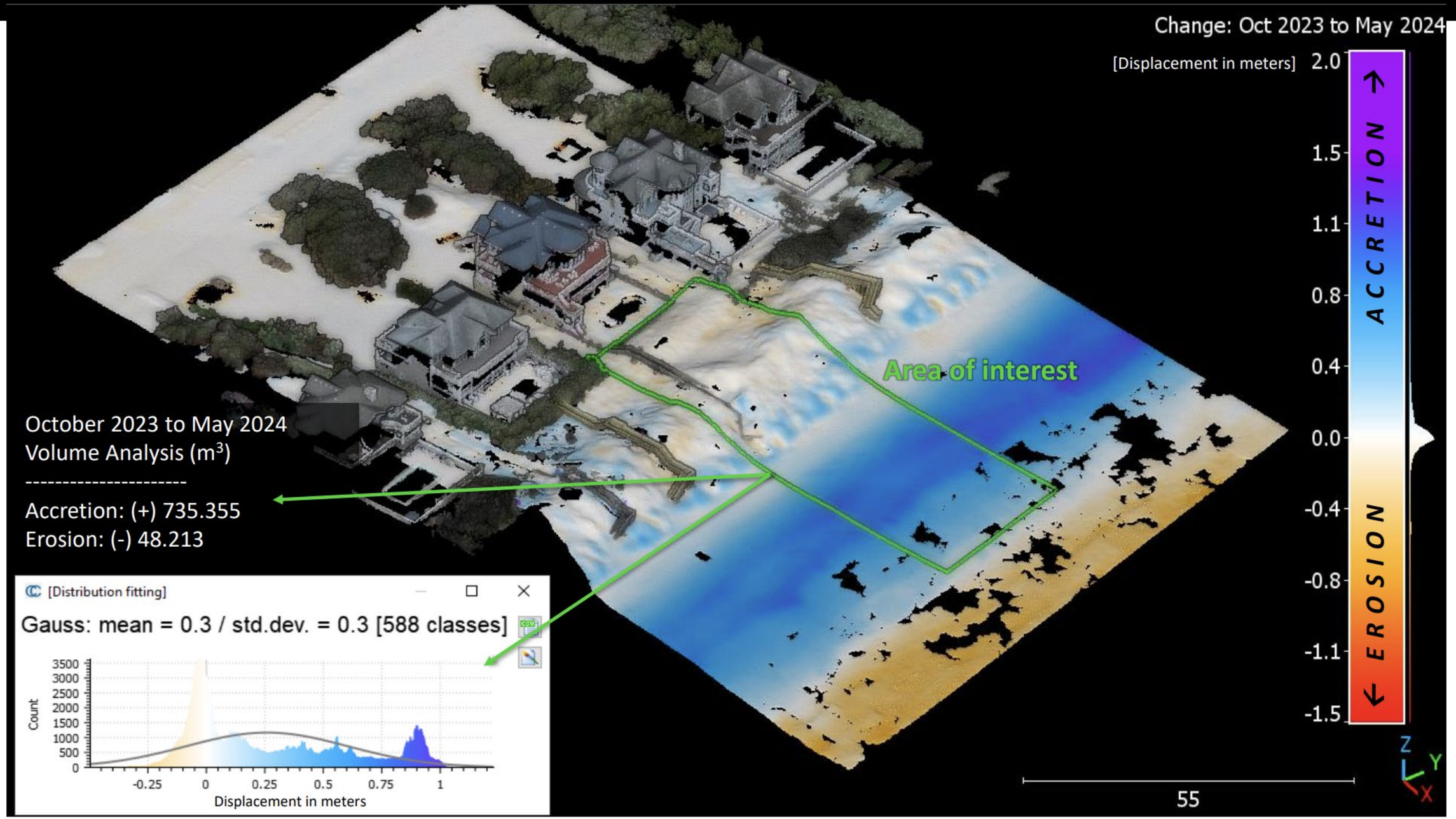

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