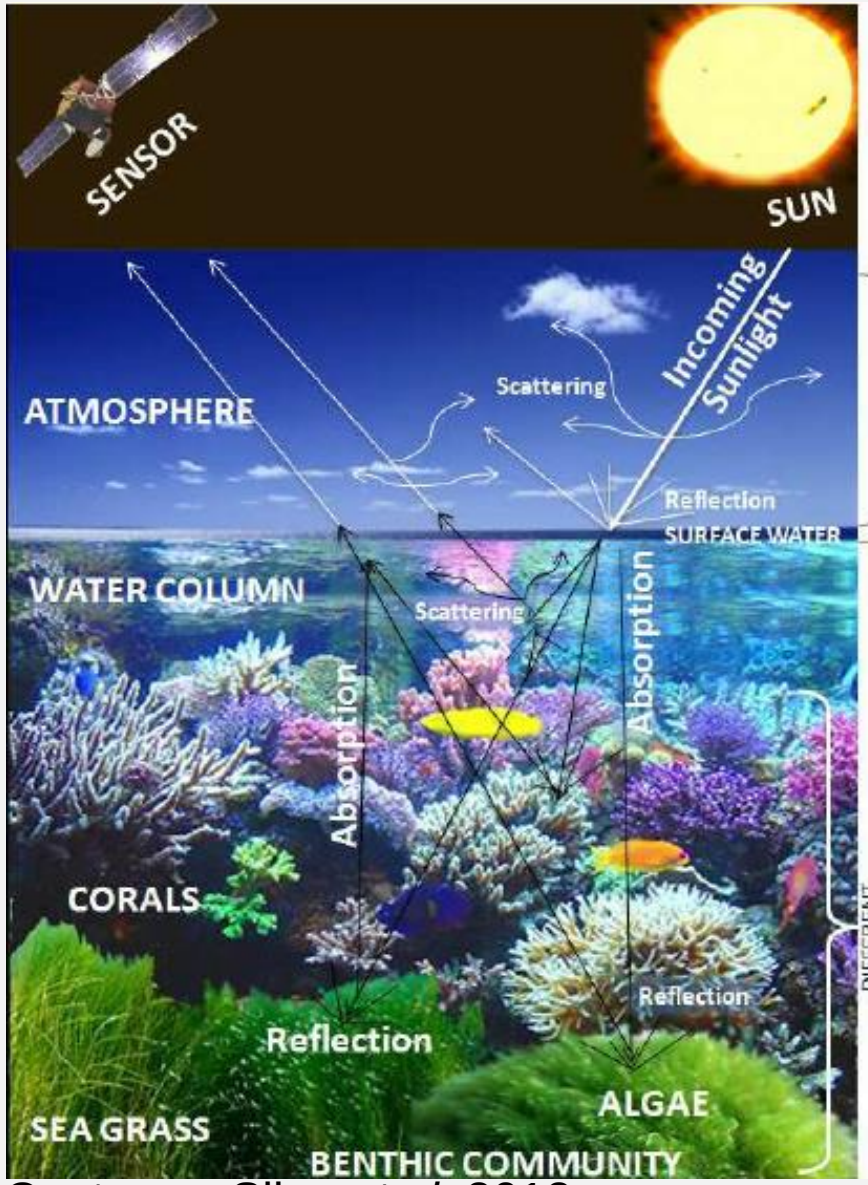
OLEH
NURHALIS WAHIDIN

PENGINDERAAN JAUH EKOSISTEM TERUMBU KARANG

DISAMPAIKAN PADA KEGIATAN
WEBINAR LAUT KITA 3

PRODI ILMU KELAUTAN FPIK
UNIVERSITAS MULAWARMAN

KOMPONEN PENGINDERAAN JAUH TERUMBU KARANG



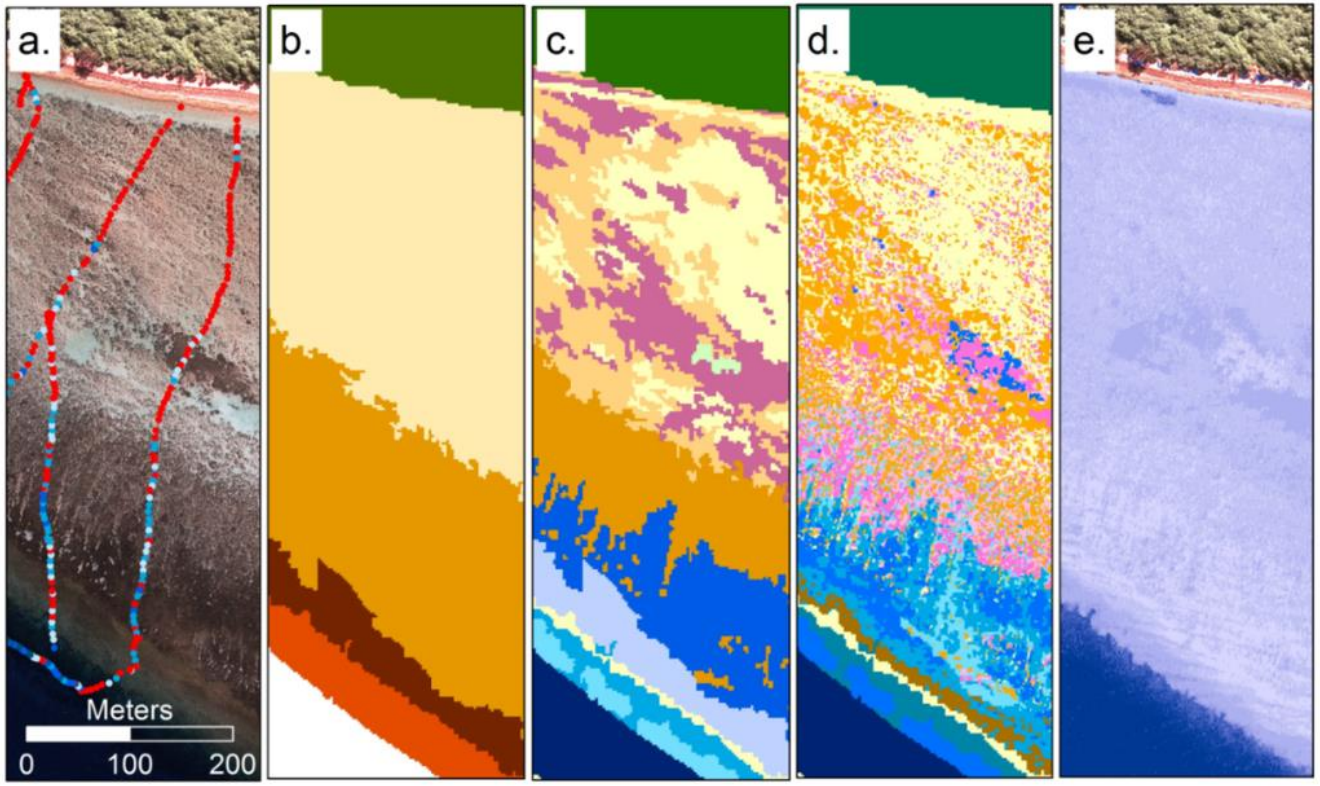
Contreras-Silva *et al*, 2012

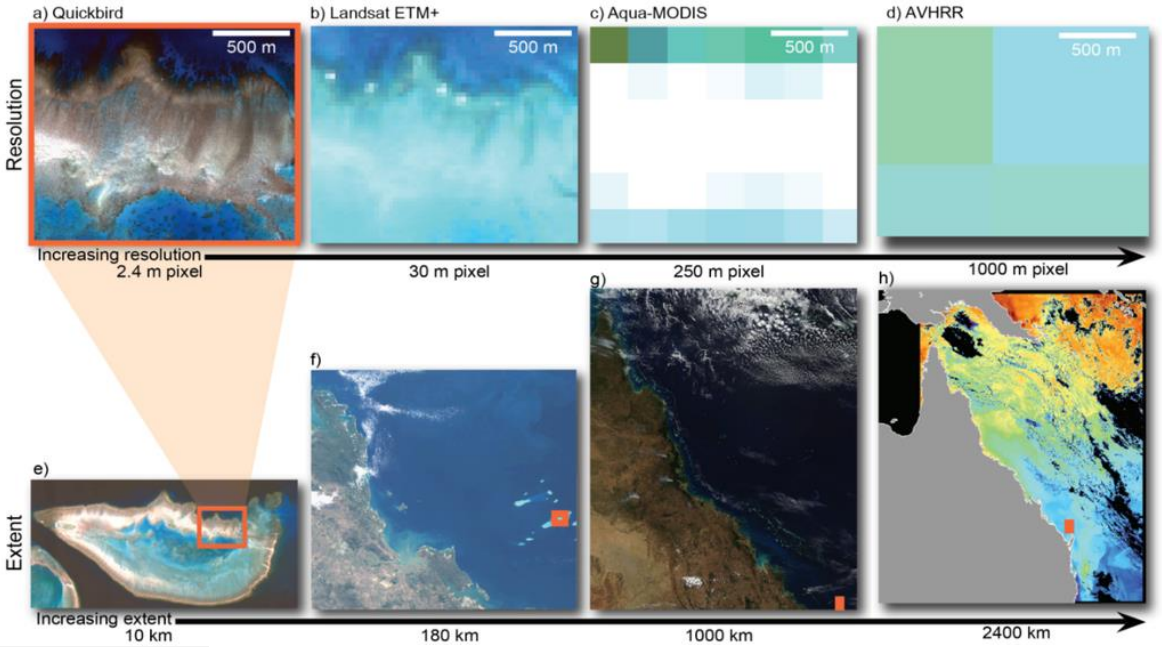
Komponen

- Sensor
- Sumber Energi
- Objek

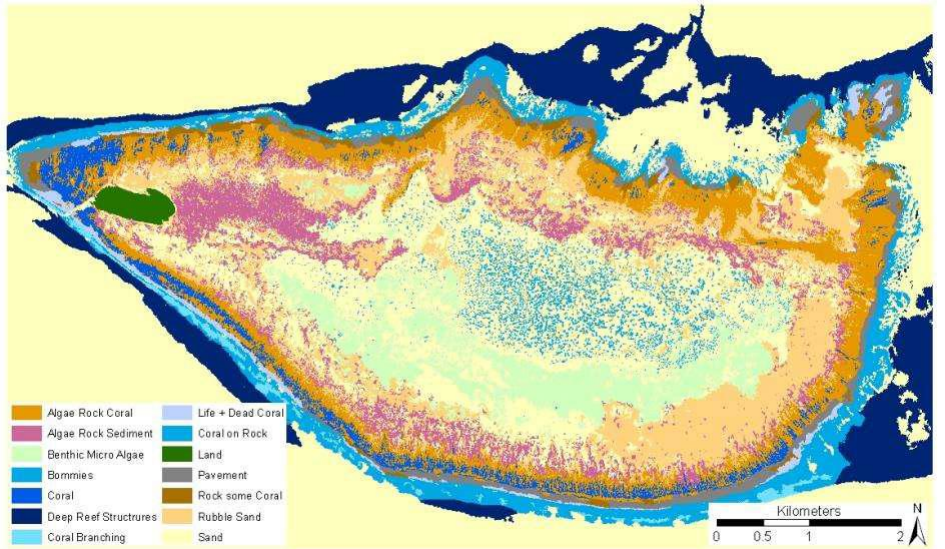
Kompleksitas Tinggi
Komponen Penyusun

KOMPONEN PENGINDERAAN JAUH TERUMBU KARANG





a. Citra Resolusi Tinggi
b. Geomorfologi
c. Komunitas Bentik
d. Tutupan Bentik
e. Batimteri



Hedley *et al*, 2016

PENGINDERAAN JAUH TERUMBU KARANG

Mumby *et al*. 1997
Landsat MSS/TM, SPOT, CASI
MLC
Bentik (4 Kelas) 30;65;56;82%
Bentik (6 Kelas) 30;59;57;80%
Bentik (9 Kelas) 18;32;41;79%

Andrefouet *et al*. 2003
Landsat ETM, IKONOS
UC/SC/CE-MLC
Bentik
4-5 Kleas (77%)
7-8 Kelas (71%)
9-11 Kelas (65%)
>13 Kelas (53%)

Joyce *et al*. 2004
Landsat ETM
UC
5 Kleas (12-74%)

Nurlidiasari 2004
QuickBird
MLC
5 Kleas (84%)

Benfield *et al*. 2007
Landsat ETM, Quickbird
ML
Bentik (6 Kelas)
Landsat (57.1%)
QB (76.9%)
Bentik (7 Kelas)
