

# **Notes from the field:**

## **4 cases of geoinformatics applications for ocean sciences**

Alonso Gonzalez

**NOVA IMS**



# Introduction

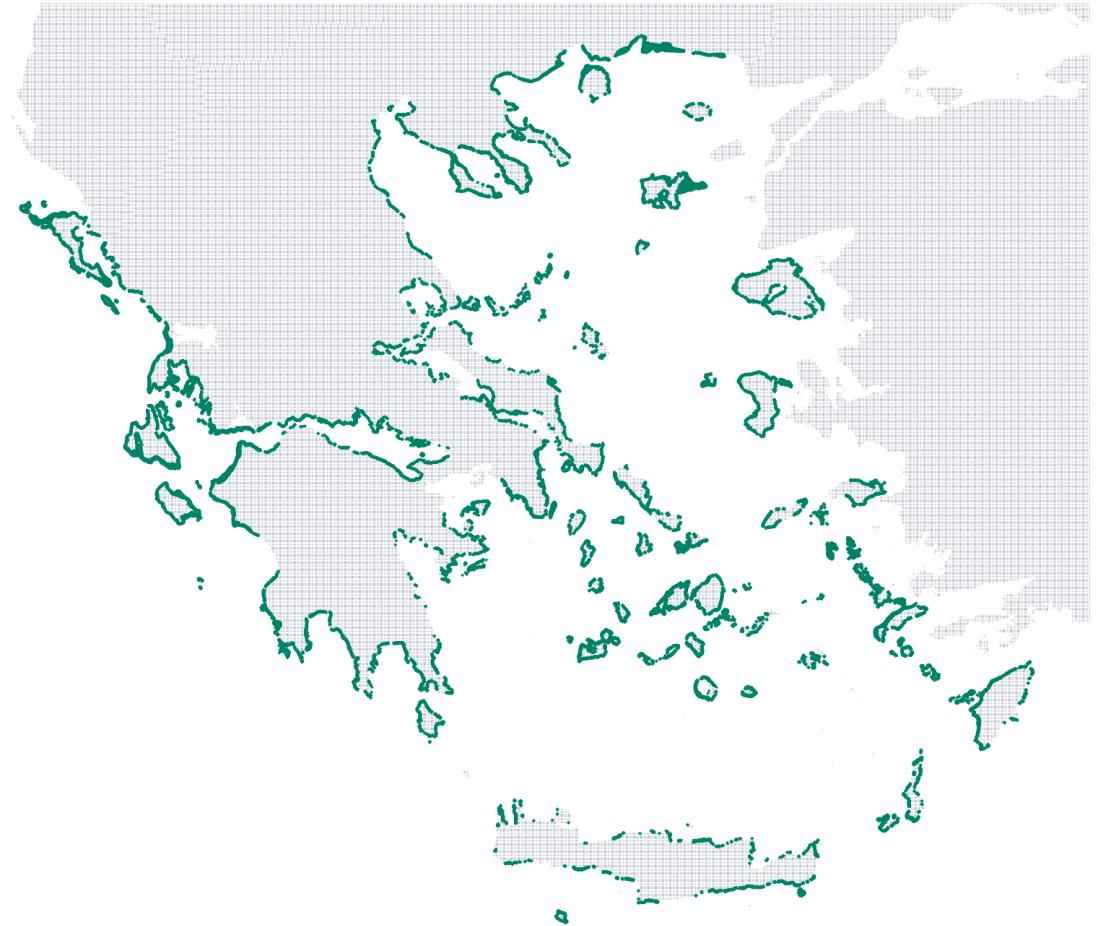
## Posidonia Oceanica meadows



# Introduction

## The distribution of seagrass

- Posidonia Oceanica is declining at alarming rates due to climate change and human activities.
- There has been a limited effort to combine all the spatial information available and provide a complete distribution of meadows across the basin



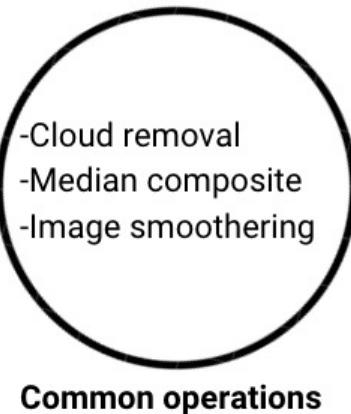
**Map 1**

Distribution of Posidonia Oceanica in Greece

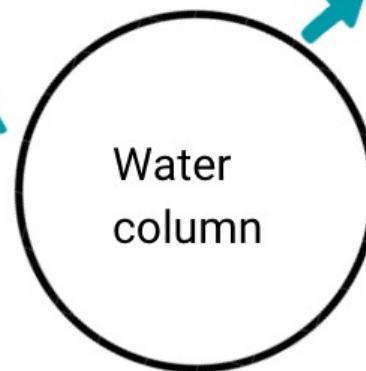
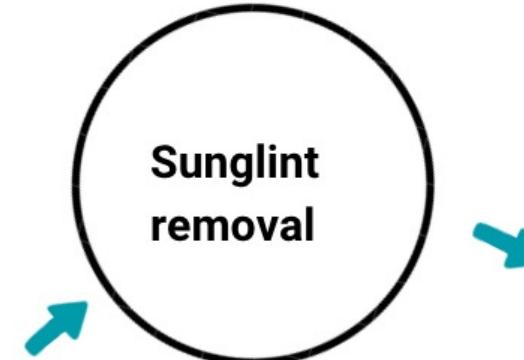
# Seagrass mapping algorithm

