

Title:

Mangroves Bioshield vs Mean Sea Level Rise: How We Wreck Our Last Defence!

Speaker:

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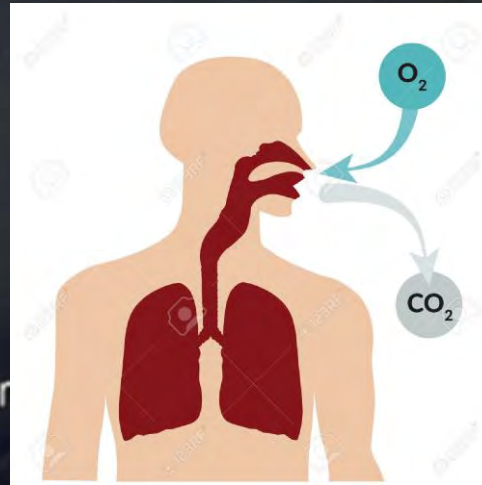
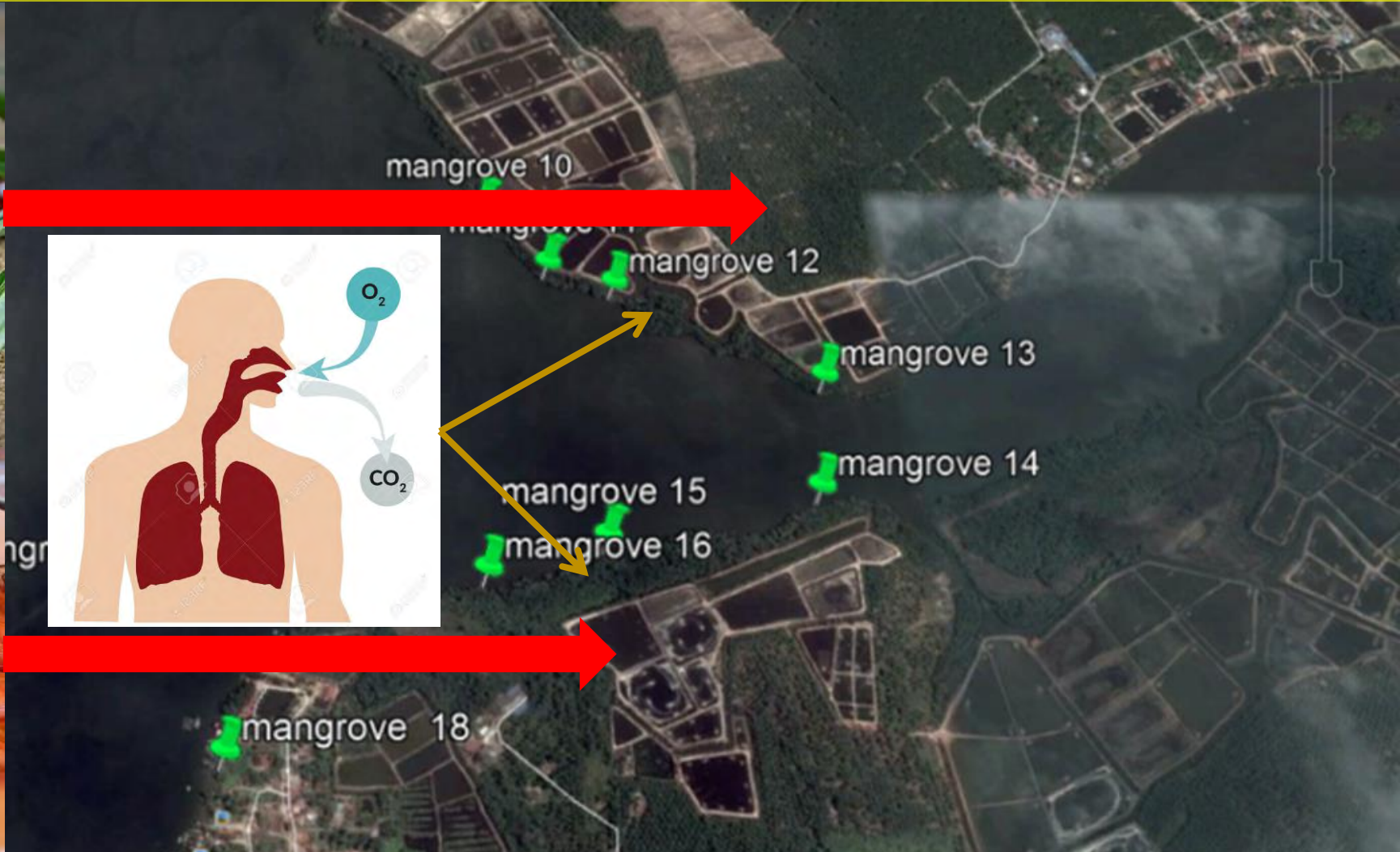