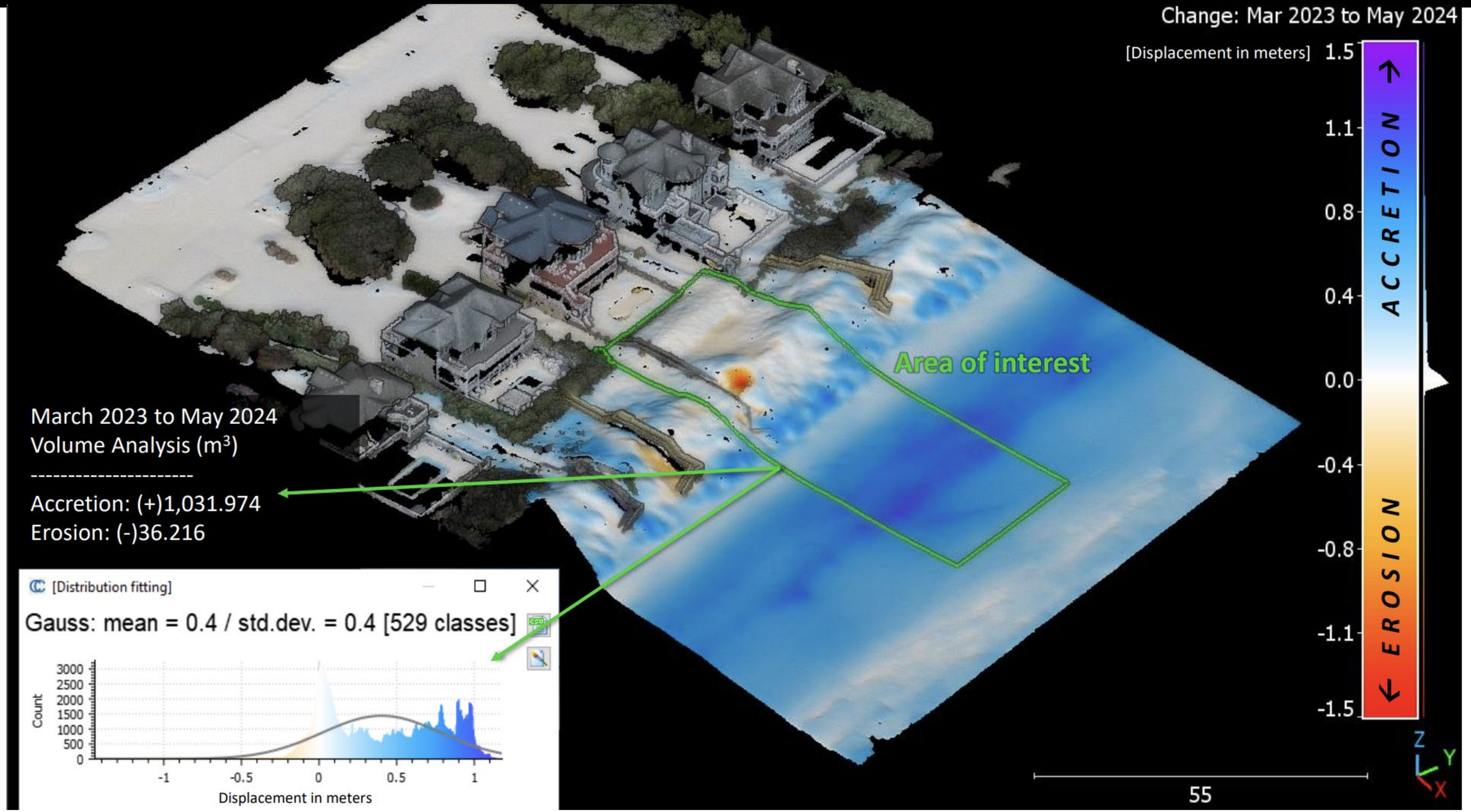
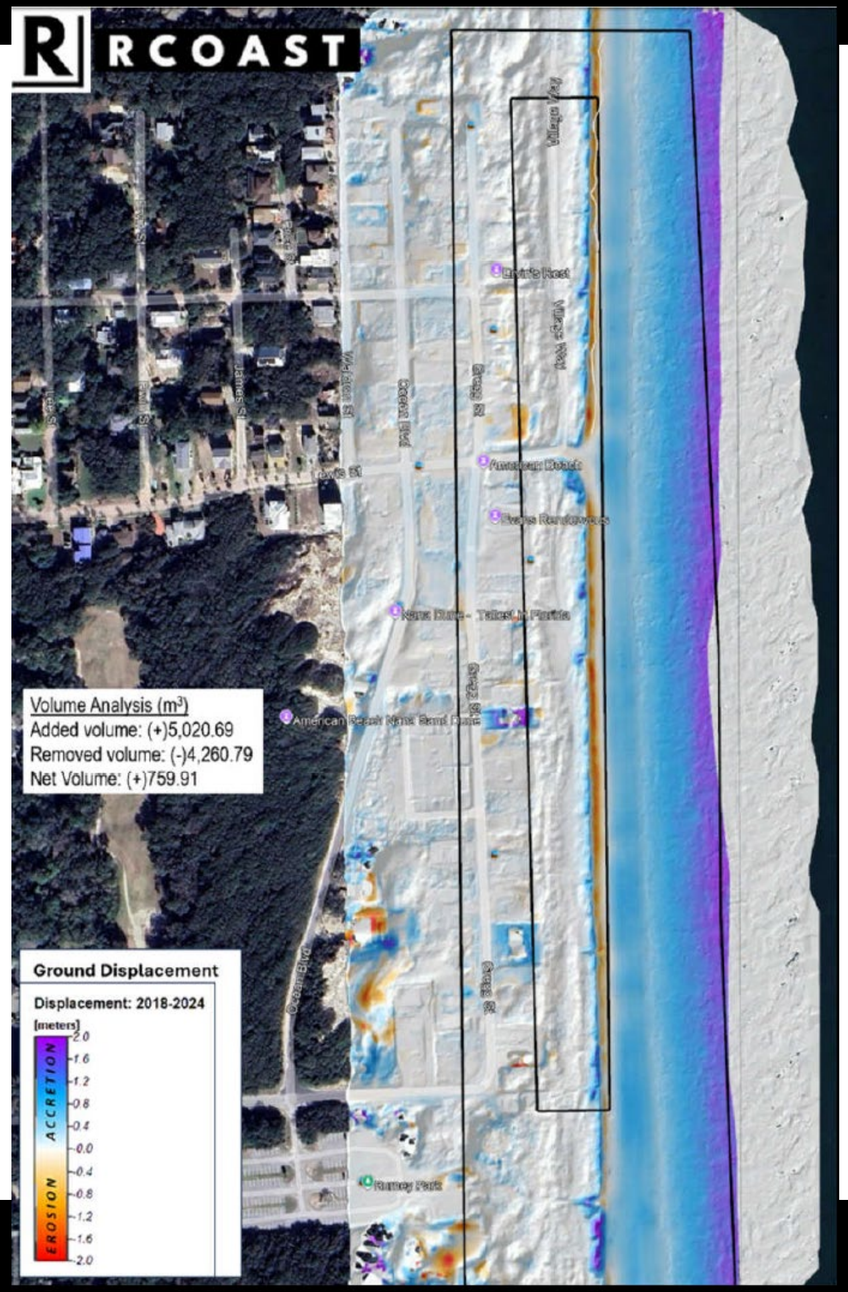
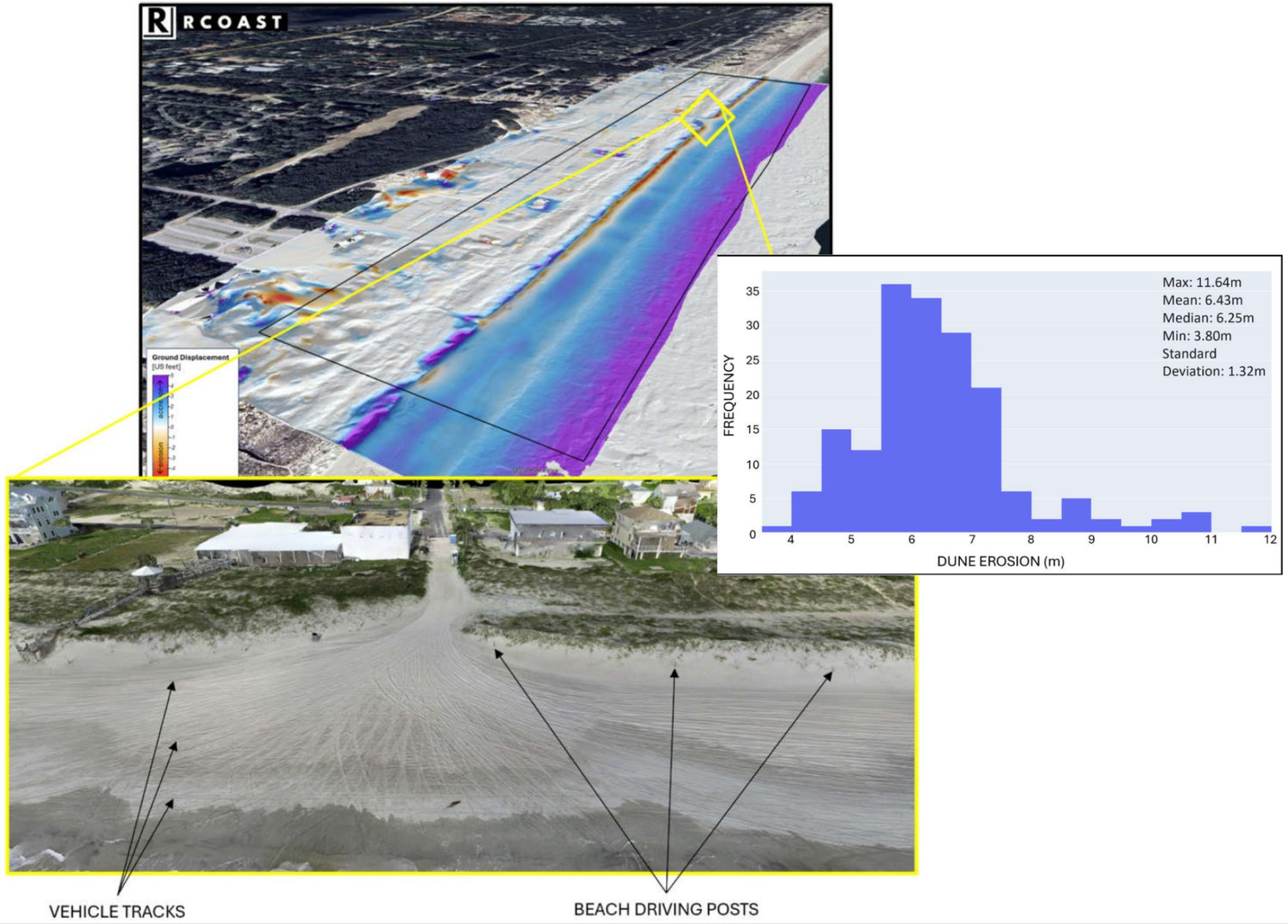