## Diagram 1

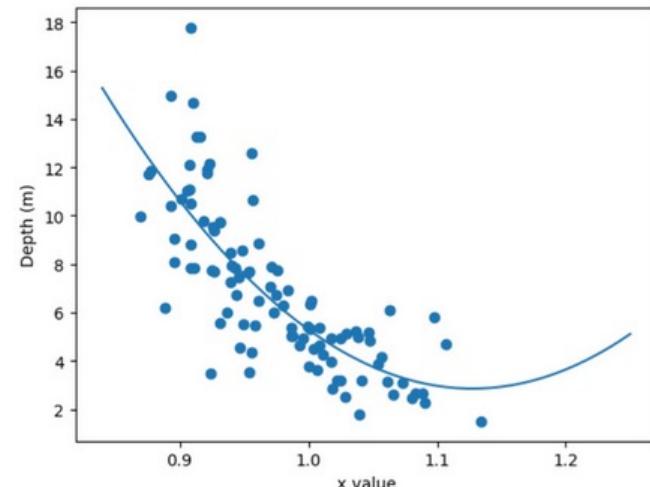
Algorithm to map seagrass meadows,  
Archipelagos Institute for Marine Conservation

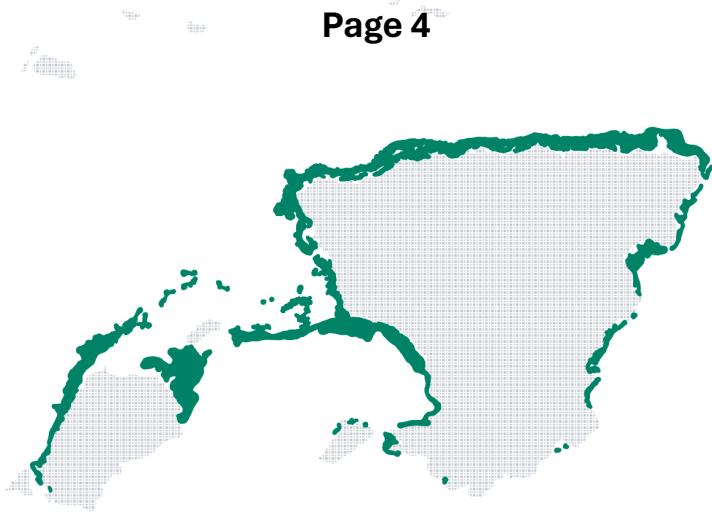
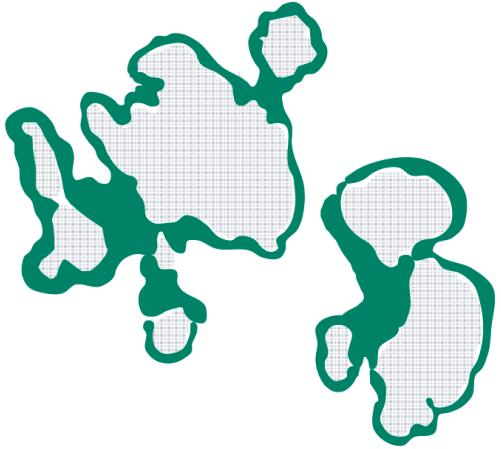