Landsat (51.4.7%)
QB (72.3%)
Bentik (11 Kelas)
Landsat (44.8%)
QB (59.1%)

Siregar 2010
QuickBird
DS-MLC
Bentik
6 Kleas (79%)

Phinn *et al*. 2011
Quickbird
MLH
Geomorfologi
6 Kelas (57%)

Kondraju 2013
Landsat ETM
MLH, SAM
SID, SVM
4 Kelas Bentik
62-95%
Optimum SVM

Siregar *et al*. 2013
WorldView-2
DS, MLC
Bentik
6 Kleas (78%)

Selamat 2014
QuickBird
DS, MLC
Bentik
3 Kelas (64.3-82.1%)
8 Kelas (48%)

Piksel

PEMETAAN TERUMBU KARANG

Objek

Benfield *et al*. 2007
Landsat ETM, Quickbird
CE, Fuzzy Logic
Bentik (6 Kelas)
Landsat (67.7;75.9%)
QB (75.0;88.8%)
Bentik (7 Kelas)
Landsat (58.7;70.7%)
QB (67.4;86.0%)
Bentik (11 Kelas)
Landsat (53.5;63.6%)
QB (61.9;81.8%)

Leon dan Woodroffe 2011
Landsat ETM
NNC,CE
Geomorfologi
10 Kleas (75%)

Phinn *et al*. 2011
Quickbird
CE
Geomorfologi
6 Kelas (>80%)
Bentik
10 Kelas (57-78%)

Roelfsema *et al*. 2011
Quickbird IKONOS
CE
Geomorfologi
6-8 Kelas (76-82%)
Bentik
20-30 Kelas (52-75%)

Zhang *et al*. 2011
AVIRIS
MLC, RF
12 Kelas Bentik
MLC (60.1-69.5%)
RF (75.1-87.9%)

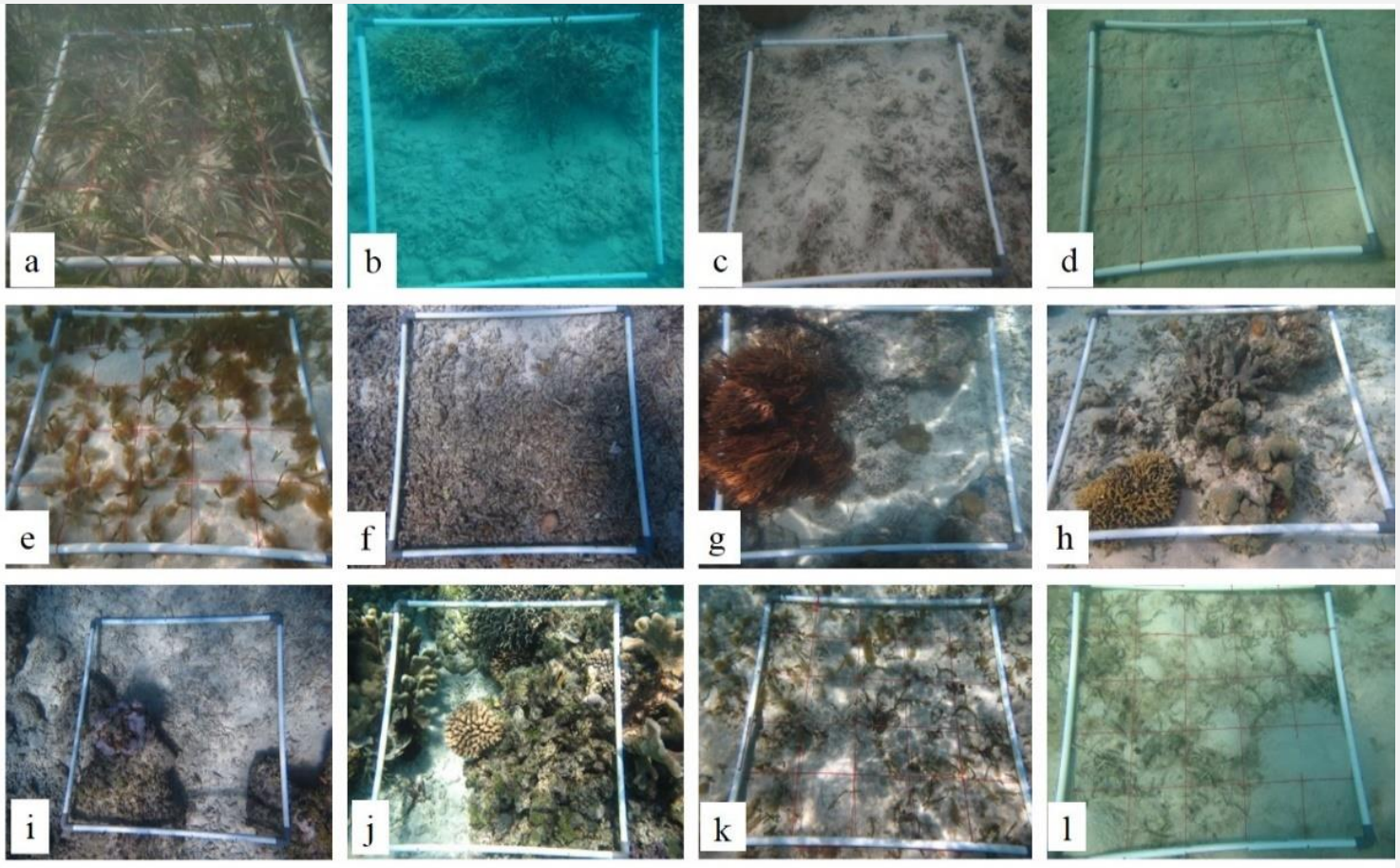
Wahidin *et al*. 2015
Landsat 8 OLI
SVM, RT, KNN
BY, DT
SVM 73%
RT 68%
KNN 67%
BY 66%
DT 56%

