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**INSTITUT OSEANOGRAFI DAN SEKITARAN**  
INSTITUTE OF OCEANOGRAPHY AND ENVIRONMENT

*Higher Institution Centre of Excellence (HiCoE) in Marine Science*

**Our Ref.:UMT/INOS/TOMSY2022/Secretariat/100-54/1 (52)**

**Date : 2 October 2022**

Dear Prof./Assoc. Prof./Dr./Sir./Mr./Mrs./Miss,

**MUHAMMAD AFIQ AZMAN**  
**INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA**

## **CONFIRMATION OF PARTICIPATION IN THE TROPICAL OCEAN AND MARINE SCIENCES INTERNATIONAL SYMPOSIUM (TOMSY2022) ON 6-7 NOVEMBER 2022**

Thank you very much for your support and interest in joining TOMSY2022. We are pleased to inform that your registration and participation in TOMSY2022 has been confirmed. The abstract below has been accepted to be presented during the Symposium.

Title

**THE PATHWAY OF MARINE LITTER ALONG PAHANG COASTLINE**

Type of  
presentation  
**ORAL**

Please submit your proof of payment via email to **inos.tomsy@gmail.com**. Please be advised that the Symposium's fee should be paid before **20 October 2022** to ensure your abstract being published in the abstract book.

Further information regarding tentative program and presentation schedule will be announced later through email and in the Symposium website. Please be free to visit our website for latest announcement (<http://tomsy.umt.edu.my>).

Thank you again for your support.

Yours sincerely,

**PROF. GS. DR. AIDY @ MOHAMED SHAWAL BIN M MUSLIM**  
Chairman for TOMSY2022  
Universiti Malaysia Terengganu (UMT)

# Trajectory of Floating Marine Litter along Pahang Coastline

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**Abstract:** Marine debris issues have been one of the major problems that every nation is facing around the world. Several studies have reported the accumulation of marine debris both in Peninsular and East of Malaysia in terms of its distribution on different places, temporal and seasons effect and the major debris type found on Malaysian coastline. However, the study on route and trajectories of floating debris in Malaysia remains to be accomplished. In this study intensively focused the pattern of marine litter pathway, distribution and sources by a numerical approach that could be a better view and improve our knowledge on the behaviour and fate of marine debris in our coastline. Particle tracking model was used to provide 1) the possible sources of floating marine debris, 2) the distribution of floating marine debris during different seasons, and 3) the trajectory of marine debris released from our coastline. The Delft3D software was used to achieve the objectives of this study by using the lagrangian particle tracking module coupled with secondary data from ECMWF. Hydrodynamic and particle simulation has shown the agreement towards in-situ data observation.

**Keywords:** marine debris, plastic, numerical modelling, Malaysia



## Programme Summary

### DAY 1 (Sunday, 6<sup>th</sup> Nov. 2022)

Time	Details		
0840 - 0900	Registration		
0900 - 0940	Plenary I <sup>##</sup> - Mr. Mirza Hamza, Technical Director at Hidrokinetik Group <i>"Industry and University Collaboration: How Partnership Drives Innovation"</i>		
0940 - 1030	MARE Round Table Discussion <sup>##</sup>		
1030 - 1050	Refreshment		
1045 - 1100	Arrival of VVIPs		
1100 - 1300	Opening Ceremony <sup>#</sup>		
1100 - 1110	National anthem, Prayer recitation		
1110 - 1120	Welcoming Speech by Prof. Gs. Ts. Dr. Aidy @ Mohamed Shawal bin M. Muslim, Chairman of TOMSY2020		
1120 - 1130	Welcoming Speech by Prof. Ts. Dr. Mohd Fadzil bin Mohd Akhir, <i>Director of Institute of Oceanography and Environment</i>		
1130 - 1145	Officiating Speech by Prof. Dato` Dr. Mazlan Bin Abd Ghaffar, Vice Chancellor of Universiti Malaysia Terengganu		
1145 - 1150	TOMSY Montage Presentation by INOS		
1150 - 1155	Introducing Keynote Speaker by Prof Aidy Muslim		
1155 - 1230	Keynote Address <sup>#</sup> by Prof. Dr. Biswajeet Pradhan, University of Technology Sydney, Australia <i>"Machine Learning and Spatial Intelligence in Urban and Coastal Applications"</i>		
1245 - 1300	MOA Document Exchange Event between UMT and Hidrokinetik Technologies Sdn. Bhd. Photo Session		
1300 - 1400	Lunch Break		
1400 - 1440	Plenary II <sup>#</sup> - Dr. Salvatore Aricò, (Senior Programme Specialist for Biodiversity Assessments and Inter-Agency Coordination, UNESCO's Natural Sciences Sector) <i>*(insert speaker talk title)</i> <b>Webex Link:</b> <a href="https://umt.webex.com/umt/j.php?MTID=m6e1850ccf11065a48f527297b082b275">https://umt.webex.com/umt/j.php?MTID=m6e1850ccf11065a48f527297b082b275</a>		
1445 - 1630	Session 1A <sup>###</sup> <i>Ecological Resilience</i> MB_ECO1-8	Session 1B <sup>#</sup> <i>Biology of Fishes</i> MB_FISH1-8	Session 1C <sup>####</sup> <i>Marine Engineering and Technology</i> MET1-7
1630 - 1700	Welcoming Hi-Tea		