Relating the influence of  
NIR on B2, B3, B4

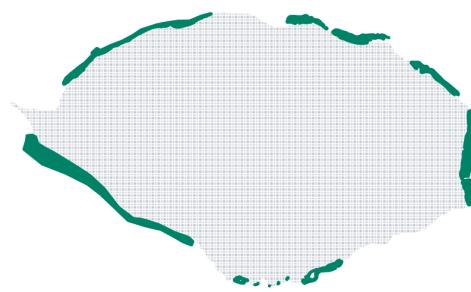


depth & the attenuation  
coefficient



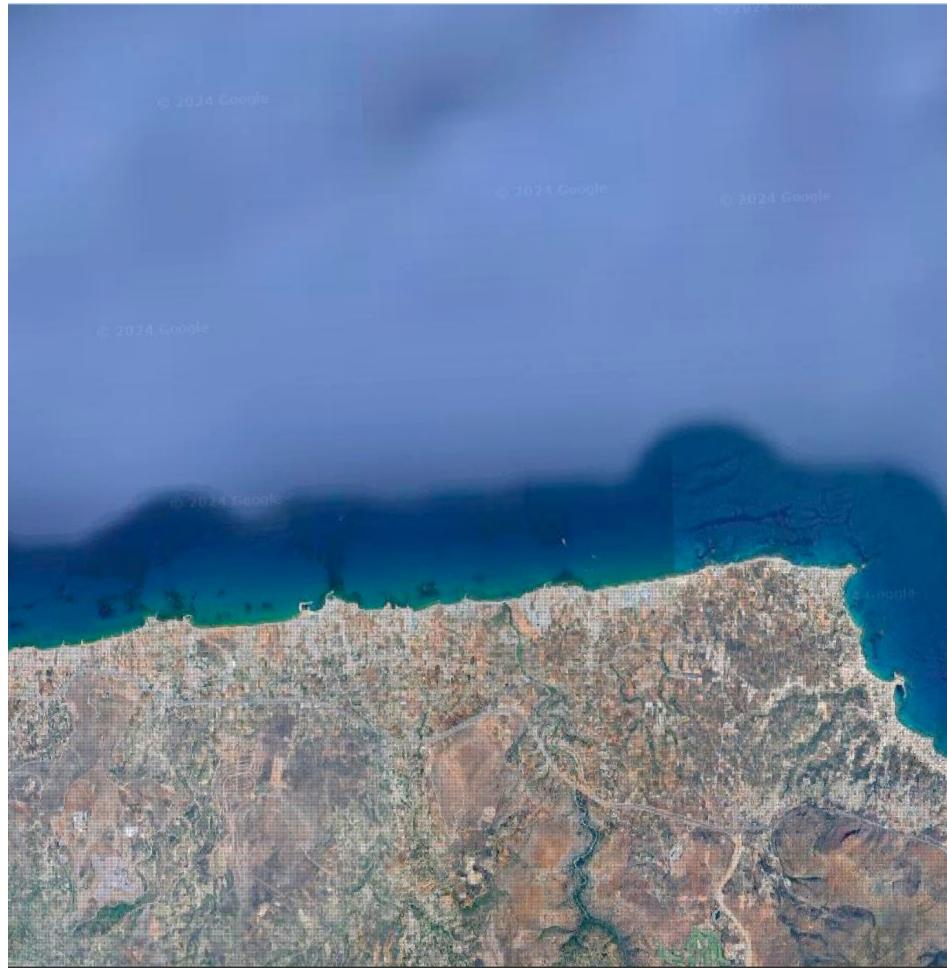


Results of the algorithm to detect seagrass from satellite imagery

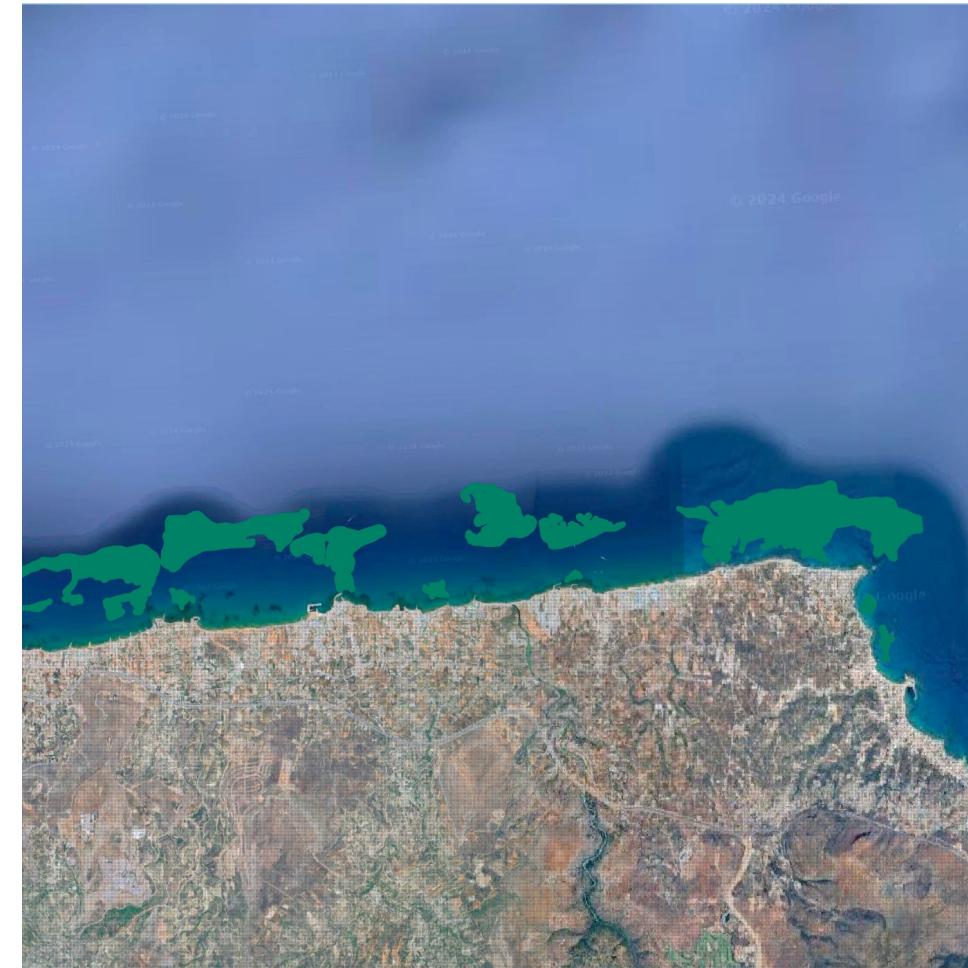


**Diagram 2**  
Results of seagrass Mapping algorithm

# Satellite image



# Classification



**Distribution of seagrass matches literature review descriptions**

Seagrass polygons

**Diagram 3**

Seagrass polygons

# Challenges

## Optical remote sensing

- Lacks accuracy close to the shoreline

Reasons:

