



Aminah Ismailluddin <amieynahzahra@gmail.com>

UMTAS 2021 submission 160

1 message

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To: Aminah Ismailluddin <amieynahzahra@gmail.com>

Tue, Aug 31, 2021 at 10:58 PM

Dear authors,

We received your submission to UMTAS 2021 (15th Virtual International UMT Annual Symposium 2021):

Authors : Aminah Ismailluddin, Effi Helmy Ariffin, Siti Ayishah Thaminah Hikmatullah, Muhammad Fadhli Abdul Harris, Amrul Jaahiz Razak, Sharnietha Ratnam, Shin Yun Lee, Mohamad Hakim Mohd Shukri and Muhammad Zahir Ramli
Title : Dynamic Visualization of Beach Morphology in Wave Overtopping over Coastal Structures
Number : 160

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Best regards,
EasyChair for UMTAS 2021.

Master Time Table based on Paper-ID

ID	Date	Session-Parallel	Time	Title	Author	Presenter
150	24/11/2021	3-6	1515	The Scientific Research Activity Of The Students In Uzbekistan During The Global Pandemic: Pressing Problems And Effective Approaches	Solikha Allayarova	Solikha Allayarova
151	24/11/2021	3-3	1415	Blow-Up And Global Existence For A System Of Multidimensional Parabolic Equations With Nonlinear Boundary Conditions	Zafar Rakhmonov And Akrom Alimov	Akrom Alimov
152	24/11/2021	4-4	1555	Identification On Long-Term Coastal Erosion Using The UAV Survey For Coastal Disaster In Kuala Nerus (Malaysia)	Adina Roslee, Effi Helmy Ariffin, Faerah Nasir And Amri Md Shah	Adina Roslee
153	24/11/2021	3-3	1430	Numerical Solution Of A Viscoplastic Problem For A Rod.	Nodira Pardaboeva, Nigora Mamatova And Otajon Тилолов	Nodira Pardaboeva
154	24/11/2021	3-3	1445	Hydrodynamic Impact Of A Partially Permeable Plate In Flow With A Breaking Jet	Askar Zakirov	Askar Zakirov
155	23/11/2021	3-5	1540	Supplementation Of Phytase In Defatted Soybean Meal Feeds In Hybrid Grouper, Tiger Grouper (Epinephelus Fuscoguttatus) X Giant Grouper (E. Lanceolatus) Juvenile	Norfazreena Mohd Faudzi, Rossita Shapawi, Shigeharu Senoo, Amal Biswas And Annita Yong Seok Kian	Norfazreena Mohd Faudzi
156	24/11/2021	4-6	1540	Expert Perspectives: 'Solveme' Web Development Based On Problem-Based Learning (Pbl) Approach In Programming Fundamental Course	Azrul Hassan	Azrul Hassan
157	24/11/2021	2-2	1135	Digital Transformation Monitoring System Of Civil Servants With Information Systems Of Electronic Government Of Republic Of Uzbekistan	Kurbon Rakhmanov And Botir Makhmanov	Kurbon Rakhmanov
158	23/11/2021	3-6	1540	Factors Affecting Asian Seafarers' Safety Culture Practices Under The Safety Management System	Sashidaran Gopala And Noor Fadhiha Mokhtar	Sashidaran Gopala
159	24/11/2021	4-4	1610	Sustainable Natural Architectural Design For Sand Dunes Restoration By Sand Trapping In Terengganu Coast	Effi Helmy Ariffin, Aminah Ismailuddin, Adina Roslee, Mohd Hakim Shukri, Lee Shin Yun, Mohd Fadli Abdul Harris And Mohd Zahir Ramli	Effi Helmy Ariffin
160	24/11/2021	4-4	1625	Dynamic Visualization Of Beach Morphology In Wave Overtopping Over Coastal Structures	Aminah Ismailuddin, Effi Helmy Ariffin, Siti Ayishah Thaminah Hikmatullah, Muhammad Fadhli Abdul Harris, Amrul Jaahiz Razak, Sharnietha Ratnam, Shin Yun Lee, Mohamad Hakim Mohd Shukri And Muhammad Zahir Ramli	Aminah Ismailuddin
161	23/11/2021	3-6	1555	The Influence Between Occupational Stress, Burnout, Work Engagement And Job Satisfaction Among Malaysian Married Offshore Workforce	Zuha Rosufila Abu Hasan, Ramis Maghenthiran And Nadia Abu Hasan	Zuha Rosufila Abu Hasan
162	24/11/2021	4-1	1540	The Effect Of SrTiO ₃ On The 4mgH ₂ -Li ₃ AlH ₆ System For The Solid-State Hydrogen Storage Material	Muhammad Syarifuddin Yahya, Noratiqah Sazelee, Nurul Amirah Ali, Mohammad Ismail, Nurul Shafikah Mustafa, Nurul Nafiqah Sulaiman And Muhammad Firdaus Asyraf Abdul Halim Yap	Muhammad Syarifuddin Yahya
163	24/11/2021	4-4	1640	Beach Morphodynamics Influence From Seasonal Monsoon In Terengganu Coast	Muhammad Fadhli Bin Abdul Harris, Effi Helmy Bin Arffin, Mohamad Hakim Bin Mohd Shukri, Aminah Ismailuddin, Nurin Adina Binti Roslee Jelani, Lee Shin Yun And Wan Amrul Jaaahiz Bin Abdul Razak	Muhammad Fadhli Bin Abdul Harris

Dynamic Visualization of Beach Morphology in Wave Overtopping over Coastal Structures

A Ismailluddin¹, E H Ariffin^{1,2}, S A T Hikmatullah³, M F Abdul Haris¹, A J Razak², S Ratnam⁴, L S Yun¹, M H M Shukri¹ and M Z Ramli³

¹ Faculty of Science and Marine Environment, Universiti Malaysia Terengganu, 21030, Kuala Nerus, Terengganu

²Institute of Oceanography and Environment, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia

³Institute of Oceanography and Maritime (INOCEM), International Islamic University Malaysia, Kampung Cherok Paloh, 26060, Kuantan, Pahang, Malaysia, Malaysia

⁴ Centre for Marine and Coastal Studies, Universiti Sains Malaysia (USM), 11800, Penang, Malaysia

Corresponding author's email: effihelmy@umt.edu.my

Abstract. Wave overtopping of coastal structures depicts a hazard for community, property, and infrastructure within the vicinity of low land areas. Given the growing threat of climate-change-induced floods, the wave attacks, particularly in Kelantan low-lying areas, can substantially affect the occurrence of wave overtopping at various coastal structures. Hence, a precise prediction of wave overtopping for different coastal structures is essential to protect community and property nearby the coastal structure areas. Smoothed Particle Hydrodynamics (SPH) method using DualSPHysics was conducted to simulate wave overtopping on flow thickness, velocity, and volume discharge. Understanding the complexity of beach dynamics and hydrodynamic characteristics were assessed using Profiler 3.2 XL and MIKE-21 to determine the current beach morphology with existing coastal structures and gain better insights into the dynamic visualization of wave overtopping. The result shows that the variation of the beach morphology throughout the storm event greatly influences the wave flow and velocity, while the wave overtopping discharges are influenced mainly by the defending of coastal structures to impede the wave overtopping water drains discharge inland. This study demonstrates the most desirable choices concerning the effectiveness of coastal structures design and types are profound in coastal erosion and flood management purposes visually and realistically.

Keywords: Coastal structures, DualSPHysics, SPH, numerical modelling, wave overtopping.

