Zahir Ramli <mzbr@iium.edu.my>

Jemputan sebagai Penceramah bagi Sesi Siri Webinar 2023 / Invitation as MBOT ThusWeb 2023 Series's Speaker

1 message

Norhamizan Fauzi <f.norhamizan@mbot.org.my> Fri, Apr 7, 2023 at 4:11 PM
To: mzbr@iium.edu.my

Assalamualaikum wbt.

YBrs. Prof. Madya Ts. Dr. Muhammad Zahir Ramli,

Dengan segala hormatnya, saya merujuk kepada perkara di atas.

Untuk makluman, MBOT telah menjalankan siri webinar yang merangkumi 24 Bidang Teknologi di MBOT sepanjang tahun 2020 hingga 2022. Usaha ini akan diteruskan bagi tahun 2023 bagi menggalakkan perkongsian pengetahuan dalam kalangan ahli berdaftar MBOT. Sesi Siri Webinar 2023 ini akan dijalankan **atas talian**, pada **setiap hari Khamis, jam 11 pagi**.

Sehubungan dengan itu, bagi bidang ***Marine Technology (MR)***, sukacita dimaklumkan bahawa YBrs. Prof. Madya Ts. Dr. telah **terpilih** untuk berkongsi bersama ahli berdaftar MBOT dengan topik bertajuk ***Coastal Erosion and Protection in Malaysia***. Mohon kerjasama pihak YBrs. Prof. Madya Ts. Dr. untuk mengisikan maklumat, seperti di pautan (https://forms.gle/HUhSm5iqWZfHpCWW8) bagi tujuan poster dan promosi.

Ketetapan bagi sesi webinar ini adalah seperti berikut:

Tarikh: 8 Jun 2023 (Khamis)
Masa: 11.00 pagi - 12.00 tengahari
Tempat: Microsoft Team (pautan kepada sesi webinar akan diberi kemudian)

Sekiranya, pihak YBrs. Prof. Madya Ts. Dr. ingin mendapatkan maklumat lanjut berkenaan hal ini, pertukaran tarikh atau masa, dan sebagainya, pihak YBrs. Prof. Madya Ts. Dr. boleh menghubungi saya di talian 019-3653774 atau di alamat emel f.norhamizan@mbot.org.my .

Segala perhatian dan maklum balas dari pihak YBrs. Prof. Madya Ts. Dr. berkenaan hal ini, saya dahului dengan ucapan ribuan terima kasih.

Sekian,

Peace be upon you.

Dear Prof. Madya Ts. Dr. Muhammad Zahir Ramli,

With all due respect, the above subject is referred to.

For your information, MBOT has conducted a series of webinars covering 24 Technology and Technical Fields at MBOT throughout the year 2020 to 2022. This effort will continue for the year 2023 to encourage knowledge sharing among registered members of MBOT. This 2023 Webinar Series session will be conducted **online, every Thursday, at 11 am.**

In conjunction with that, for the field of **Marine Technology (MR),** I am pleased to inform you that Prof. Madya Ts. Dr. is **selected** to share with MBOT registered members, the topic titled **Coastal Erosion and Protection in Malaysia**. Please kindly fill in the information as per the link (https://forms.gle/HUhSm5iqWZfHpCWW8) for poster and promotion purposes.

The setting for this webinar session is as follows:

Date: 8 **June 2023 (Thursday)**

Time: 11 am to 12 noon

Venue: Microsoft Team (link to webinar session will be provided later)

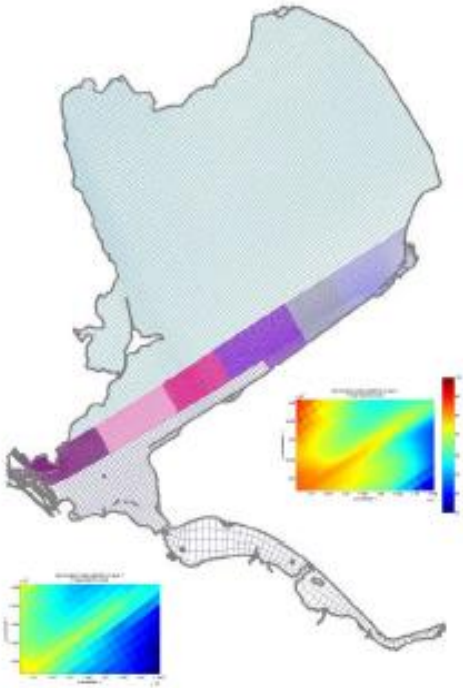
If Prof. Madya Ts. Dr. would like to get more information regarding this matter, change of date or time, and so on, Prof. Madya Ts. Dr. can contact me at 019-3653774 or at the email address f.norhamizan@mbot.org.my .

All attention and feedback from Prof. Madya Ts. Dr. regarding this matter is highly appreciated.

Warmest Regards,

Norhamizan binti Fauzi
Penolong Pendaftar (Bahagian Strategik)
Emel: f.norhamizan@mbot.org.my
No. Telefon: 03-8800 6214/ 019-3653774

NUMERICAL TECHNIQUES IN COASTAL EROSION STUDY IN MALAYSIA



Assoc. Prof. Ts. Dr. Muhammad Zahir Ramli

MBOT ThursWeb @2023

Attendance Registration

Background

Assoc. Prof. Ts. Dr. Muhammad Zahir Ramli

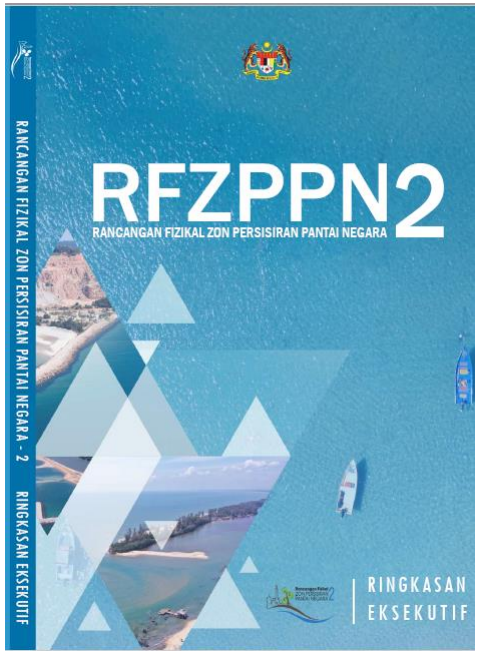
PhD in Engineering and the Environment, University of Southampton.

Master in Eng. From Yokohama National University, Japan.

Attendance Registration

RFZPPN

Official Portal
PLANMalaysia
Department of Town and Country Planning

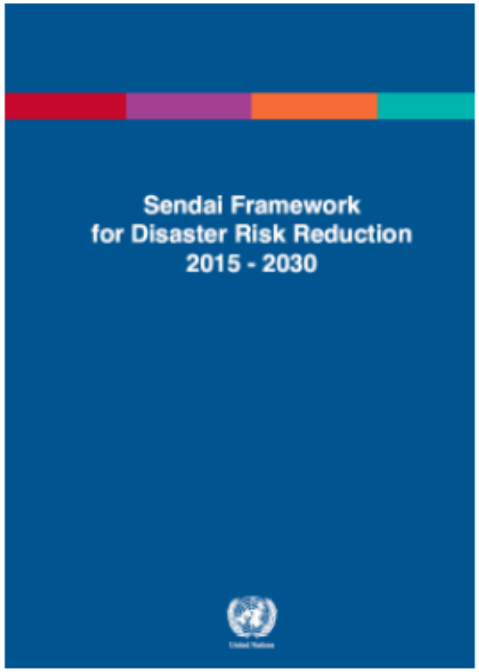


TERAS	1 PEMBANGUNAN BERDAYA TAHAN TERHADAP RISIKO BENCANA (PB) *DISASTER RISK RESILIENT DEVELOPMENTS (PB)*	2 ASET EKOLOGI DAN PERKHIDMATAN EKOSISTEM LESTARI (AE) *SUSTAINABLE ECOLOGICAL ASSETS AND ECOSYSTEM SERVICES (AE)*	3 TADBIR URUS KUKUH DAN EFEKTIF (TE) *STRONG AND EFFECTIVE GOVERNANCE (TE)*	4 KOMUNITI PEKA DAN BERUPAYA IKHTIAR (KB) *CONSCIOUS AND INITIATIVE-DRIVEN COMMUNITIES (KB)*
STRATEGI	4 Strategi	4 Strategi	4 Strategi	4 Strategi
TINDAKAN	10 Tindakan	11 Tindakan	5 Tindakan	8 Tindakan
INISIATIF	26 Inisiatif	28 Inisiatif	12 Inisiatif	18 Inisiatif

JILID

Planning guidelines and development for the coastal zone of Peninsular Beach Malaysia and WP Labuan.

Global Contexts



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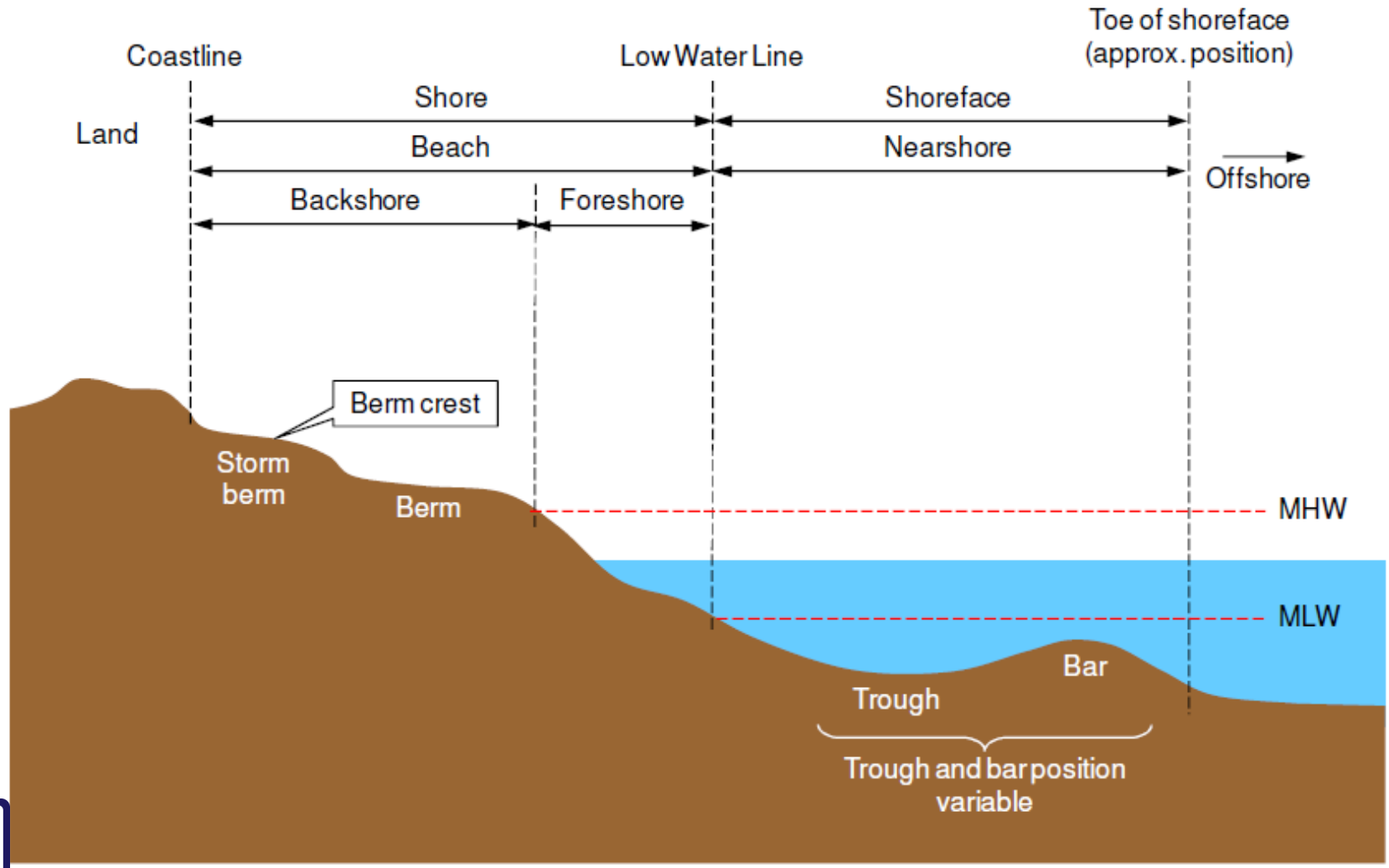
Typical classification of the coastal zone



Source: USACE, 2002

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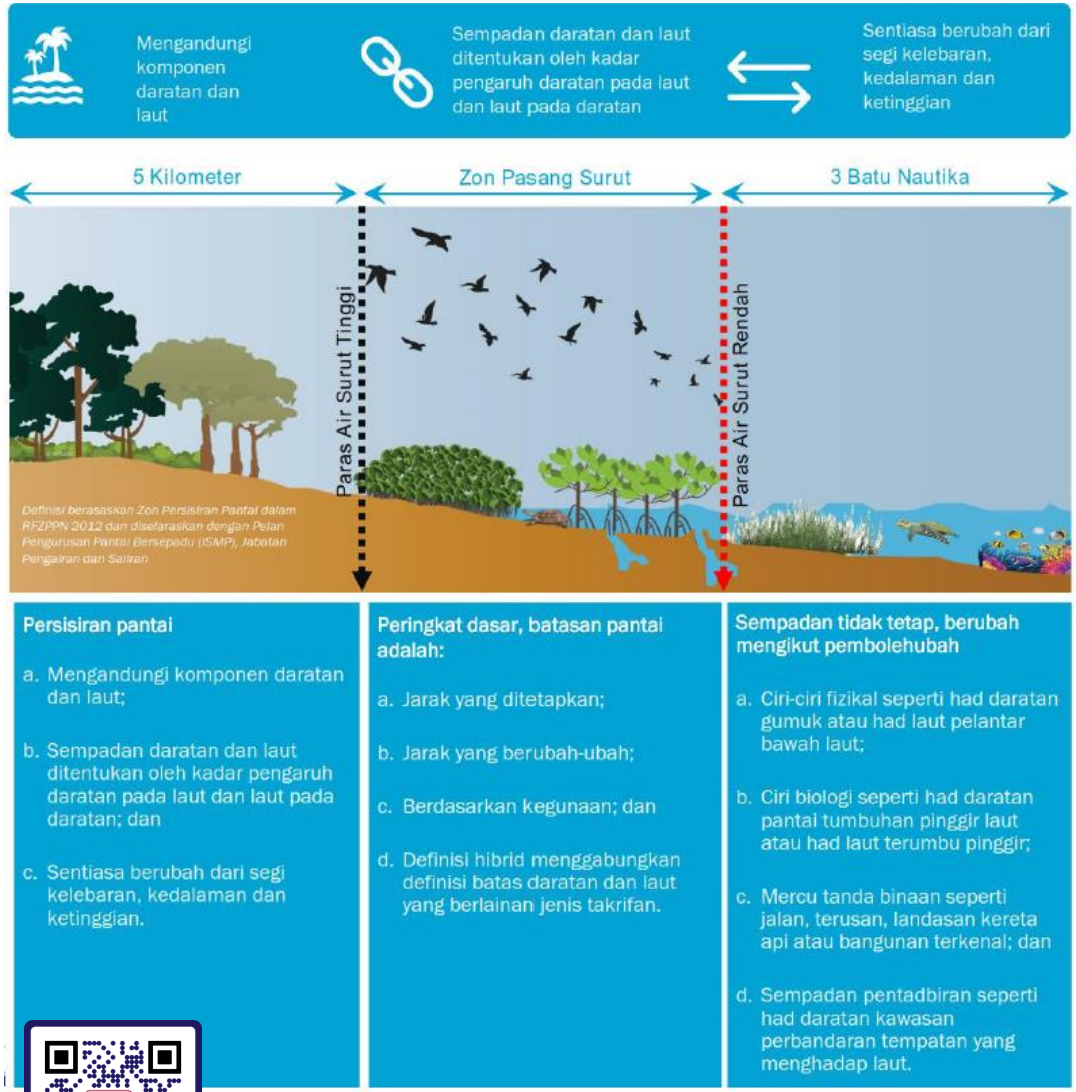
Coastal zone definition