- Don't account for bathymetry
- Don't remove the sunlight reflection on the water surface
- Don't consider the effect water column interference

## Available data lacks accuracy



# Application 1 : Citizen Seagrass

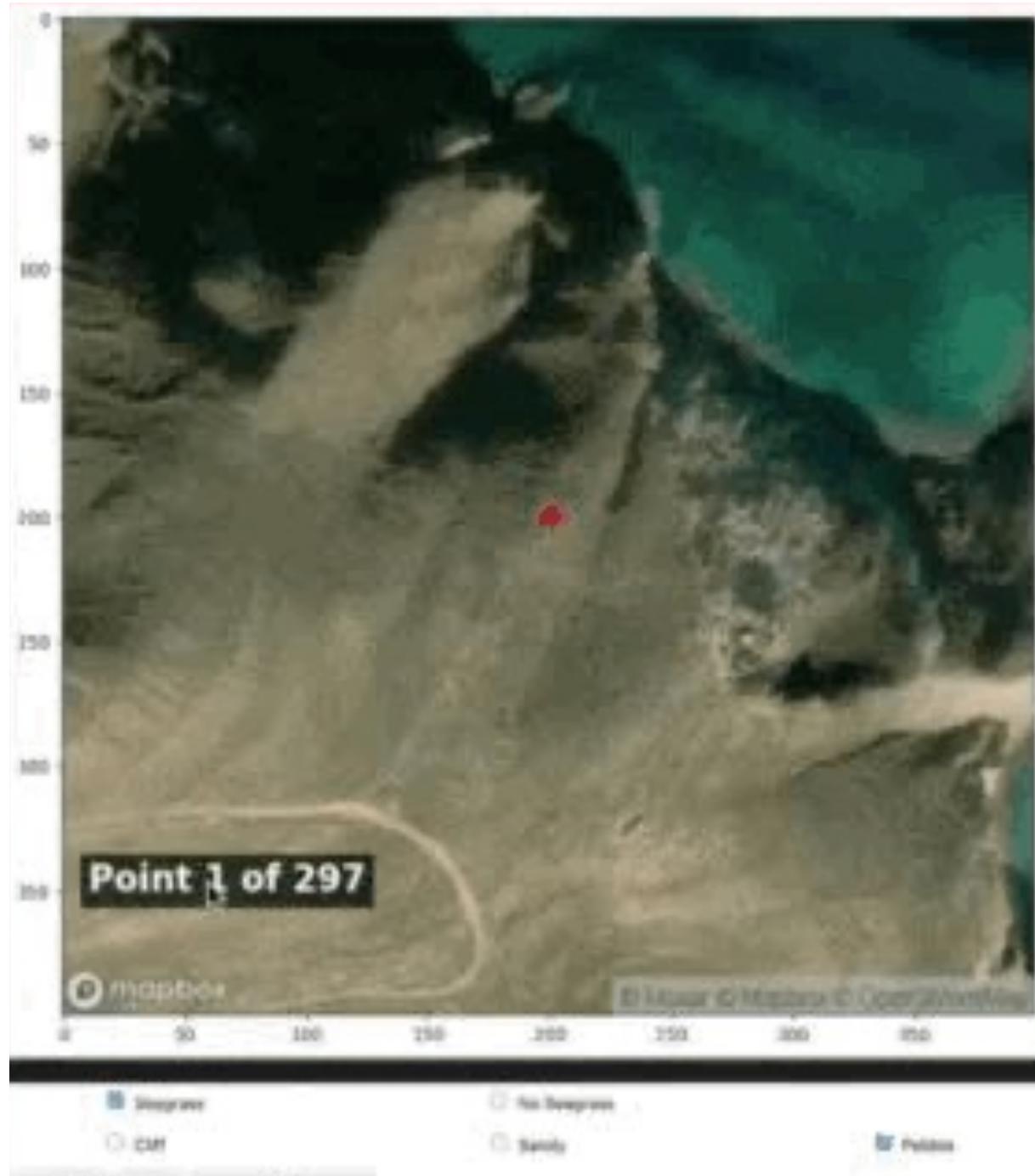


Seagrass

No Seagrass



**Diagram 5**  
Module of Citizen science for visual inspection



Accuracy Assessment,  
a benchmark:

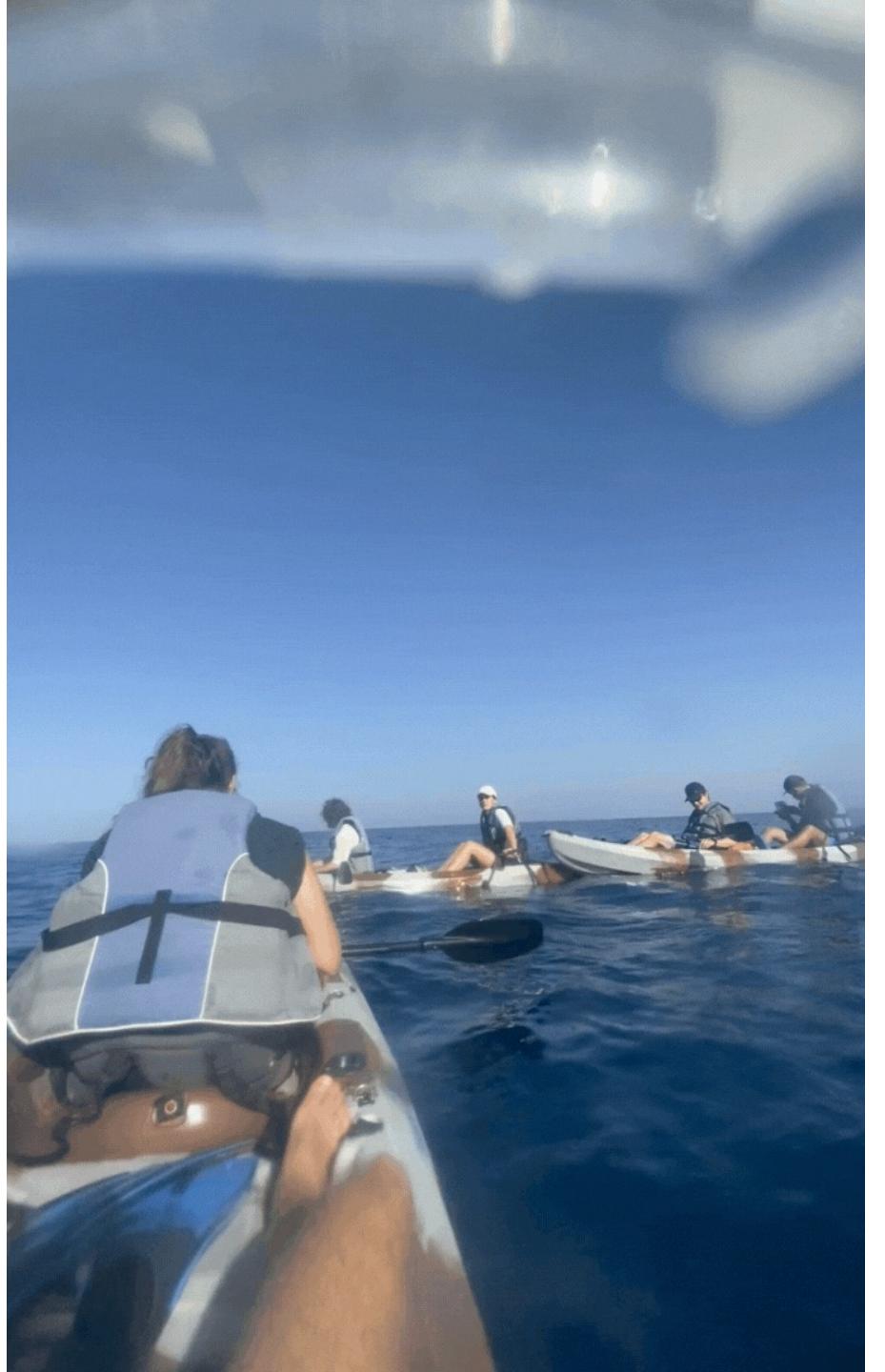
Confusion Matrix:

	Neg.	Pos.
Negative	[1010 539]	
Positive	[1075 930]	