Dynamic Visualization of Beach Morphology in Wave Overtopping over Coastal Structures

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Faculty of Science and Marine Environment, Universiti Malaysia Terengganu, 21030, Kuala Nerus, Terengganu

OUTLINE

INTRODUCTION

- Research Background
- Problem Statement
- Research Objectives

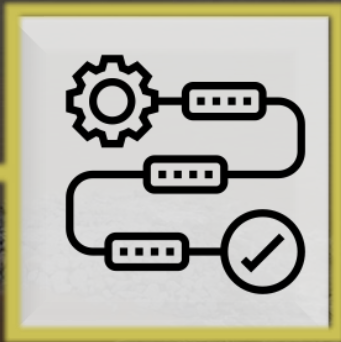
PRIMINALIRY RESULT

- Beach Profile
- Wind, Wave and current



RESEARCH AREA

- Environmental Setting
- Research study



METHODOLOGY

- Data collection
- Data analysis/ interpret



INTRODUCTION

CLIMATE
CHANGE IS
THE **BIGGEST**
THREAT WE'RE
FACING -
PERIOD



Sea level rise and its impacts in the coastal areas
(Ehsan et al., 2019)

Sea Level Rise?

An **increase in global mean sea level** as a result of an increase in the volume of water in the world's ocean

IPCC: globally sea level has risen by **2.4 mm to 3.8 mm (per year)**.

So, who is the most impacted?

Low-lying coastal communities are vulnerable to flooding & erosion due to elevated water level, large battering waves or the combined effect of storm events

(Kirshen et al., 2008; National Research Council, 2009; NOAA, 2018).

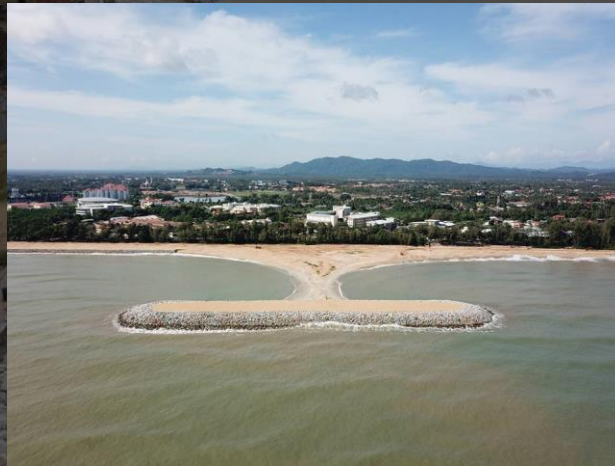
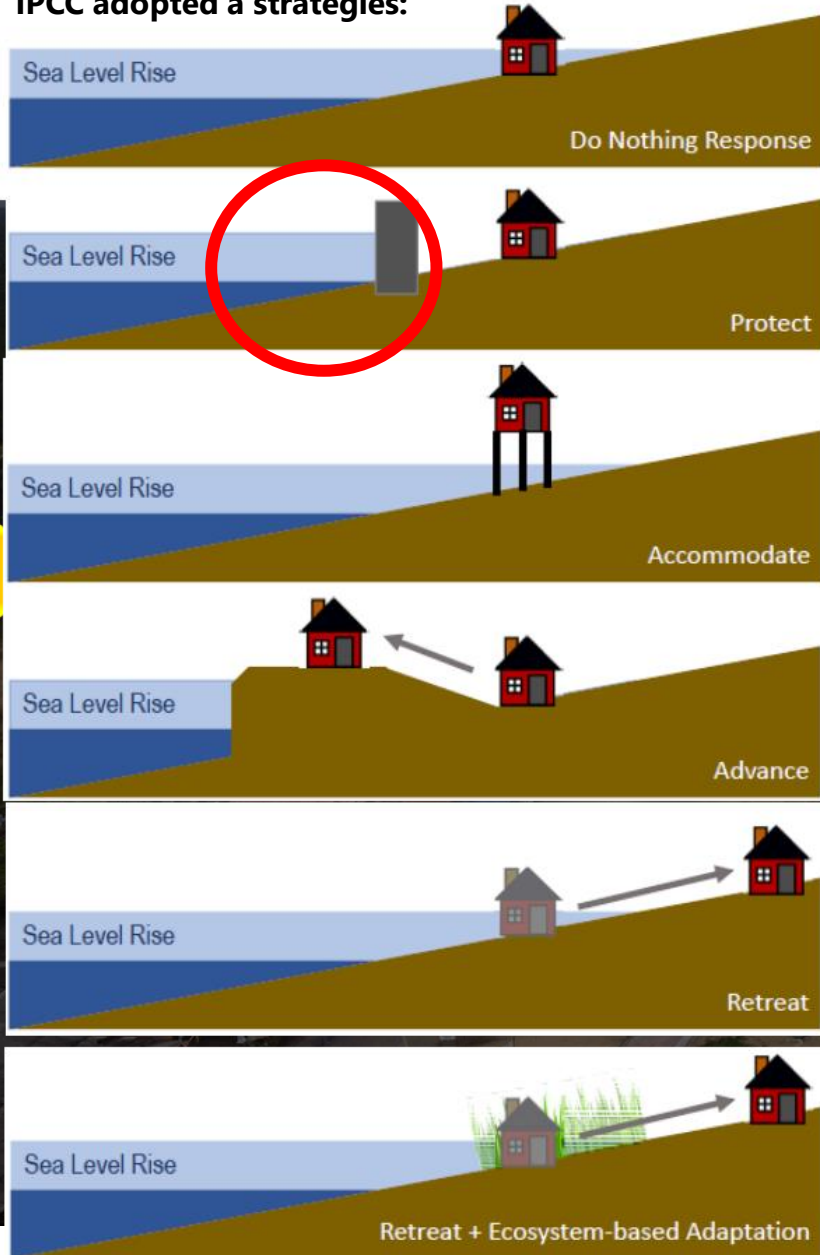
Impacts of sea level rise

- Wet land loss
- Salt water intrusion
- Loss of habitat
- Contamination of agriculture soil
- **Loss of low lying lands**
- **Coastal erosion**
- Powerful storm surges



If sea level rise **cannot be stopped**, what can be done about it?

IPCC adopted a strategies:



Issues!

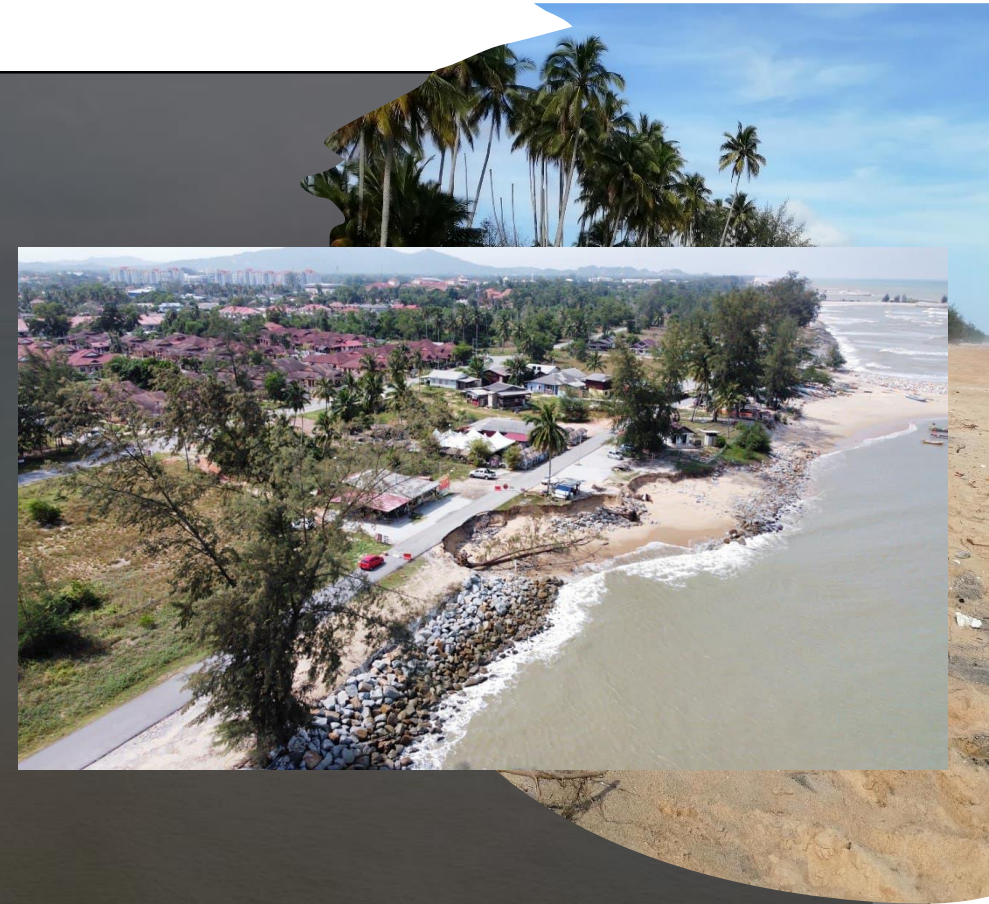
Structural failures of coastal defenses, coastal erosion & Coastal flooding under the scenarios of:

- (1) The water level exceeds the crest elevation of coastal defenses
- (2) Waves rush up the shore and overtop the crest of coastal defenses
- (3) Coastal defenses are breached or undermined



Depicts a hazard for community, property, and infrastructure behind the coastal structure area.