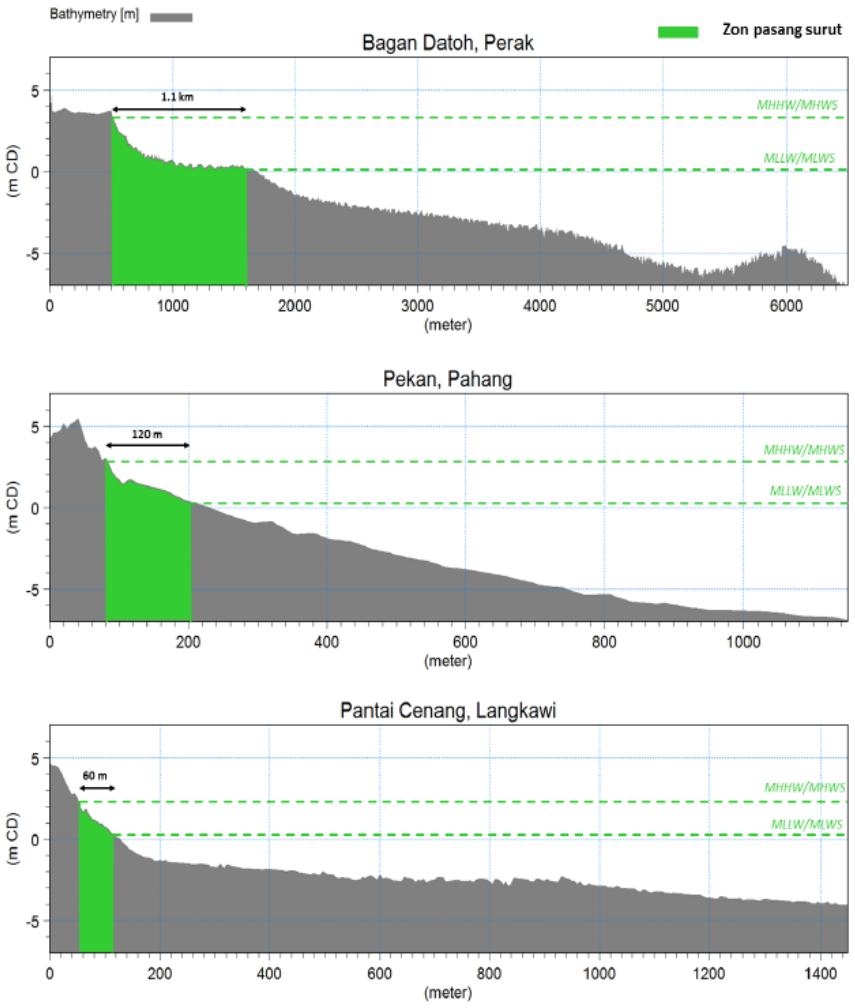


Coastal zone or Zon Persisiran Pantai (ZPP) by RFZPPN-2 (2022)

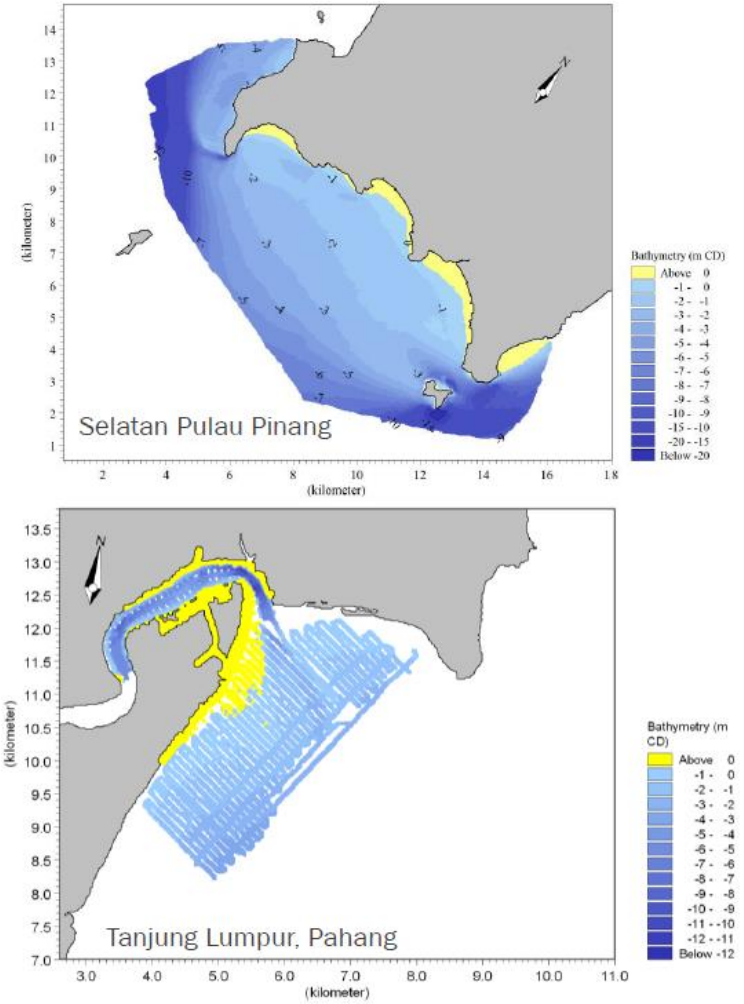
Source: RFZPPN2, 2022

Coastal zone definition

Cross Sections in Three Different Coastal Areas Showing Different Tidal Zones



A two-dimensional plan of two different areas the slope of the beach is different



Source: RFZPPN2, 2022

Sandy beaches

	Negeri	Bil	Panjang (km)	(%)
1	Perlis	1	2.40	0.54
2	Kedah	15	33.30	7.55
3	Pulau Pinang	16	14.10	3.20
4	Perak	22	41.30	9.37
5	Kelantan	12	23.50	5.33
6	Terengganu	59	123.50	28.02
7	Pahang	33	87.00	19.74
8	Selangor	12	17.90	4.06
9	Negeri Sembilan	18	18.80	4.26
10	Melaka	11	30.30	6.87
11	Johor	24	41.60	9.44
12	WP. Labuan	6	7.10	1.61
		229	440.80	100

Sumber : PLANMalaysia, JPS, JUPEM (1990)

Peninsular Malaysia and Labuan has a coastline of 3,853 km.

Of this total length, only 440.80 km covered by sand (sandy beach) involving 229 coastal areas.

Source: RFZPPN2, 2022

Population

A total of 5,929,698 people (almost 24% of the population) estimated to live within the coastline zone of Peninsular Malaysia and Labuan in 2020.

Anggaran Perkampungan dalam Kawasan RFZPPN-2

2,344 buah	Jumlah Perkampungan
20 buah	Jumlah Kampung Orang Asli
129 buah	Jumlah Kampung Nelayan
97,211 buah	Jumlah Perumahan Kampung

Source: RFZPPN2, 2022

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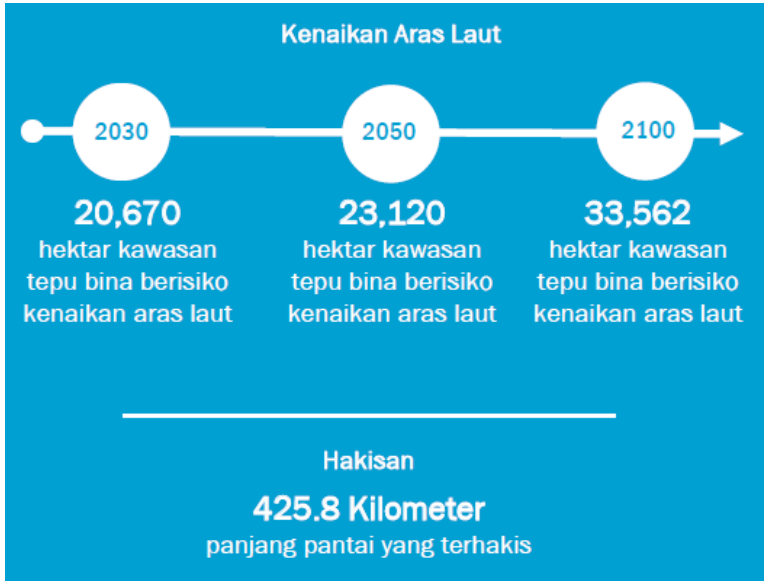
Issues in Coastal Zone

A total of 1,348 km of coastline in Malaysia experienced coastal erosion where 421.4 km is in Peninsular Malaysia and 4.4 km in Labuan.



Source: RFZPPN2, 2022

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Beaches and Beach Attractions

There are many important tourist attractions which is located near the coastal area national coast.

90% of the heritage area, nature natural and tourist attractions are at in the coastal environment.

> 430 lokasi pelancongan dan kawasan warisan di zon persisiran pantai.

155	188	94
Tarikan Warisan Sejarah dan Kebudayaan. Kawasan tapak dan senibina bangunan lama.	Tarikan Alam Semula jadi & Geopark. Kawasan gunung dan pantai serta pulau.	Tarikan Buatan Manusia. Kawasan perbandaran, rekreasi, tempat membeli belah, pusat makanan

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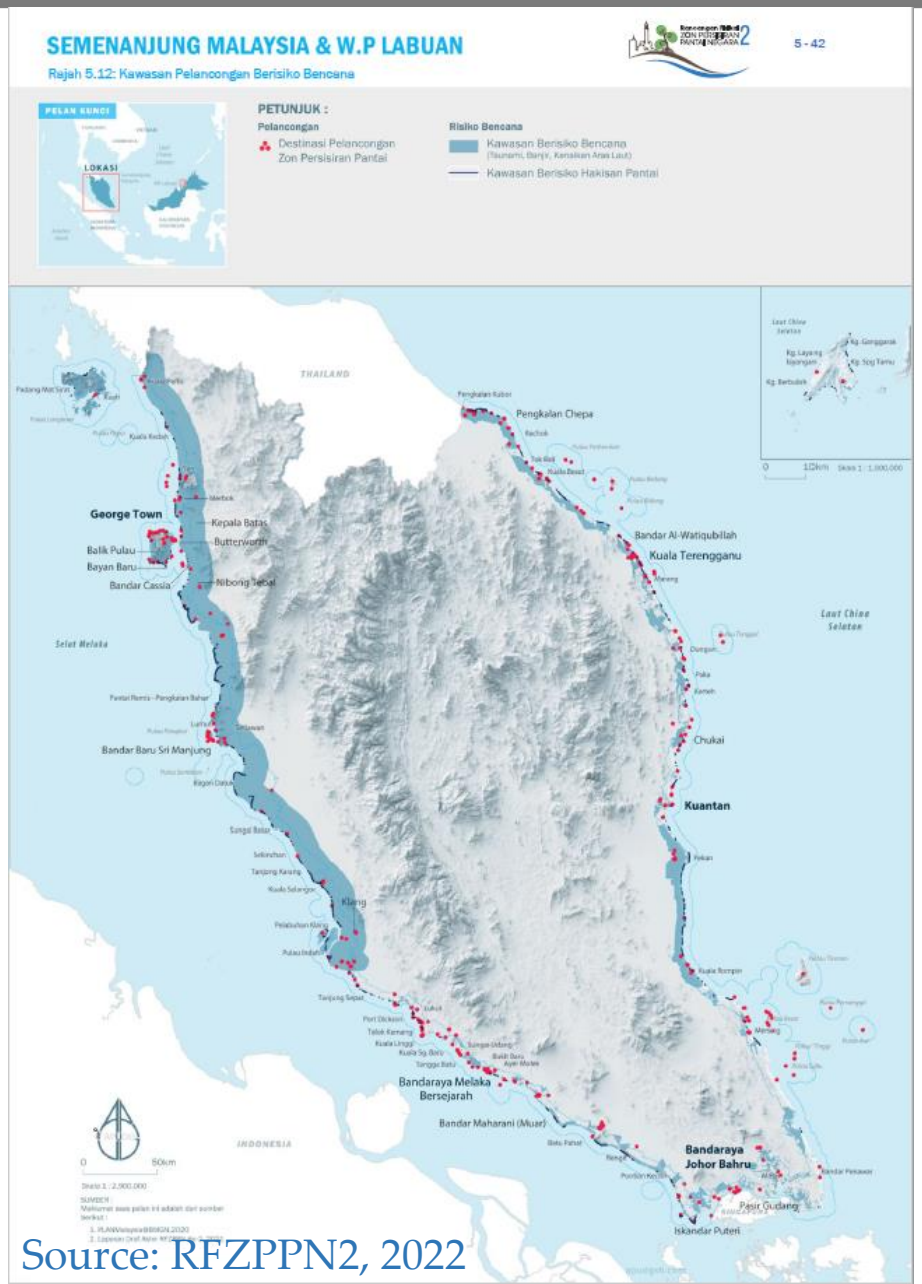
Jumlah Ketibaan Pelancong		Jumlah Pekerja
24.58 juta	26.1 juta	6.7 juta
2010	2019	2017



Source: RFZPPN2, 2022

Sea level rise

- Increase sea level threatens many coastal areas in Malaysia, especially the low and vulnerable floods and erosion.