Wahidin, 2015

PENGINDERAAN JAUH UNTUK PEMETAAN TERUMBU KARANG

PENGINDERAAN JAUH UNTUK PEMETAAN TERUMBU KARANG

Klasifikasi Objek/Skema Klasifikasi

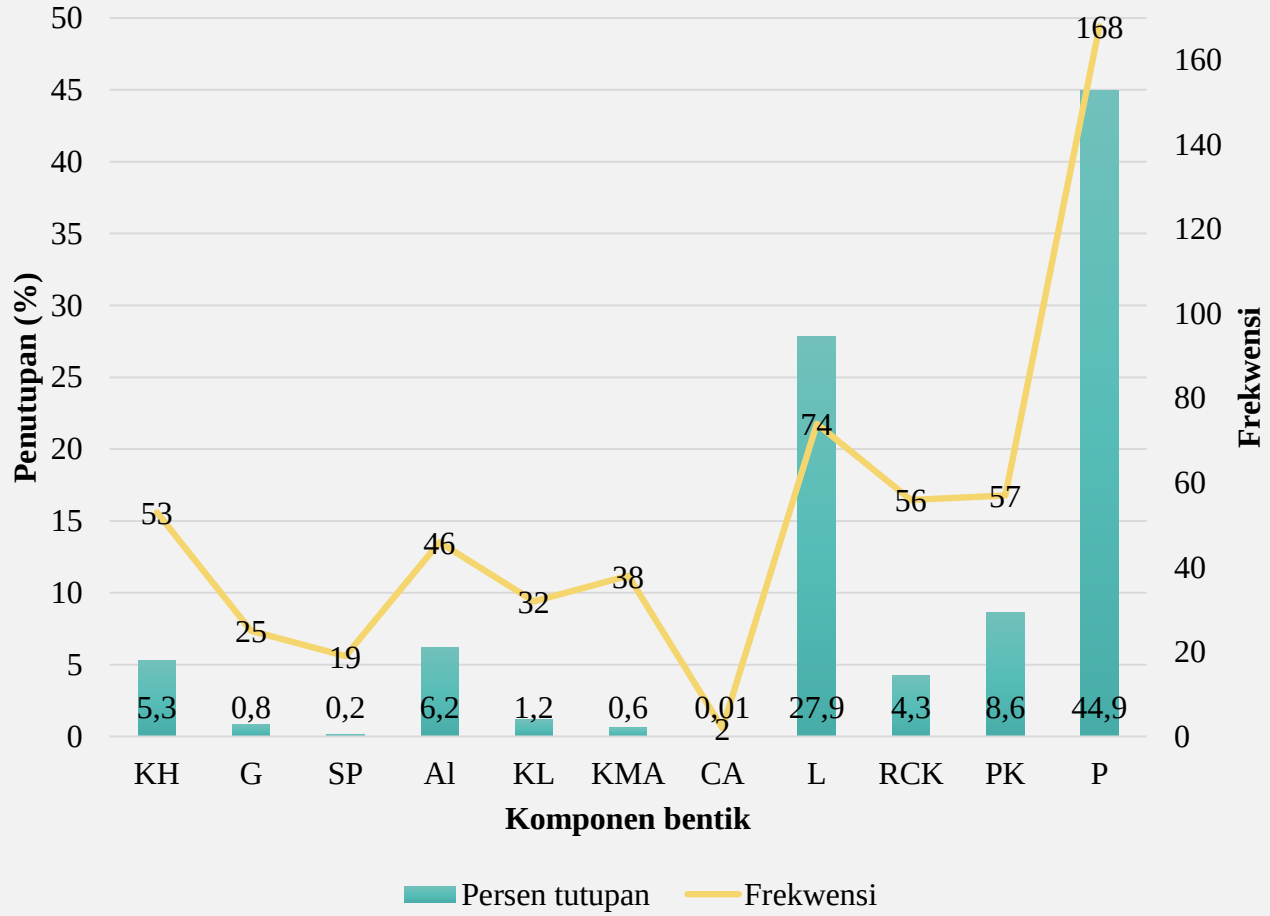


Keterangan:

a) Dominan lamun;
b) Pasir, pecahan karang, Rock, Karang hidup dan Fauna lain;
c) Pasir, Pecahan karang dan Rock;
d) Dominan Pasir;
e) Pasir Alga;
f) Dominan Pecahan karang;
g) Pecahan karang, Rock Karang hidup Fauna lain;
h) Karang Hidup, Pecahan karang, Pasir;
i) Karang Hidup, Rock;
j) Dominan Karang Hidup;
k) Alga Lamun;
l) Pasir Lamun