**Venue:** <sup>#</sup>Dewan Persidangan 2; <sup>##</sup> Dewan Persidangan 3; <sup>###</sup> Bilik Seminar 1; <sup>####</sup> Dewan Seminar 1

## DAY 2 (Monday, 7<sup>th</sup> Nov. 2022)

Time	Details		
0900 - 0940	<b>Plenary III<sup>#</sup> - Prof. Shing Yip (Joe) Lee</b> (The Chinese University of Hong Kong) <i>"Mangrove microphytobenthos - a neglected driver of estuarine trophodynamics"</i> <b>Webex Link:</b> <a href="https://umt.webex.com/umt/j.php?MTID=m5a53c92c996217eba7a7eed6d87983a">https://umt.webex.com/umt/j.php?MTID=m5a53c92c996217eba7a7eed6d87983a</a>		
0945 - 1120	<b>Session 2A<sup>###</sup></b> <i>Satellite Oceanography</i> SAT1-7	<b>Session 2B<sup>#</sup></b> <i>Marine Pollution I</i> MP1-7	<b>Session 2C<sup>####</sup></b> <i>Ocean Governance</i> OG1-7
1120 - 1140	Refreshment		
1140 - 1300	<b>Session 3A<sup>###</sup></b> <i>Marine Coastal and Delta Sustainability for Southeast Asia</i> MARE1-7	<b>Session 3B<sup>#</sup></b> <i>Marine Pollution II</i> POL1-6	<b>Session 3C<sup>####</sup></b> <i>Coastal Geomorphology</i> COAST1-7
1300 - 1400	Lunch Break		
1400 - 1440	<b>Plenary IV<sup>#</sup> - Prof. Dr. Wan Izatul Asma binti Wan Talaat</b> , Head of Centre for Ocean Governance, INOS. <i>"The Role of Ocean Governance in Translating Science into Policies ~ Accelerating the National Delivery to the Ocean Decade"</i>		
1445 - 1600	<b>Session 4A<sup>###</sup></b> <i>MARE extended discussion room</i>	<b>Session 4B<sup>#</sup></b> <i>Coastal and Shelf Seas Dynamics</i> COD1-7	<b>Session 4C<sup>####</sup></b> <i>Ocean Literacy</i> OL1-7
1600 - 1630	Refreshment		
1630 - 1700	<b>Closing Ceremony<sup>#</sup></b>		

**Venue:** <sup>#</sup>Dewan Persidangan 2; <sup>###</sup> Dewan Persidangan 3; <sup>####</sup> Bilik Seminar 1; <sup>#####</sup> Dewan Seminar 1