Accuracy: 0.5459  
Precision: 0.6331

# Application 2: Bathymetric profiling

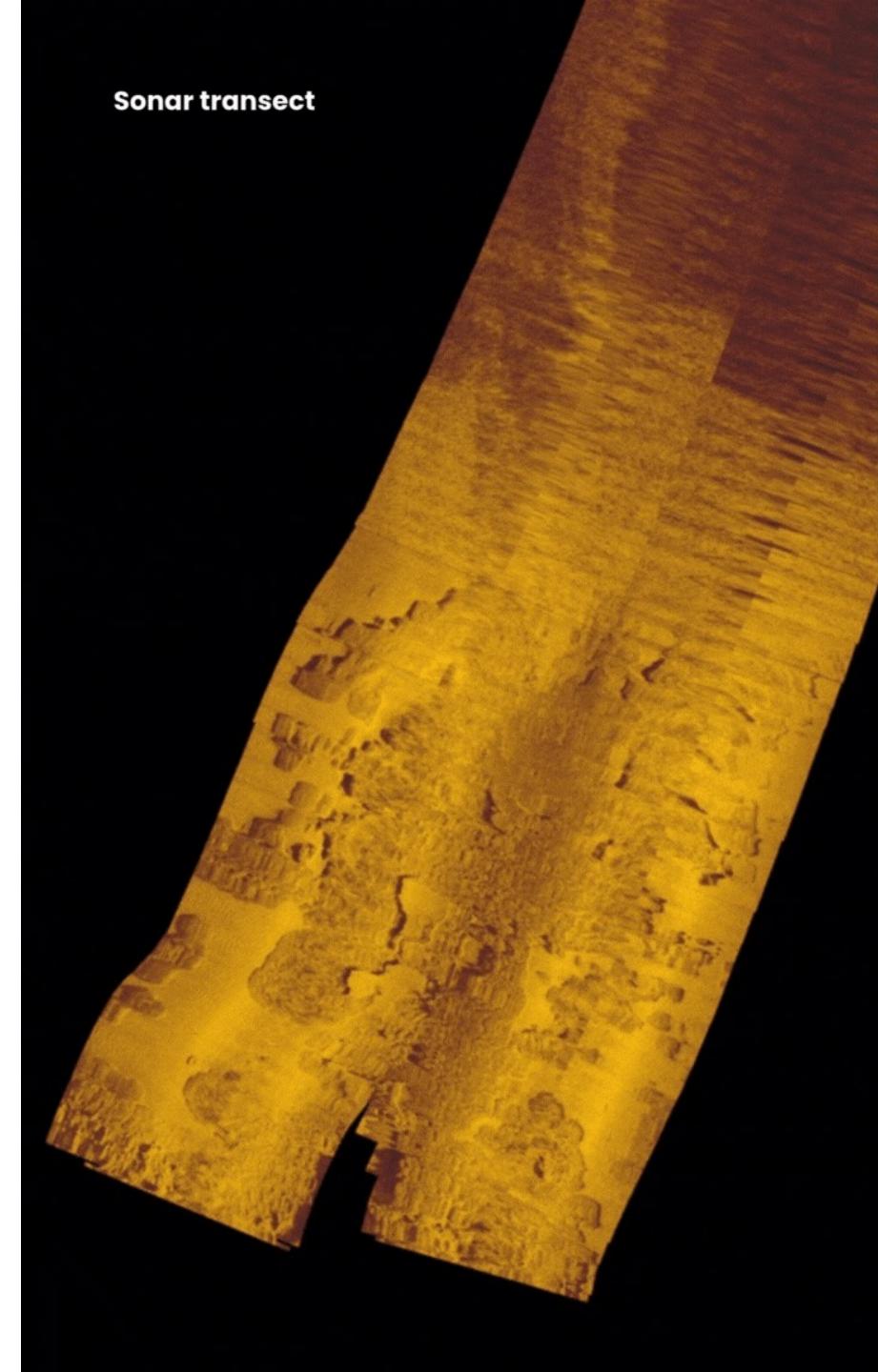


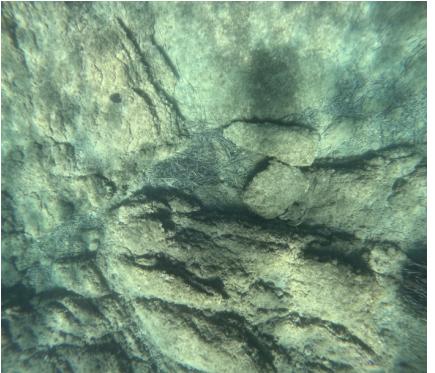


