

THE USE OF CLOUD COMPUTING FOR SHORELINE CHANGES MAPPING IN JAKARTA BAY USING OTSU THRESHOLDING AND EDGE DETECTION ON LANDSAT-5 AND LANDSAT-8 SATELLITE IMAGERY

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Discussion Today

Introduction
(Background and Goals)

Methods
(Data, tools, algorithm)

Result

Conclusion



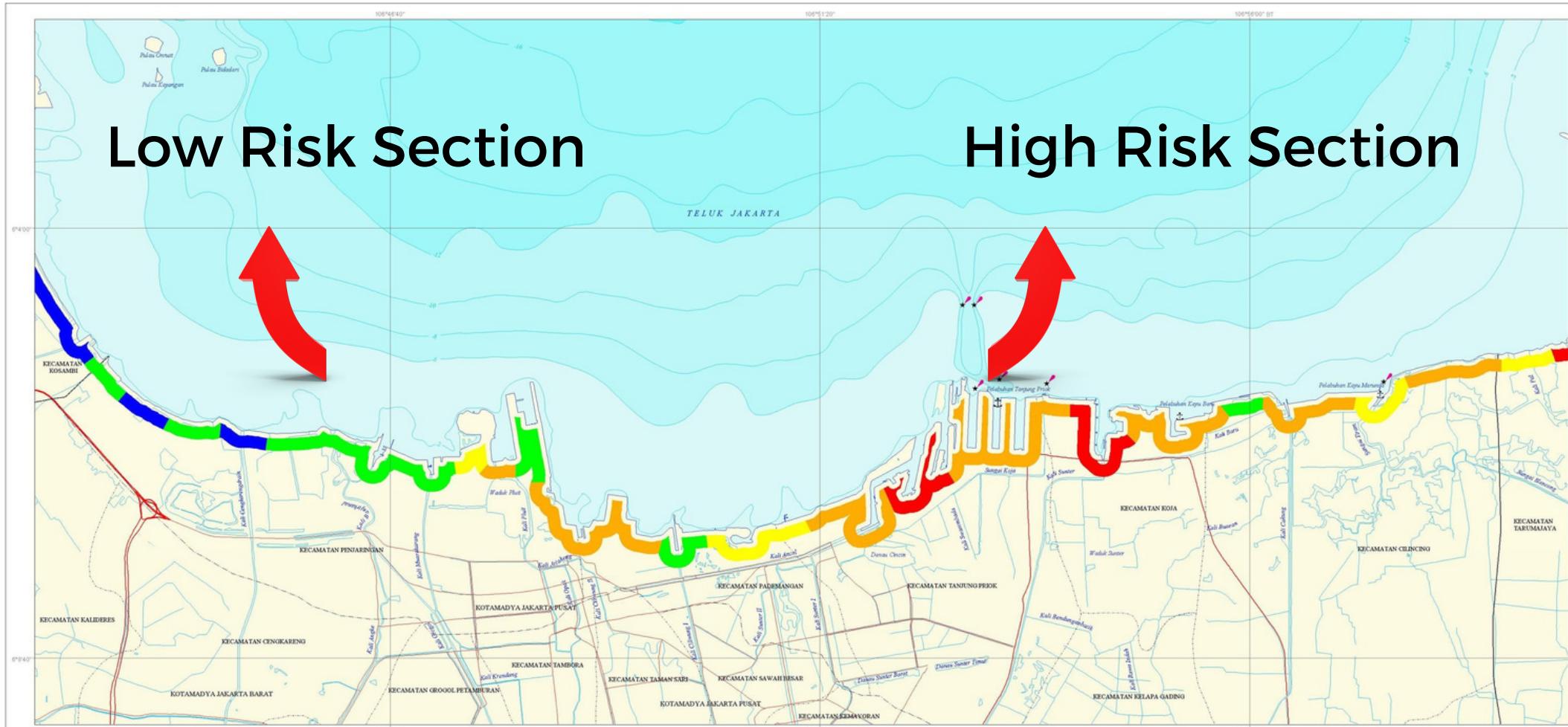
Why We Focus on Jakarta Bay?



**High population density
with many buildings on it
and its role as the national
center of economic activity**



Why North Jakarta Bay?



Source : Marine Research Center, Marine and Fisheries Ministry

Variable	Unit	Value
Slope	%	0,648 - 2,133
Realtive Sea-Level Rise	mm/year	4,248 - 4,460
shoreline change	m/year	(-0,29) - (-1,38)
maximum tide range	m	0,734 - 0,941
mean significant wave height	m	0,473 - 0,630

The Effect if the shoreline is getting eroded :

1. Can damage buildings and infrastructure
2. Disruption to business operations and logistics
3. Having to move residents to safer places to live.

Methods



Data

...



Tools and Kit

...