**LIST OF ORAL PRESENTATION SESSION  
TOMSY 2022**

No	NAME	TITLE	ABSTRACT TITLE	INSTITUTION	EMAIL	ASSIGNED REF. NO. (SCIENTIFIC)
<b>SESSION 1A (Ecological Resilience)</b>						
1	MOHAMMAD SAUPI ISMAIL	MR	REEF HEALTH ASSESSMENT OF SEMBILAN ARCHIPELAGO, PERAK	FISHERIES RESEARCH INSTITUTE DEPARTMENT OF FISHERIES MALAYSIA	saupi@rocketmail.com	MB_ECO1
2	MEI LING KHOO	DR.	A CHECKLIST OF CORAL REEF FISHES AT PULAU SEMBILAN ARCHIPELAGO, PERAK	DEPARTMENT OF EARTH SCIENCES AND ENVIRONMENT, FACULTY OF SCIENCE AND TECHNOLOGY, UNIVERSITI KEBANGSAAN MALAYSIA, BANGI, SELANGOR, 43600	meilingkhoo@ukm.edu.my	MB_ECO2
3	NUR ARBAEEN MOHD JOHARI	MRS	COMMUNITY STRUCTURE OF MACROFOULING ON "RIG-TO-REEF" ARTIFICIAL REEFS AT PULAU KAPAS WATERS, SOUTH CHINA SEA	UMT	arbaeenjohari@gmail.com	MB_ECO3
4	ZAINUDIN BACHOK	PROFESSOR	INFLUENCE OF SURROUNDING HABITAT ON THE FOOD SOURCES OF LONG-SPINED URCHIN, DIADEMA SETOSUM (LESKE, 1778) AS INDICATE BY FATTY ACID MARKERS	INOS, UMT	zainudinb@umt.edu.my	MB_ECO4
5	AMIR SYAZWAN SHAWEL	MR.	INVERTEBRATES COMMUNITY AND ROLES AS AN ECOLOGICAL INDICATOR OF INTERTIDAL ECOSYSTEM IN TROPICS	IPMB, UMS	amir_syazwan_my21@iluv.ums.edu.my	MB_ECO5
6	NURULAFIFAH YAHYA	DR.	ORGANIC FOOD SOURCES OF MANGROVE CLAM, GELOINA EXPANSA (MOUSSON, 1849) IN THE MANGROVE OF SETIU WETLANDS, EAST COAST OF MALAYSIA AS INDICATED BY FATTY ACID MARKERS	INSTITUTE OF OCEAN AND EARTH SCIENCES (IOES), NO. C308, IGS BUILDING, CANSELERI UNIVERSITI MALAYA, WILAYAH PERSEKUTUAN KUALA LUMPUR, UNIVERSITI MALAYA	nurulafifah88@gmail.com	MB_ECO6
7	SURIYANTI SU NYUN PAU	DR.	VIBRIO ABUNDANCE IN RELATION TO PHYTOPLANKTON AND ENVIRONMENTAL PARAMETERS IN KEPULAUAN SEMBILAN PERAK	UKM	suriyanti@ukm.edu.my	MB_ECO7
	NURUL FARHANA BINTI SANSUDIN	MS	ASSESSMENT OF SEROTONIN PRECURSORS AND SELECTIVE SEROTONIN REUPTAKE INHIBITOR (SSRI) FROM FLUOXETINE, TRYPTOPHAN, AND GLYCINE IN REDUCING CANNIBALISTIC BEHAVIOR AMONG HYBRID GROUPER (EPINEPHELUS LANCEOLATUS ♂) - (E. FUSCOGUTTATUS ♀) JUVENILE	INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA	farhana_sansudim@live.iium.edu.my	MB_ECO8
<b>SESSION 1B (Biology of Fishes)</b>						
1	ZAINUDDIN ILIAS	MR	ESTIMATION OF PULAU PAYAR MARINE PARK CORAL REEF FISHES BIOMASS USING VISUAL OBSERVATION	FISHERIES RESEARCH INSTITUTE DEPARTMENT OF FISHERIES MALAYSIA	zainuddin01@tof.gov.my	MB_FISH1
2	MUHAMMAD AFIQ FIRDAUS AMINUDIN	MR	BASELINE STUDY ON CORAL REEF FISH IN PULAU KAPAS, TERENGGANU, SOUTH CHINA SEA	INOS, UMT	fiqdaus99@gmail.com	MB_FISH2
3	NOR HAZIRAH MOHD ZUKI	MRS.	ONTOGENY OF MALE PARROTFISH (SCARUS GENUS) MATURATION AT PULAU BIDONG, SOUTH CHINA SEA	INOS, UMT	norhazirahzuki@gmail.com	MB_FISH3