PENGINDERAAN JAUH UNTUK PEMETAAN TERUMBU KARANG

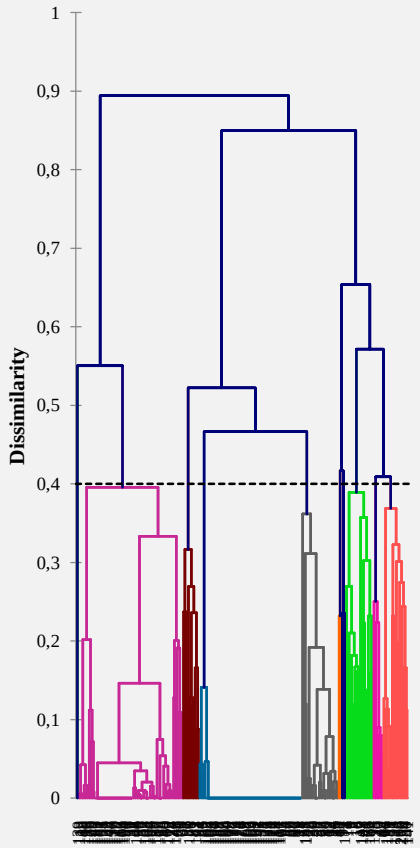
Klasifikasi Objek/Skema Klasifikasi

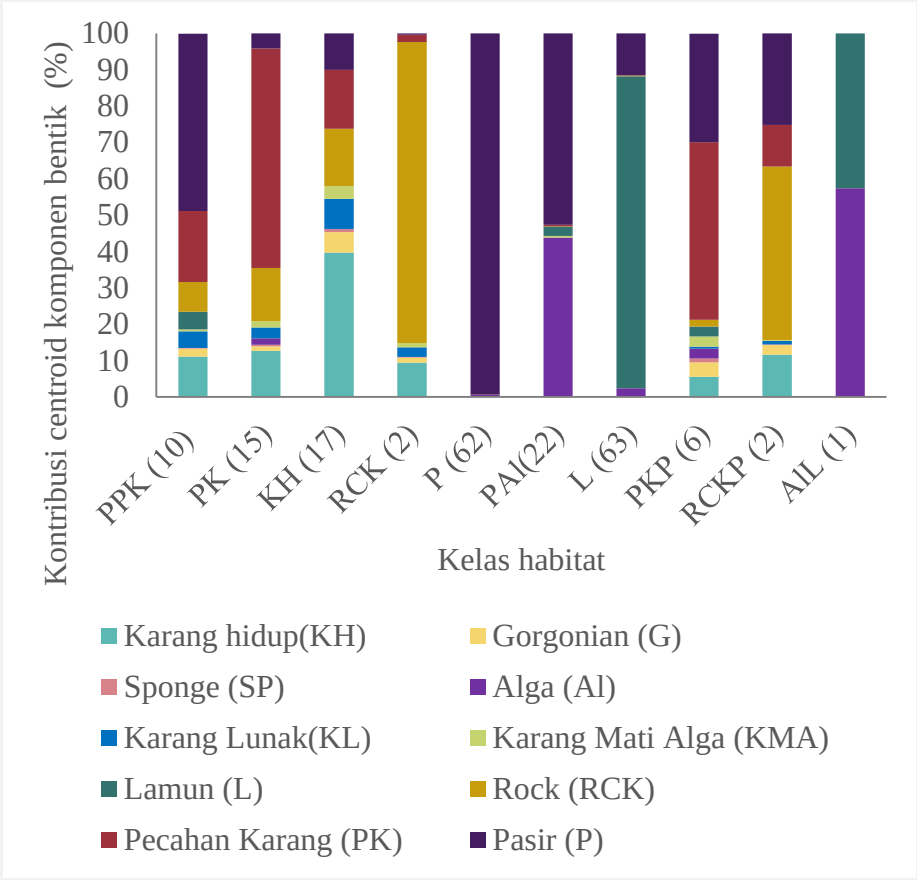


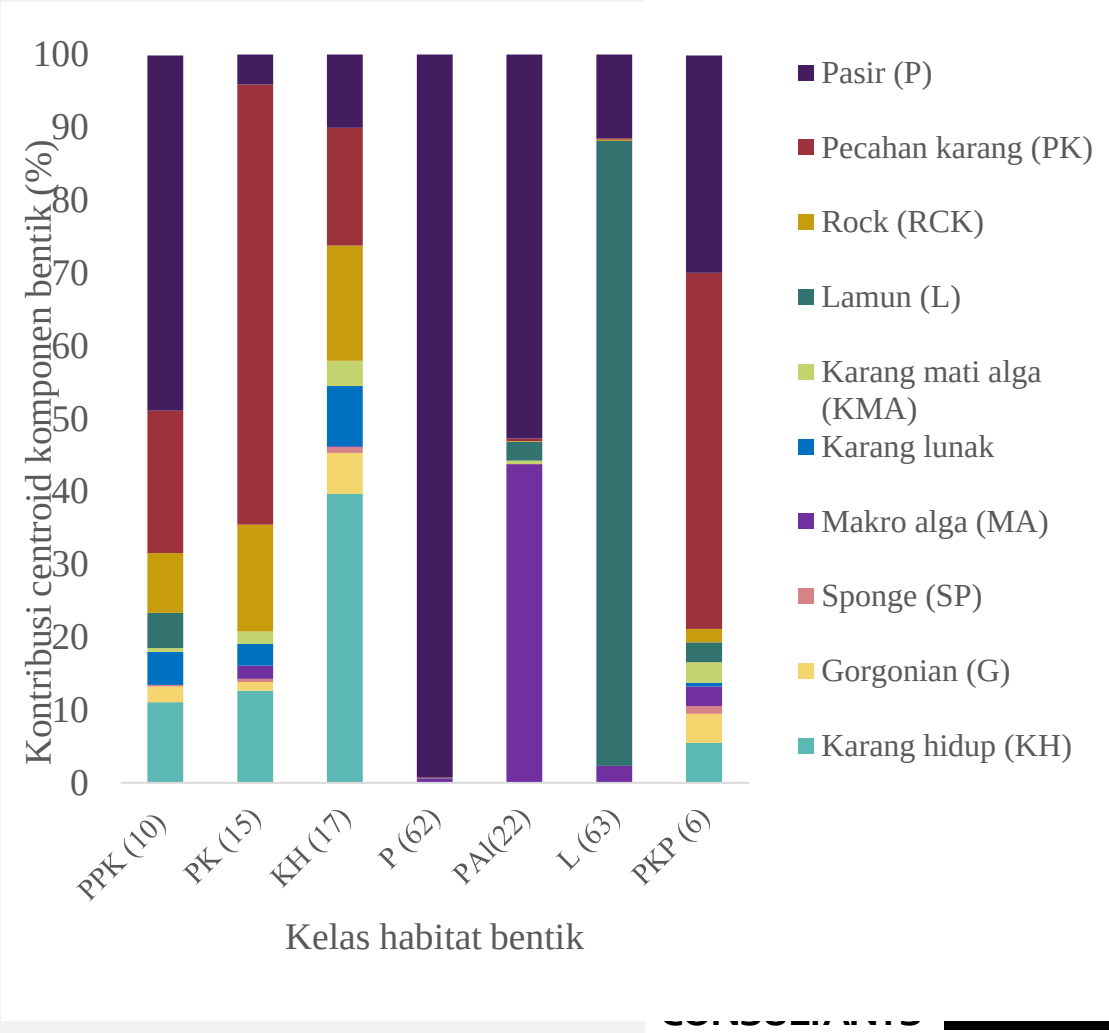
KH = Karang hidup;
G = Gorgonian/kipas laut;
SP = *Sponge*;
Al = Alga;
KL = Karang lunak;
KMA = Karang Mati dengan Alga;
CA = Coraline Alga;
L = Lamun;
RCK = Rock;
PK = Pecahan Karang;
P = Pasir

PENGINDERAAN JAUH UNTUK PEMETAAN TERUMBU KARANG

Klasifikasi Objek/Skema Klasifikasi

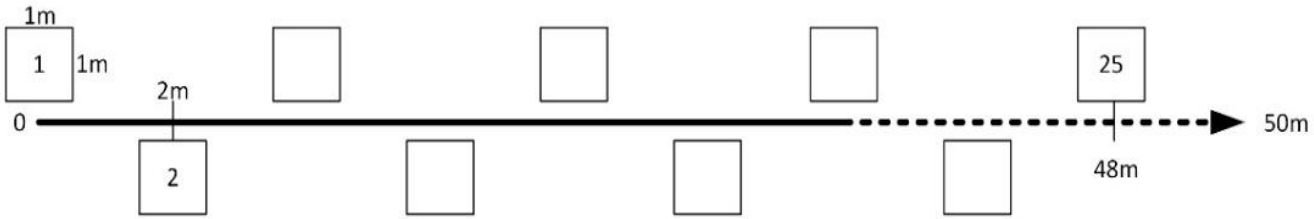


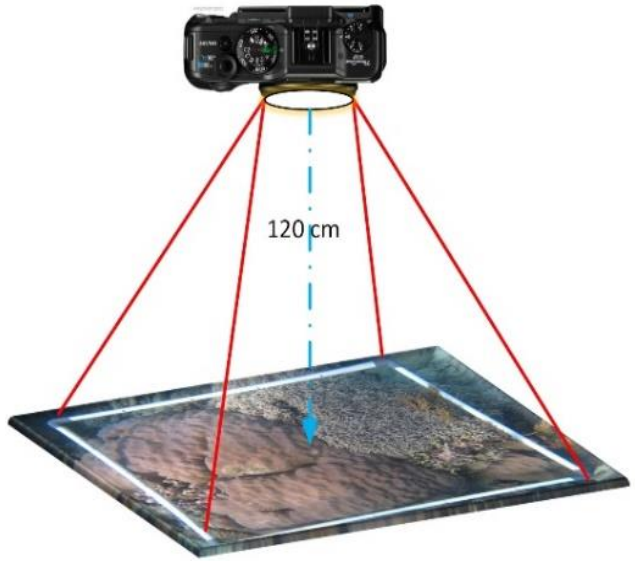




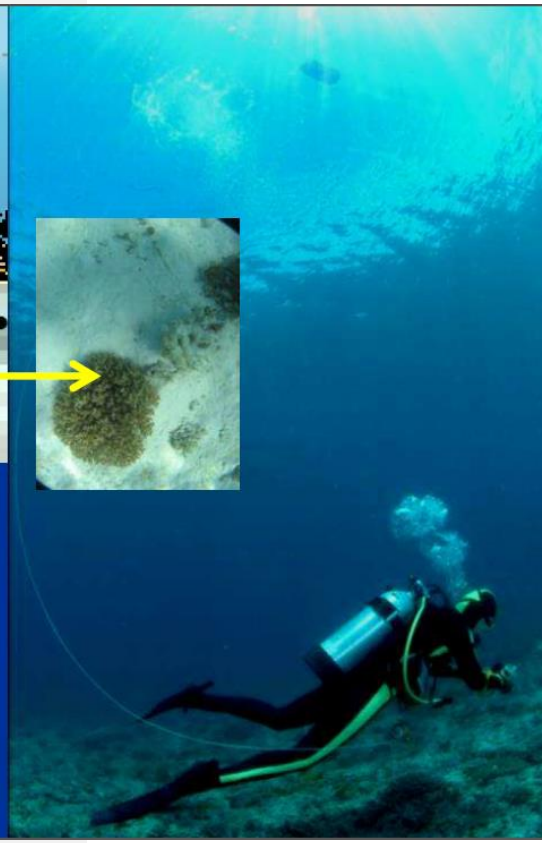
PENGINDERAAN JAUH UNTUK PEMETAAN TERUMBU KARANG

Data Lapang





MT,PIT, LIT, UPT



GPS TOWING

PENGINDERAAN JAUH UNTUK PEMETAAN TERUMBU KARANG

Pendekatan Klasifikasi

Teknik Klasifikasi

- Berbasis Piksel
- Berbasis Objek

Koreksi

- Atmosfir
- Kolom Perairan

Algoritma

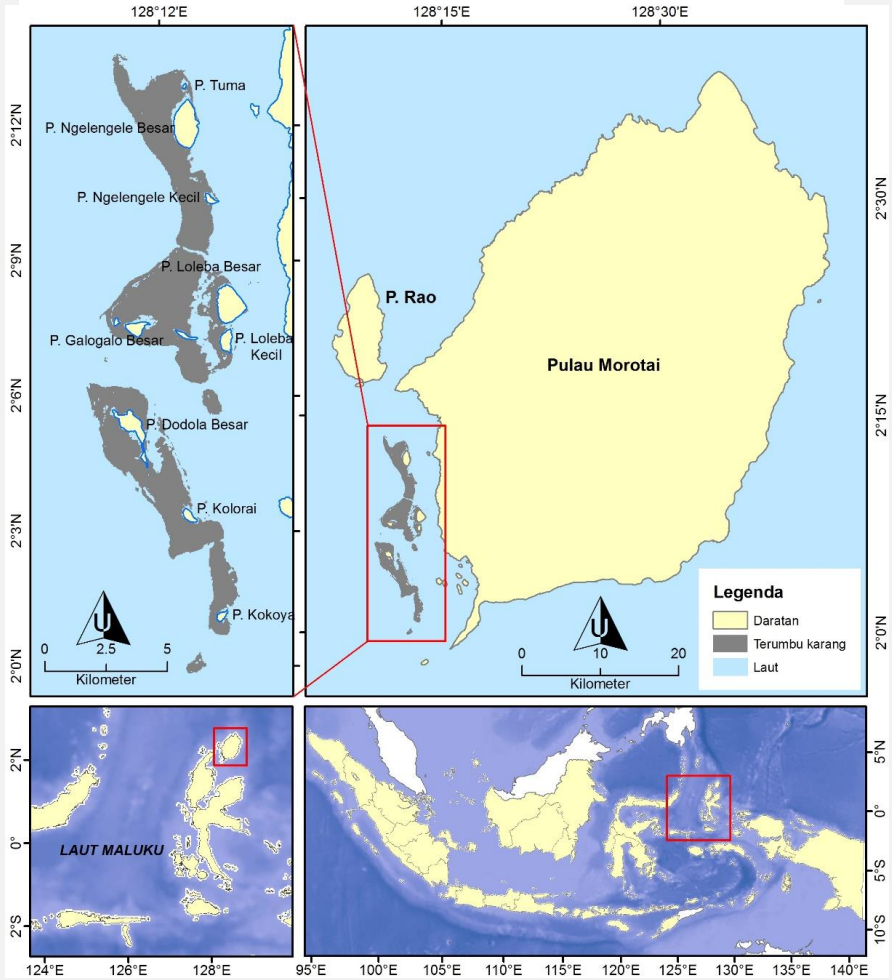
- Konvensional (MLH-MD)
- Machine Learning (SVM-RF-NN-BY-DT)