- This causing the sea to become deeper flood tides spreading waves the increase in the magnitude of the wave current factor this factor is the driving force of sedimentation erosion.

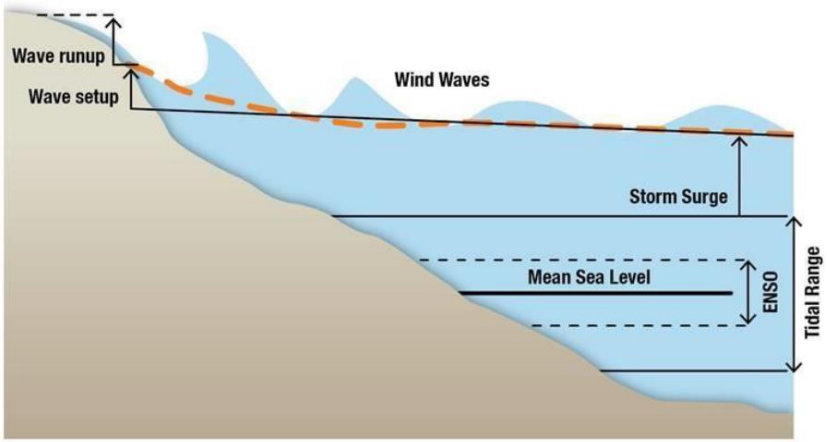
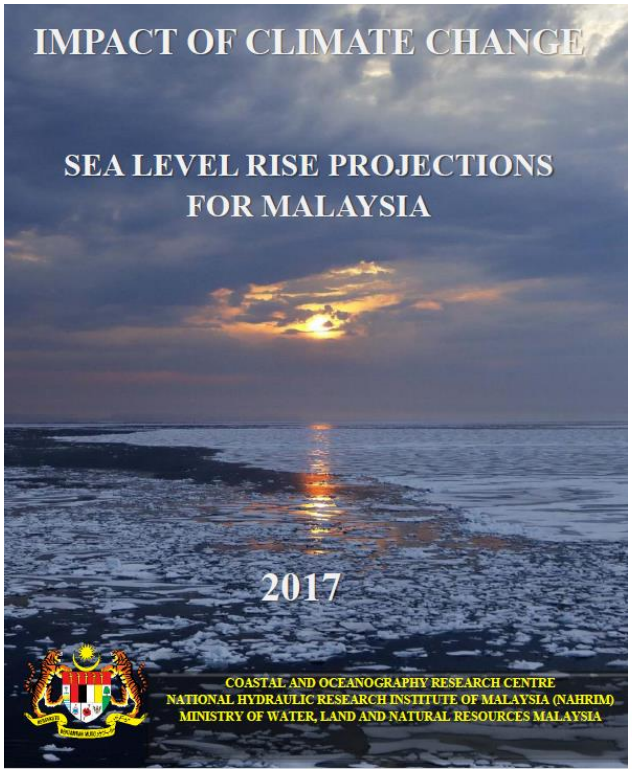


Figure 41: Schematic illustration of the different contributions to sea level extremes.



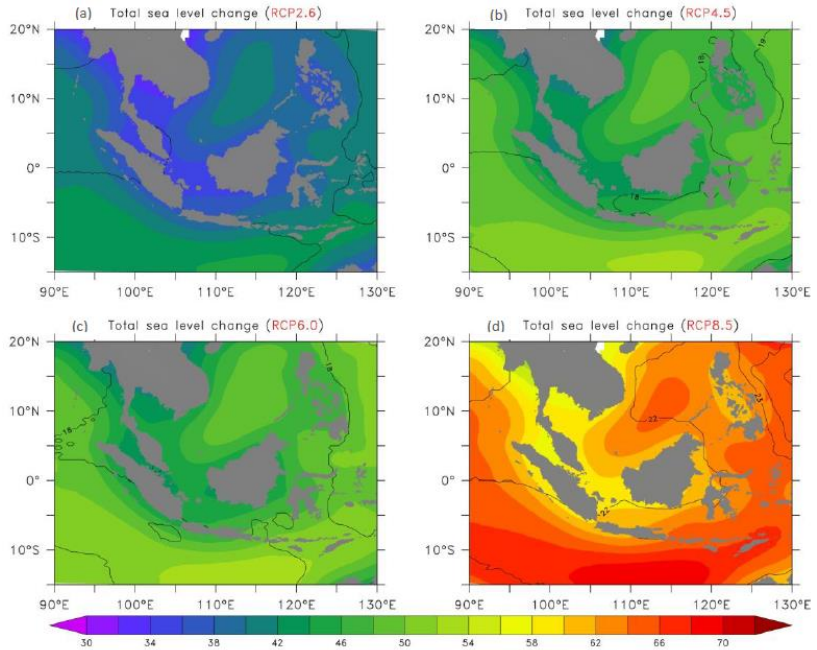


Figure 14: Total sea level projections (cm) for the Malaysian region over 2080-2099 relative to 1986-2005 under four emission scenarios, with uncertainty indicated by contours.

National Coastal Erosion Study (1985/2017)

Carried out to identify areas of erosion and the effects of erosion to economic and social activities

Objectives

- Assess and update coastal erosion problem
- Develop numerical model and baseline data
- Review existing guidelines for erosion control

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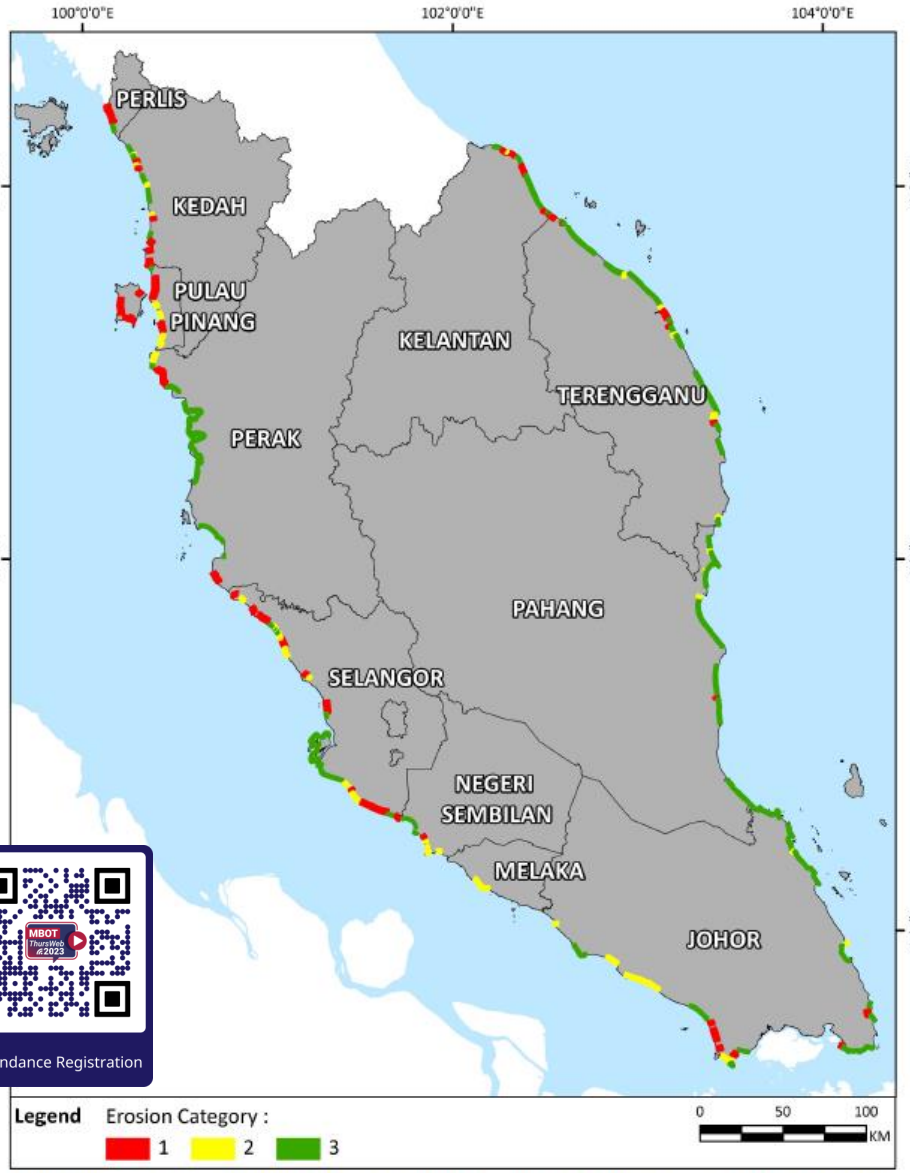

Figure 3 Locations of eroding coastline in Peninsular Malaysia based on NCES (1985)

Source: ADB, 2002

Figure 5 Coastal protection projects in Peninsular Malaysia constructed using ADB's loan

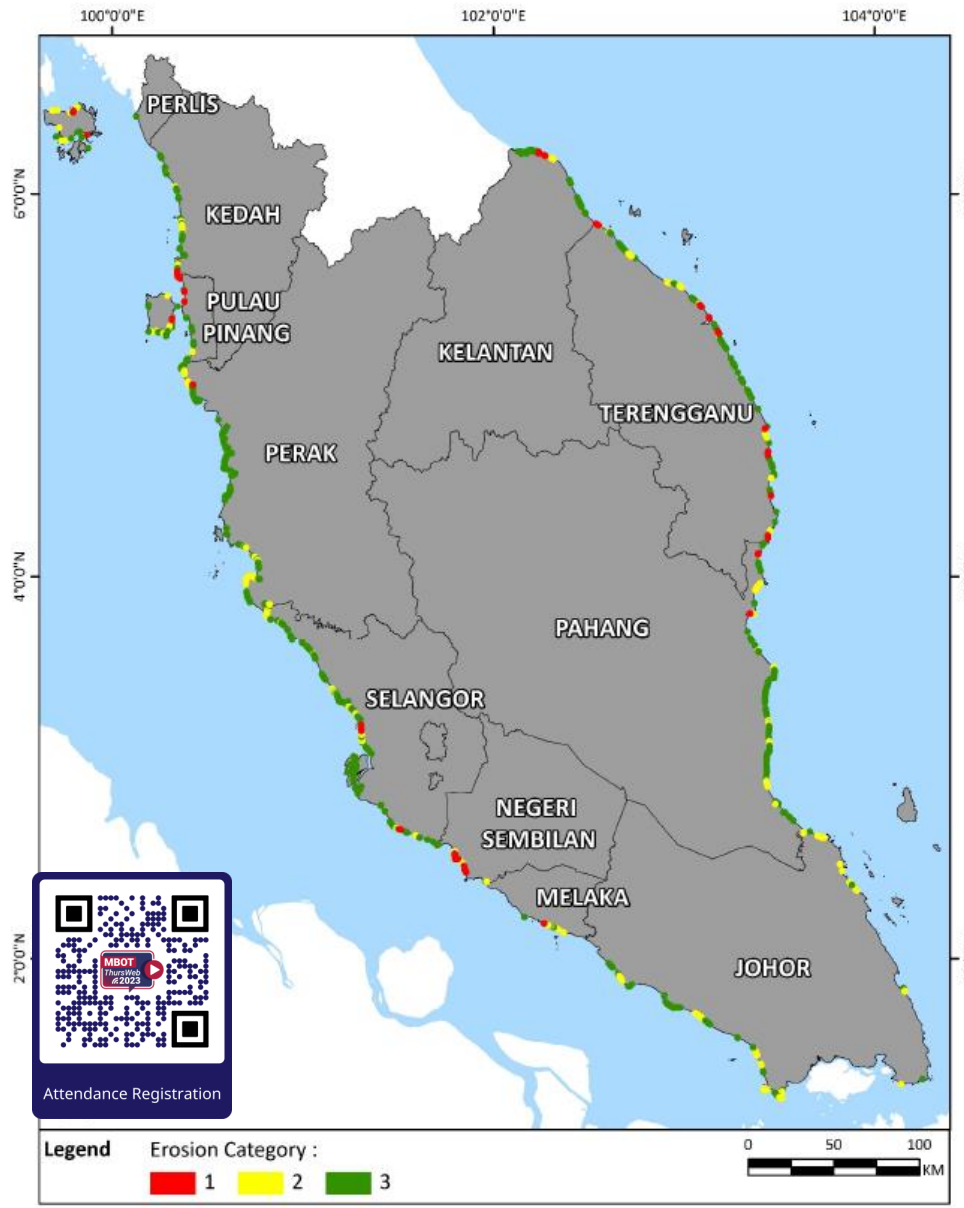

Figure 19 Coastal erosion categorisation for Peninsular Malaysia

ure 21 Category 1 erosion sites along Peninsular Malaysia's coastline

Table 6 Number of areas and length of eroded coastline in Malaysia based on the respective erosion categories

State	Coastline Length (km)	Eroded Coastline (km)	Category 1 Critical Erosion		Category 2 Significant Erosion		Category 3 Acceptable Erosion	
			No. of Areas	Aggregate Length (km)	No. of Areas	Aggregate Length (km)	No. of Areas	Aggregate Length (km)
Perlis	26.4	0.1	0	0.0	0	0.0	2	0.1
Kedah	639.8	26.8	4	1.9	28	13.6	90	11.3
Pulau Pinang	215.6	16.3	7	4.7	13	5.0	31	6.6
Perak	397.5	95.1	1	0.3	21	33.6	105	61.2
Selangor	492.1	74.6	2	4.8	16	18.6	156	51.2
Negeri Sembilan	65.0	9.8	6	5.5	9	4.1	2	0.2
Melaka	120.5	3.7	1	0.2	6	1.7	3	1.8
Johor	813.6	64.7	0	0.0	30	38.1	42	26.6
Pahang	378.4	61.8	2	1.5	14	16.9	58	43.4
Terengganu	443.1	48.7	8	12.3	20	15.4	115	21.0
Kelantan	179.5	19.8	2	2.0	2	2.5	43	15.3
Sarawak	1,234.1	492.5	7	18.6	78	144.8	566	329.1
Sabah	3,752.9	429.3	3	3.0	63	79.1	1120	347.2
Labuan	81.5	4.4	1	0.6	9	2.5	11	1.3
Total	**8,840.0**	**1,347.6**	**44**	**55.4**	**309**	**375.9**	**2,344**	**916.3**