(Sallenger, 2000; Zou et al., 2013).

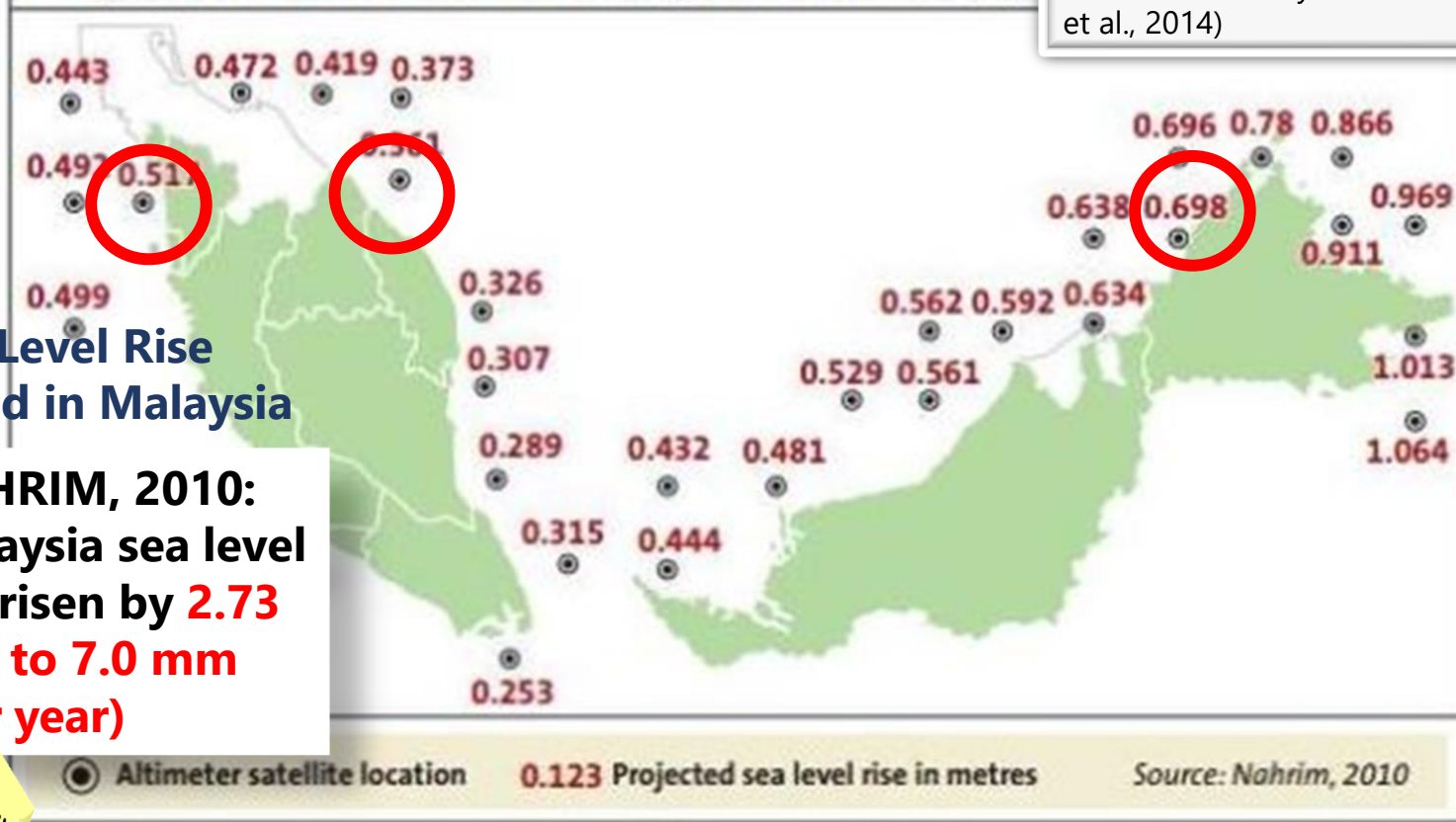


Malaysia- land area of 330,000 km² & a coastline of 4800 km.
 About 70% of the total population live in the coastal zones.

Low-Lying Area

(Department of Minerals and Geoscience Malaysia, 2003;Nazaruddin et al., 2014)

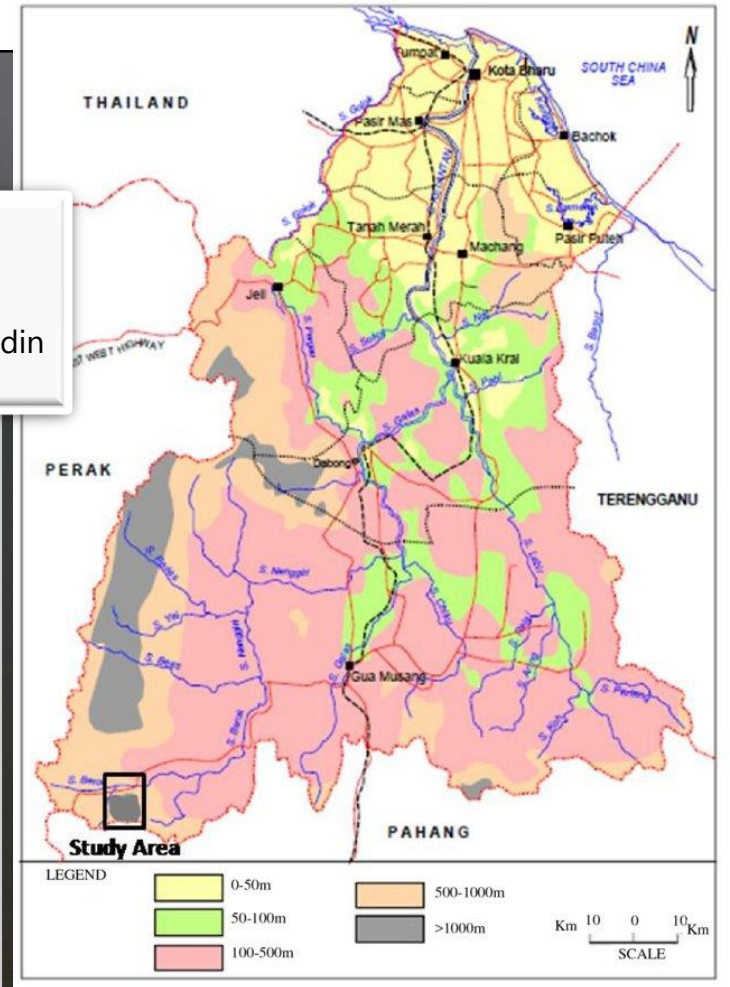
Projected sea level rise for Malaysia coastlines by



Sea Level Rise Trend in Malaysia

NAHRIM, 2010:
 Malaysia sea level has risen by **2.73 mm to 7.0 mm (per year)**

Take Note



Coastal floods - 2 mechanisms, **tidal effects** causing sea water flow inland (wave overtopping) & **low-lying area**