AMERICAN BEACH, FLORIDA





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AMELIA ISLAND, FLORIDA

LiDAR volumetric measurements of dunes

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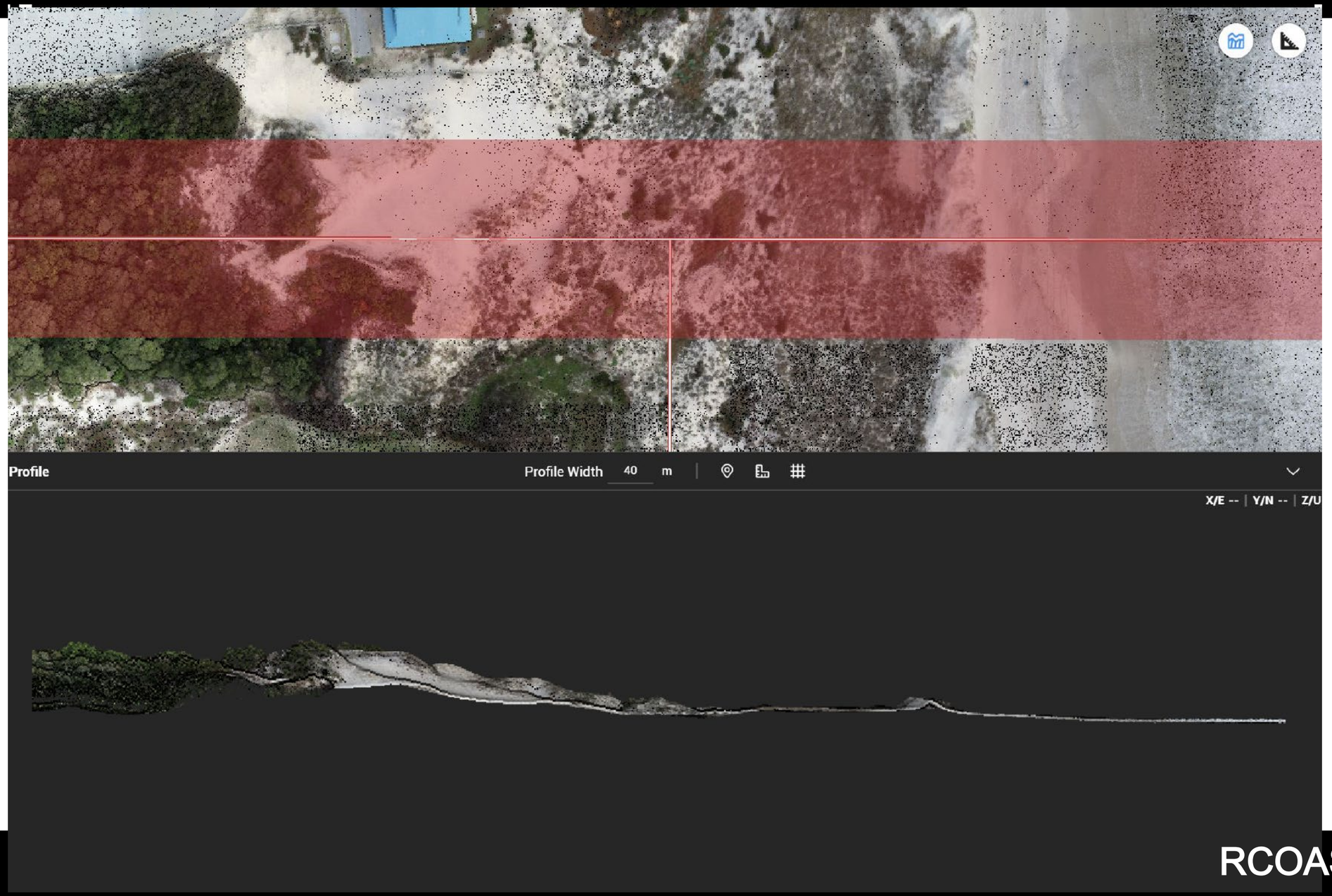