4	NURAIN NAZIRATUL-AKMA BINTI MOHAMAD DAUD	MS	A PRELIMINARY STUDY ON FEEDING FREQUENCY OF CLOWNFISH (AMPHIPRION OCELLARIS) USING ARTIFICIAL FOOD	NATIONAL UNIVERSITY OF MALAYSIA	p105355@siswa.ukm.edu.my	MB_FISH4
5	MOHAMMAD FAIZ AHMAD	MR.	FISH COMMUNITY STRUCTURE AT RIG-TO-REEF (R2R) ARTIFICIAL REEF OFF PULAU KAPAS, SOUTH CHINA SEA.	UMT	mfaizahmad27566@gmail.com	MB_FISH5
6	SITI TAFZILMERIAM BINTI SHEIKH ABDUL KADIR	DR.	LENGTH-WEIGHT RELATIONSHIP OF 30 MOST ABUNDANT FISH SPECIES IN THE SETIU WETLANDS, TERENGGANU, MALAYSIA	INOS, UMT	sittitafzil@umt.edu.my	MB_FISH6
7	MUHAMMAD AIMAN BIN MASUD	MR.	DO DEPTH OF DEPLOYING ARTISANAL FISH TRAPS AFFECT BYCATCH DISTRIBUTION IN BIDONG ARCHIPELAGO?	UNIVERSITI MALAYSIA TERENGGANU	aiman.masud6395@gmail.com	MB_FISH7
8	SAIFULLAH ARIFIN JAAMAN	ASSOCIATE PROF. DR.	CETACEANS OF THE LUCONIA SHOALS NATIONAL PARK (L-SNP), OFFSHORE SARAWAK, MALAYSIA	INOS, UMT	saifullahaj@umt.edu.my	MB_FISH8
<b>SESSION 1C (Marine Engineering and Technology)</b>						
1	SITI AYISHAH THAMINAH	MS	NUMERICAL MODELLING ON THE PERFORMANCE OF SUBMERGED BREAKWATER USING THE SPH-BASED DUALSPHYSICS MODEL	INSTITUTE OF OCEANOGRAPHY AND MARITIME STUDIES (INOCEM), INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA, KAMPUNG CHEROK PALOH, KUANTAN, PAHANG, 26610	thaminah1997@gmail.com	MET1
2	NOOR ASIAH MOHAMAD	MRS	THE EFFECT OF ROCK ARMOUR THICKNESS ON WAVE OVERTOPPING PERFORMANCE AT COASTAL REVETMENTS	UNIVERSITI PUTRA MALAYSIA	gs59282@student.upm.edu.my	MET2
3	MD NIZAM BIN ISMAIL	MR.	SEABED MAPPING OF PULAU SONGSONG AND TUKUN TERENDAK, YAN, KEDAH	FISHERIES RESEARCH INSTITUTE (FRI) BATU MAUNG, BATU MAUNG, PULAU PINANG, 11960	nizam7402@gmail.com	MET3
4	WAN NUJR KHAIRUNNISA WAN MAT NOR	MS	MARINE LANDSCAPE MAPPING USING 3D PHOTOGRAMMETRY AT KARANG TENGAH	INOS, UMT	p4503@pps.umt.edu.my	MET4
5	MUHAMMAD MAZMIRUL ABD RAHMAN	MR.	SENSITIVITY ANALYSIS AND APPLICATION OF XBEACH AT CHEROK PALOH BEACH, PAHANG, MALAYSIA	KULLIYAH OF SCIENCE, INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA, KUANTAN, PAHANG, 25300	mazmirul.94@gmail.com	MET5
6	MUHAMMAD ABDUL HAKIM MUHAMAD	MR.	IMPLEMENTATION OF TILTED MULTIBEAM ECHOSOUNDER DATA AND RANDOM FOREST FOR SHALLOW WATER MARINE HABITAT MAPPING	UNIVERSITI TEKNOLOGI MALAYSIA	hakim1991@graduate.utm.my	MET6
7	BRYAN YONG	MR.	LARGE-SCALE CORAL REEF HABITAT SUITABILITY MODEL USING MARINE LANDSCAPE MAPPING TO SUPPORT EFFECTIVE ECOSYSTEM-BASED MARINE MANAGEMENT	UMT	bryanyong@live.com.my	MET7
<b>SESSION 2A (Satellite Oceanography)</b>						
1	MUHAMMAD SHAWKAT HOSSAIN	DR.	ANNUAL MONTHLY AND SEASONAL PROBABILITIES OF ACQUIRING CLOUD-FREE AND LOW-TIDE LANDSAT OBSERVATIONS FOR MAPPING SALTPANSH LAND COVER OVER SOUTH-EASTERN BANGLADESH FROM 1980 TO 2019	INOS, UMT	shawkat@umt.edu.my	SAT1
2	MUHAMMAD IZUAN NADZRI	MR.	EVALUATION OF TRMM AND GPM PRECIPITATION PRODUCT FROM HIGHLAND TO COASTAL AREA IN MALAYSIA	INOS, UMT	izuan.nadzri@umt.edu.my	SAT2
3	IDHAM KHALIL	MR.	MODELLING AND FORECASTING THE EFFECTS OF INCREASING SEA SURFACE TEMPERATURE ON CORAL BLEACHING IN THE INDO-PACIFIC REGION	FACULTY OF SCIENCE AND MARINE ENVIRONMENT, UMT	idham@umt.edu.my	SAT3