Coastal Structures in Kelantan

No.	Location	Existing Coastal Protection	Sources
1	Pantai Kudur	Rock revetment (river mouth)	DID, 2015
2	Pantai Cahaya Bulan	Rock revetment, Groynes, Seawall	DID, 2015
3	Pantai Sabak	Rock revetment, Breakwater (river mouth)	Google Earth
4	Pantai Senok	Rock revetment, Beakwater (river mouth)	Google Earth
5	Pantai Damai	Breakwater (river mouth)	Google Earth
6	Pantai Irama	Breakwater, Seawall, Rock revetment	Google Earth
7	Pantai Kandia	Breakwater (river mouth)	Google Earth
8	Pantai Tok Bali	Groyne, Seawall, Rock revetment	Google Earth



PROBLEM STATEMENT



JUSTIFICATION

Limited study of effectiveness of coastal structures in low land area
- Prevent & minimize the wave attack impact

Important reference to **helping authorities in coastal planning and development** in the future

Lowland vulnerable to wave impact

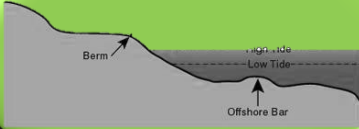
The detailed **post overtopping processes** on coastal structures are not fully understood

Wave overtopping studies play a **key role in planning and design of coastal structures**

(Subramaniam et al., 2021)

Objective

1 Beach Morphology
Characteristic



2 Hydrodynamic
Characteristic
(Wave)



3 Wave Overtopping





Research Area

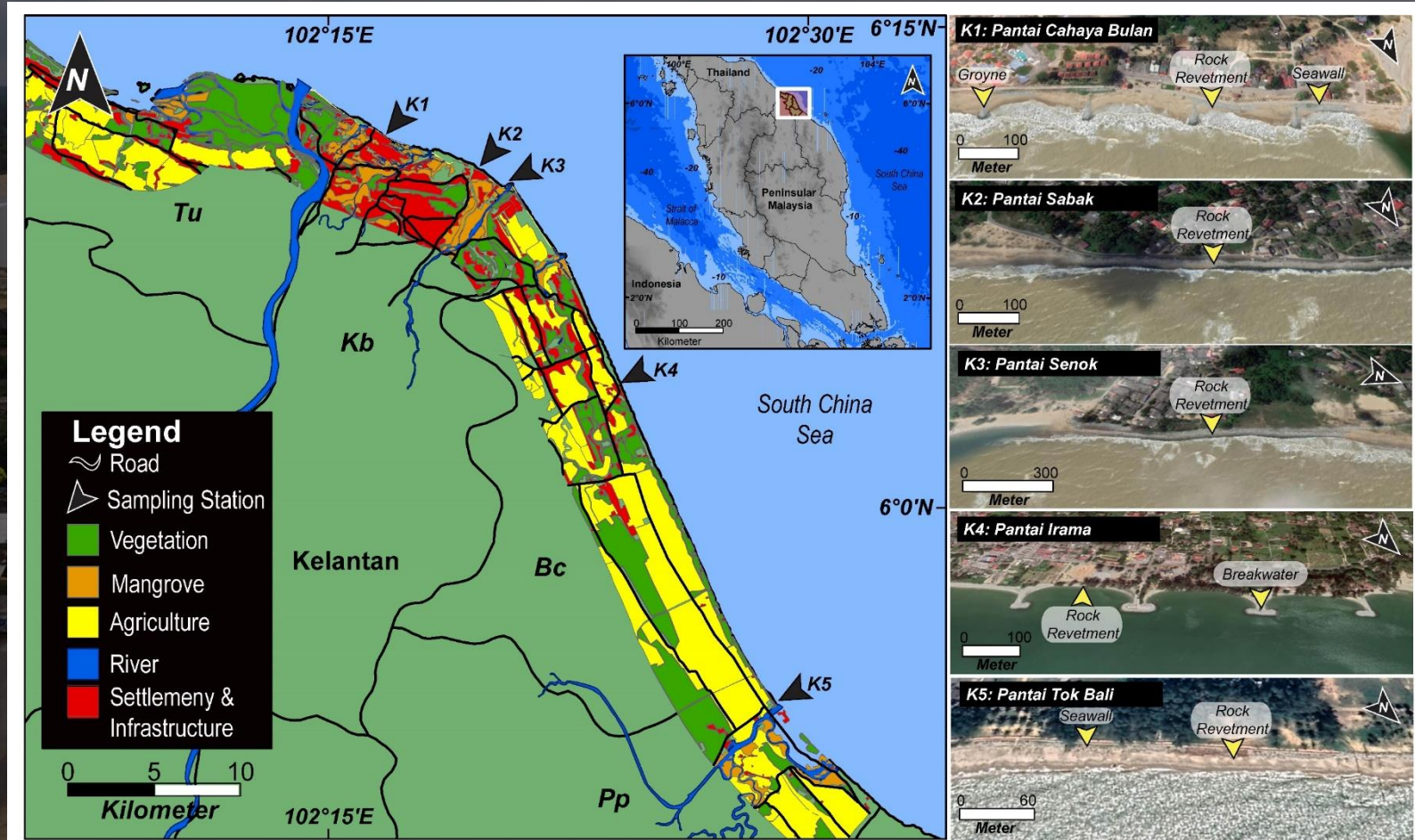
Selected research area

- Sensitive area (settlement area)
- Present of coastal structure (Rock Revetment; groyne, seawall)

Kelantan

- Kota Bharu
- Bachok
- Pasir Puteh

5 Sampling Stations
- 5 transect lines (50 m interval)





Methodology

2

Hydrodynamic
Characteristic (Wave)