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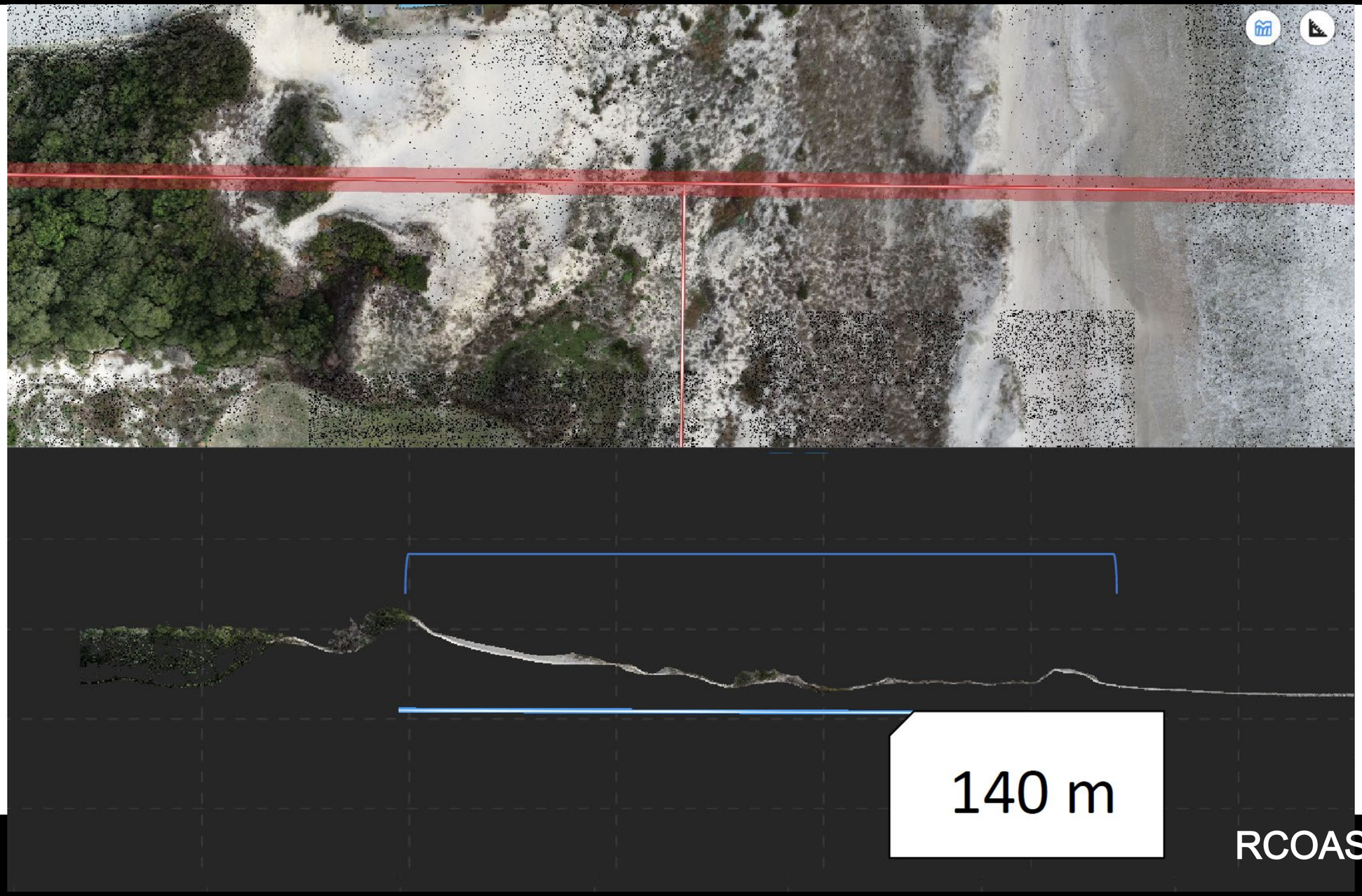