Algorithm

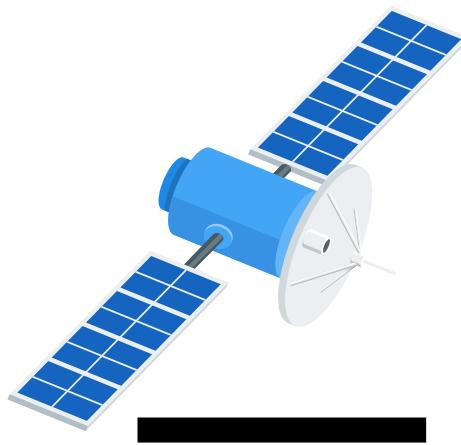
Tools and Data



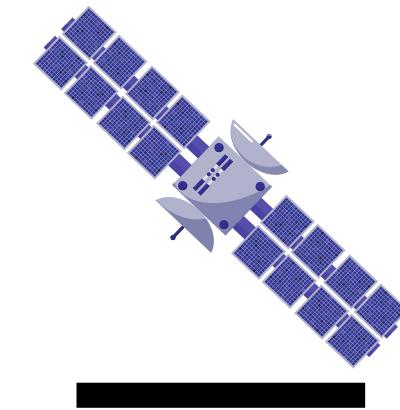
Google Earth Engine

colab

 python™



LANDSAT-5 SR



LANDSAT-8 SR

work-flow



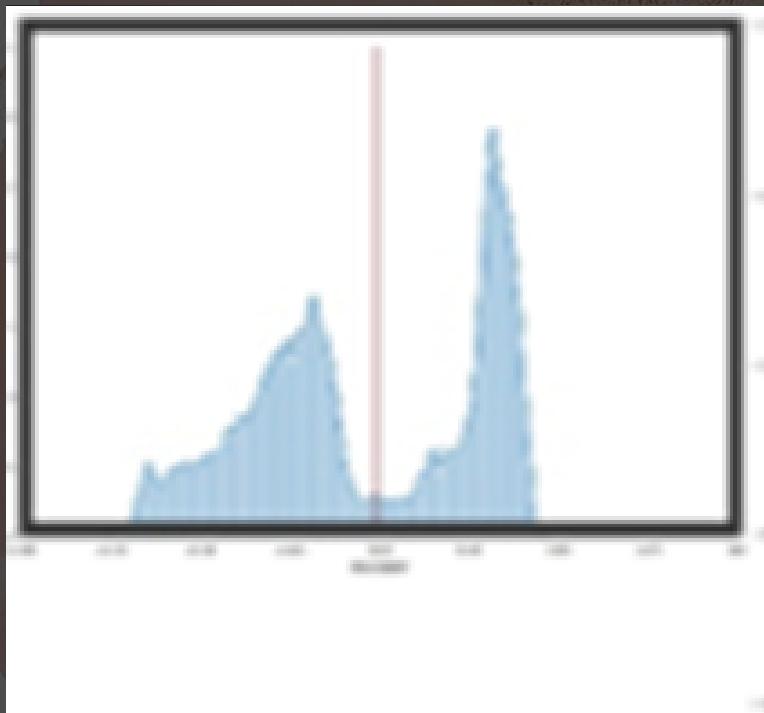
CLEAR DATA

Using median composite
to find the median from 1
year data image.



NDWI (NORMALIZED DIFFERENCE WATER INDEX)

To mark the water



OTSU THRESHOLDING

To separate the water
from other things

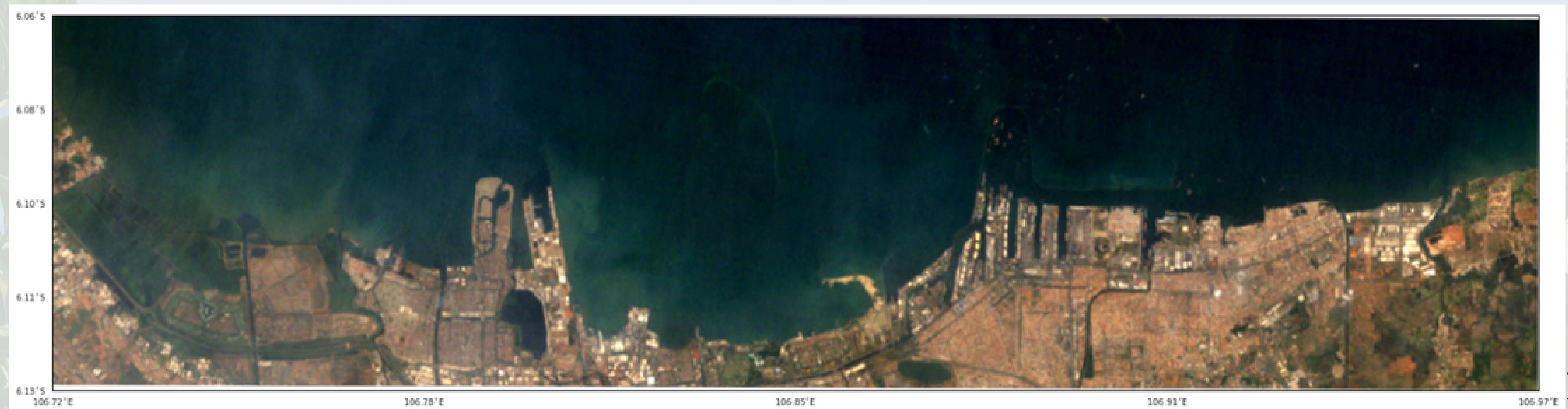


CANNY EDGE DETECTION

to obtain only the edge
of the land/sea (shoreline)