3

Wave Overtopping



Incoming Waves

Waves Run-up

Waves Overtopping

Overtopping flow

Seawall

Rock revetment

Coastal Defences

Beach Profile

1

Beach Morphology
Characteristic

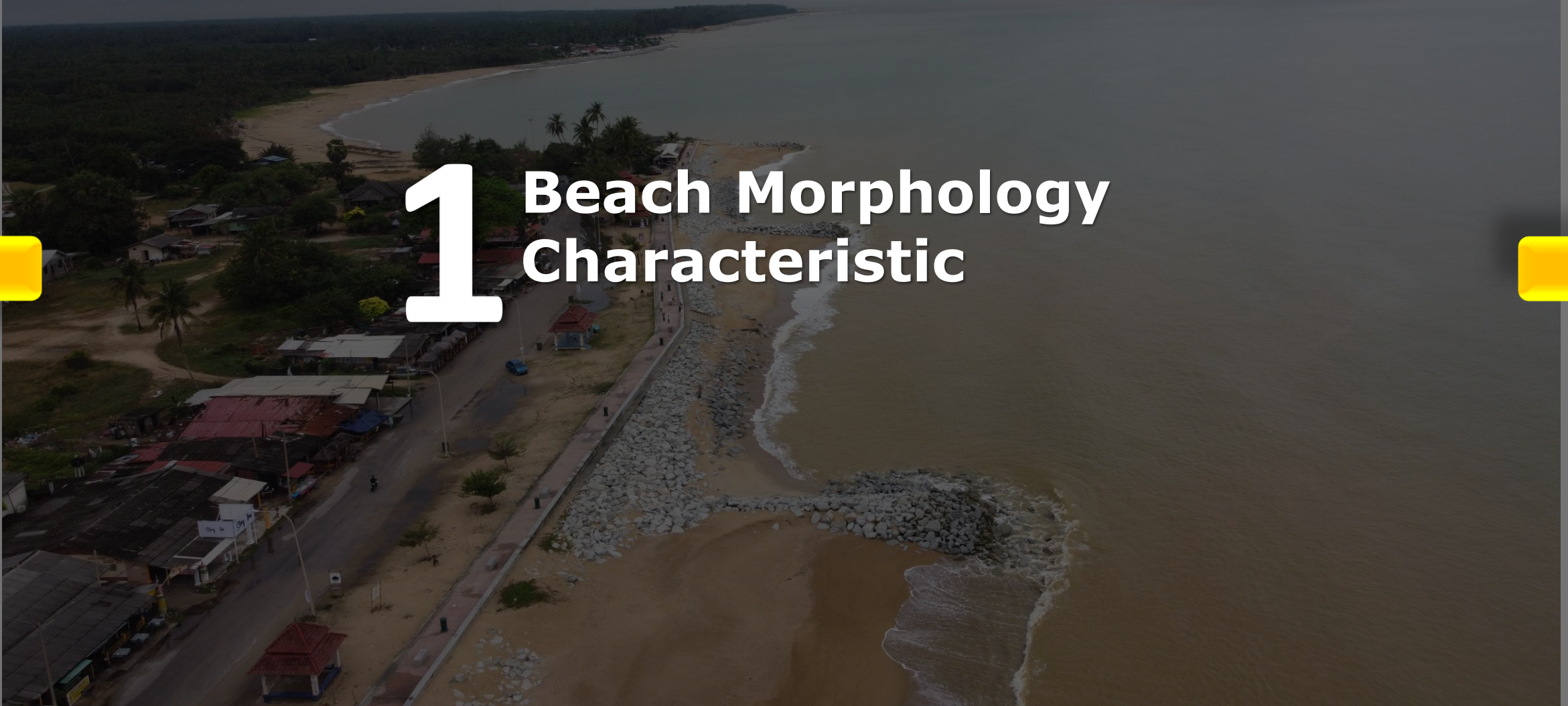


Profiler 3.2 XL
(Cohen, 2016)

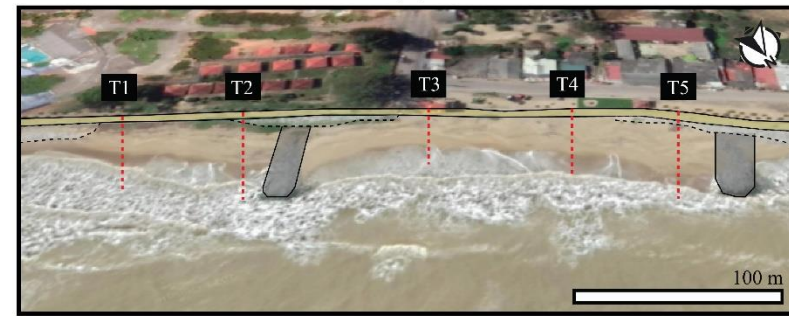
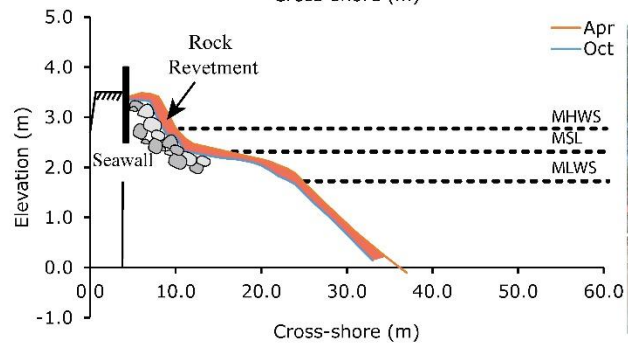
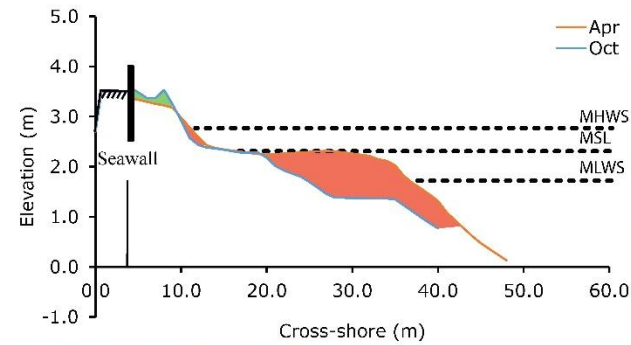
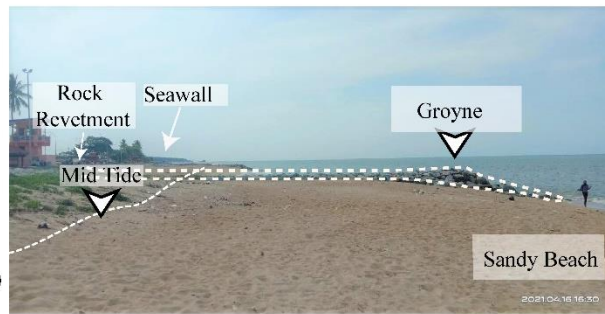
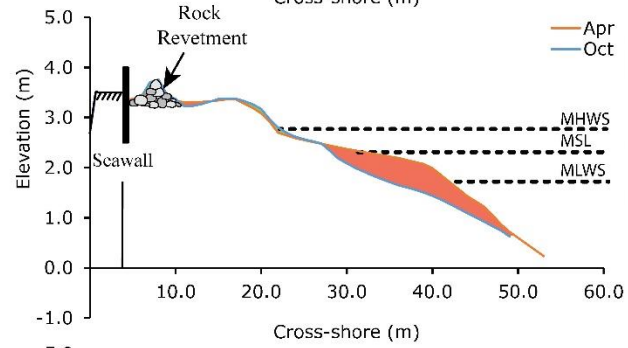
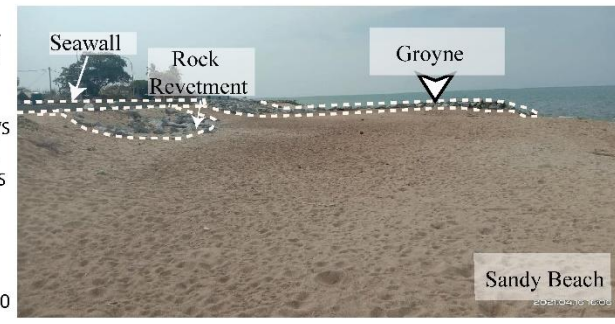
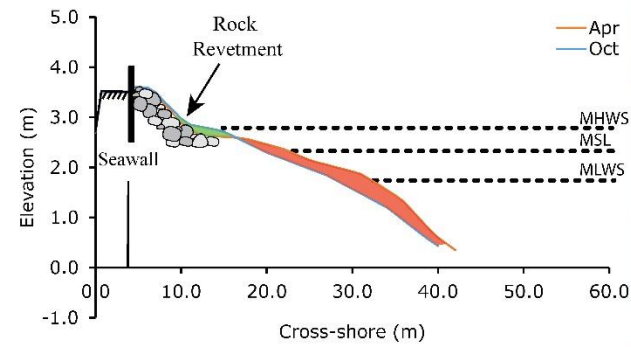
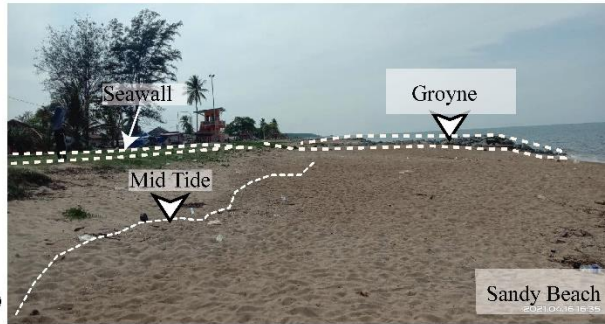
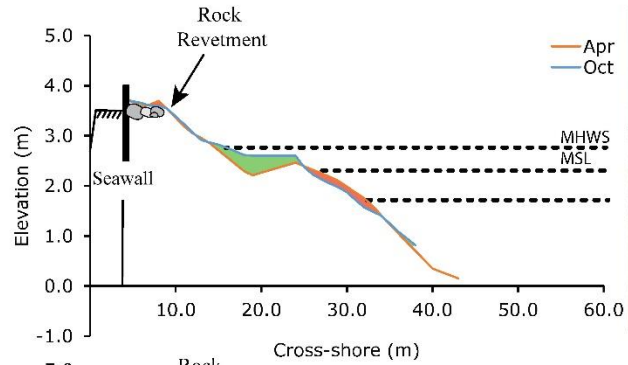