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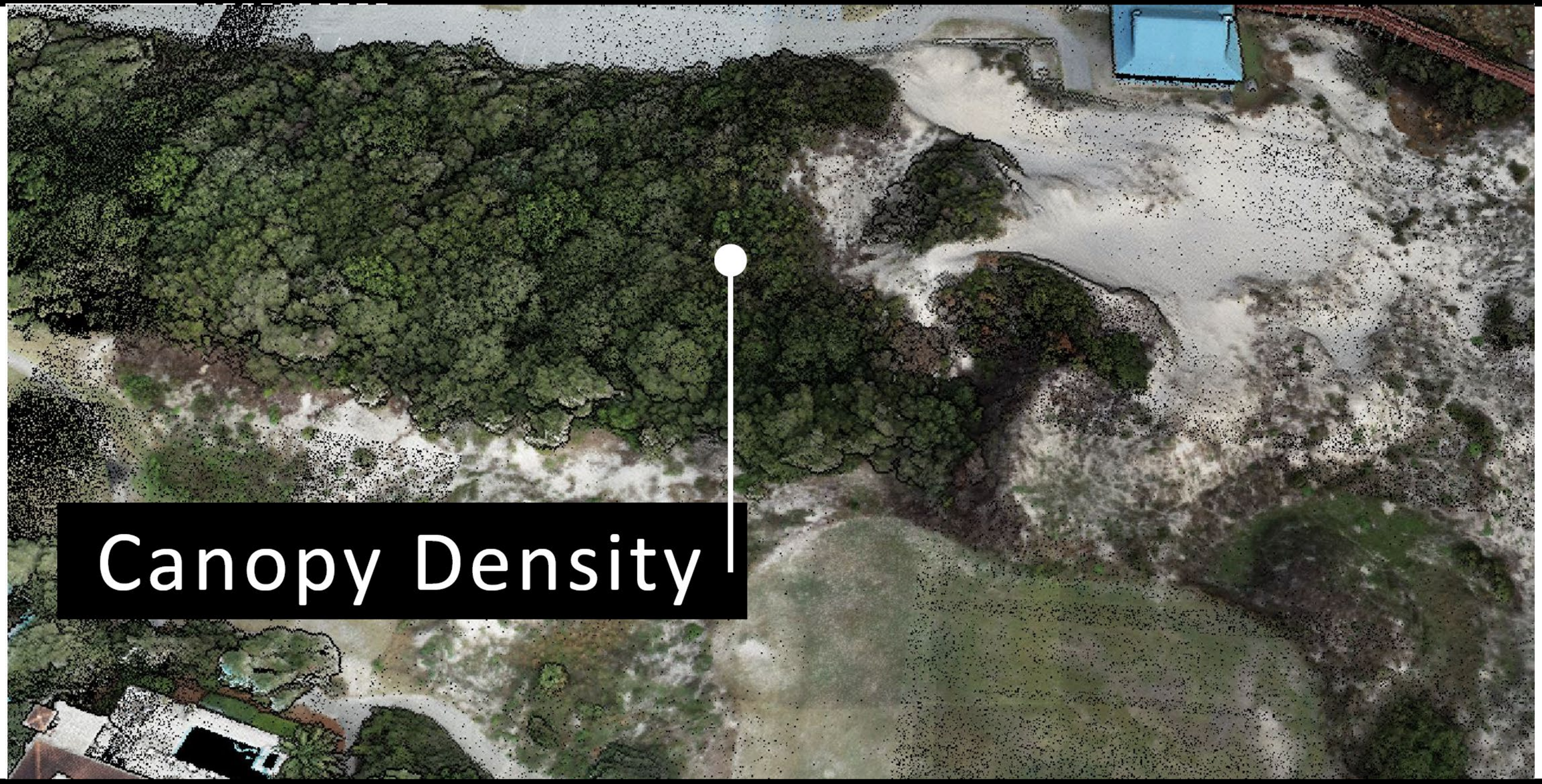