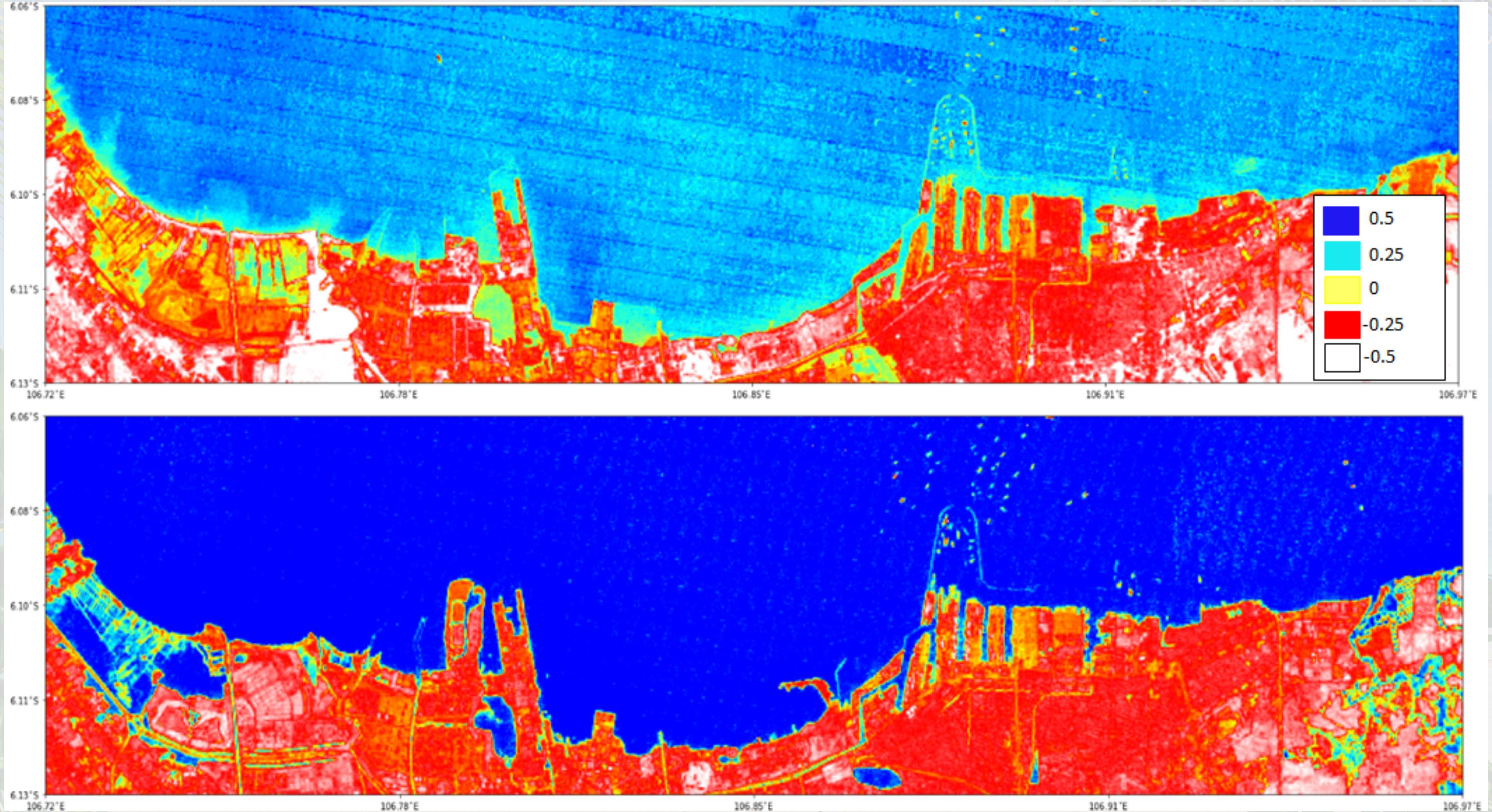
Result

Free cloud satellite image



Result

NDWI - Normalized Difference Water Index

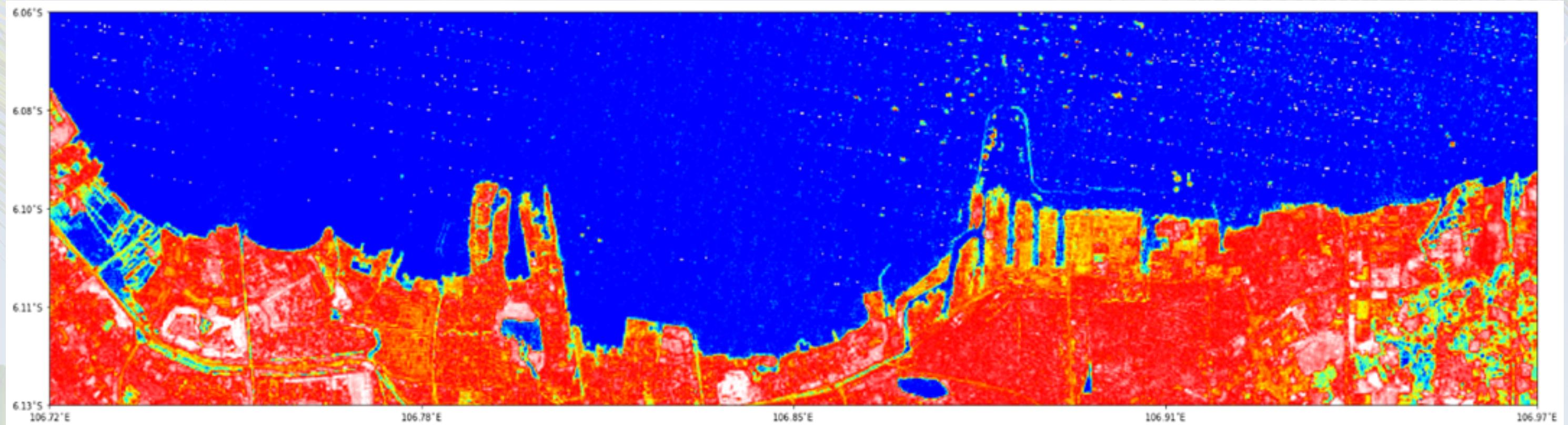


1990