PRELIMINARY RESULT

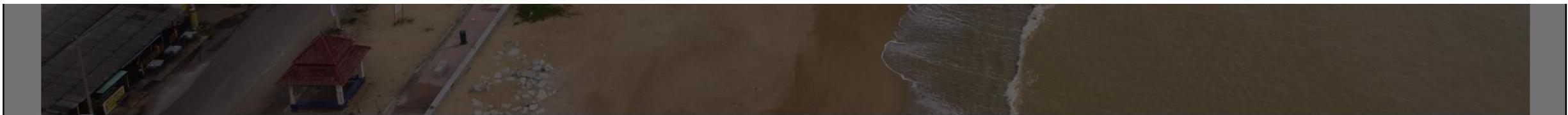
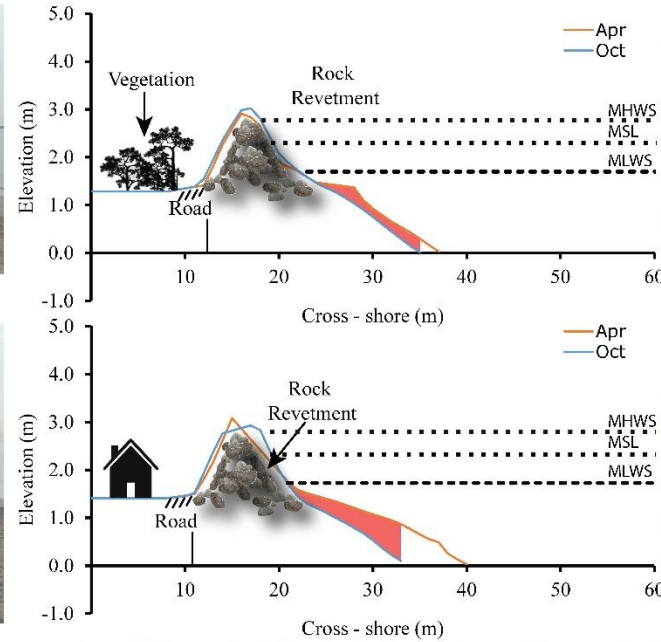
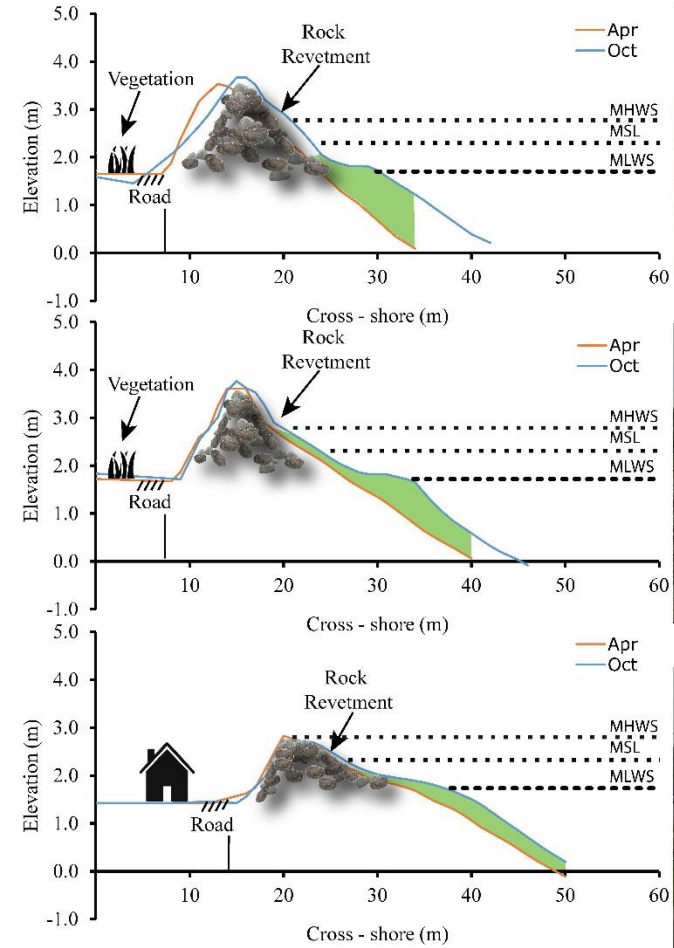
1 Beach Morphology Characteristic



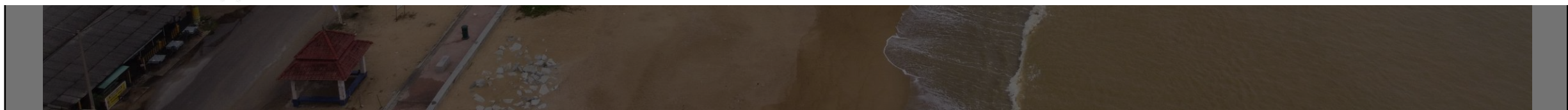
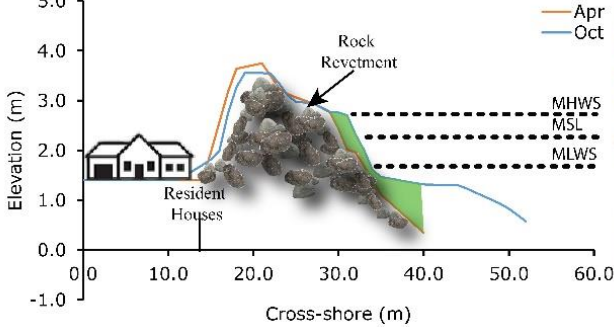
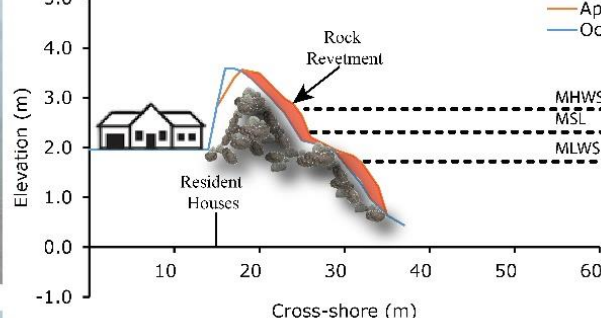
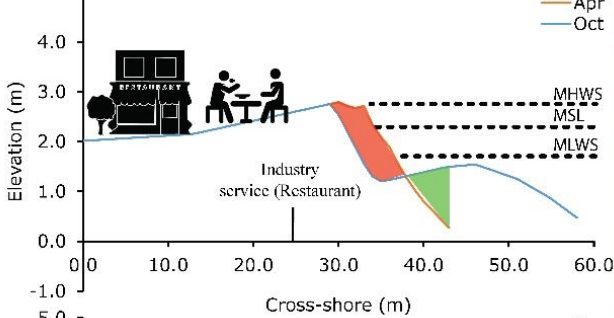
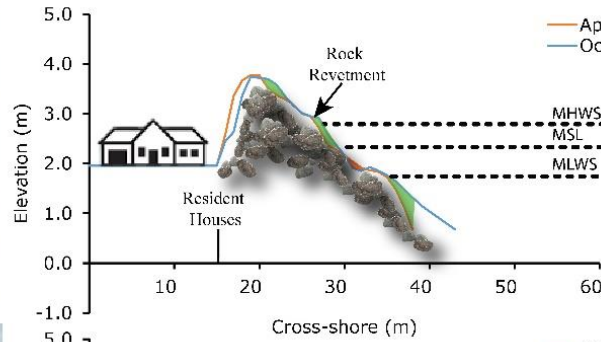
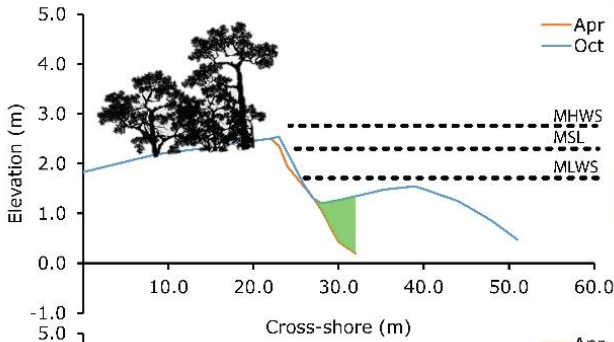
K1: Pantai Cahaya Bulan