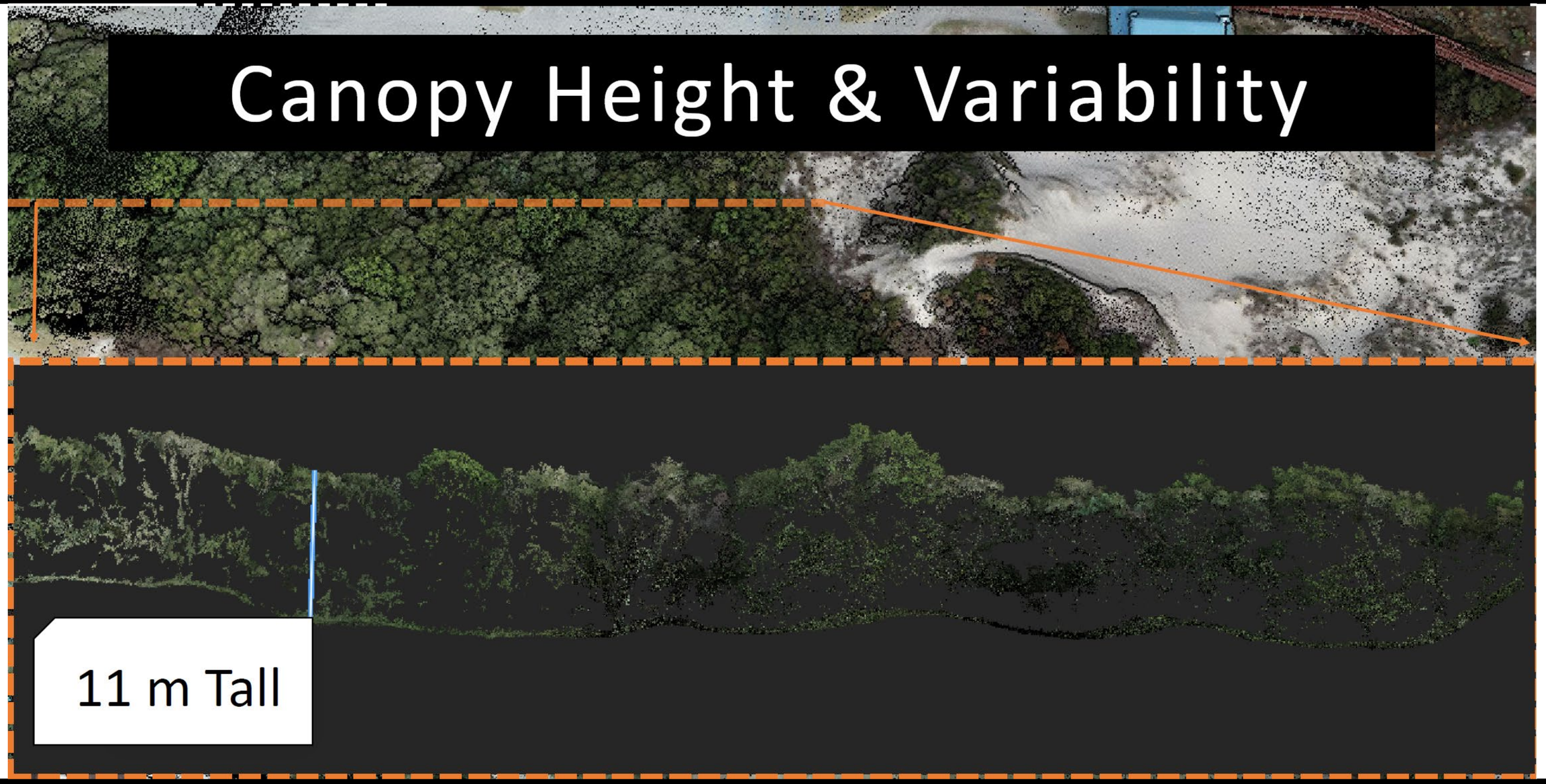
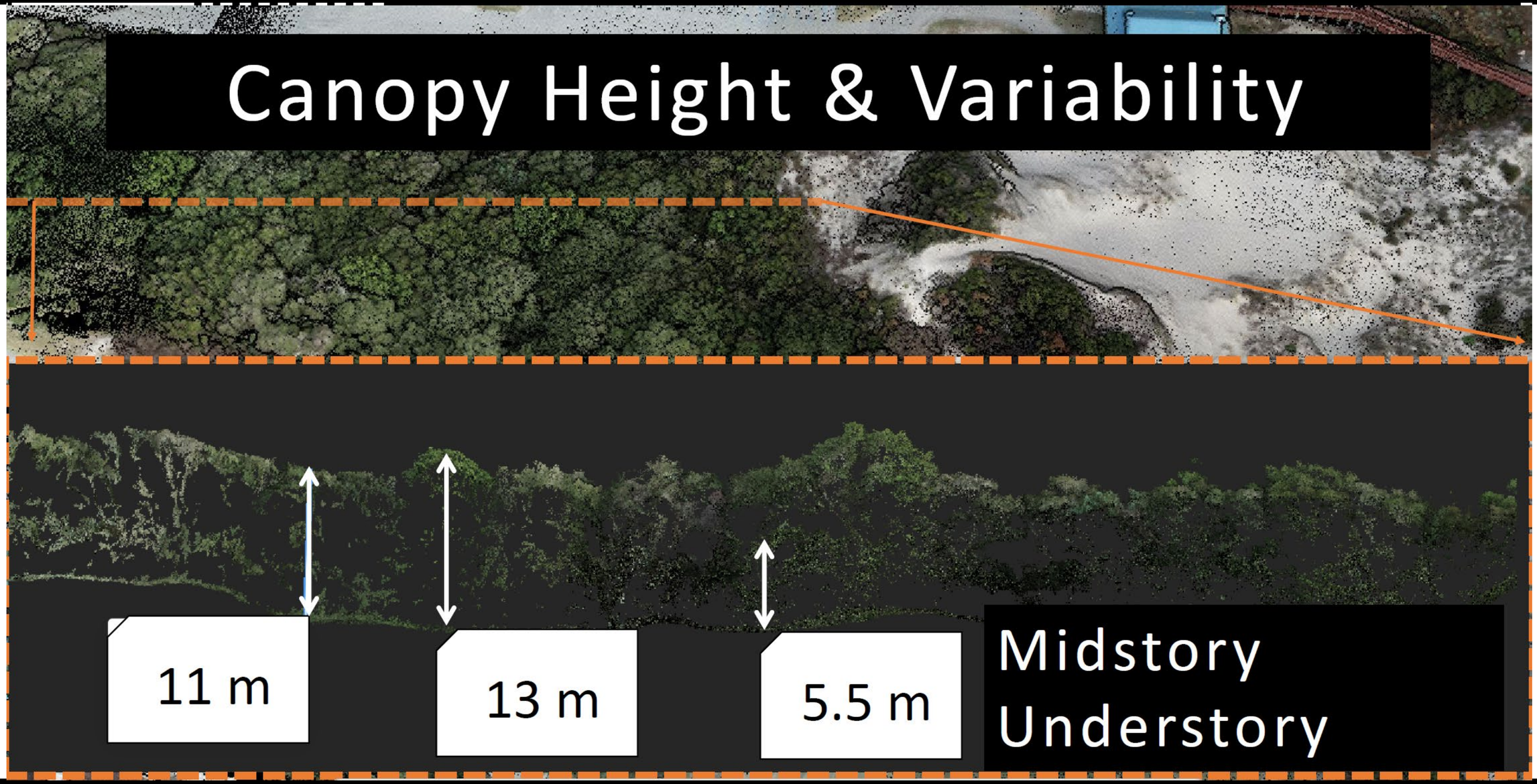