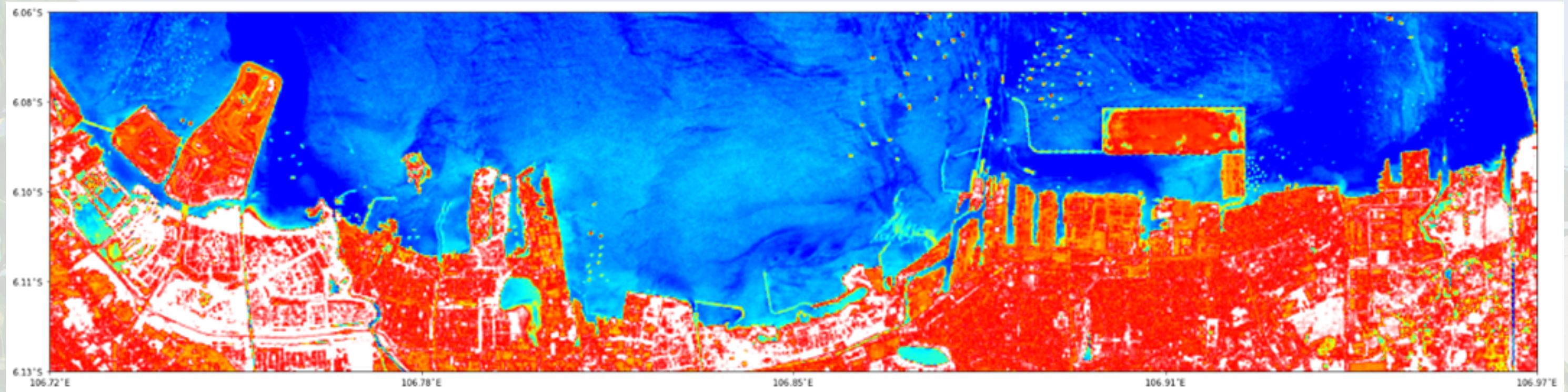
2000

Result

NDWI - Normalized Difference Water Index



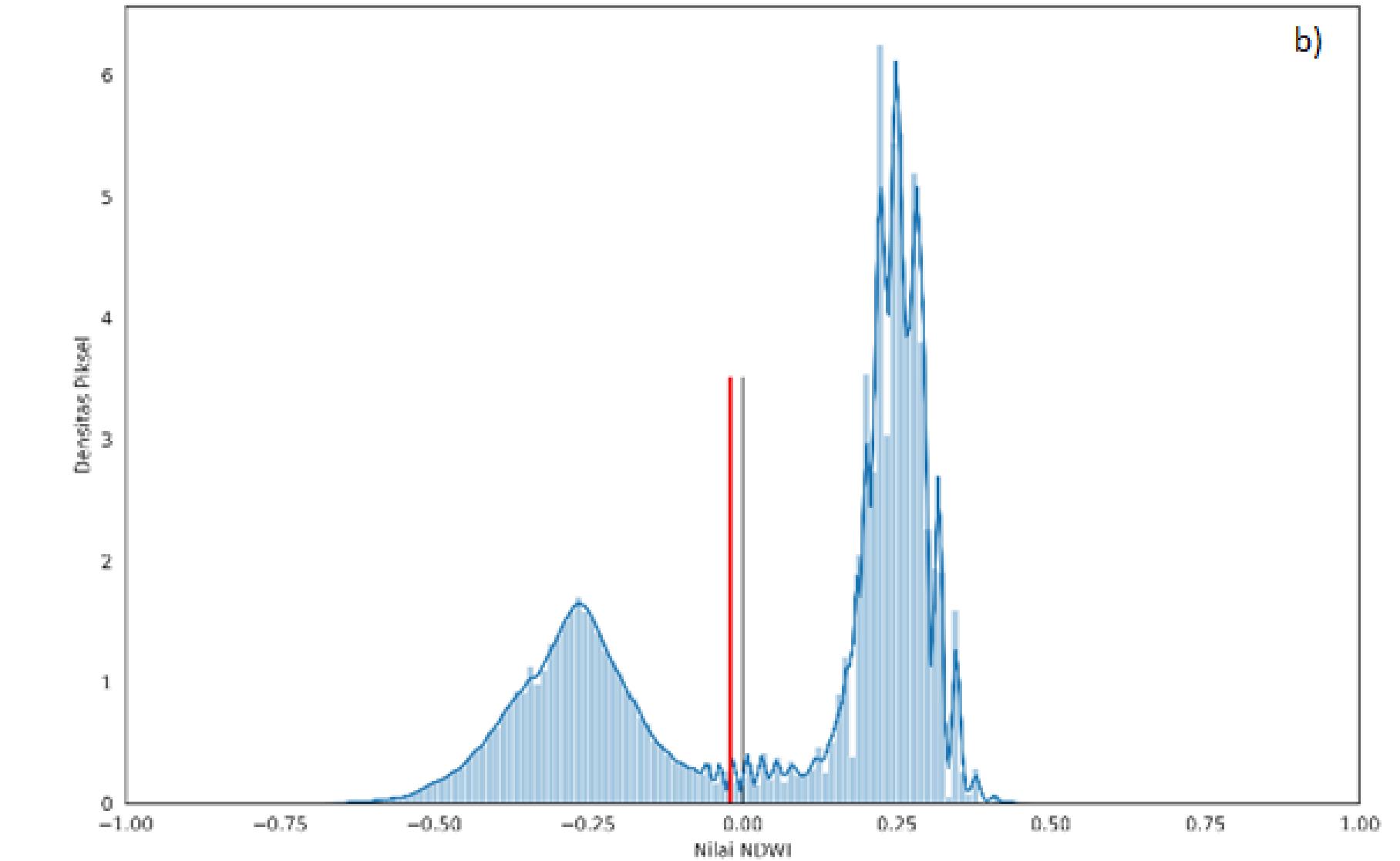
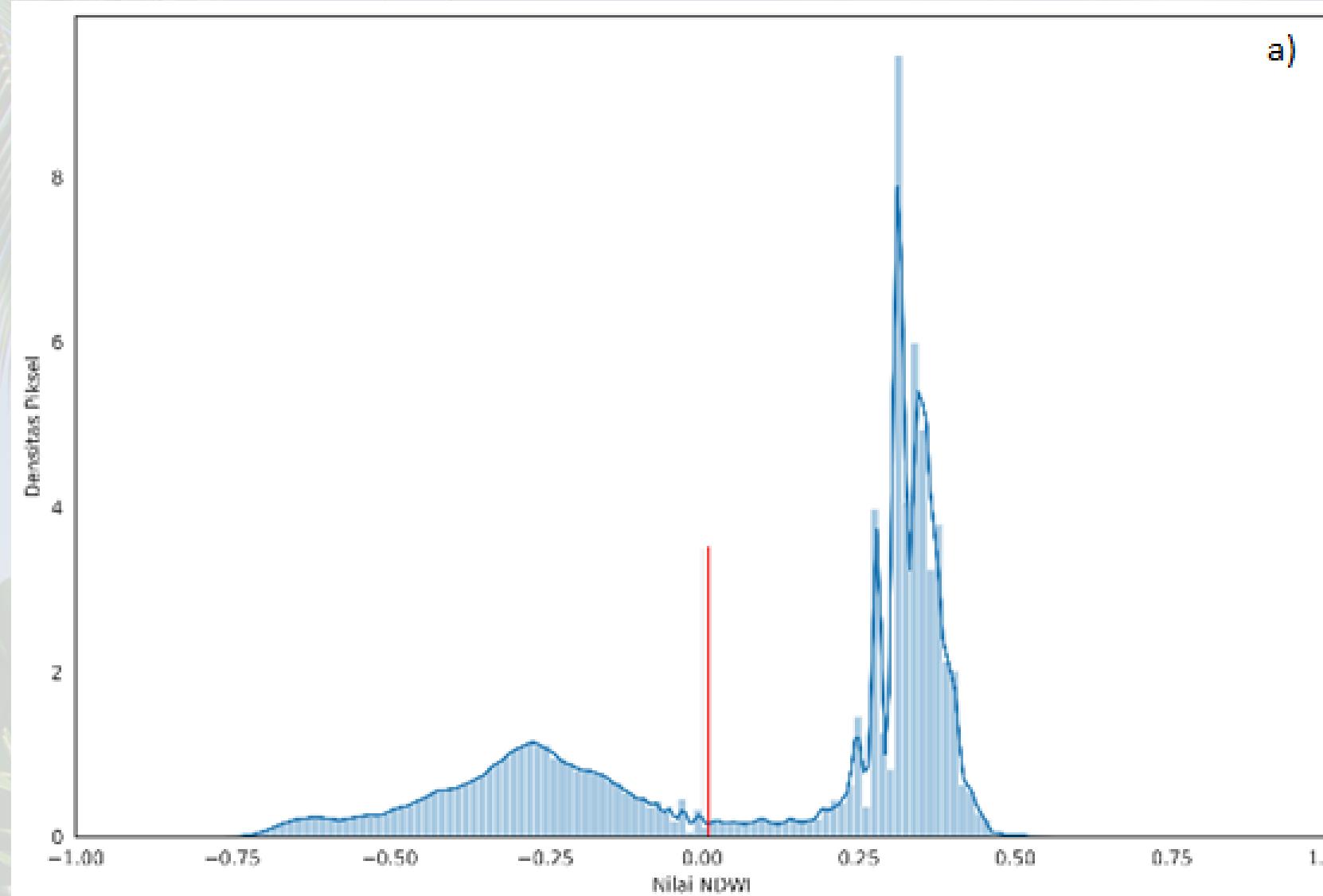
2010