4	KU NOR AFIZA ASNIDA KU MANSOR	MS	DETECTION AND VISUALIZATION OF OCEANIC FRONTS IN PENINSULAR MALAYSIA USING SATELLITE DATA DURING MONSOON SEASON	UNIVERSITI MALAYSIA TERENGGANU	kufeezakumansor@gmail.com	SAT4
5	NURUL HIDAYAH MAT ZAKI	MRS.	ASSESSING OPTIMAL DOWNSCALING PARAMETERS FOR UAV-ORTHOMOSAIC PREPARATION TO ACHIEVE CORAL MAPS WITH GREATER ACCURACY	INOS, UMT	n.hidayah@umt.edu.my	SAT5
6	MD SUFFIAN IDRIS	DR.	OPTICAL WATER TYPE CLASSIFICATION SCHEME FOR MONITORING WATER QUALITY IN MALAYSIAN WATERS	FACULTY OF SCIENCE AND MARINE ENVIRONMENT, UMT	suffian@umt.edu.my	SAT6
7	YUZWAN MOHAMAD	MIR.	DEVELOPMENT OF MARINE GEOSPATIAL DATA MODEL (MGDM) FOR LONG-TERM RESEARCH REPOSITORY: A CASE STUDY IN PULAU BIDONG	UMT	yuzwanm@umt.edu.my	SAT7
<b>SESSION 2B (Marine Pollution I)</b>						
1	PAUL TEESALU	MR.	LDPE MICROPLASTICS INDUCED DIFFERENTIAL STRESS RESPONSES IN TWO AMPHIPOD SPECIES	ESTONIAN UNIVERSITY OF LIFE SCIENCES	paul.teesalu1@gmail.com	MP1
2	INTAN NOOR MUNIRA GHAZALI	MS	WIDESPREAD OCCURRENCE OF MICROPLASTIC IN ISLANDS ON THE NORTH COAST OF PENINSULAR MALAYSIA USING BIVALVE AS BIOINDICATOR	INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA	intanghazali27@gmail.com	MP2
3	WAN SITI MARDHIAH WAN JOHARI	MS	MICROPLASTICS ASSESSMENT USING ROCK OYSTER (SACCOSTREA CUCULLATA) IN TIOMAN ISLAND, PAHANG	INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA	mardhiahpg@gmail.com	MP3
4	YUSOF SHUAIB IBRAHIM	ASSOCIATE PROFESSOR DR.	MICROPLASTICS INGESTION BY ESTUARINE NEREIDID POLYCHAETE (NAMALYCASTIS SP.) FROM THE SOUTH CHINA SEA	UNIVERSITI MALAYSIA TERENGGANU	yusofshuaib@umt.edu.my	MP4
5	MUNIRAH MAT DERS	MS	ASSESSING SPATIAL VARIATION ON MICROPLASTICS ABUNDANCE IN KUANTAN RIVER WATER	INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA	fikriahf@ium.edu.my	MP5
6	ISMILA CHE ISHAK	MRS	THE CHALLENGES IN MARINE ECOSYSTEM	UNIVERSITI KUALA LUMPUR MARINE INSTITUTE OF MARINE ENGINEERING TECHNOLOGY, (UNIKL MIMET)	ismila@unikl.edu.my	MP6
7	HANIF AKBAR AWALUDDIN	MIR.	SEASONAL VARIATION OF SPECIFIC ACTIVITY GLUTATHIONE S-TRANSFERASE IN GONAD OF DIADEMA SETOSUM	INOS, UMT	hanifakbar1401@gmail.com	MP7
<b>SESSION 2C (Ocean Governance)</b>						
1	BEHARA SATYANARAYANA	ASSOCIATE PROFESSOR DR.	CARBON STOCK OF MATANG MANGROVE FOREST RESERVE (MALAYSIA): WHAT IT SHOWS IN RELATION TO CENTURY OLD MANAGEMENT?	INOS, UMT	satyam@umt.edu.my	OG1
2	MOHD RODILA IBRAHIM	MR.	INDIVIDUAL MODEL SIMULATION ASSESSMENT TO FIND THE BEST TIMING FOR CUTTING AT MATANG MANGROVE TREES UNDER CURRENT MANAGEMENT	INOS/ PUSAT ASASI STEM, UNIVERSITI MALAYSIA TERENGGANU, KUALA NERUS	mdrodila@umt.edu.my	OG2
3	MOHD SAFUAN CHE DIN	DR.	CORAL REEF COMMUNITIES ASSESSMENT IN PULAU KAPAS MARINE PARK: LOOKING TOWARDS STRATEGIC REEF MANAGEMENT VIA ECOLOGICAL DATA APPROACH	INOS, UMT	chedinmohdsafuan@umt.edu.my	OG3
4	NUR ARIFAH NAJIAH IBRAHIM	MS	IMPACT OF SEA LEVEL RISE TOWARDS VULNERABILITY AND SOCIO-ECONOMY OF PAHANG COASTLINE	INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA	arifah9591@gmail.com	OG4
5	NURUL SYAMIMI BINTI SAMSUDDIN	MRS	THE UTILIZATION OF TRADITIONAL KNOWLEDGE DUE TO CLIMATE CHANGE IMPACT TOWARDS ISLAND COMMUNITIES' SOCIAL WELLBEING: THE MEDIATING EFFECT OF ADAPTIVE CAPACITY	UNIVERSITI MALAYSIA TERENGGANU	Syamimi9116@gmail.com	OG5
6	HUSNI ALHAN MD SALIMUN	MR.	ASSESSING GOVERNANCE FEASIBILITY TO ADOPT MARINE SPATIAL PLANNING TOWARDS SUSTAINABLE OCEAN ECONOMY IN TERENGGANU, MALAYSIA	INOS, UMT	P5330@pps.umt.edu.my	OG6