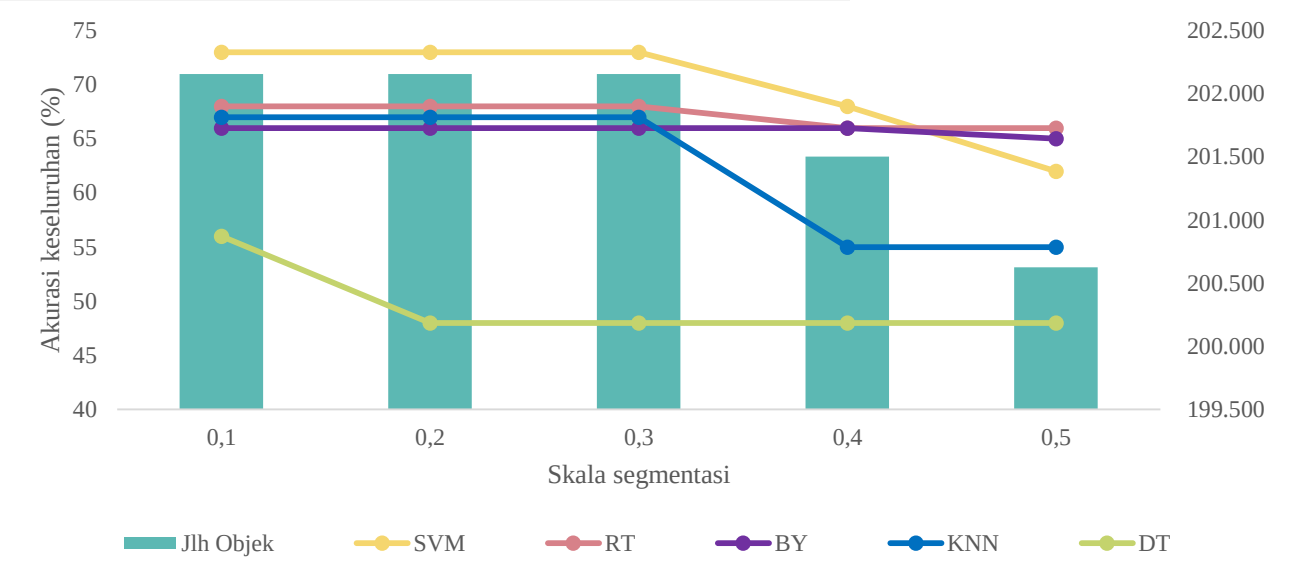
KLASIFIKASI TERUMBU KARANG

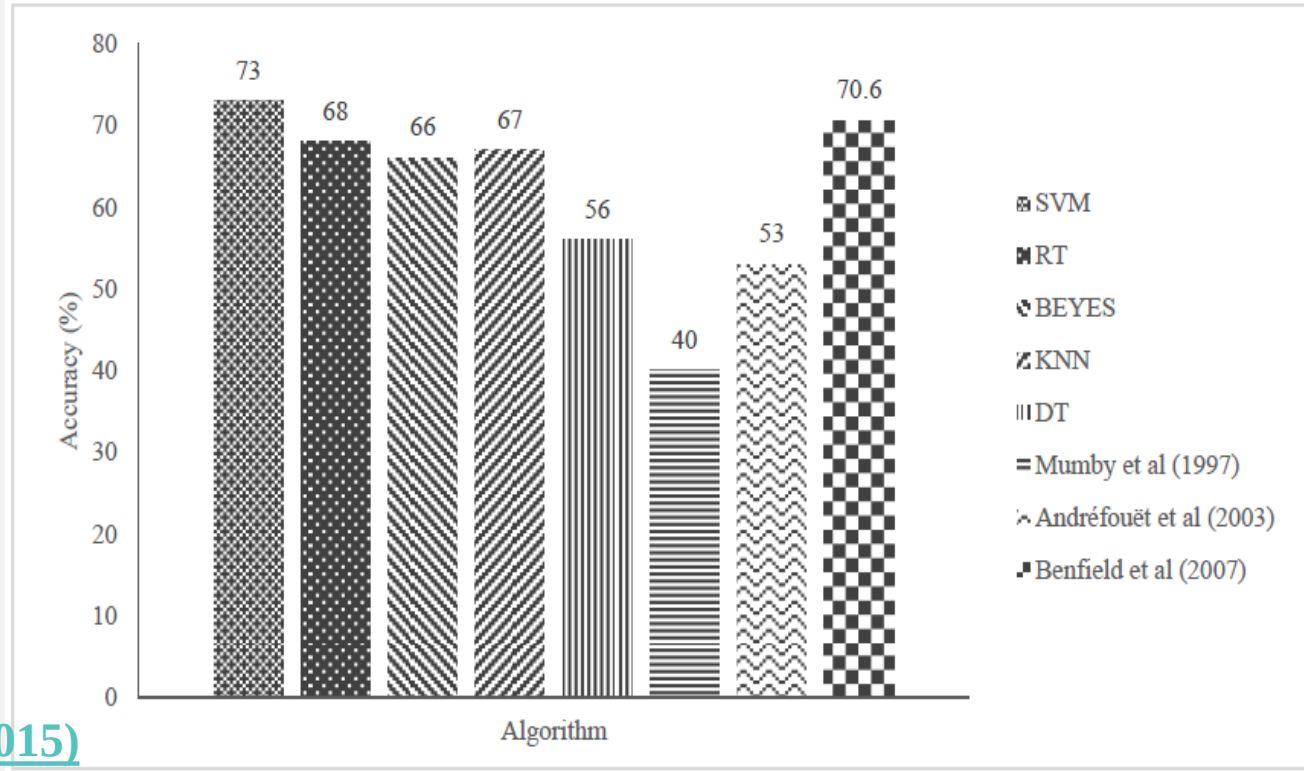
Klasifikasi Berbasis Objek (OBIA)

Landsat 8 OLI

Algoritma Machine Learning (SVM)







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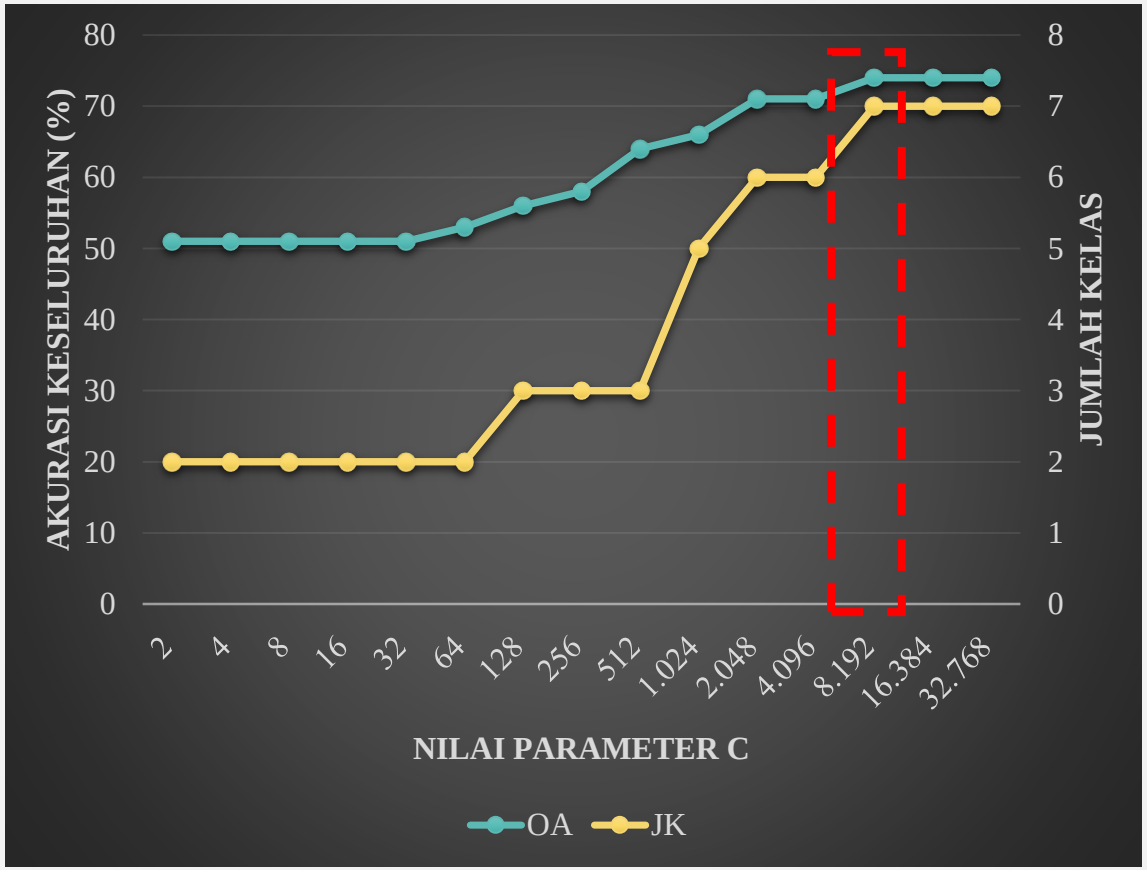
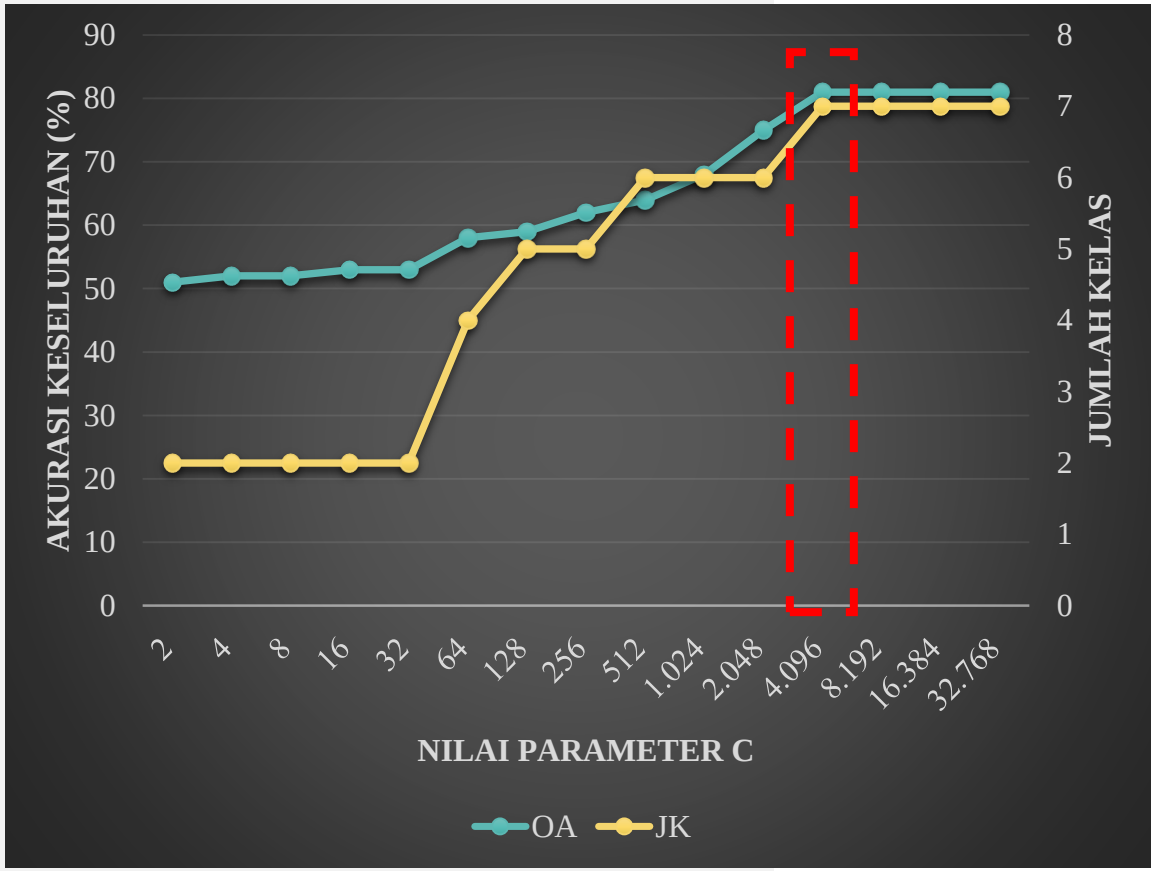
KLASIFIKASI TERUMBU KARANG