2020

Result

The Separation - Otsu Thresholding

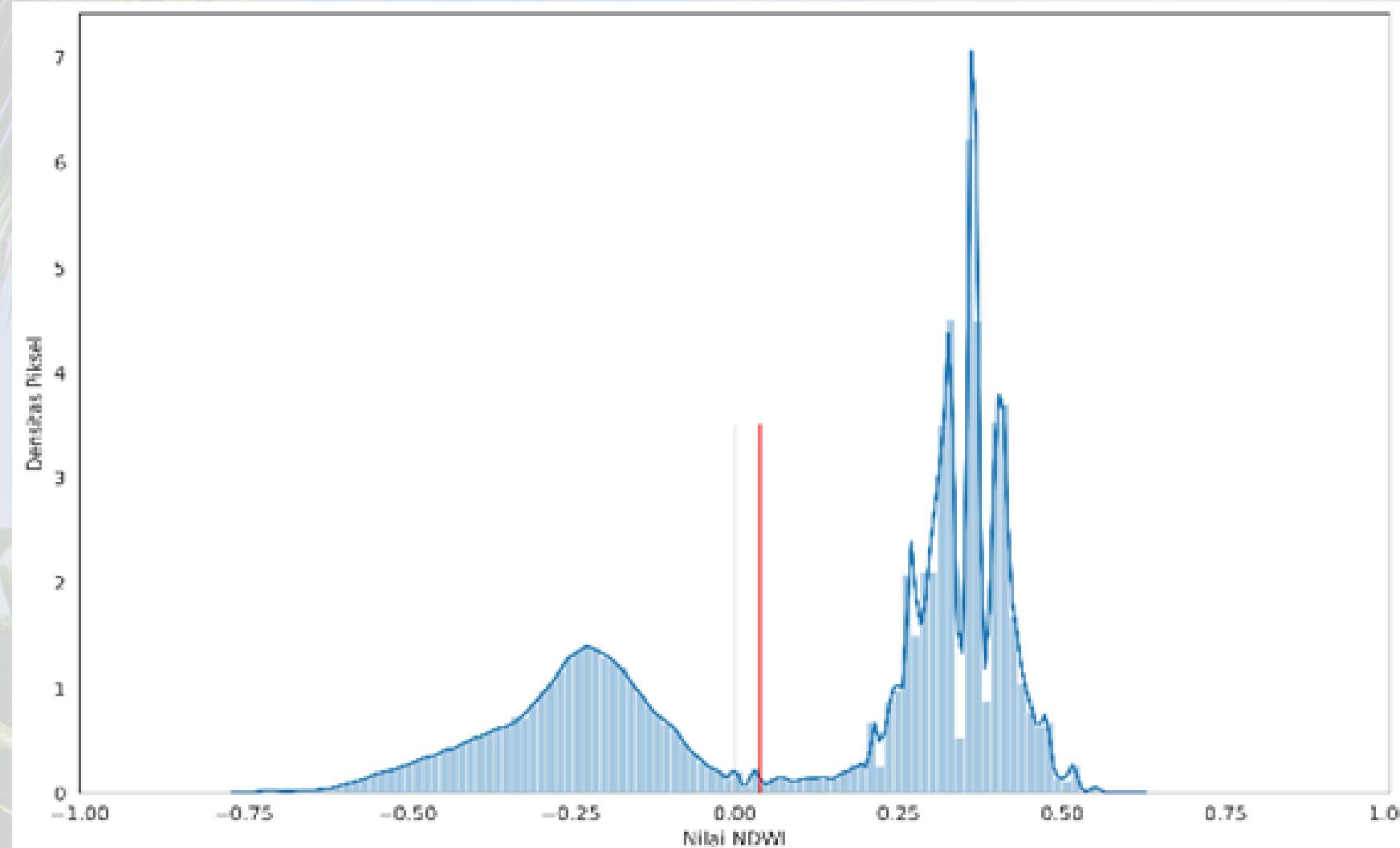


2010

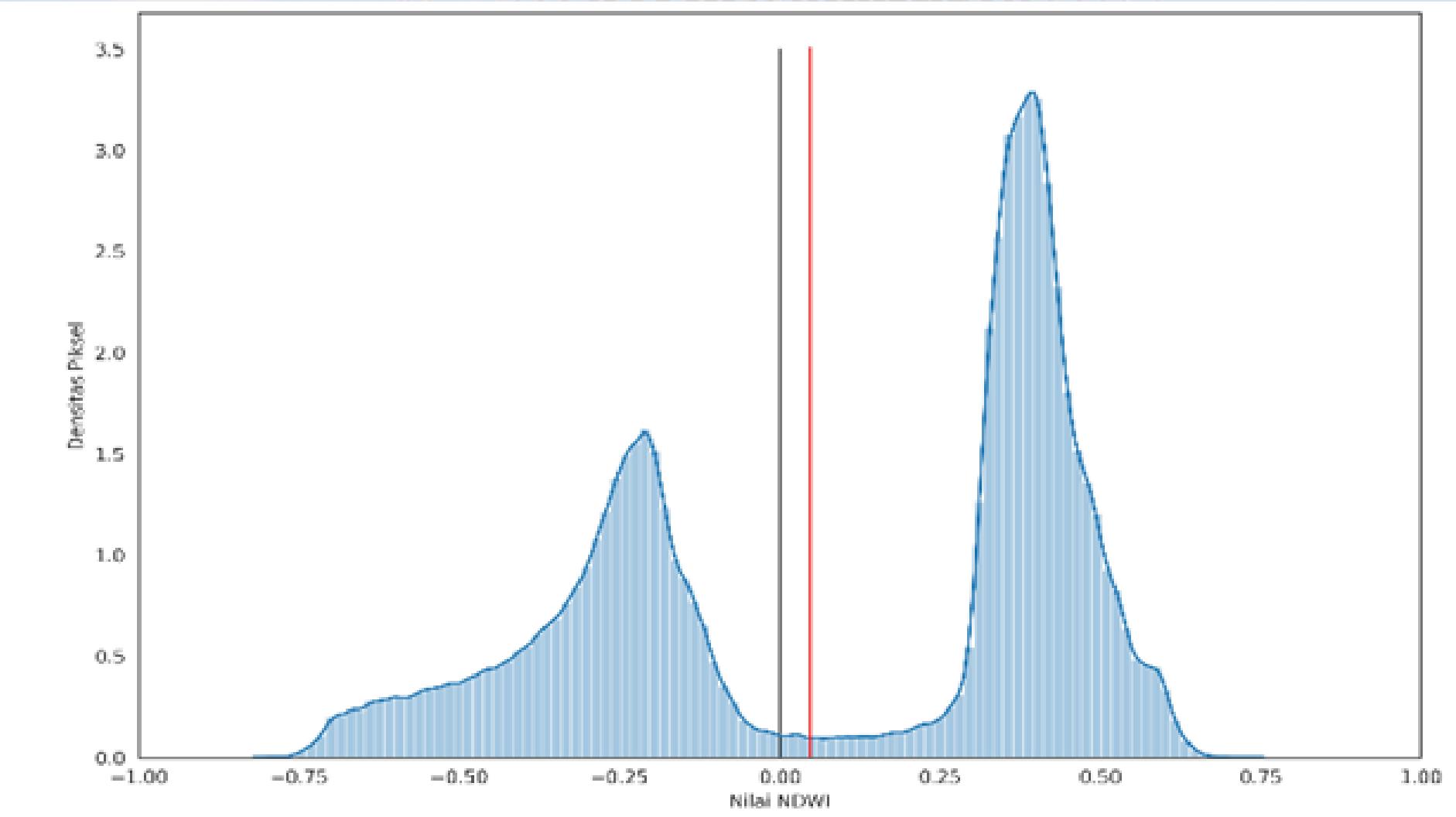
2020

Result

The Separation - Otsu Thresholding



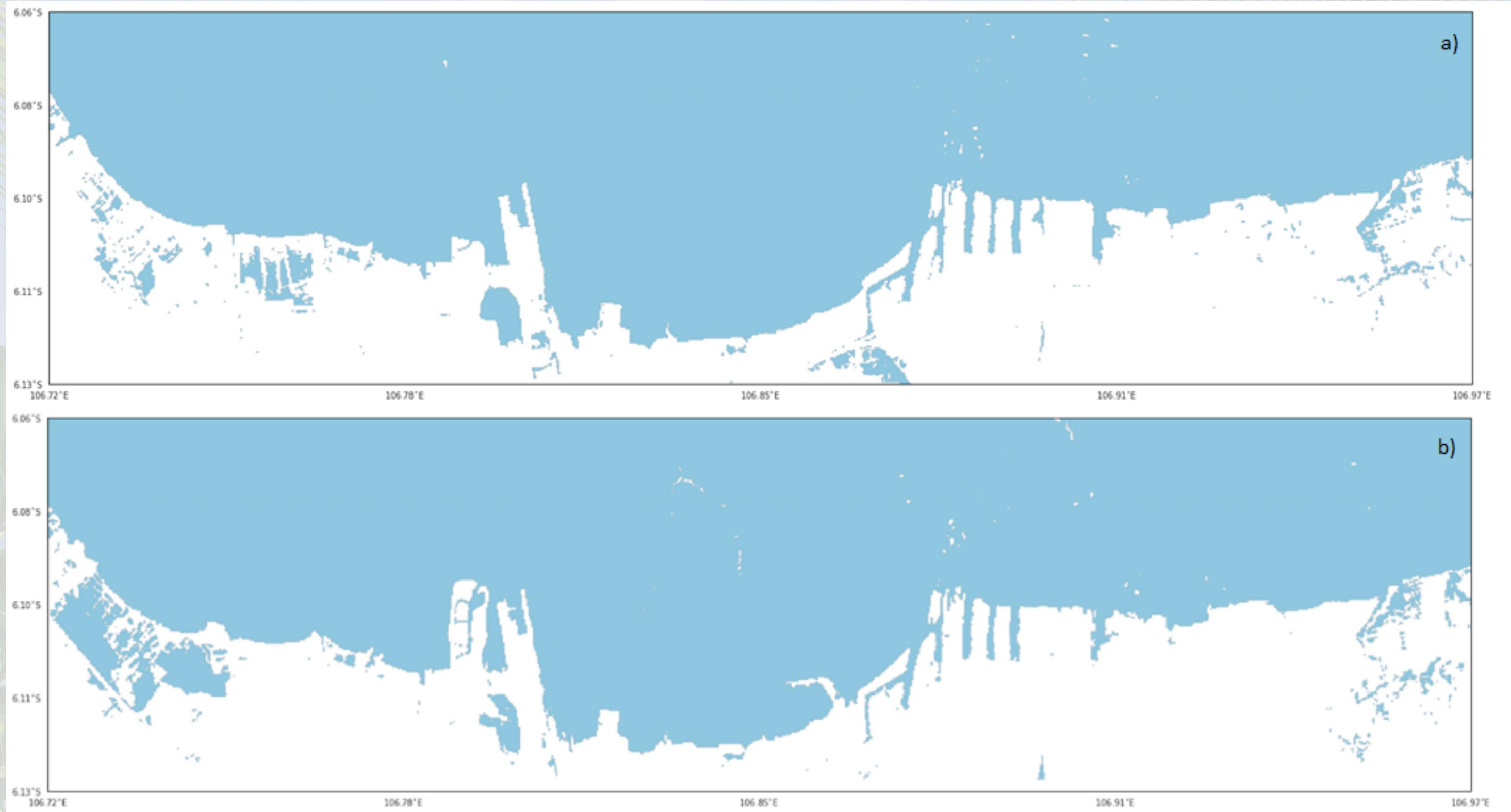
1990



2000

Result

The Separation - Applying the threshold