Coastal Erosion

Wave-exposed site

Bathymetric conditions

Causes

Sea level rise

Extreme wave and storm surge events

Removal of natural vegetation

Reduction of sediment supply

Interruption of long-shore sediment

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Figure 3.266
Erosion at Tanjung Agas located south of Sungai Pahang river mouth, Pahang (24th March 2015)

b) Fallen casuarina trees and distinct scarp face along Taman Gelora's coastline (22nd June 2013)

c) Fallen casuarina trees along unprotected coastline beyond the rock revetment (22nd June

Figure 14
Removal of sand along the coast (March 2015)

Erosion in the Pantai Sungai Lang, Selangor

a) Heavy waves in 2010

b) Seawall damaged after wave attacks (2010)

c) Aerial photograph of existing condition (20th November 2015)

Coastal erosion by satellite images

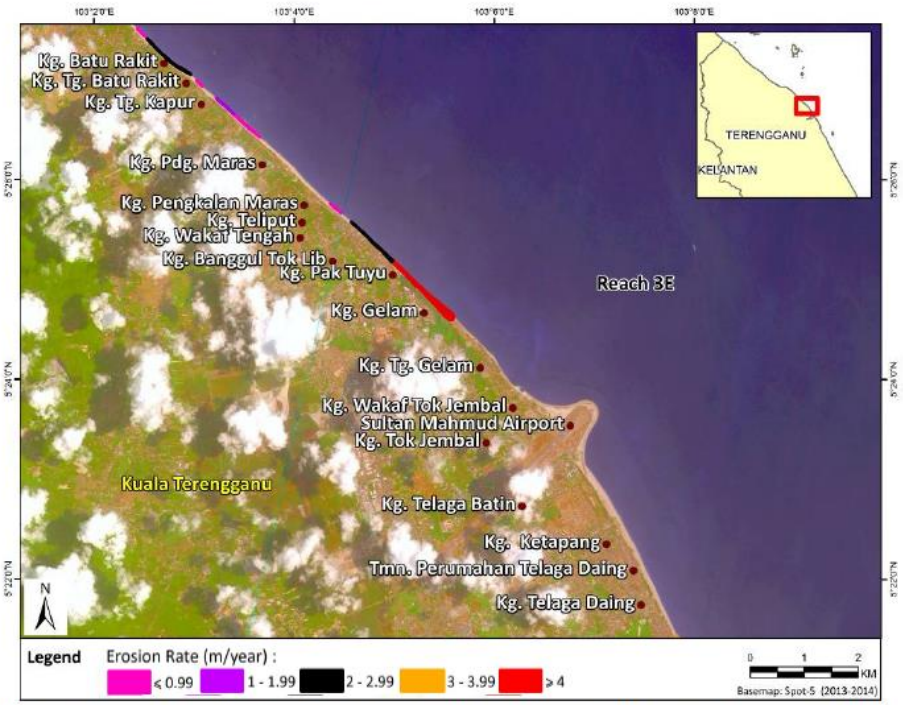


Figure 2.261 Plot of maximum average annual erosion rate from Kampung Batu Kampung Telaga Daing, Kuala Terengganu, Terengganu

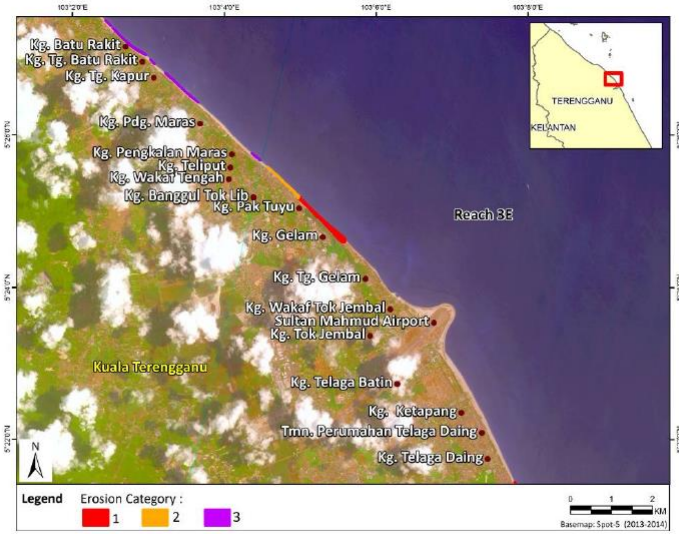


Figure 3.277 Coastal erosion categorisation from Kampung Batu Rakit to Kampung Telaga Daing, Kuala Terengganu, Terengganu

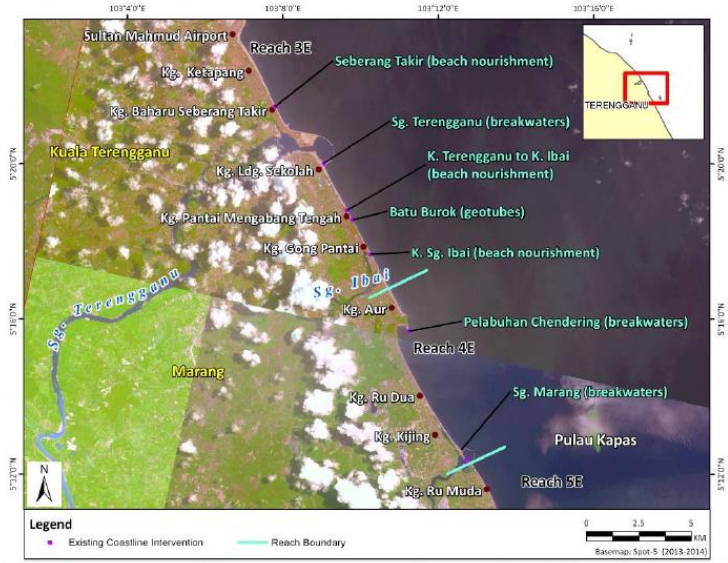
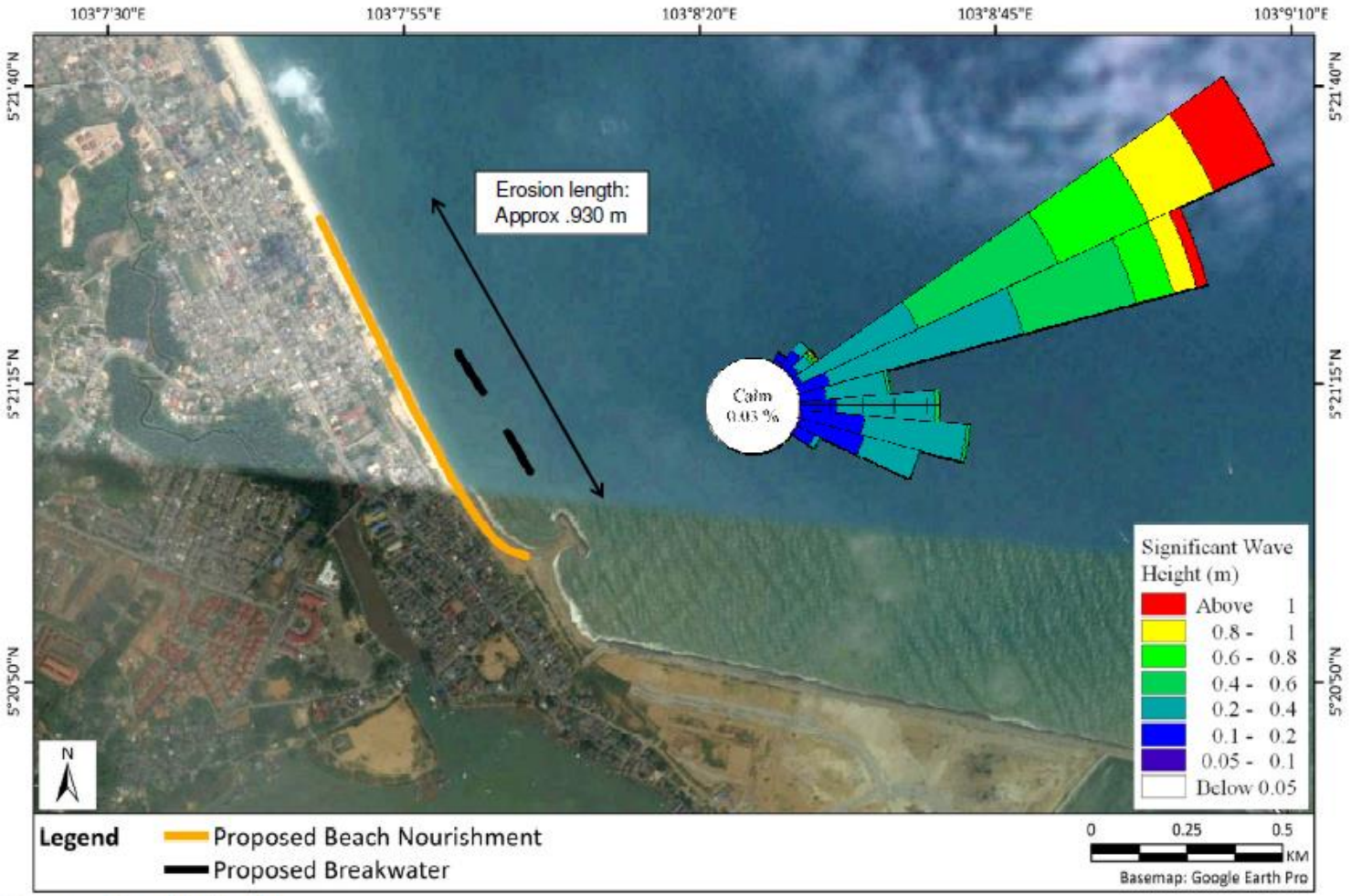


Figure 2.279 Existing coastline interventions constructed from Seberang Takir to Sungai Marang river mouth, Terengganu

Source: NCES, 2015

Proposed protection measures



Source: Google Earth

Figure 4.79 Pantai Seberang Takir, Kuala Terengganu

Source: NCES, 2015

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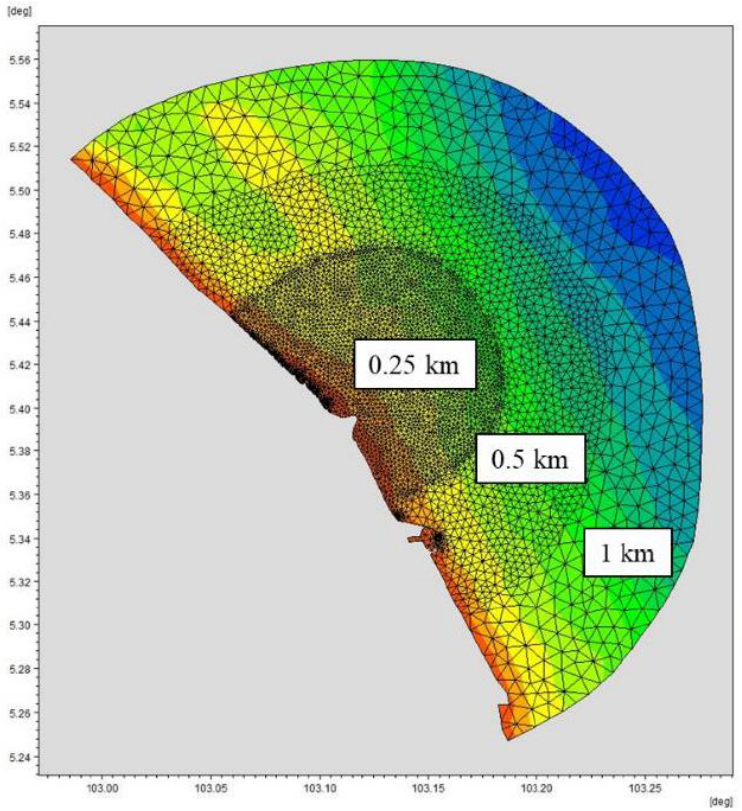
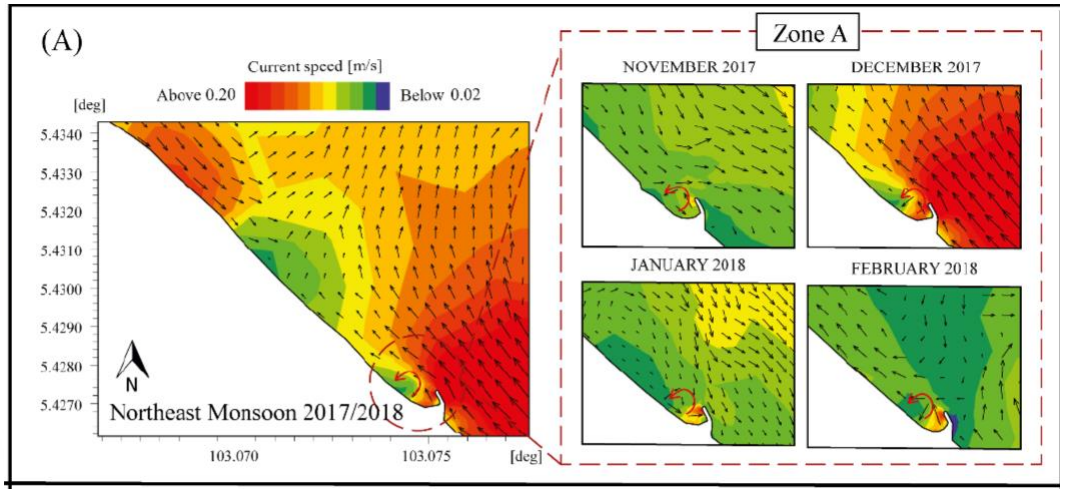
Numerical method used in monitoring in NCES

Department of Drainage and Irrigation (DID) use MIKE 21 HD for modelling

Modelling hydrodynamics, waves and sediment dynamics mostly offshore



Parameter	Method	Frequency
Coastline change	▪ Satellite imagery ▪ Nearshore and bathymetric survey ▪ Unmanned aerial vehicle (UAV)	Annually
Water levels	▪ Automated tide gauge ▪ (ADCP	Continuously (*in-situ*)
Currents	ADCP	
Waves	▪ ADCP ▪ HF radar	
Water quality	Multi-parameter water quality sonde	