Algoritma Machine Learning (SVM)



- **Kernel type: Linier**
  - Optimum **OA (74%)**-parameter **C 8192**



- **Kernel type: rbf**
  - Optimum **OA (81%)**-parameter **C 4096**

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DETEKSI PERUBAHAN TERUMBU KARANG

Contents lists available at ScienceDirect

Estuarine, Coastal and Shelf Science

journal homepage: www.elsevier.com/locate/ecss

Changes of coral communities over 35 years: Integrating in situ and remote-sensing data on Saint-Leu Reef (la Réunion, Indian Ocean)

J. Scopélitis [a,b,c,*], S. Andréfouët [b], S. Phinn [a], P. Chabanet [c], O. Naim [c,d], C. Tourrand [e], T. Done [f]

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[b] Commutates Coralliennes et Usages, Institut de Recherche pour le Dévelopment, 101 Promenade Laroque, Anse Vata, BP A5, 98848 Nouméa Cedex, Nouvelle-Calédonie, France
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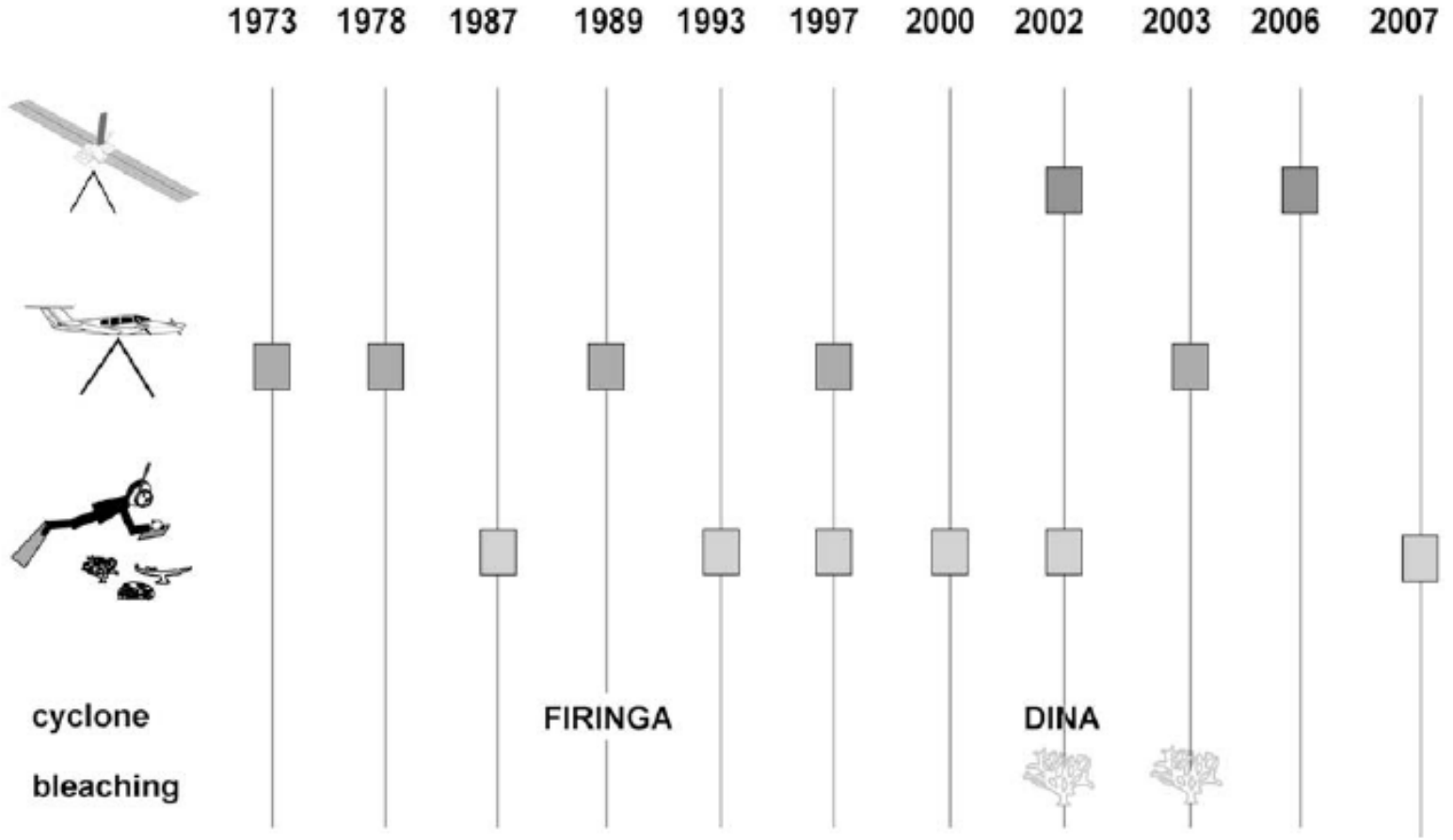
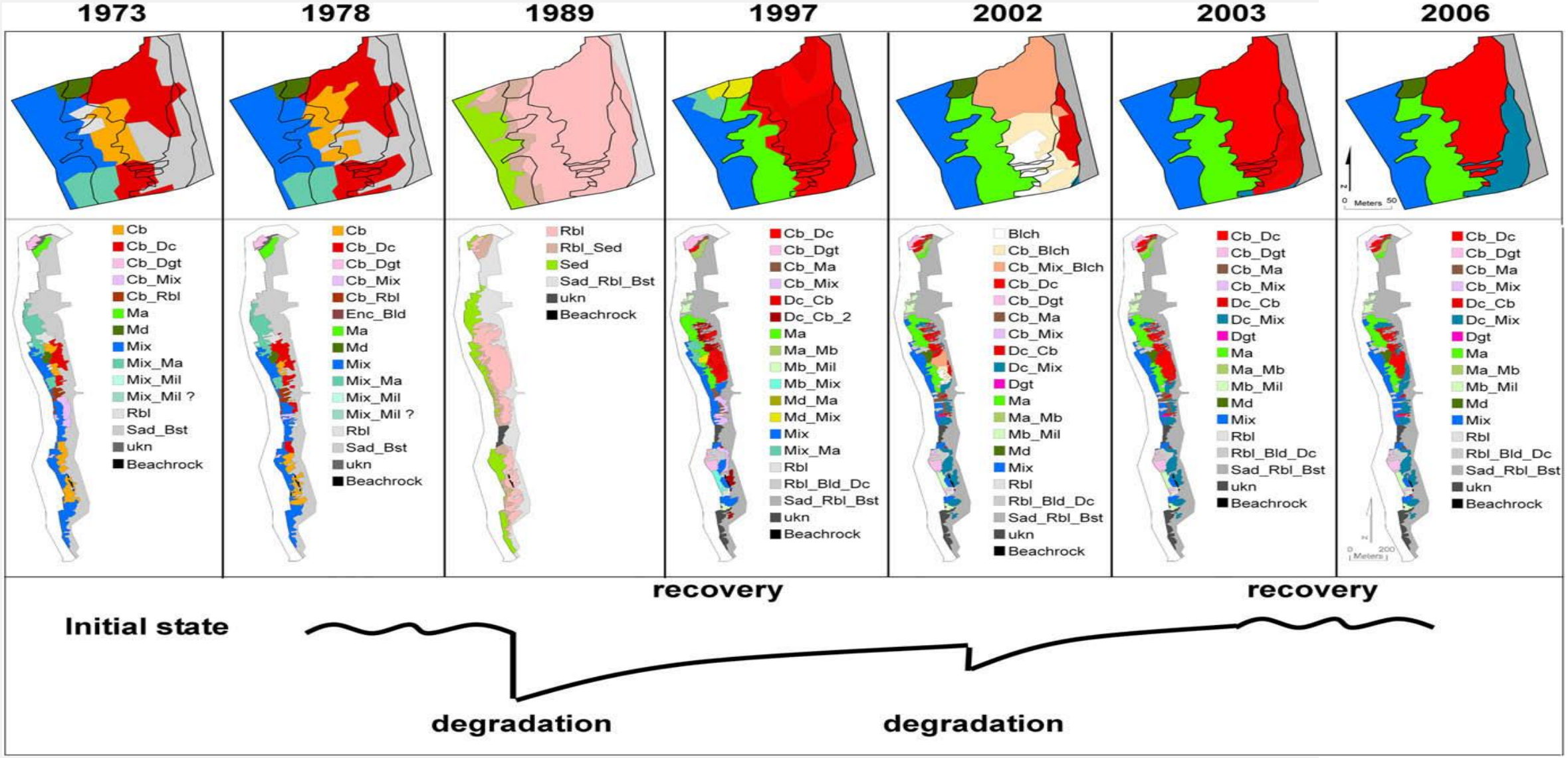
[f] Australian Institute of Marine Science, PMB 3, Townsville MC 4810, Qld, Australia