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Mangroves Bioshield vs Mean Sea Level Rise

How We Wreck Our Last Defence!



Climate Change → Sea Level Rise Related?



2014 Kelantan, Terengganu & 2017 Penang, Kedah flood

- 200,000 people displaced
- Government spent over RM2 billion to rebuild basic infrastructure
- Banks/Insurance bore the costs of moratoriums on loan repayments



2016 El Niño drought

- agriculture shrank by 5.2%
- jeopardise domestic food production and cause prices to inflate

WE MEASURE THESE



MANGROVES DEFORESTATION RATES

LAND USE LAND COVER CHANGE

Top to bottom mangroves density is the key to study mangroves mechanism in defending coastal areas

WE MATCH THIS

mangrove 6

mangrove 5

mangrove 8

mangrove 9

mangrove 10

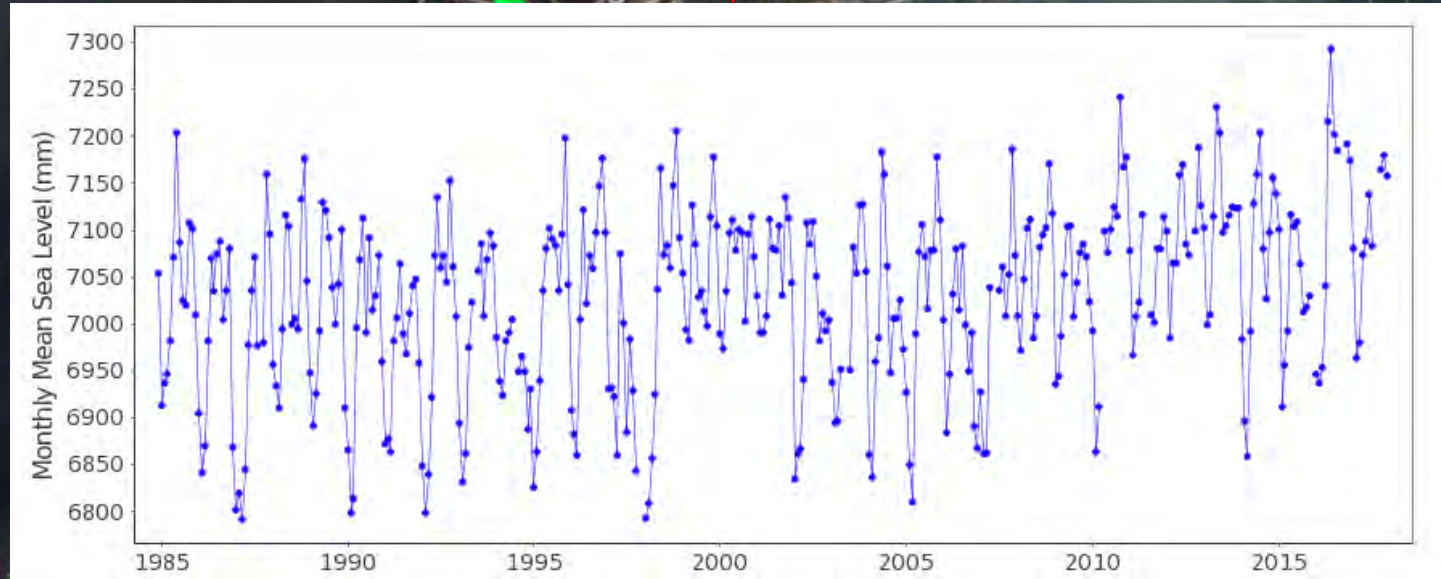
mangrove 11

mangrove 2

mangrove 1



MANGROVES DEFORESTATION RATES

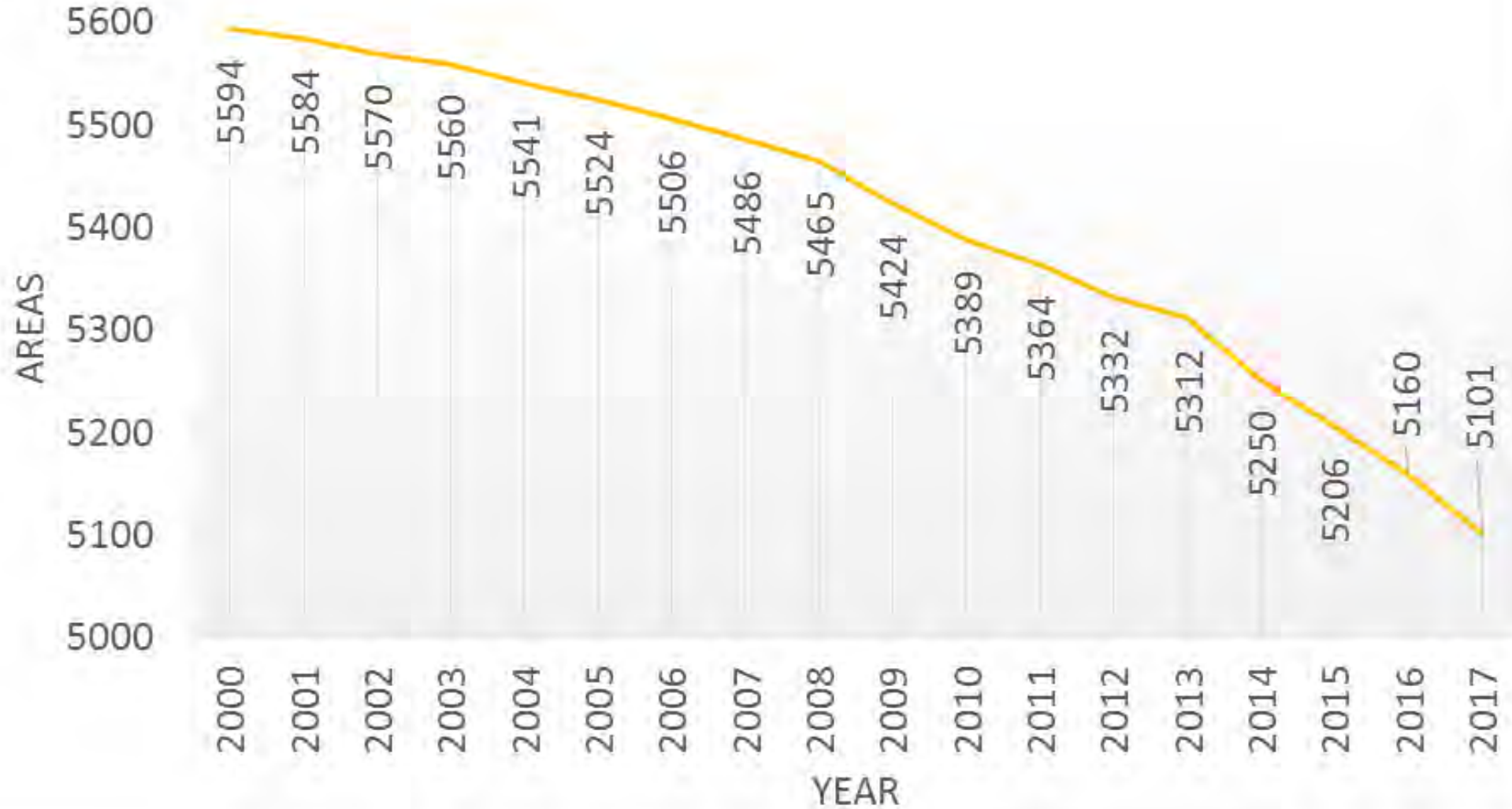


ANNUAL MEAN SEA LEVEL

WE FOUND THIS



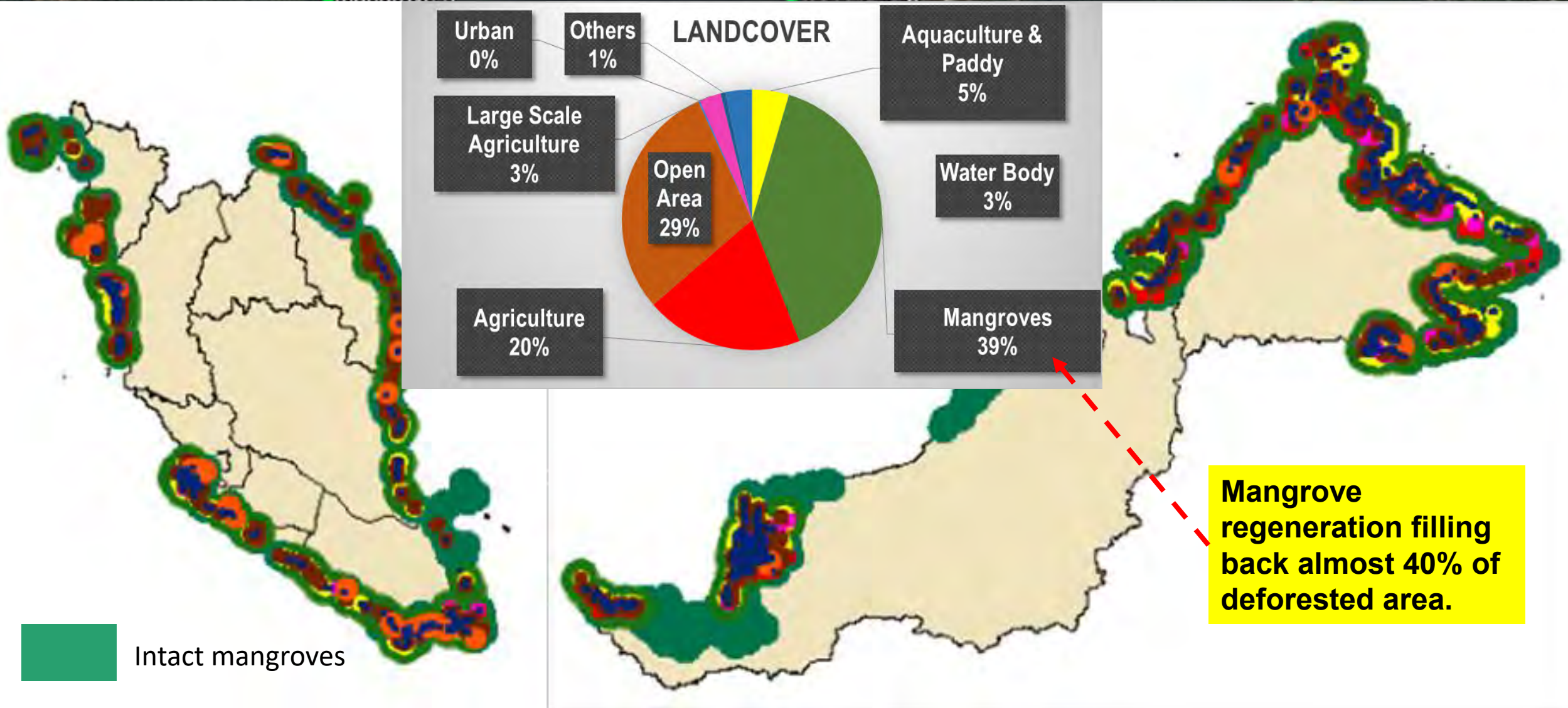
WE FOUND THIS (km²)