7	WAN MOHAMAD AKIF WAN RUSELI	MR.	HIGH-RESOLUTION HABITAT SUITABILITY MODELLING TO SUPPORT MARINE SPATIAL PLANNING	INOS, UMT	p4528@pps.umt.edu.my	OG7
<b>SESSION 3A (Marine Coastal and Delta Sustainability for Southeast Asia-MARE)</b>						
1	ANTON SHKARUBA	DR.	MARE APPROACH TO HIGHER EDUCATION AND RESEARCH TRAINING AND THE FIRST RESULTS	ESTONIAN UNIVERSITY OF LIFE SCIENCES	anton.shkaruba@emu.ee	MARE1
2	HEE MIN TEH	DR.	IMMERSIVE LEARNING OF AN ENGINEERING DESIGN COURSE THROUGH A REAL-LIFE PROBLEM-BASED PROJECT	UNIVERSITI TEKNOLOGI PETRONAS	heemin.teh@utp.edu.my	MARE2
3	DANIELE LA ROSA	ASSOCIATE PROFESSOR DR.	SPATIAL PLANNING TO ADDRESS ECOSYSTEM SERVICES TRADE-OFFS IN COASTAL AREAS	UNIVERSITY OF CATANIA, ITALY	dlarosa@darco.unict.it	MARE3
4	NUR HIDAYAH ROSELI	DR.	FORMAL MARINE EDUCATION IN FIELD: IDENTIFYING PHYSICAL PROPERTIES AND CURRENT CIRCULATION IN BIDONG ISLAND, MALAYSIA	UNIVERSITI MALAYSIA TERENGGANU	nurhidayahroseli@umt.edu.my	MARE4
5	VINCENZO MACCARRONE	DR.	TOOLS FOR TRAINING THE FUTURE BLUE CITIZENSHIP	ITALIAN NATIONAL RESEARCH COUNCIL - INSTITUTE FOR MARINE BIOLOGICAL RESOURCES AND BIOTECHNOLOGY	vincenzo.maccarrone@cnr.it	MARE5
6	SHAMILA AZMAN	DR.	IMPACT OF COVID-19 ON TEACHING AND LEARNING IN ENVIRONMENTAL MANAGEMENT	UNIVERSITI TEKNOLOGI MALAYSIA	shamila@utm.my	MARE6
7	PIETRO SCANDURA	ASSOCIATE PROFESSOR DR.	NUMERICAL SIMULATION OF BREAKING WAVES THROUGH THE SPH METHOD	UNIVERSITY OF CATANIA, ITALY	pietro.scandura@unict.it	MARE7
<b>SESSION 3B (Marine Pollution II)</b>						
1	IZAN JAAFAR	DR.	CLASSIFICATION AND QUANTIFICATION OF MARINE DEBRIS FROM VOLUNTARY BEACH CLEAN-UP PROGRAM AT PANTAI PERANGINAN KELULUT, MARANG, TERENGGANU	FACULTY OF SCIENCE AND MARINE ENVIRONMENT, UNIVERSITI MALAYSIA TERENGGANU, KUALA NERUS, TERENGGANU, 21030 TERENGGANU	izanjaafar@umt.edu.my	POL1
2	KHAIRUL NIZAM MOHAMED	DR.	EFFECT OF NORTHEAST MONSOON TO THE DISTRIBUTION OF BIOAVAILABLE DFE(III) AT THE COAST OF PULAU REDANG, TERENGGANU	DEPARTMENT OF ENVIRONMENT, FACULTY OF FORESTRY AND ENVIRONMENT, UNIVERSITI PUTRA MALAYSIA, 43400 UPM, SERDANG, SELANGOR	k_nizam@upm.edu.my	POL2
3	SITI MUNIRAH JOHARI	MS	NUTRIENT INPUT INTO THE MALACCA STRAIT FROM NORTHERN AND SOUTHERN RIVER OF PENINSULAR MALAYSIA.	UNIVERSITI KEBANGSAAN MALAYSIA	p97869@siswa.ukm.edu.my	POL3
4	NABEELA ALI NASSER AL-AWLAQI	DR.	BIOREMEDIATION POTENTIAL OF BROWN SEAWEED, PADINA BORYANA: TOXICITY AND BIOACCUMULATION STUDIES OF COPPER	ADEN UNIVERSITY, UAE	nabeela.awlaqi@gmail.com	POL4
5	MUHAMMAD AFIQ AZMAN	MR.	THE PATHWAY OF MARINE LITTER ALONG PAHANG COASTLINE	INSTITUTE OF OCEANOGRAPHY AND MARITIME STUDIES (INOCEM), INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA, KAMPUNG CHEROK PALOH, KUANTAN, PAHANG, 26610	mafiq.azman@iive.iiuim.edu.my	POL5