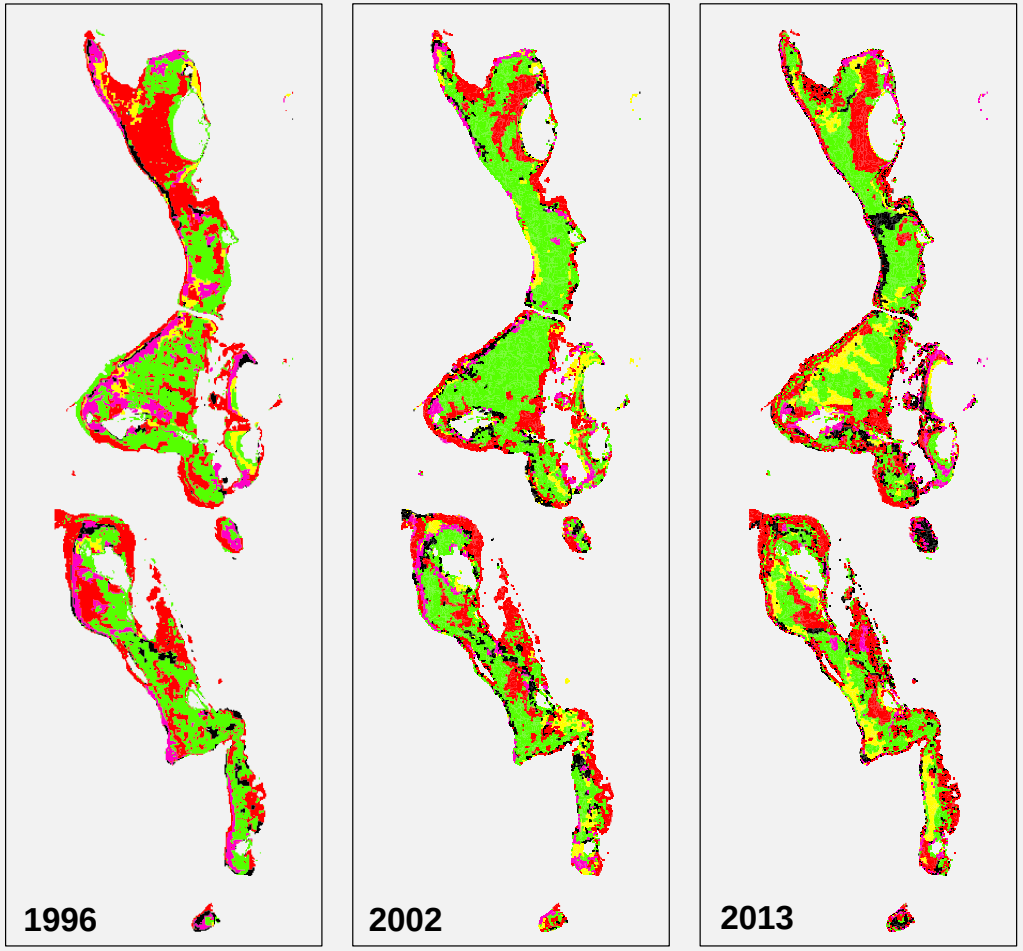
Scopélitis *et al.* 2009

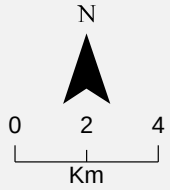
DETEKSI PERUBAHAN TERUMBU KARANG



Scopélitis *et al.* 2009

DETEKSI PERUBAHAN TERUMBU KARANG

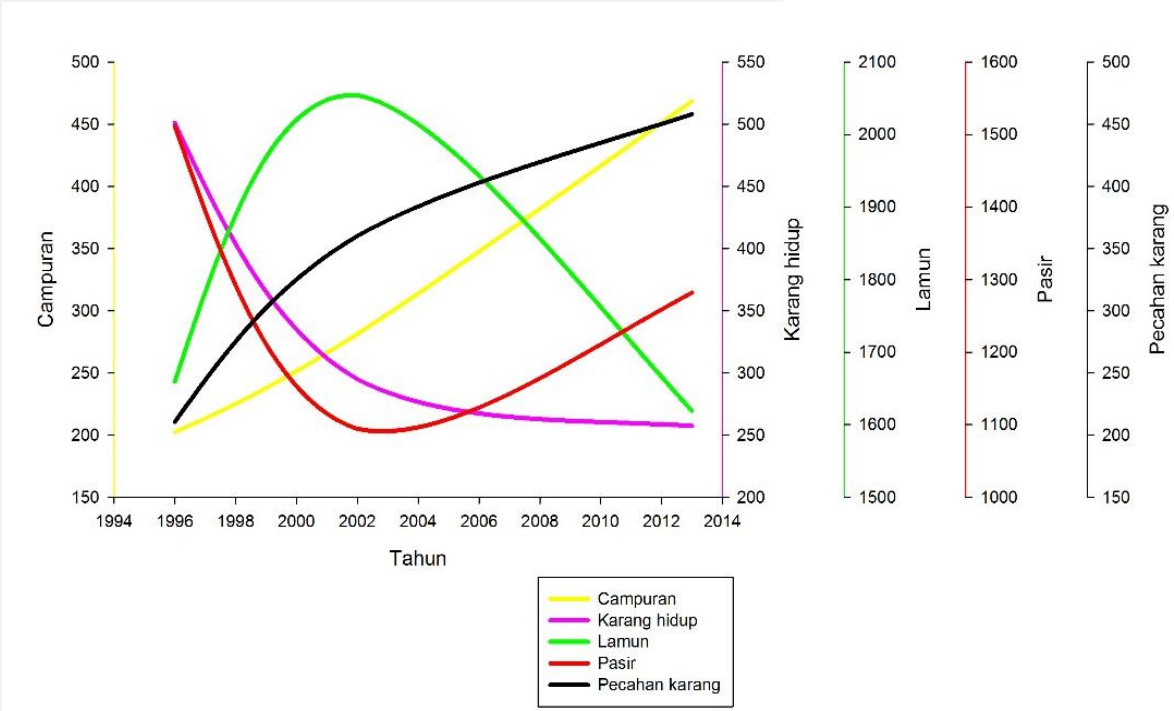




Legenda

Kelas Perubahan

- Campuran
- Karang Hidup
- Lamun
- Pasir
- Pecahan Karang



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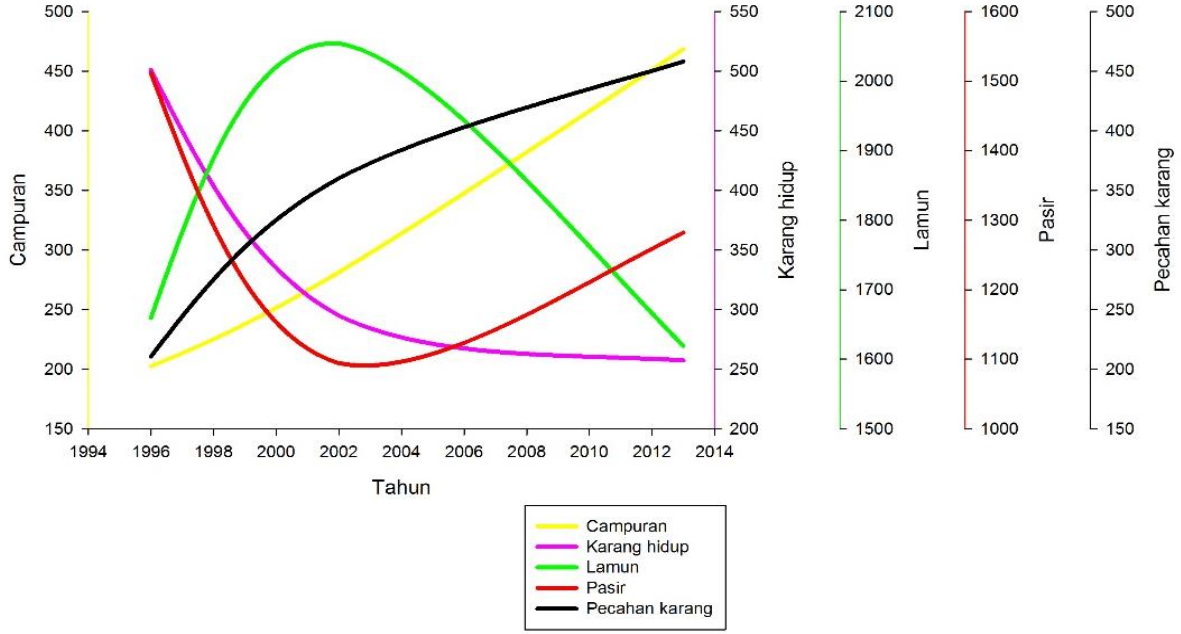
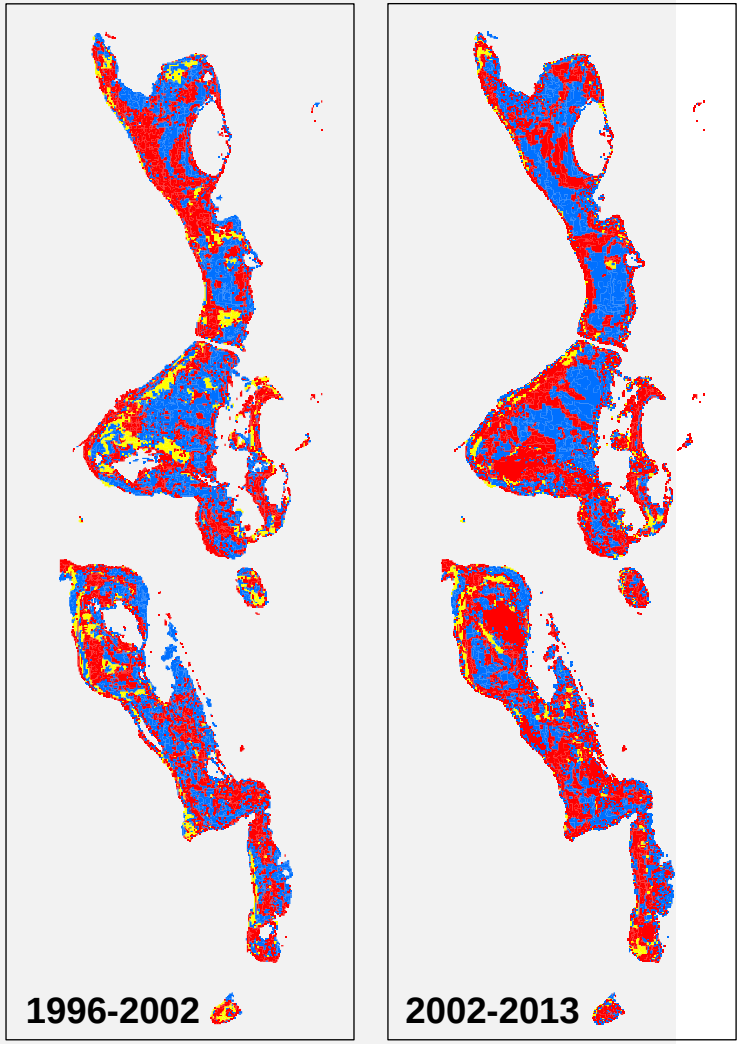
DETEKSI PERUBAHAN TERUMBU KARANG

Kelompok Perubahan	1996-2002	%	2002-2013	%
Berubah	1897.02	46.4	2021.04	49.5
Tetap	1827.9	44.7	1840.5	45.1
Tidak terdefenisikan	359.91	8.8	223.29	5.5
Total	4084.83		4084.83	