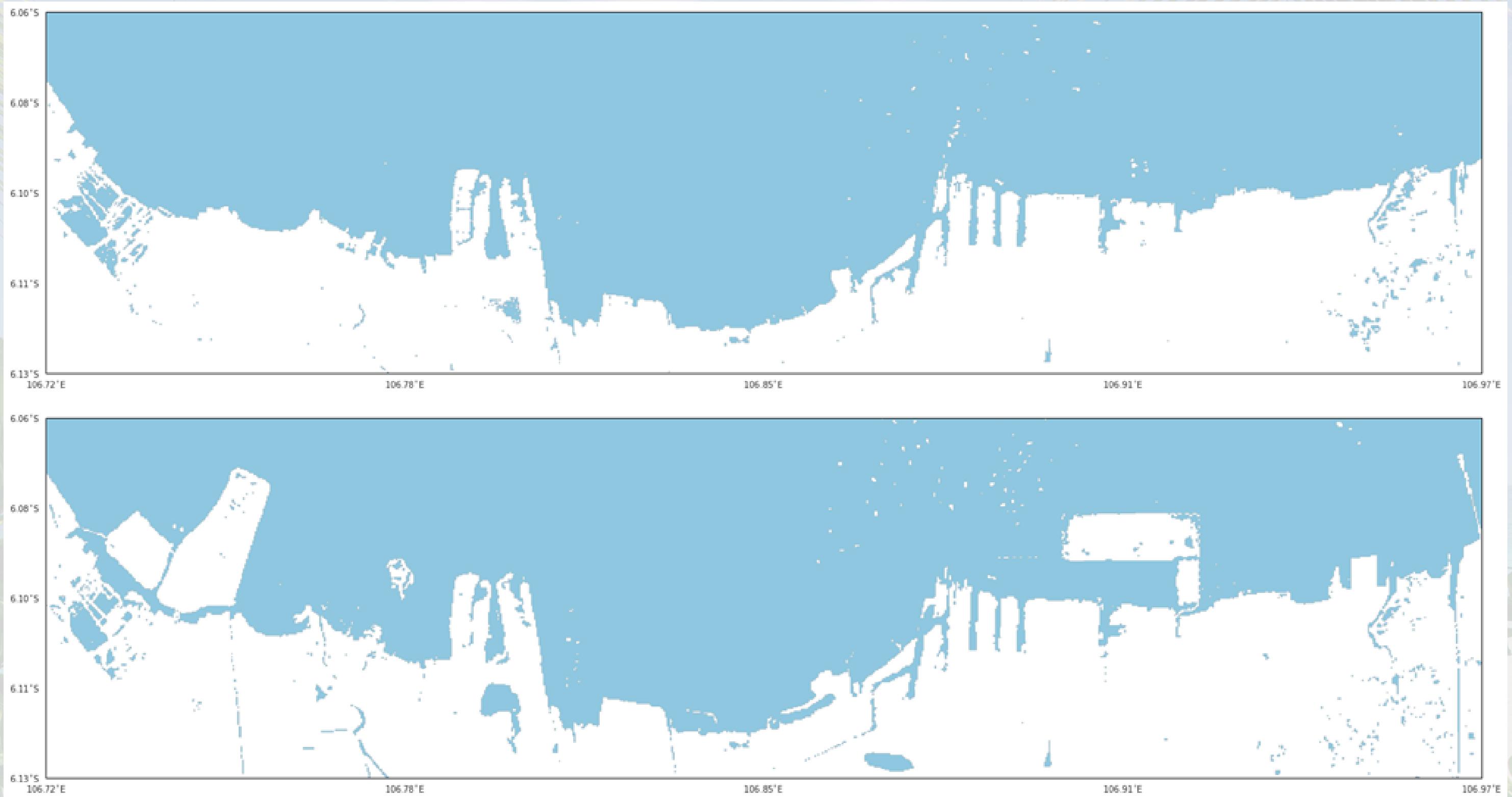


1990

2000

Result

The Separation - Applying the threshold

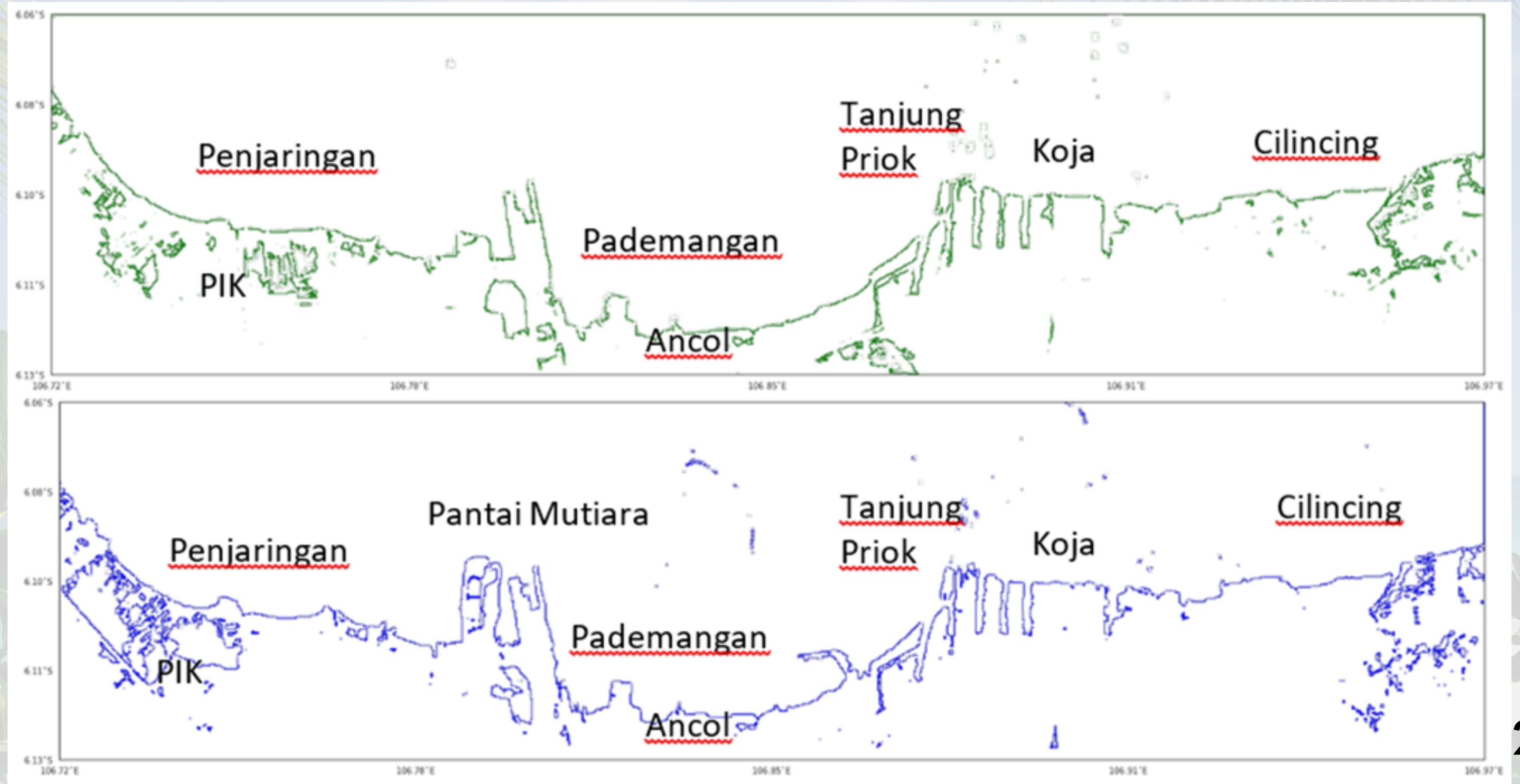


2010

2020

Result

Obtaining the edge - Canny Edge Detection

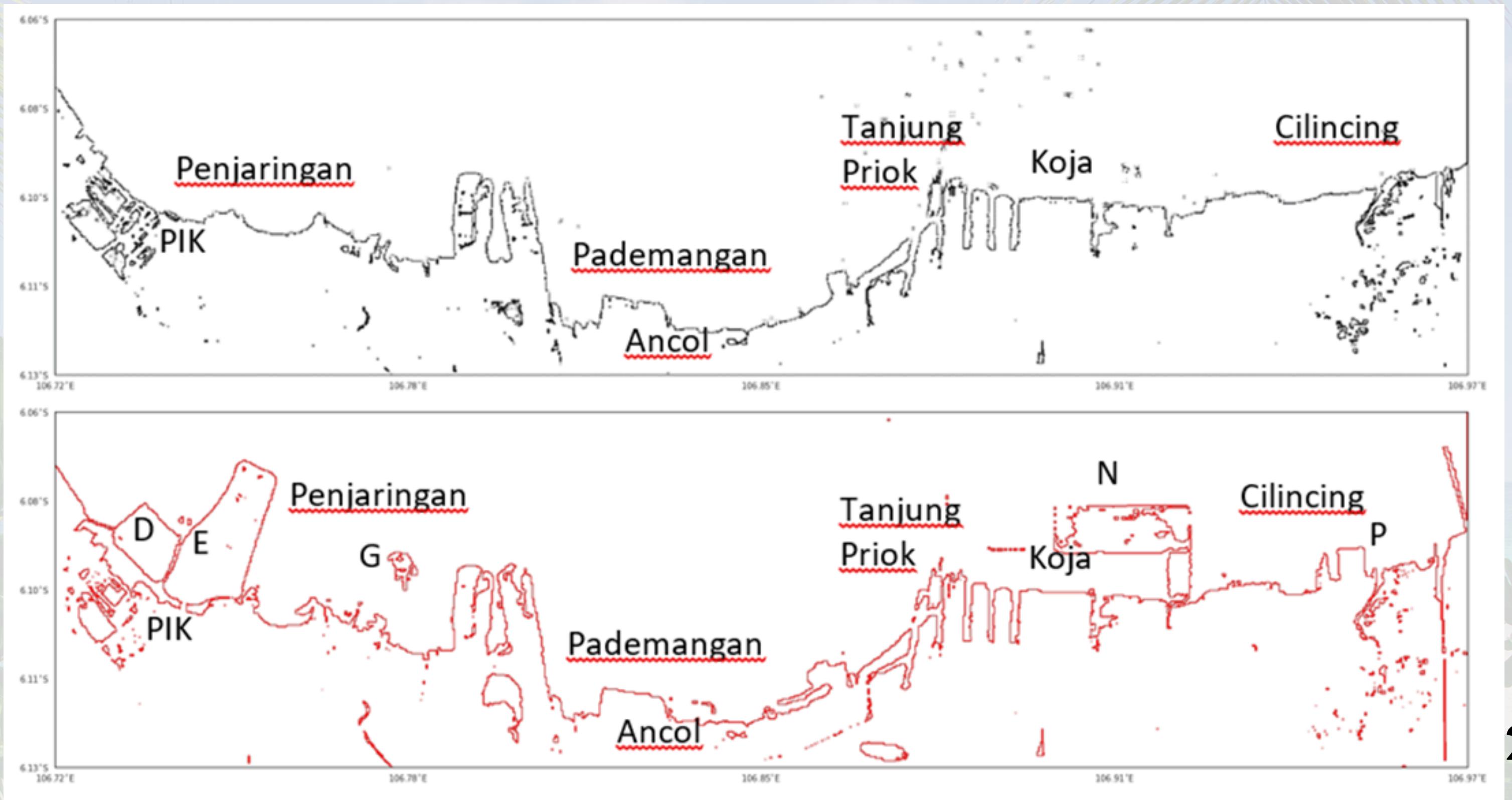


1990

2000