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WE FOUND THIS



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WE ARE SORRY TO SHARE THIS

Revelation of anthropogenic (**NOT MSL**) for 8% mangrove deforestation (2001-2017) means Malaysia has lost 493 km² coastal defends **BY OUR OWN HANDS!**

WE ARE NOT ALONE!

YEAR	INDONESIA	MYANMAR	MALAYSIA	THAILAND	PHILIPPINES	CAMBODIA	VIETNAM	BRUNEI	SINGAPORE	TOTAL
2000	27818.704	3322.80306	5798.807082	2278.253511	2491.620777	402.318702	853.36083	123.359985	4.88601	43094.114
2001	27753.857	3319.674021	5788.048086	2277.590265	2490.202278	402.159204	852.870213	123.293484	4.881879	43012.576
2002	27665.023	3307.615101	5773.108437	2275.988571	2488.161951	401.648112	852.361317	123.217218	4.874121	42891.998
2003	27577.224	3296.39904	5762.174256	2273.232861	2486.249775	401.370777	851.988087	123.141411	4.874121	42776.655
2004	27450.038	3275.873262	5741.72127	2267.04843	2483.203176	400.431321	851.2551	122.92173	4.873248	42597.365
2005	27378.713	3257.346717	5723.420391	2261.410056	2481.36336	399.106368	850.575636	122.884083	4.865445	42479.685
2006	27319.567	3233.824443	5703.675003	2255.40306	2478.376323	396.862308	849.423078	122.841	4.865445	42364.837
2007	27263.336	3200.969079	5681.79198	2250.986148	2475.479547	394.072398	848.069829	122.791869	4.865445	42242.362
2008	27219.884	3158.096832	5658.546564	2244.726819	2473.024554	392.864805	846.692757	122.729643	4.865445	42121.431
2009	27123.955	3104.867367	5614.113519	2235.059298	2469.019419	386.757972	844.65738	122.691384	4.862223	41905.984
2010	27080.541	3045.72465	5575.364784	2229.929388	2465.470503	384.57522	843.684048	122.64012	4.862223	41752.792
2011	27024.057	3030.246981	5548.253076	2225.537244	2463.623577	383.857938	843.030828	122.448555	4.857507	41645.913
2012	26944.363	3015.509976	5513.179473	2220.511986	2459.055051	382.512087	842.009319	122.388048	4.857507	41504.387
2013	26905.474	3009.790467	5491.277172	2218.560318	2454.509844	382.322898	841.374288	122.374728	4.856049	41430.540
2014	26769.305	3002.531868	5425.057998	2215.39563	2448.451431	381.933459	839.113704	122.257521	4.852683	41208.900
2015	26640.575	2997.10377	5377.474251	2213.442315	2446.142184	381.582252	838.367316	122.014035	4.850163	41021.551
% LOSS	4.235	9.802	7.266	2.845	1.825	5.154	1.757	1.091	0.734	4.809