Source: Effi Helmy, 2016

Waves near the dune foot on beaches

HOWEVER, studies show that very low frequency waves dominate in shallow water during storms

- Infragravity waves, low frequency waves or surf beat
- Wave period ~ 20 – 500 seconds

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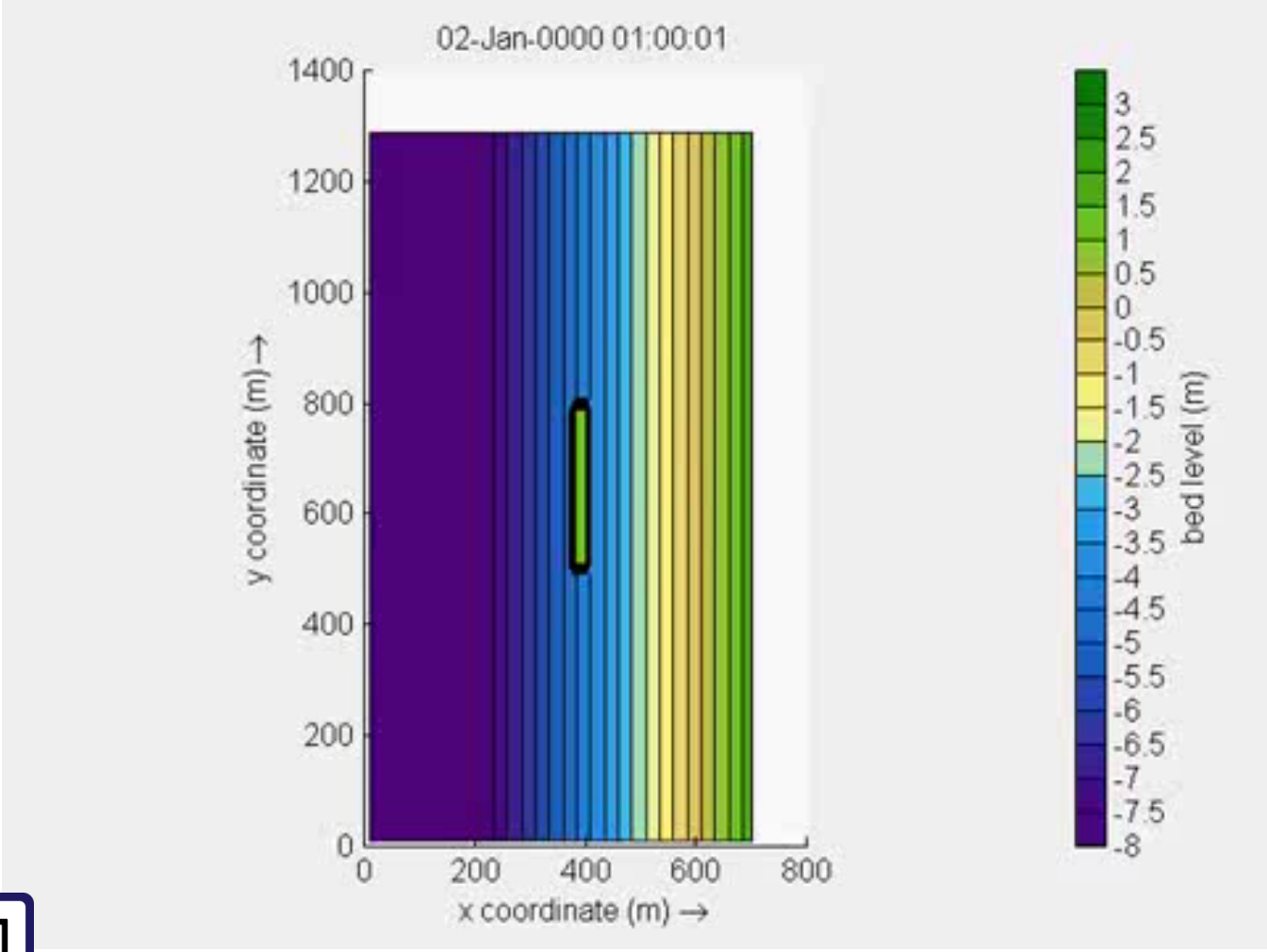
Application of Xbeach

- An open-source program, XBeach for eXtreme Beach behaviour, has been developed to model the nearshore response to storm impacts.

Deltares

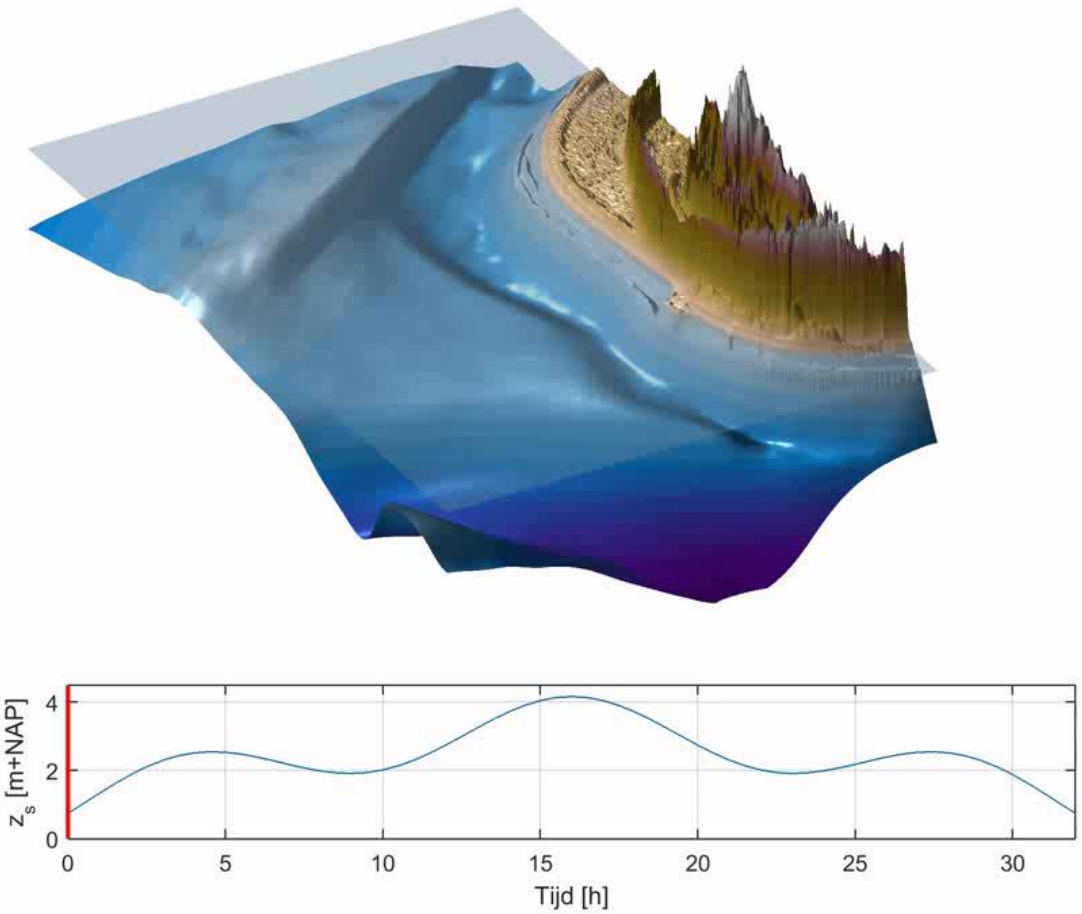
Enabling Delta Life

1. Stationary mode



XBeach simulation of the offshore breakwater case described in Nicholson, J., I. Broker, J.A. Roelvink, D. Price, J.M. Tanguy, L. Moreno. Intercomparison of coastal area morphodynamic models. (1997) 97-123. Simulation using stationary wave solver, approx. 3 months simulation time.
Source: https://www.youtube.com/watch?v=-BV-8ReVfX4

2. Surfbeat mode (instationary)



Nederhoff, Elias, Vermaas (2016). Erosion on Ameland Northwest. Model studies with Delft3D and XBeach simulations. Number: 1503-0080. In Dutch.
Source: https://www.youtube.com/watch?v=F44-1QVsmjE&feature=youtu.be

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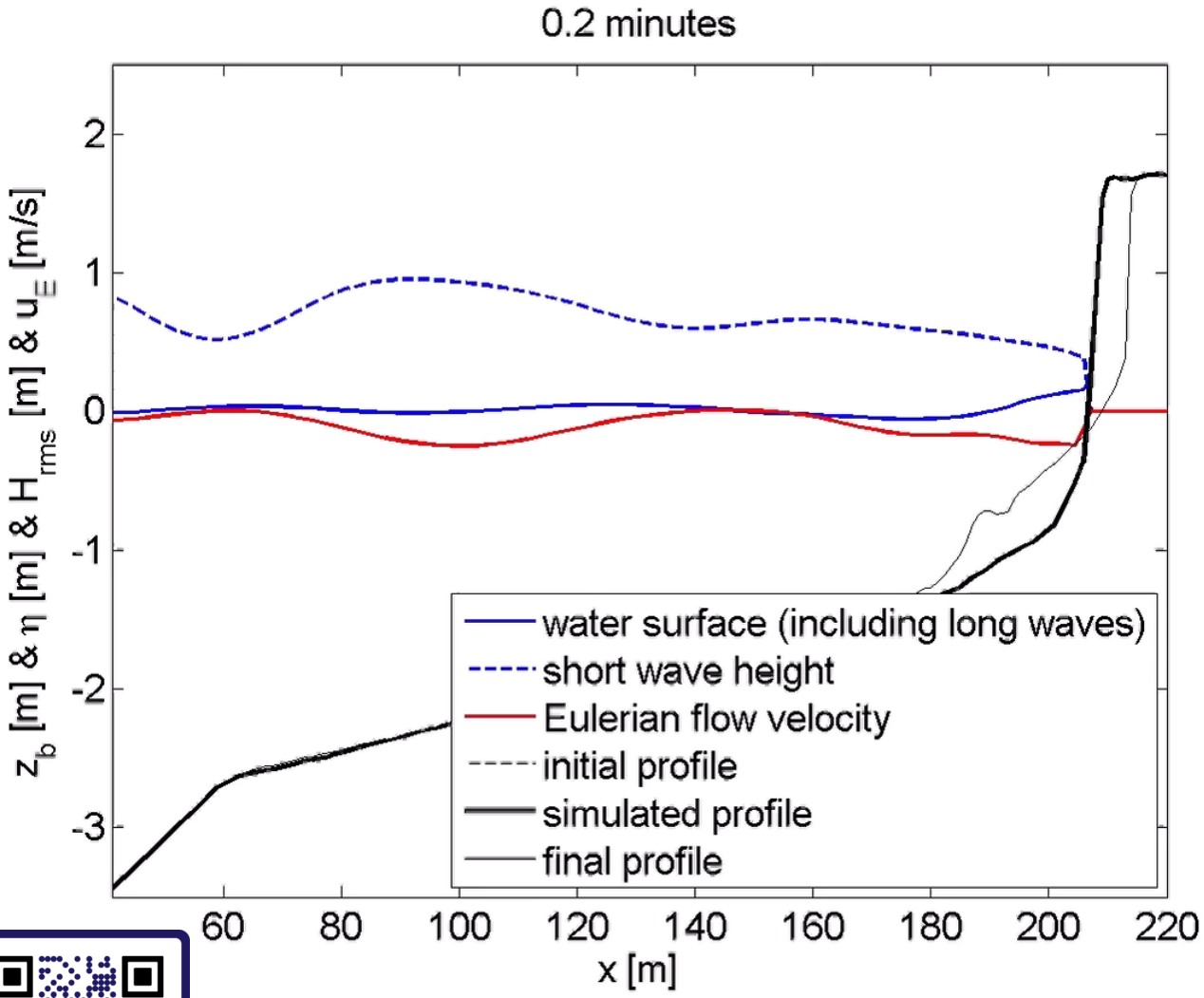
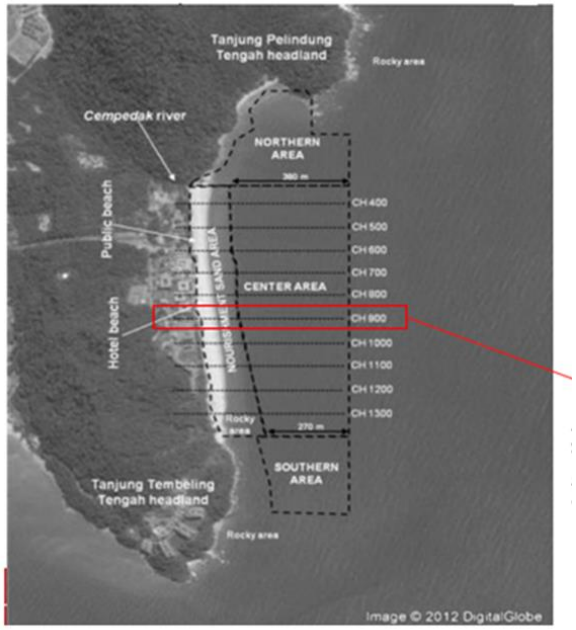
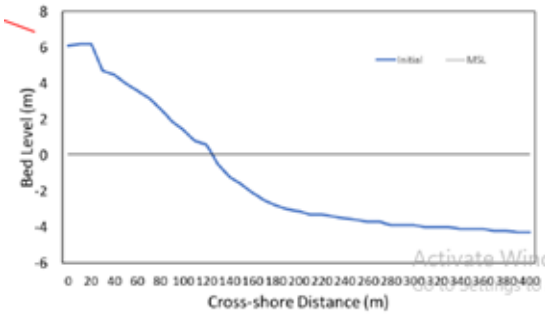
Wave action balance