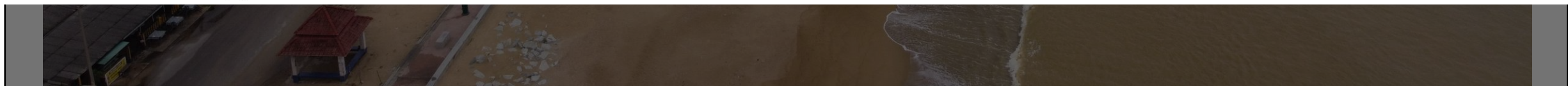
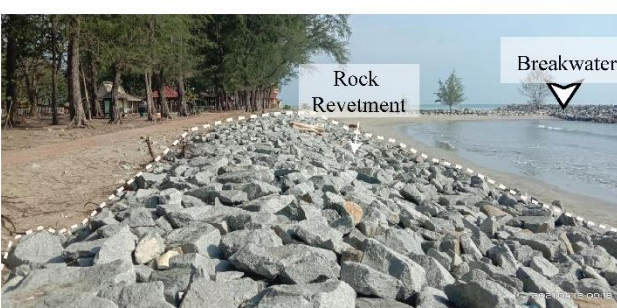
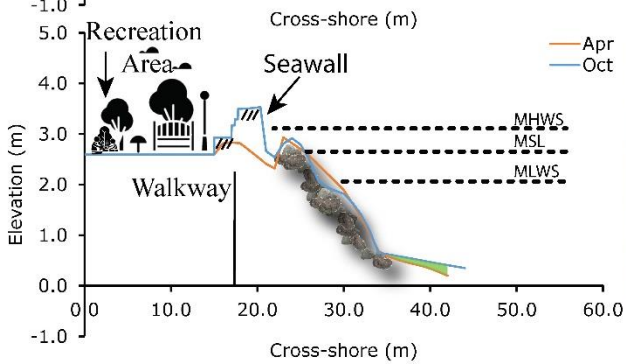
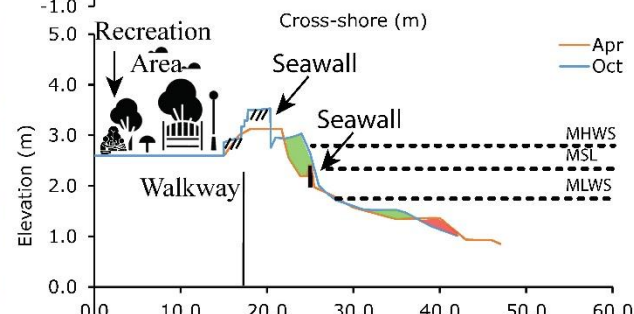
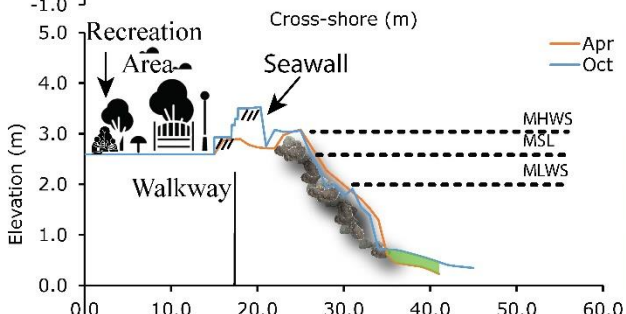
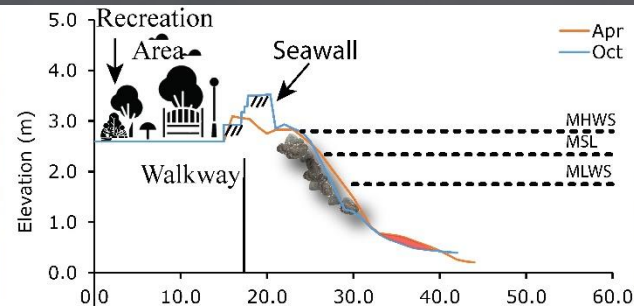
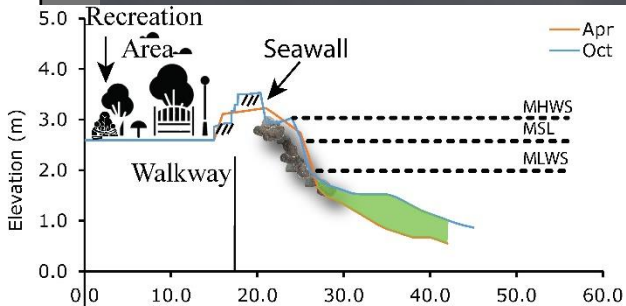
K2: Pantai Sabak