6	ARVO TUVIKENE	ASSOCIATE PROFESSOR DR.	POLLUTANTS IN BALTIC SEA COMMERCIAL FISH CATCHES	ESTONIAN UNIVERSITY OF LIFE SCIENCES	arvo.tuvikene@emu.ee	POL6
<b>SESSION 3C (Coastal Geomorphology)</b>						
1	MILAD BAGHERI GHADIKOLAEI	DR.	HAZARD ASSESSMENT AND MODELLING OF EROSION AND SEA LEVEL RISE UNDER GLOBAL CLIMATE CHANGE CONDITIONS FOR COASTAL CITY MANAGEMENT	INOS, UMT	milad.bagheri.gh@gmail.com	COAST1
2	UMMI NAQIYAH SALIN	MS	MORPHOLOGICAL EVOLUTION ALONG SELECTED COASTS OF PAHANG AND JOHOR	INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA	umminaqiyahs@gmail.com	COAST2
3	MUHAMMAD HAZIQ MOHD SUBRI	MR.	INFLUENCE OF CLIMATE CHANGE TO BEACH MORPHOLOGY AT KEDAH AND MELAKA COAST	INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA	haziqsubri97@gmail.com	COAST3
4	EFFI HELMY ARIFFIN	ASSOCIATE PROFESSOR DR.	SUSTAINABLE NATURAL ARCHITECTURAL DESIGN FOR SAND DUNES RESTORATION BY SAND TRAPPING IN TERENGGANU COAST	INOS, UMT	effihelmy@umt.edu.my	COAST4
5	TOH SIAW HUI	MS	INVESTIGATION OF BEACH MORPHOLOGICAL CHANGES TREND IN THE EAST AND WEST COAST OF PENINSULAR MALAYSIA	UNIVERSITI MALAYSIA TERENGGANU	shtoh98@gmail.com	COAST5
6	SURESH GANDHI	PROFESSOR	BENTHIC FORAMINIFERAL TURN-OVER AND PALEOBATHYMETRIC VARIATION ACROSS CRETACEOUS/PALEOGENE BOUNDARY FROM CAUVERY BASIN, INDIA - AN INSIGHT TO K-PG TECTONIC REPURCUSSIONS	UNIVERSITY OF MADRAS, DEPARTMENT OF GEOLOGY, CHENNAI, INDIA	msureshgandhi@gmail.com	COAST6
7	HARIS ABDUL RAHIM	MR.	BEACH MORPHOLOGY AND EROSION ALONG TERENGGANU COAST	FACULTY OF ARCHITECTURE, PLANNING & SURVEYING, UNIVERSITI TEKNOLOGI MARA, 40450 SHAH ALAM, SELANGOR, MALAYSIA, SHAH ALAM, SELANGOR, 40450	harisrahim8@gmail.com	COAST7
<b>SESSION 4B (Coastal and Shelf Seas Dynamics)</b>						
1	NOIR P PURBA	MR	REVISITING WATERMASS IN EASTERN INDIAN OCEAN NEAR INDO-AUSTRALIAN BASIN	INOS, UMT	p4830@pps.umt.edu.my	COD1
2	POH HENG KOK	DR.	OVERVIEW OF THE UPWELLING FEATURES ALONG THE EAST COAST OF PENINSULAR MALAYSIA DURING THE SOUTHWEST MONSOON	HIDROKINETIK TECHNOLOGIES SDN. BHD.	pohhengkok@gmail.com	COD2
3	WINFRED MARSHAL	MR	THE IMPACTS OF CLIMATE CHANGE ON MARINE BIOGEOCHEMISTRY IN REGIONAL OCEANS: AN OVERVIEW	INOS, UMT	winfredmarshal11@gmail.com	COD3
4	MUHAMMAD NAIM MOHD SATAR	MR	PROGRESS ON UPWELLING STUDIES UNDER INFLUENCE OF CLIMATE CHANGE IN SOUTH CHINA SEA	INOS, UMT	mnaimsatar@gmail.com	COD4
5	ZURAINI ZAINOL	DR.	THE EFFECTS OF DIFFERENT INLET CONFIGURATIONS ON PARTICLES TRANSPORT AND RESIDENCE TIME IN A SHALLOW AND NARROW COASTAL LAGOON: A NUMERICAL-BASED INVESTIGATION	INOS, UMT	zuraini.z@umt.edu.my	COD5
6	MUHAMMAD HAFEEZ JOEFRY	DR.	21ST CENTURY SOUTHERN SOUTH CHINA SEA DYNAMIC SEA LEVEL FROM COUPLED MODEL INTERCOMPARISON PROJECT PHASE 6 (CMIP6)	FACULTY OF SCIENCE AND MARINE ENVIRONMENT, UNIVERSITI MALAYSIA TERENGGANU	hafeez.jeofry@umt.edu.my	COD6
7	AFIFI JOHARI	MR.	INTER-ANNUAL FEATURES OF THE PENINSULAR CURRENT FROM 2001 TO 2017	INOS, UMT	afifjohari17@gmail.com	COD7
<b>SESSION 4C (Ocean Literacy)</b>						
1	NAZLI AZIZ	DR.	LOCAL COMMUNITY'S AWARENESS OF LABUAN MARINE PARKS	INOS, UMT	nazli_aziz@umt.edu.my	OLI