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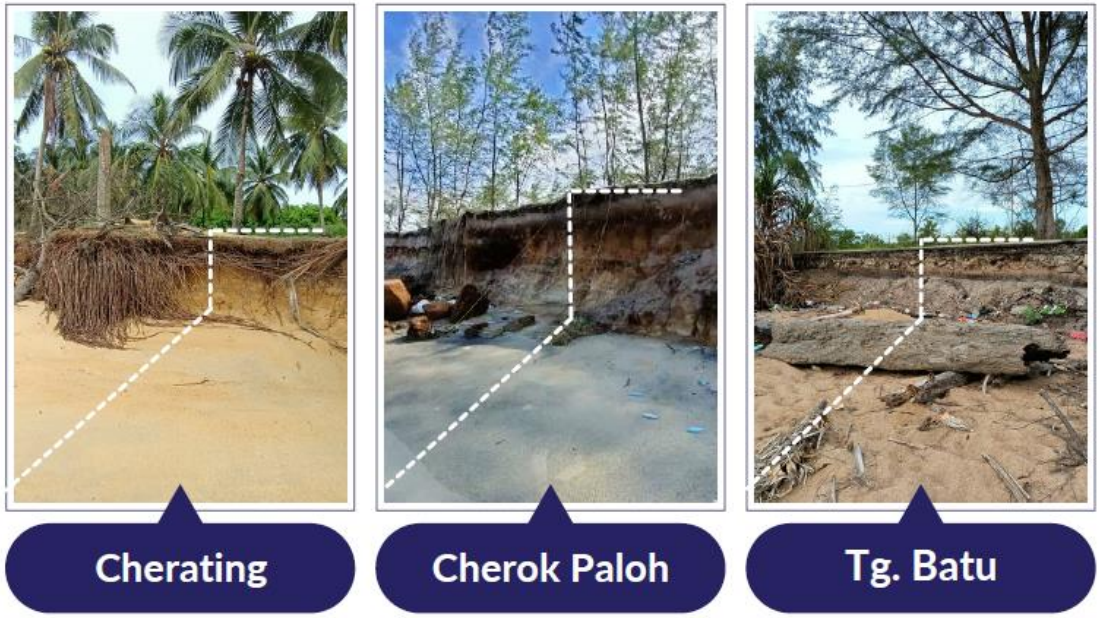
Example of extreme event in Pahang coastline



Pahang beach's condition during the preliminary survey on 25 April 2021

- About 16.33% of Pahang Beach eroded from 378.4 km.
- 2 Areas with a length of 1.5 km fall into Cat 1 (Critical)
- 14 Areas with lengths of 16.9 km at Cat 2 (significant)
- 58 areas with a total of 43.4 km in Cat 3 (Not Serious)
- A total of 61.8 km of erosion

note: NCES report, 2015

- Storm surge is an abnormal rise of water generated by a storm, above predicted astronomical tide
- Caused primarily by strong winds in a tropical storm

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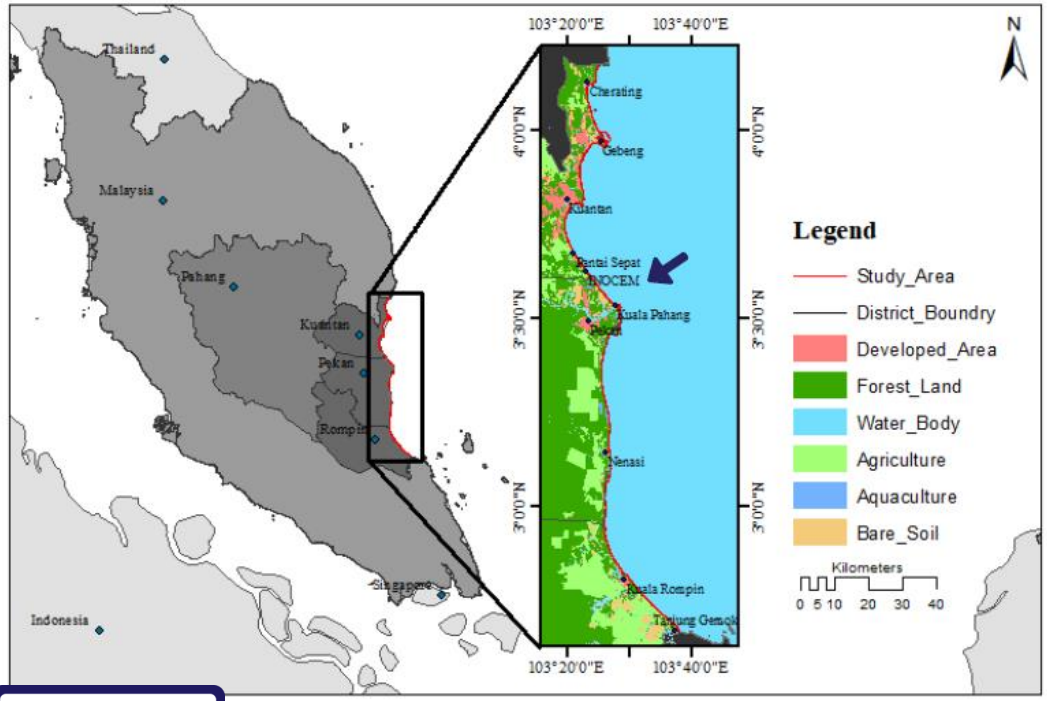
STUDY AREA

Maps of Pahang Coastal District and land use

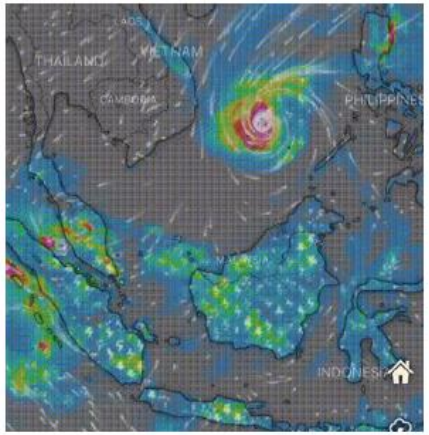


Area lengths = 207 km

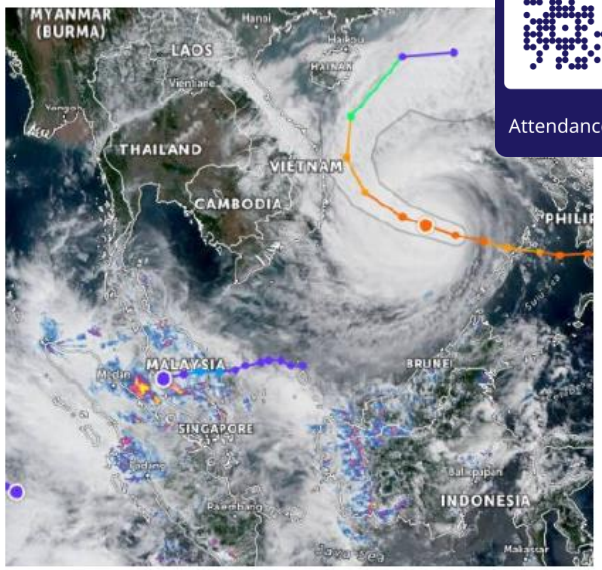
Cherok Paloh aligned with shoreline changes

CASE STUDY

SUPER TYPHOON RAI
(ODETTE)
11 DEC 2021 - 21 DEC 2021
(16 DEC 2021)



Wind Speed : 267km/h
Diameter: 185km/h
Eye: 56km
Air pressure : below 915mbar
Saffir-Simpson scale : Cat 5



Attendance Registration

TROPICAL DEPRESSION 29

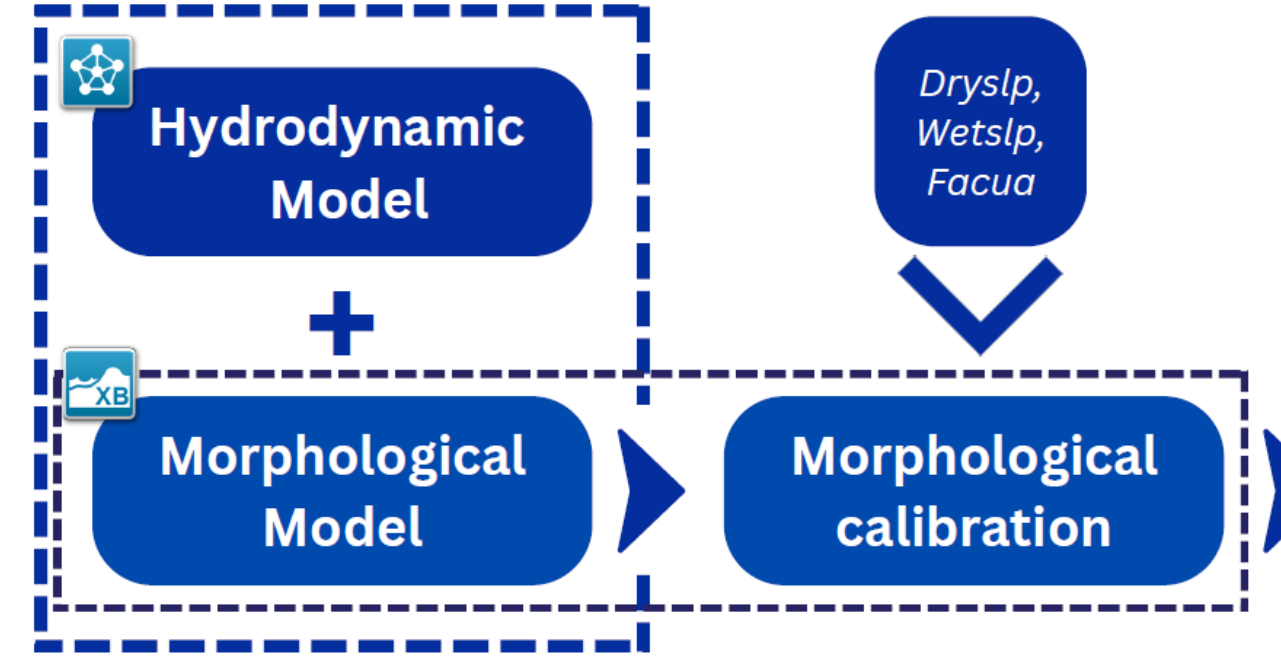
Categorized as a rapidly rotating storm system commonly referred to as a tropical cyclone

PATHWAYS

Make landfall at Terengganu coast and move to Straits of Malacca

METHODOLOGY

Attendance Registration

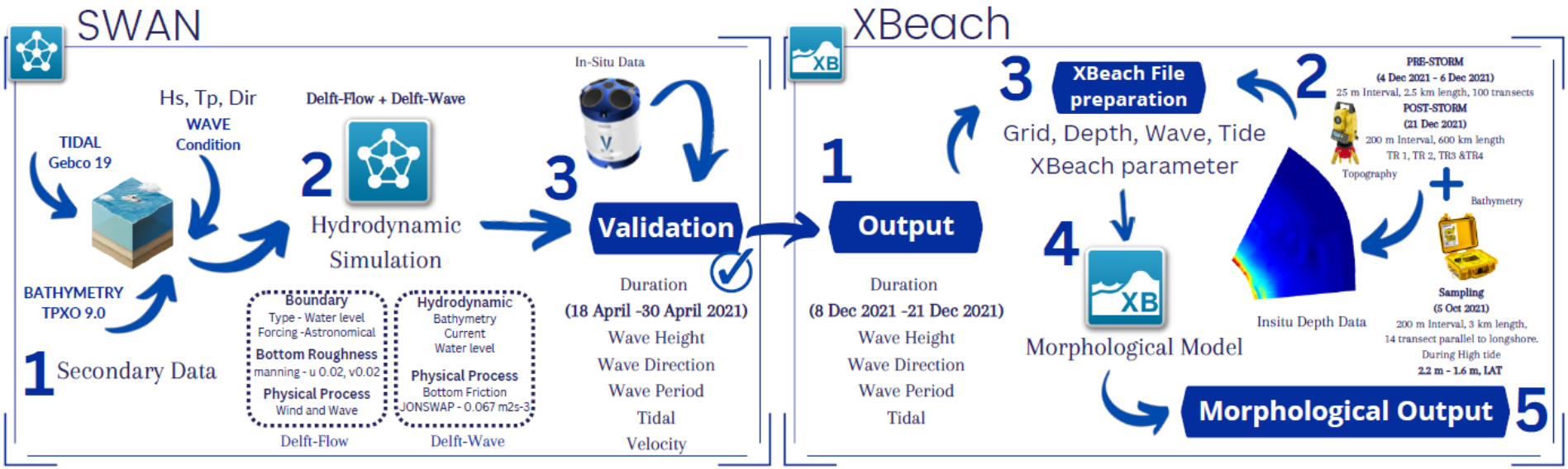


$$BSS = 1 - \frac{\sum(S_f - XB_f)^2}{\sum(S_f)^2}$$

proposed by van Rijn et al

METHODOLOGY

Attendance Registration

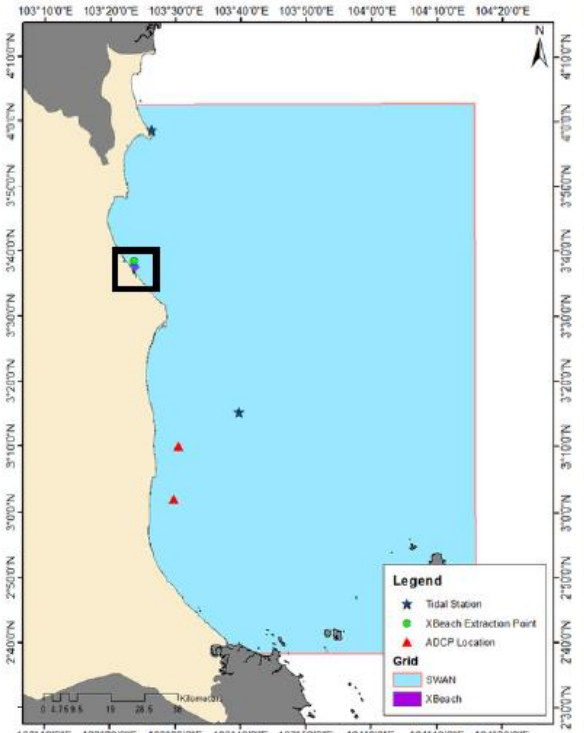


Deltares
Enabling Delta Life

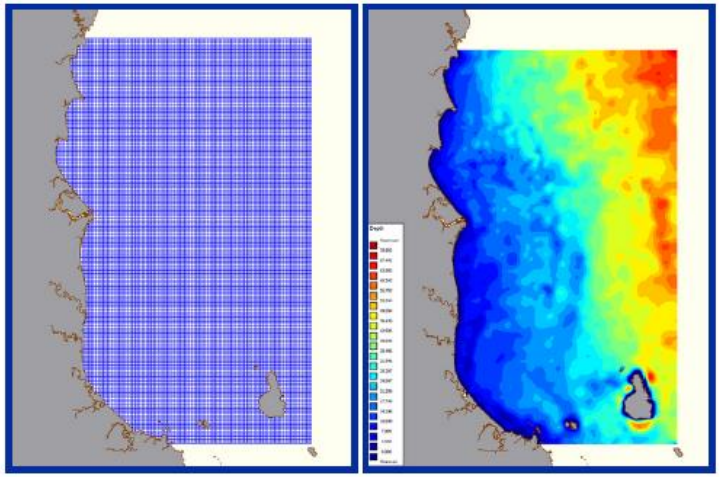
SWAN – XBeach Coupling Model

Source: Mazmirul, 2021

METHODOLOGY



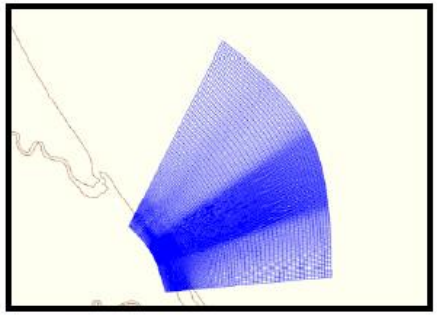
Location of SWAN and XBeach, ADCP, Tidal and XBeach Data Extraction point



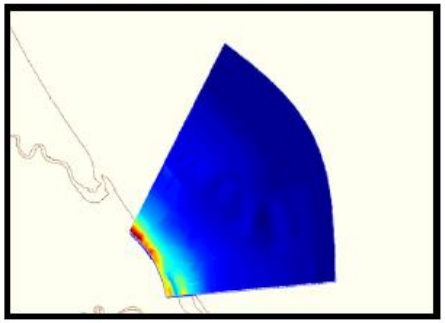
SWAN Grid
- Grid Size (1000 x 1000 m)
- Size of (97800 x 176400 m)

SWAN Bedlevel
- Bedlevel (0m to -80m)
- Taken using Delft Dashboard.
- TPXO 9.0
- Resolution 1/30 (deg)

SWAN Grid and Bedlevel Setup



XBeach Grid
- Grid Size varying (5m to 100 m)
- Finer at the study area.