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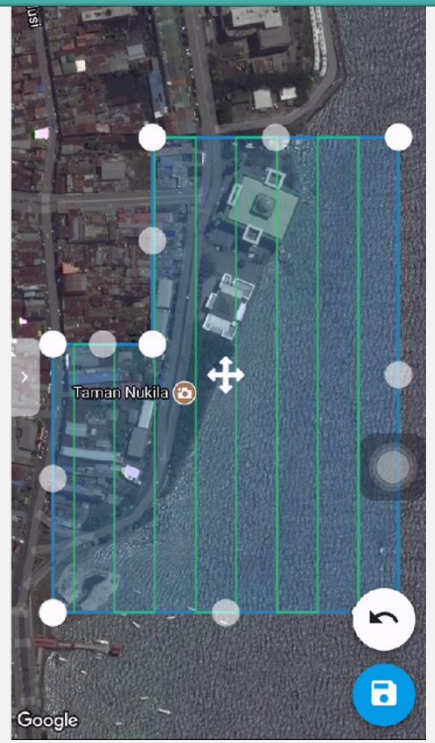
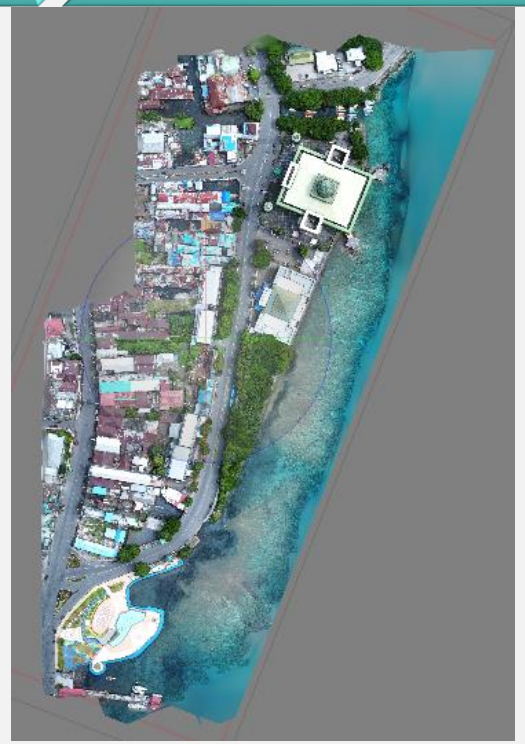
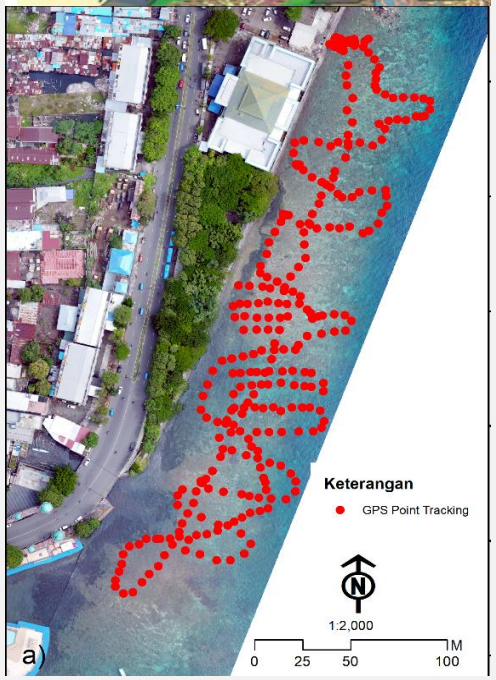
KLASIFIKASI TERUMBU KARANG DENGAN DRONE

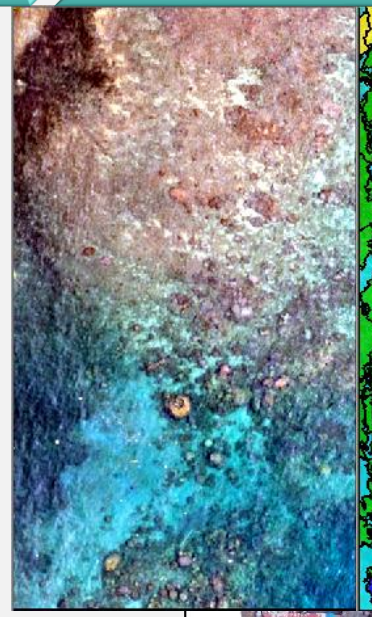
Rencana Terbang → Ortho Mosaic → Ground Truth → OBIA-NN

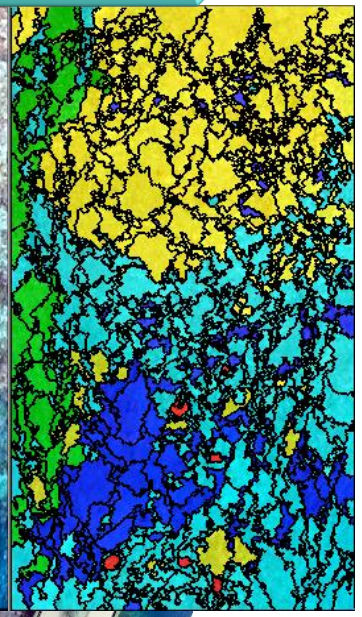




Fotogrametri







Wahiddin (2017)

KLASIFIKASI TERUMBU KARANG DENGAN DRONE

	Ground Truth						
Klasifikasi	Lamun	Masive	Mix	Pasir	Rubble	Total	% PA
Lamun	6	0	0	0	0	6	100.0
Masive	0	4	1	0	0	5	80.0
Mix	1	1	19	1	5	27	70.4
Pasir	0	0	1	9	1	11	81.8
Rubble	0	0	1	1	22	24	91.7
Total	7	5	22	11	28	73	
% UA	85.7	80.0	86.4	81.8	78.6	82.2	

Wahiddin (2017)

TERIMA KASIH

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