**Video 1**  
Sonar survey

**Sonar transect**

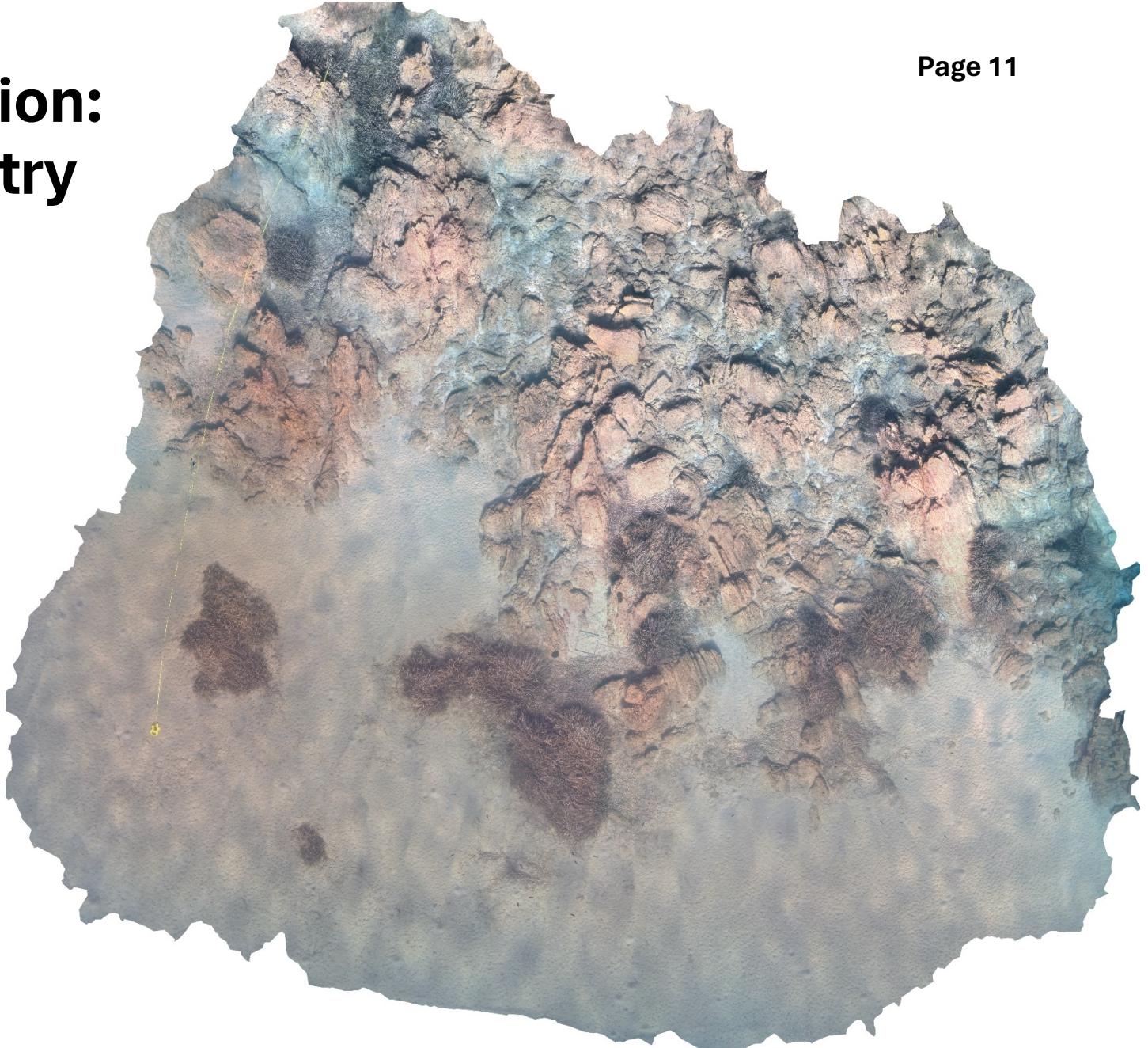
**Diagram 6**  
Transect sonar  
dataset