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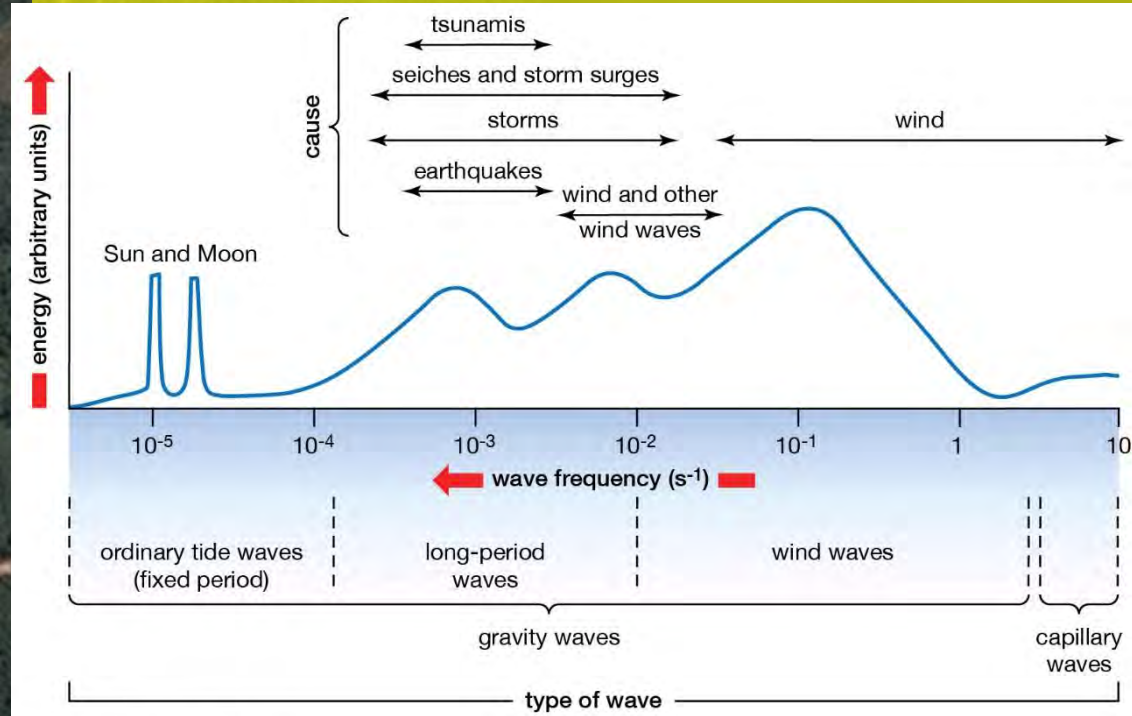
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WHAT IS NEXT!

1. We are looking forward to measure **wave attenuation** from mangrove density variations
2. We are intrigued to know how much **CO₂** has been **emitted** from **mangroves deforestation** that lead to **global warming** and end up causing **mean sea level rise**

HOW LAND SURVEY & HYDROGRAPHY COME INTO PICTURE?



Land surveyor able to **PRECISELY** determine deforested area – equal area (preserve area) projection transformation, location

Hydrographer – **COINCIDE** land and sea (coastal datum) to model mangrove wave attenuation $\text{bulk drag coefficient}$ -water density, wave length, gravity acceleration, wave frequency water depth and wave height.

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WHO ARE WE?

SEAMLESS LAND – SEA ENTHUSIAST

Land Surface Dynamics Research Areas

Coastal Processes

Erosion and
Orogenesis

Glacial
Geomorphology

Natural Hazards

Land Surface Dynamics
People

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LSD

Topo Tools

Welcome to **LSDTopoTools**. This software was developed by members of the [Land Surface Dynamics \(LSD\) research group](#) at the [University of Edinburgh](#).

The software aims to operate:

- As a framework for implementing the latest developments in topographic analysis.
- As a framework for developing new topographic analysis techniques.
- As a framework for numerical modelling of landscapes.
- To improve the speed and performance of topographic analysis versus other tools (e.g., commercial GIS software).
- To enable **reproducible** topographic analysis in the research context.