Result

Obtaining the edge - Canny Edge Detection

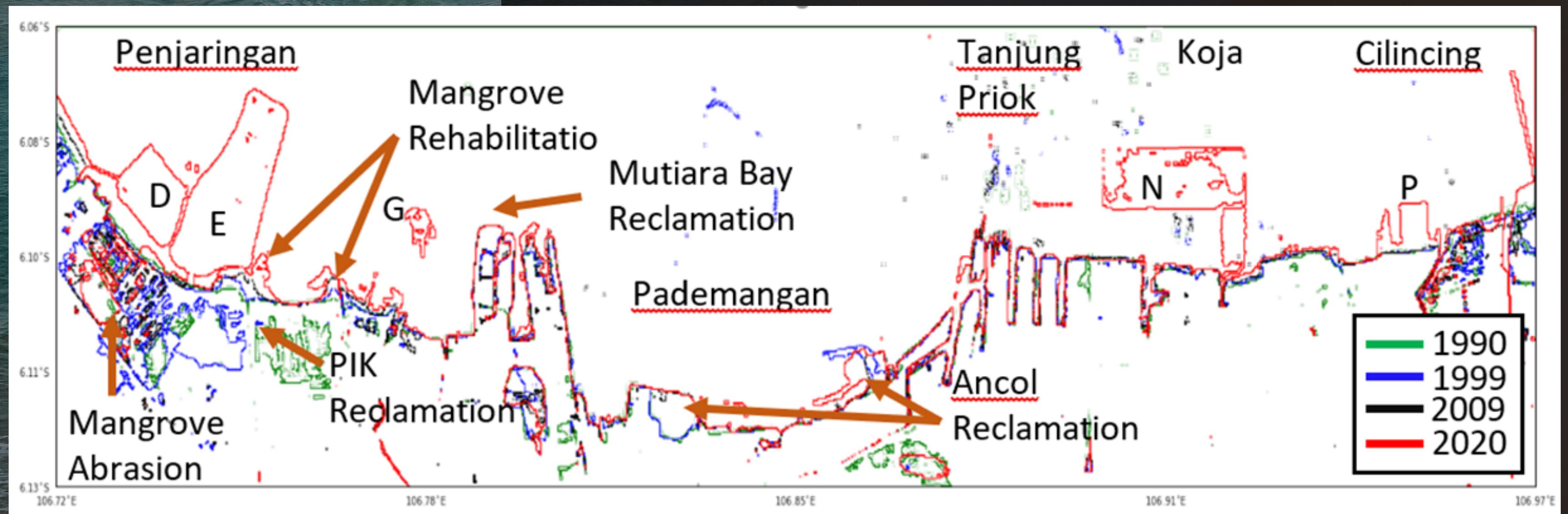


2010

2020

Shoreline Change

Conclusion



Conclusion

REMOTE SENSING CAN BE USED TO
DETECT SHORELINE CHANGES

With ndwi data then separate sea and
land afterwards take only the edges,
Finally the coastline can be detected.

THERE ARE SIGNIFICANT SHORELINE
CHANGES BETWEEN 1990-2020

There is abrasion and reclamation

SUITABLE

The result related to the real condition.

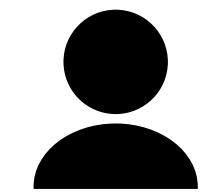


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