## 3rd Application: Photogrammetry surveys

**Diagram 7**  
Photogrammetry  
reconstruction



**Map 2**  
Output of algorithm after  
corrections

# Results of the classification

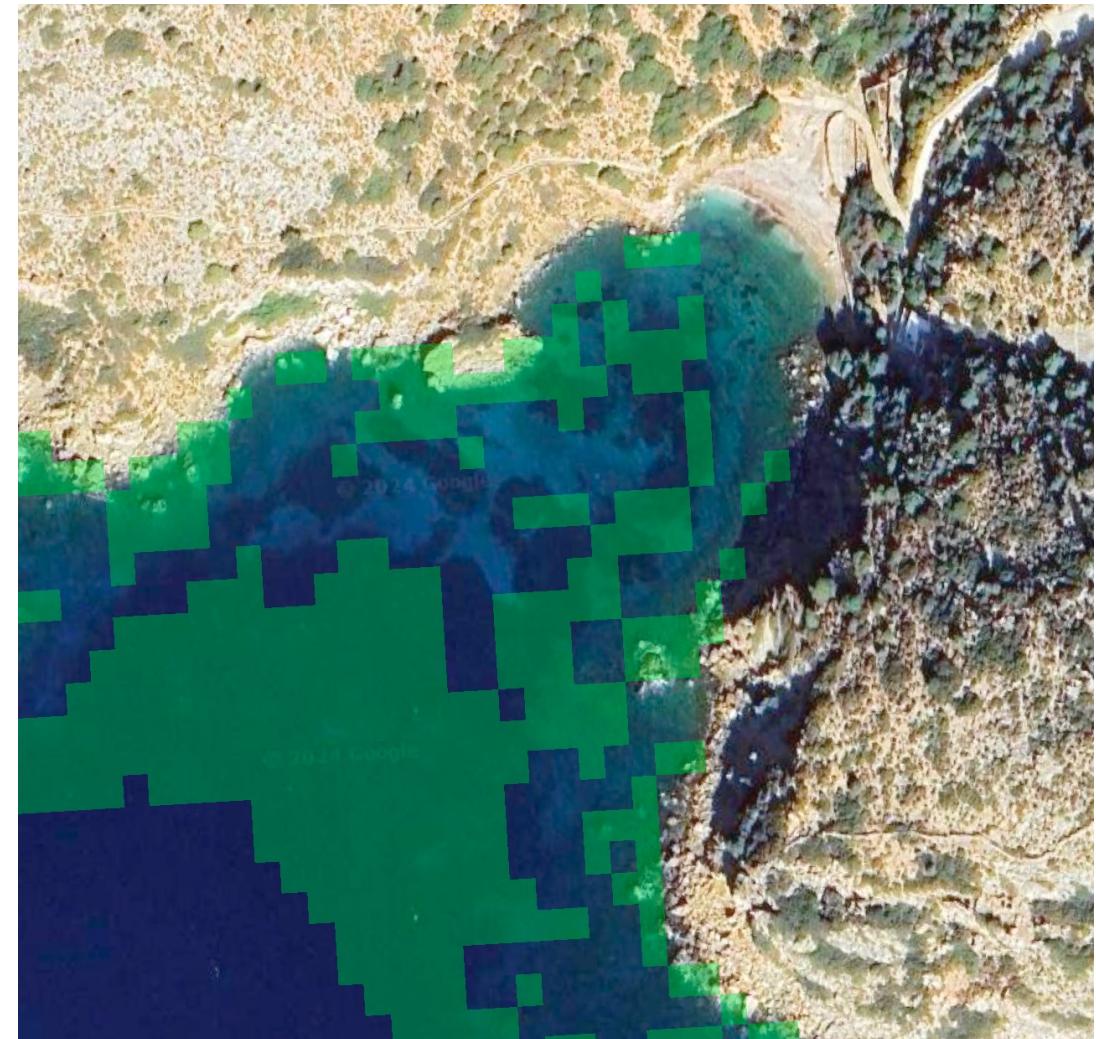


**Diagram 8**  
Comparison of algorithm before and after corrections

**Before**



**After**



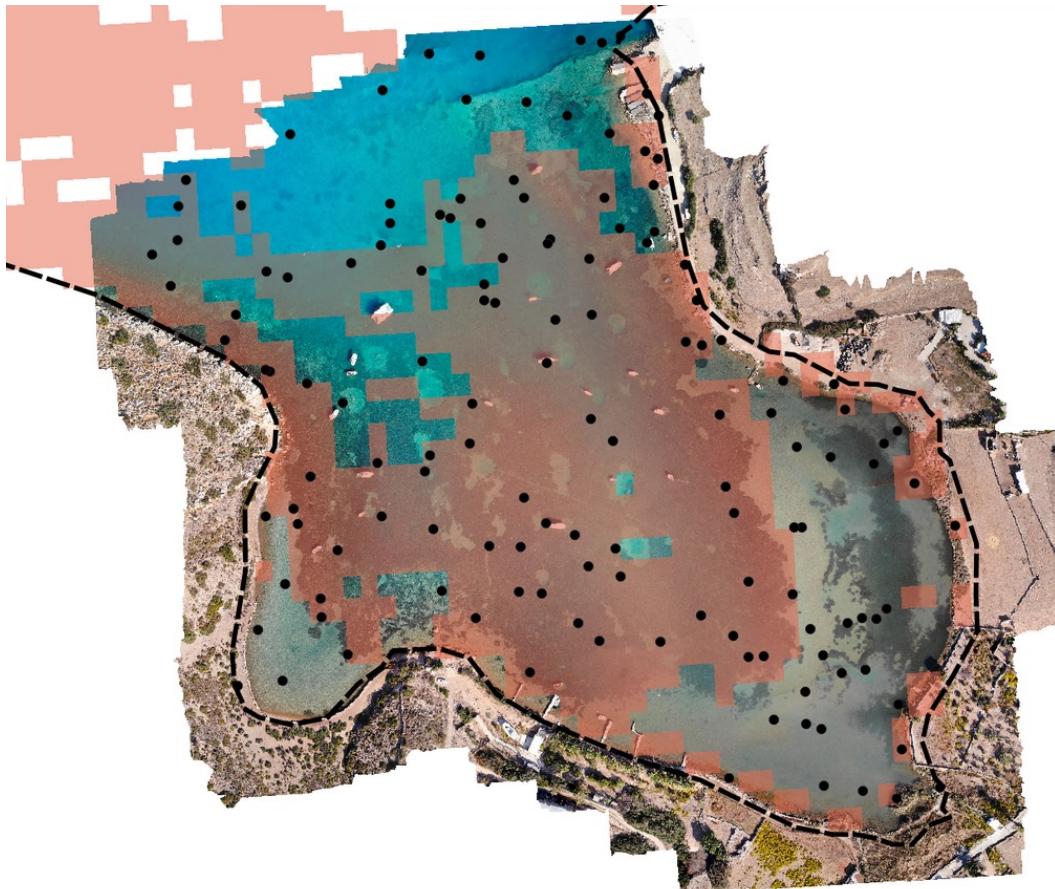
# 4th Application: Drone mapping



Diagram 10  
Drone surveys



# Results



Before

Accuracy: 0.5459  
Precision: 0.6331

After

	Predicted Positive	Predicted Negative
Actual Positive	71	35
Actual Negative	11	22

Accuracy 0,669064748  
Precision 0,865853659

# Questions



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