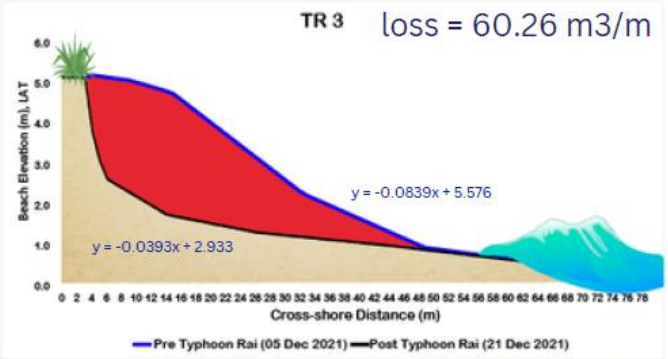
XBeach Bedlevel
- Bedlevel (7m to -11m)
- Water depth at boundary required more than 10 m

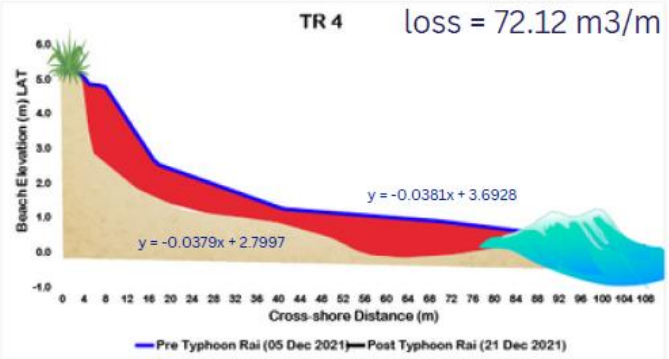
XBeach Grid and Bedlevel Setup

Attendance Registration

MONITORING

Attendance Registration

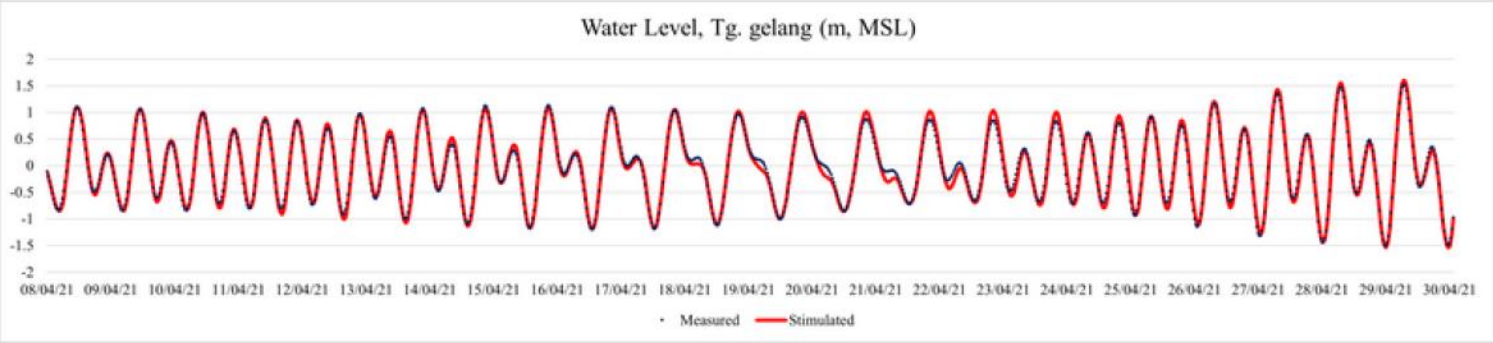


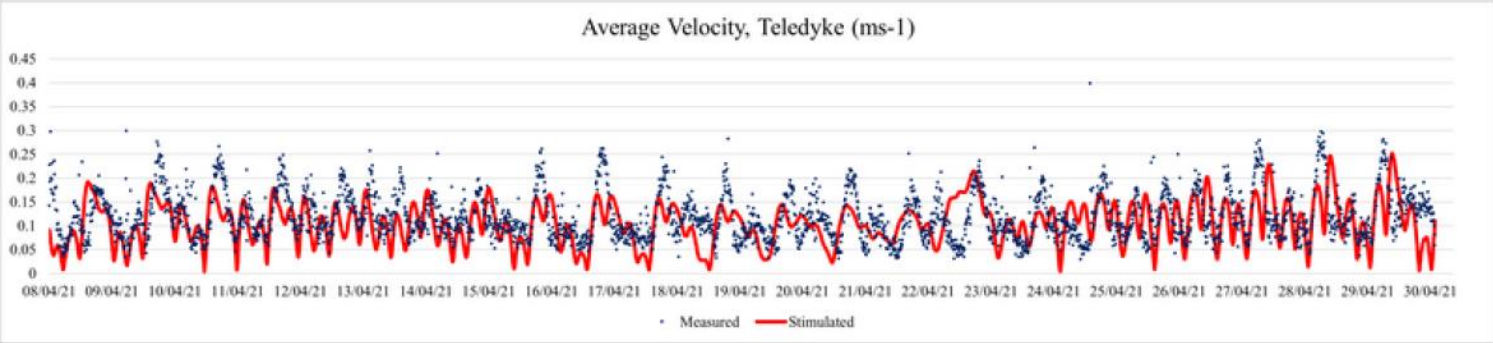


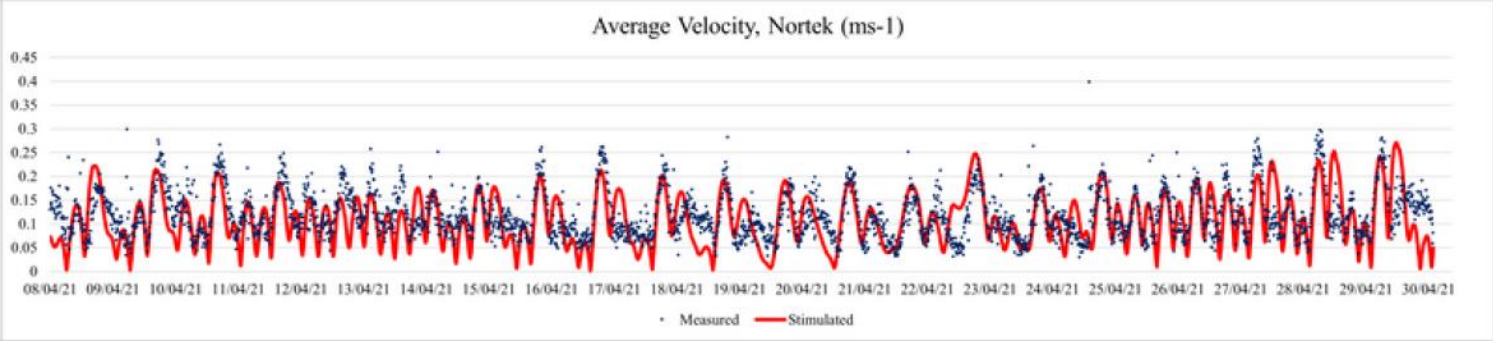
Before

After

Validation



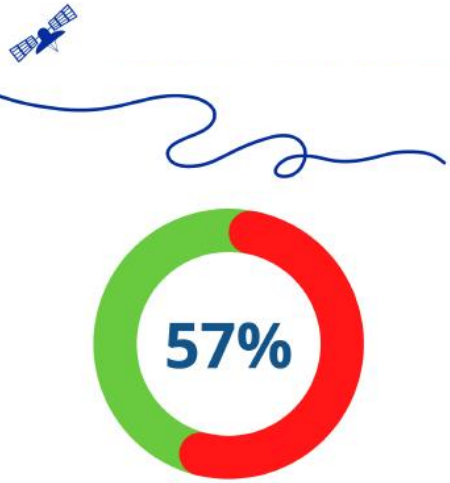




Attendance Registration

Result

DSAS
DIGITAL SHORELINE ANALYSIS SYSTEM



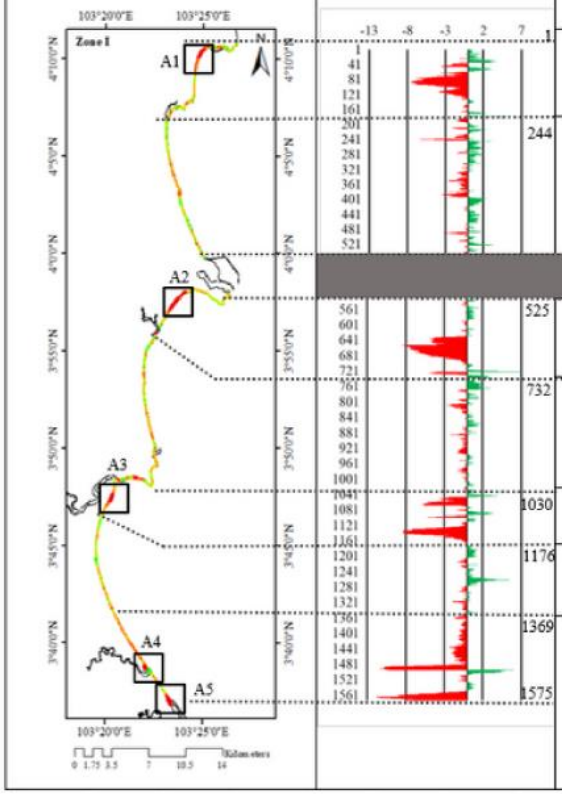
Legend

Shoreline Analysis

Linear Reggresion Rate (LRR), (m/year)

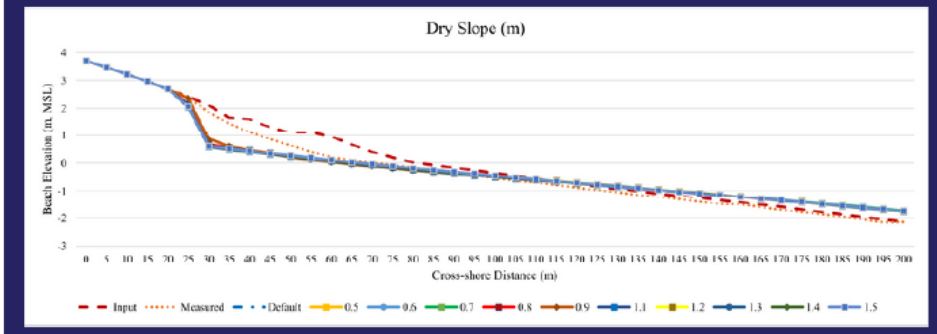
- Extreme Erosion
- Moderate Erosion
- Low Erosion
- Stable
- Low Accretion
- Moderate Accretion
- Extreme Accretion

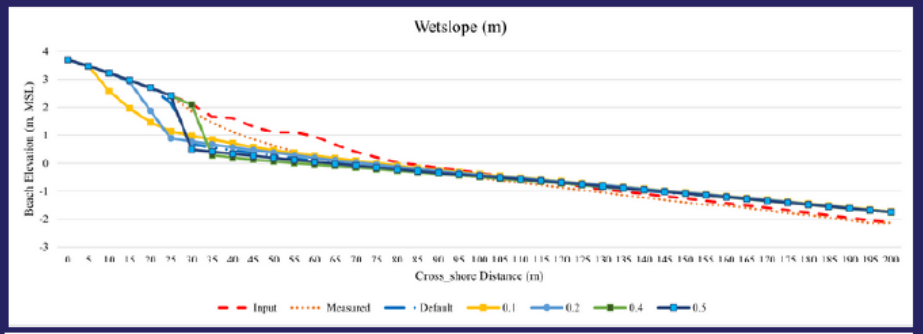
Kuantan Shoreline Analysis Result

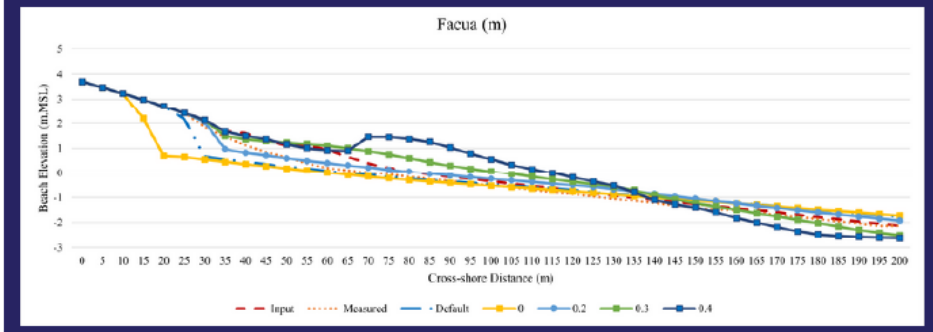
Zone 1	Rate of change, LRR (m/year)	Section & (shoreline length, km)	LRR (m/ year) mean	Remark
		K1 (12.20)	-0.99	Action required
		K2 (14.10)	+0.19	Stable
				Kuantan Port
		K3 (10.40)	-1.47	Action required
		K4 (14.90)	+0.08	Stable
		K5 (7.30)	-1.66	Action required
		K6 (7.10)	+0.18	Stable
		K7 (10.30)	-1.80	Action required