AMELIA ISLAND, FLORIDA

Canopy Height & Variability



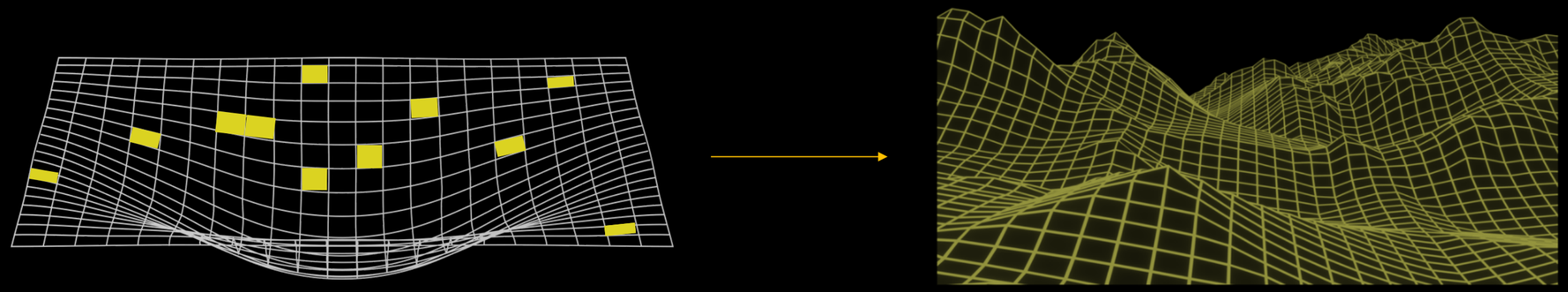
AMELIA ISLAND, FLORIDA



RCOAST

MACHINE LEARNING

to build a 3D Mitigation Library of what mitigation works and where



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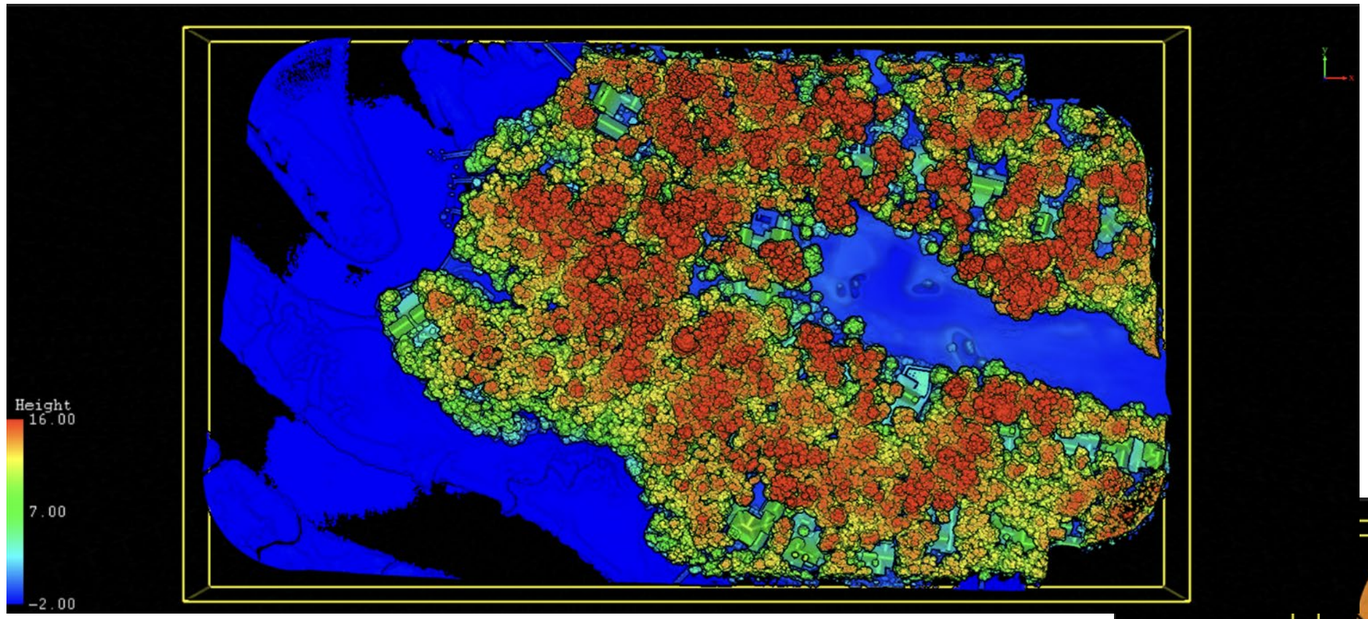
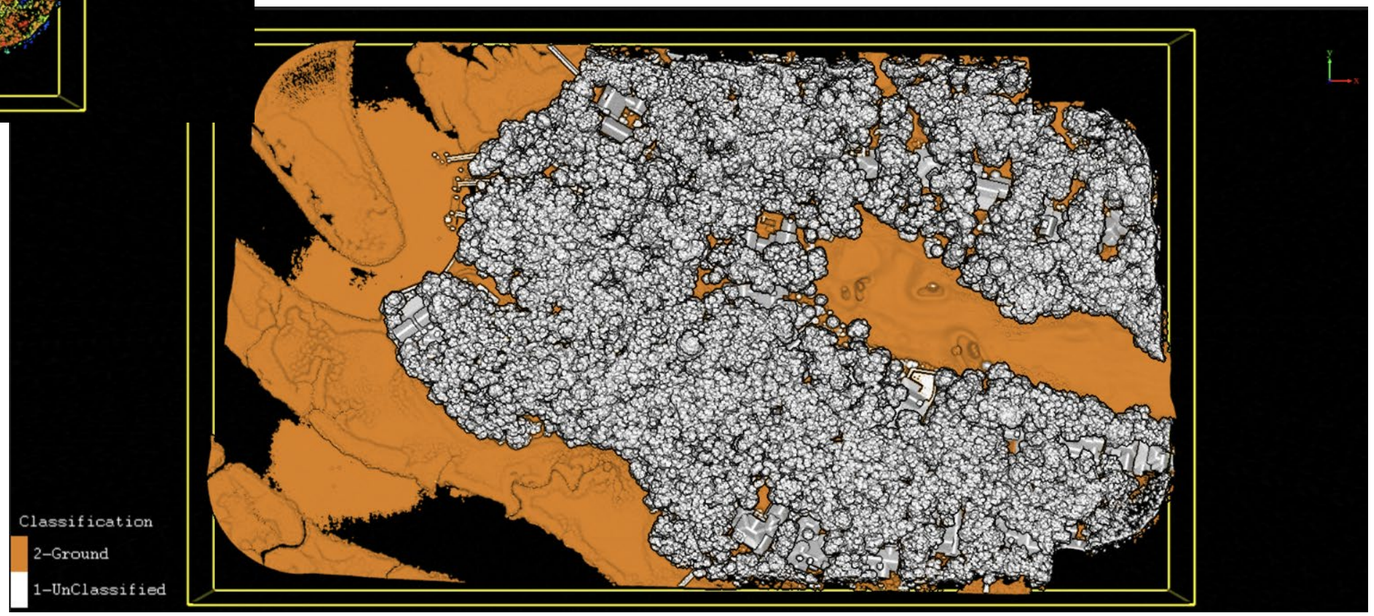