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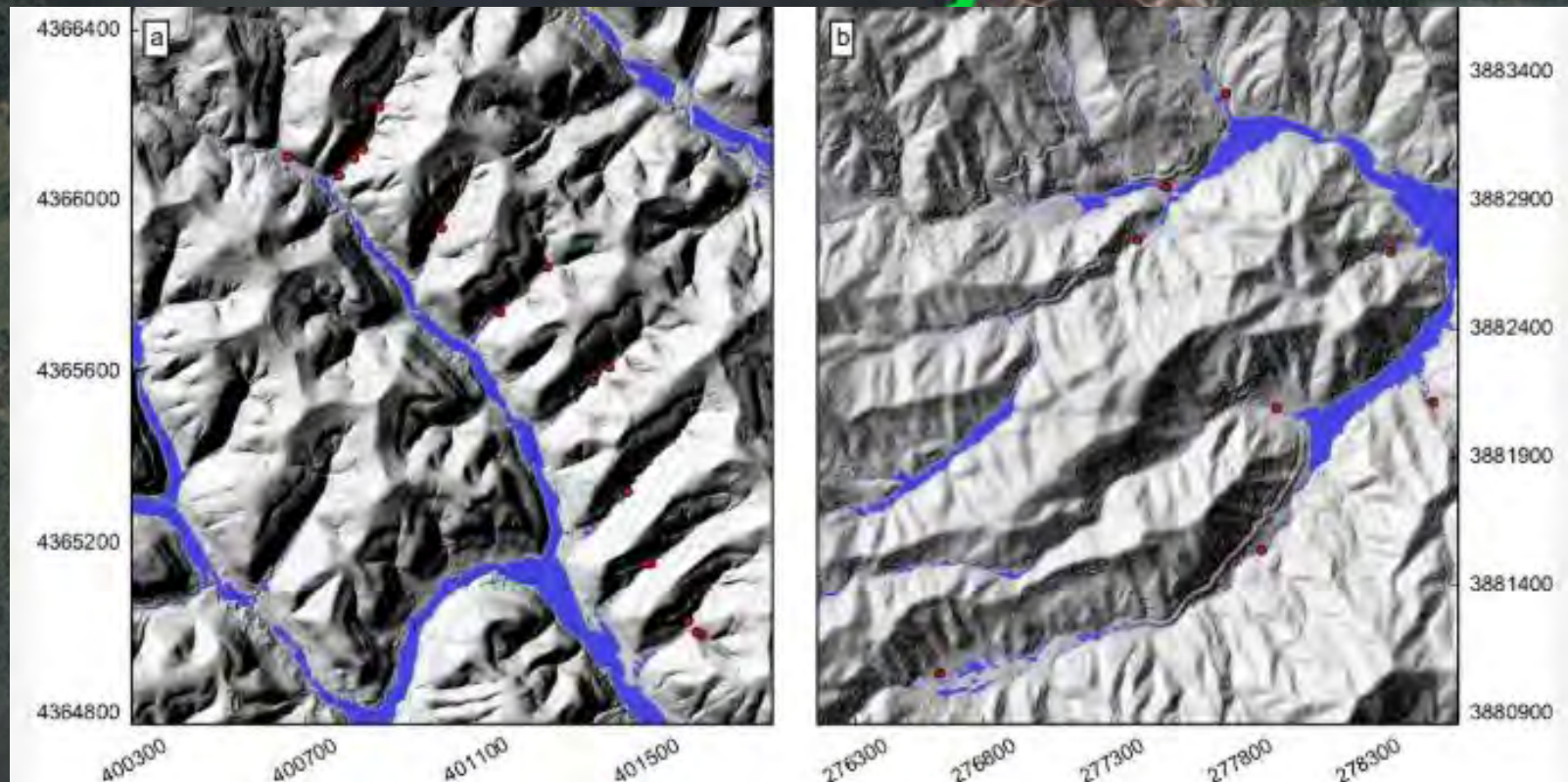
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THANK YOU

Datasets origin, code and method available at

<https://github.com/NoorzalineeG>

<https://lsdtopotools.github.io/>



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