Result

XBeach morphological parameters calibration





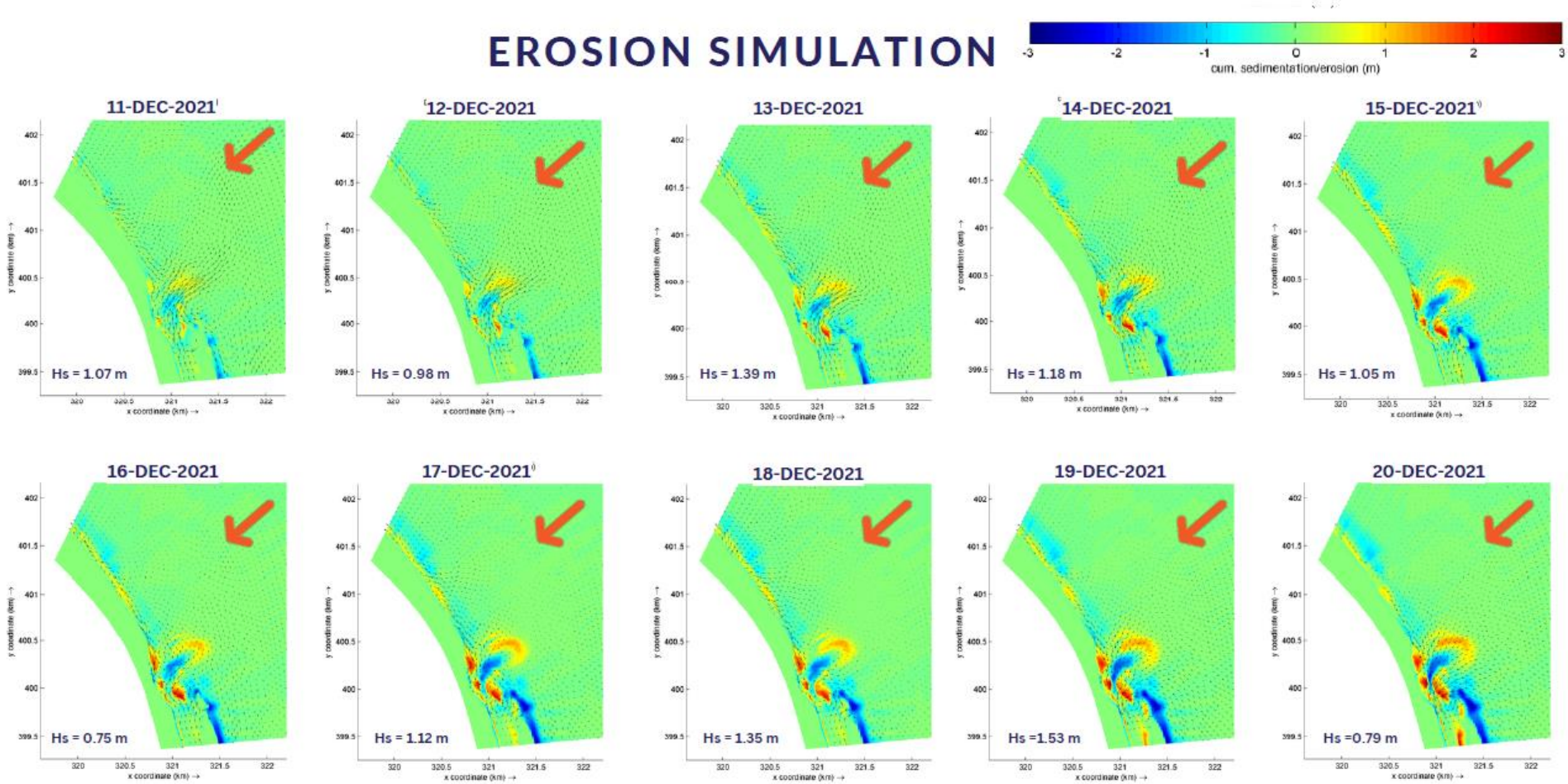


Parameters	Description	Default Value	Range Value	Used Value
Dryslope	Critical avalanching slope above water	1.0	0.1 – 2.0	0.9
Wetslope	Critical avalanching slope under water	0.3	0.1 – 1.0	0.4
Facua	Calibration factor time averaged flows due to wave skewness and asymmetry	0.1	0.0 – 1.0	0.2

- Calibration values that could be used for future predictions and scenarios

Attendance Registration

Result

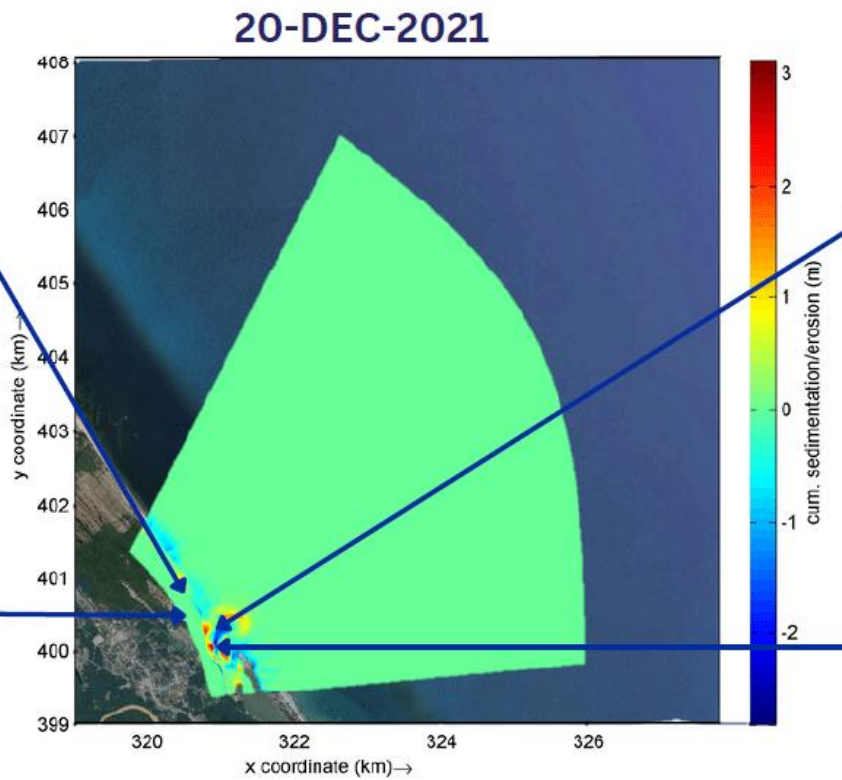


Attendance Registration

Result

23 Dec 2021 TR 2

23 Dec 2021 TR 3

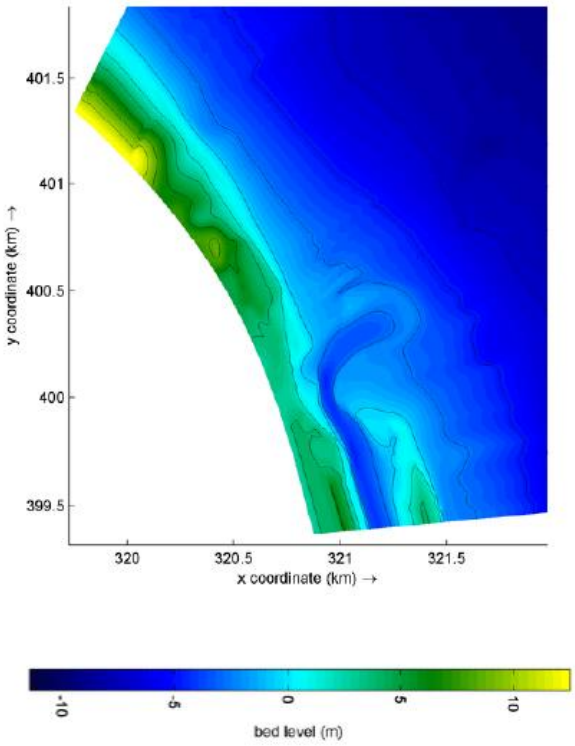


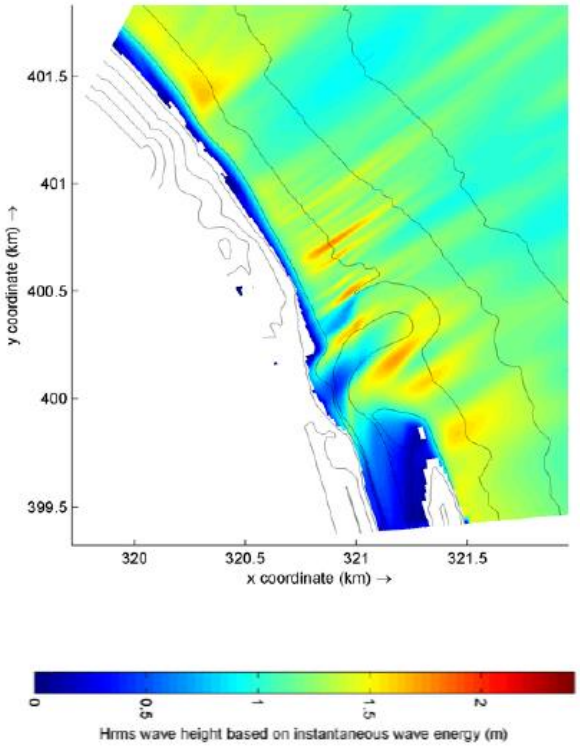
3 Jan 2022

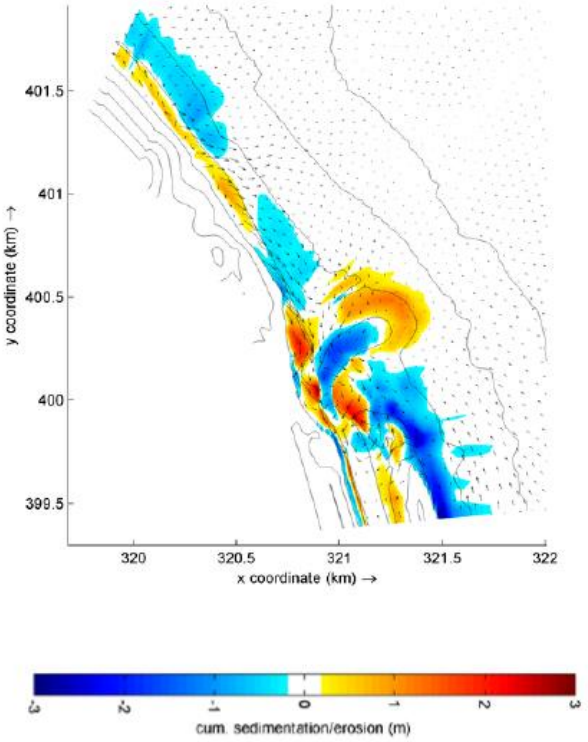
3 Jan 2022

Attendance Registration

CRITICAL TIME 18-DEC-2022 12:00:00







Attendance Registration

- Provide better understanding on morphological changes towards storm surge

Thank you

mzbr@iium.edu.my

LEMBAGA TEKNOLOGIS MALAYSIA
MALAYSIA BOARD OF TECHNOLOGISTS

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Jalan P8G, Presint 8,
62250 Putrajaya, Malaysia

Ruj.: MBOT 100-2/7/1 JLD.3 (47)
Tarikh: 13 Julai 2023

YBRS. PROF. MADYA TS. DR. MUHAMMAD ZAHIR RAMLI
Pensyarah Universiti Islam Antarabangsa Malaysia
No 6, Jalan Ketiau 3/10
Seksyen 3
40000 Shah Alam
SELANGOR DARUL EHSAN

YBrs. Prof. Madya Ts. Dr.,

PENGHARGAAN DAN TERIMA KASIH ATAS SUMBANGAN SEBAGAI PENCERAMAH PADA SESI MBOT THURSWEB 2023

Dengan segala hormatnya perkara di atas adalah dirujuk.

2. Lembaga Teknologis Malaysia (MBOT) mengucapkan setinggi-tinggi penghargaan dan terima kasih atas kehadiran YBrs. Prof. Madya Ts. Dr. sebagai penceramah pada Sesi MBOT ThursWeb 2023 seperti butiran berikut:

Tajuk	:	*"Numerical Techniques in Coastal Erosion Study in Malaysia"*
Tarikh	:	**13 Julai 2023 (Khamis)**
Masa	:	**11.00 pagi - 12.00 tengahari**

3. Untuk makluman permohonan jam *Continuing Professional Development* (CPD) boleh dilakukan di sistem CPD MBOT di pautan https://cpd.mbot.org.my/login dengan mengemukakan slaid pembentangan, poster dan surat penghargaan ini sebagai bukti kehadiran.

4. Segala jasa dan sokongan berterusan yang telah diberikan YBrs. Prof. Madya Ts. Dr. pada program-program anjuran MBOT sedikit sebanyak dapat menggalakkan pembelajaran sepanjang hayat dan sumbangan yang cemerlang bagi memartabatkan dan mempromosikan profesion Teknologis dan Juruteknik di Malaysia.

Setinggi-tinggi penghargaan diucapkan atas komitmen YBrs. Prof. Madya Ts. Dr. dan segala kerjasama berkaitan perkara ini saya dahului dengan ucapan terima kasih.

Sekian.

"MALAYSIA MADANI"

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

(DR. MD FAUZI BIN MD ISMAIL)
Pendaftar
Lembaga Teknologis Malaysia

MBOT ThursWeb 2023

NUMERICAL TECHNIQUES IN COASTAL EROSION STUDY IN MALAYSIA

Marine Technology (MR)

ELIGIBLE FOR 1 CPD POINT

Topic Objectives

1. To identify the highly impacted areas from coastal erosion.
2. To demonstrate the numerical technique used in morphological processes particularly for extreme events.

13th July 2023

11.00 am - 12.00 pm

LIVE STREAMING

https://shorturl.at/gmERX

Speaker

Assoc. Prof. Ts. Dr. Muhammad Zahir Ramli

Lecturer
International Islamic University Malaysia (IIUM)