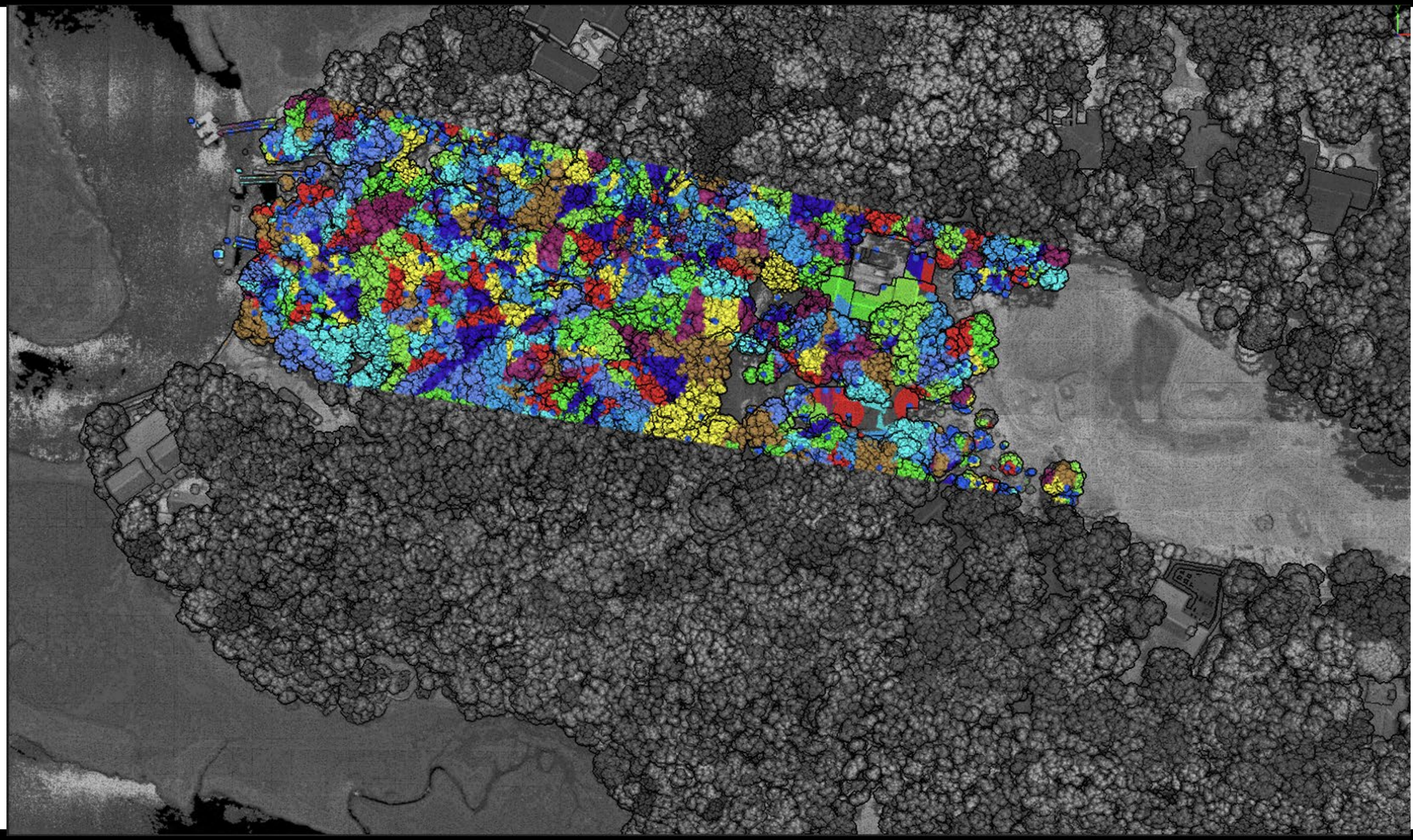
height
species
crown
dbh



high res
classification

MACHINE LEARNING

train to predict



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