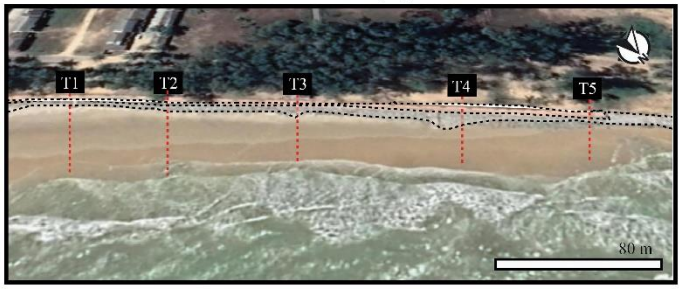
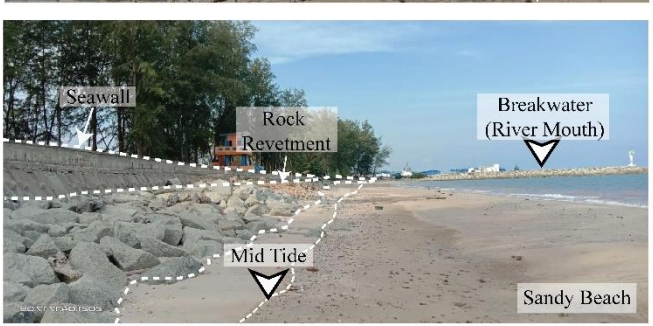
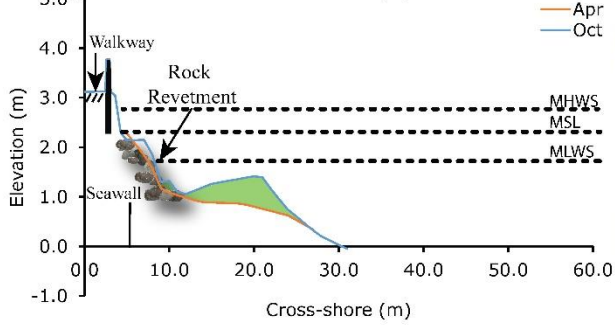
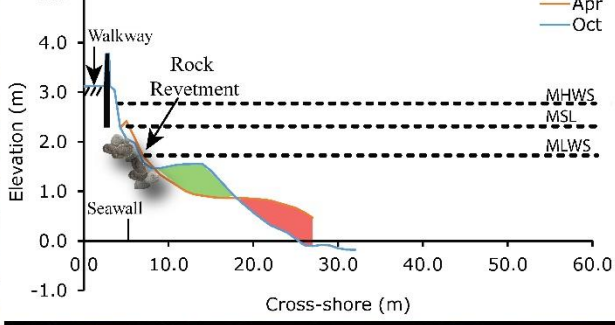
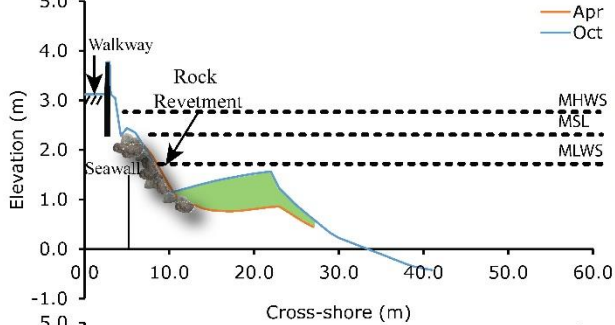
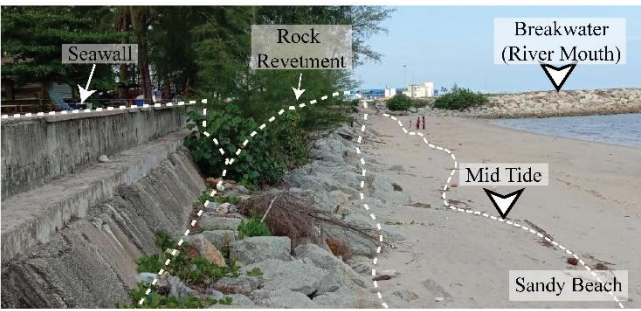
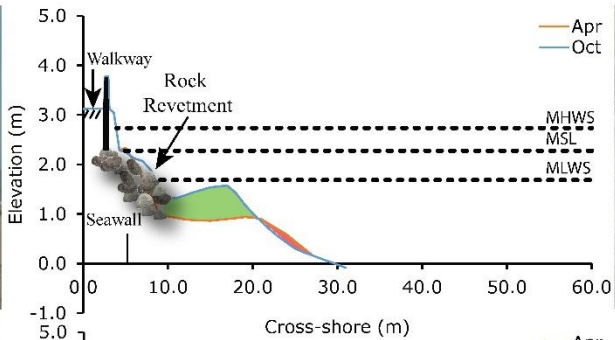
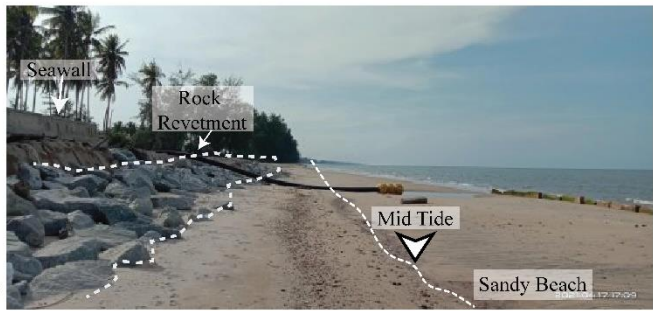
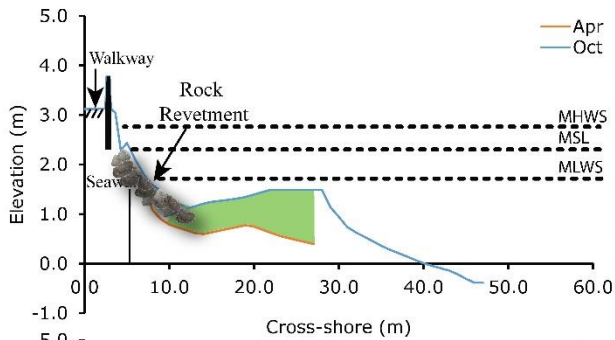
K3: Pantai Nusuk



K4: Pantai Irama



K5: Pantai Tok Bali



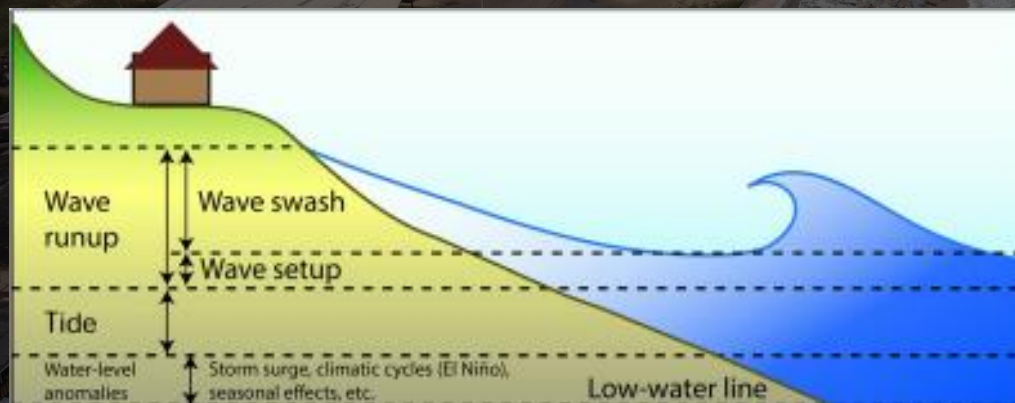


Run Hydrodynamic Simulation

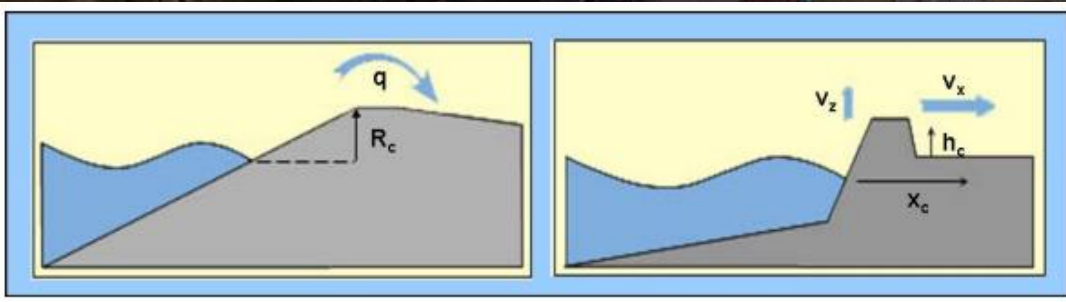
Next step?



Run Wave Overtopping Simulation



Overtopping phenomenon - passing of water over the crest of natural beach or top of structure as a result of wave runup or surge action

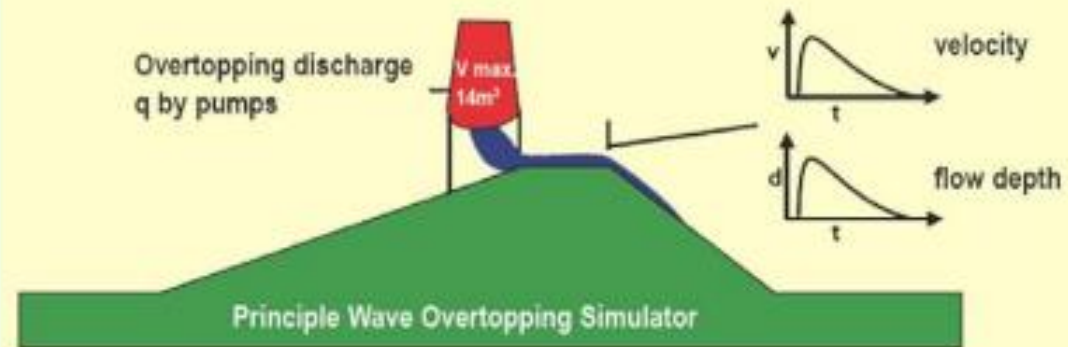


Suzuki et al. (2017), the **simulation of wave overtopping** generally capable of estimating the instantaneous wave overtopping event and water discharge over impermeable structures which important requirement of implementation of new coastal structures with reducing coastal flood risk.

Intensity of the mean overtopping event impact during extreme event and frequency of extreme surge events which can lead to severe overtopping hazards

(Dong et al., 2020; Abolfathi et al., 2016, 2018, 2020; Cheon and Suh, 2016; Chini and Stansby, 2012).

Principle Wave Overtopping Simulator



TQ