2	AMEER FARHAN MOHD ARZAMAN	MR.	AWARENESS OF PROTECTIVE MECHANISMS AGAINST TRADITIONAL KNOWLEDGE OF MARINE RESOURCES AMONG COASTAL COMMUNITIES IN PENINSULAR MALAYSIA	UNIVERSITI MALAYSIA TERENGGANU	p4247@pps.umt.edu.my	OL2
3	NURUL NADHIRAH ISKANDAR	MS	LOCAL PERCEPTION AND KNOWLEDGE ON SOCIO-ECONOMIC IMPACTS OF SEA LEVEL RISE IN PANTAI CHERATING AND PANTAI PELINDUNG, PAHANG, MALAYSIA	INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA	nadhirah.iskandar@live.iium.edu.my	OL3
4	NOR HAFZAN ABD RASID	MS	ASSESSING THE IMPACT OF SEA LEVEL RISE TO THE ISLAND COMMUNITIES ON PERHENTIAN ISLANDS AND REDANG ISLAND MALAYSIA	INOS, UMT	hafzan.abd@umt.edu.my	OL4
5	NURUL FARHANA ABDUL RAZAK	MS	EVALUATING THE ATTITUDE AND BEHAVIOUR OF REDANG ISLAND'S COMMUNITY TOWARDS SUSTAINABLE WASTE MANAGEMENT	INOS, UMT	frhana.abdrzak@gmail.com	OL5
6	AZZA JAUHAR AHMAD TAJUDDIN	DR.	TELLING OCEAN LITERACY STORIES TO COMMUNICATE SCIENCE: FOR CHILDREN BY CHILDREN	PUSAT PENDIDIKAN ASAS DAN LANJUTAN, UNIVERSITI MALAYSIA TERENGGANU	azzajauhar@umt.edu.my	OL6
7	NUR SALINA ISMAIL	MRS	ENHANCING OCEAN LITERACY THROUGH ART ACTIVITIES	PUSAT PENDIDIKAN ASAS DAN LANJUTAN, UNIVERSITI MALAYSIA TERENGGANU	p5141@pps.umt.edu.my	OL7

# CERTIFICATE OF APPRECIATION

is presented to

**MUHAMMAD AFIQ AZMAN**

in sincere appreciation for valuable contribution as

**Oral Presenter**

**THE PATHWAY OF MARINE LITTER ALONG PAHANG COASTLINE**

during the

THE 3<sup>RD</sup> TROPICAL OCEAN AND MARINE SCIENCES INTERNATIONAL SYMPOSIUM



**6-7 November 2022**  
Universiti Malaysia Terengganu



**PROF. GS. TS. DR. AIDY @ MOHAMED SHAWAL  
BIN M. MUSLIM**  
Chairman of TOMSY2022



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OCEANOGRAPHY  
AND ENVIRONMENT

# TRACKING THE TRAJECTORY OF MARINE LITTER ALONG EAST COAST OF PENINSULAR MALAYSIA

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(Institute of Oceanography and Maritime Studies IIUM)

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(Institute of Oceanography and Environment UMT)

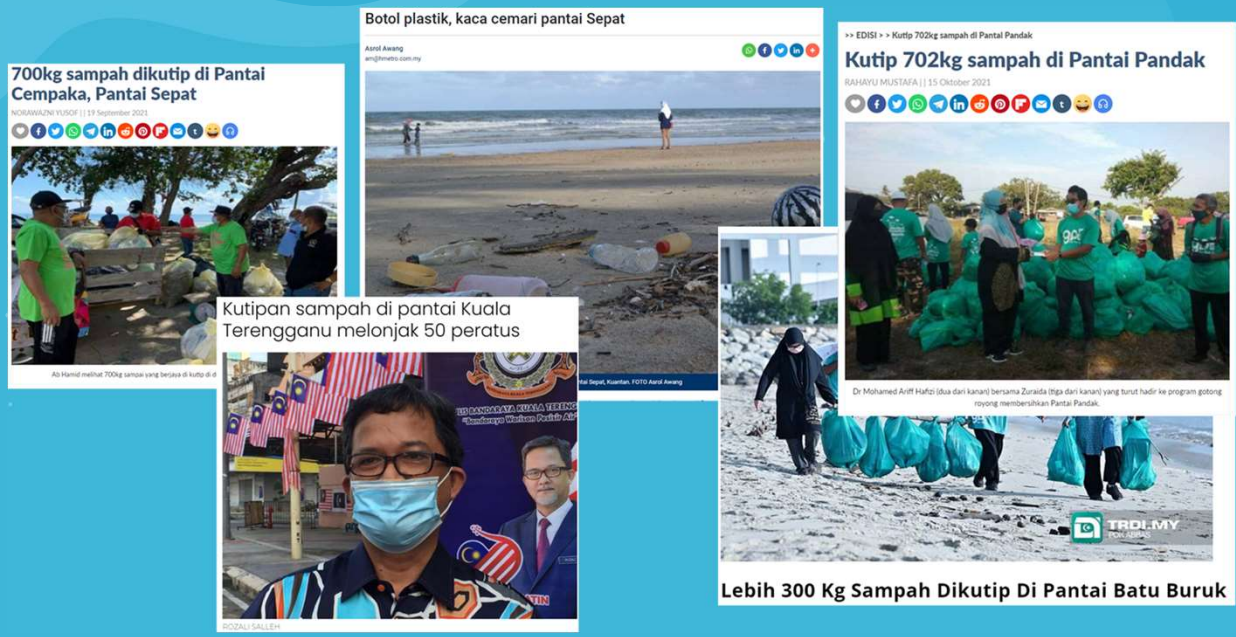
# MARINE LITTER ISSUES IN MALAYSIA



Malaysia ranks 8th amongst the countries with mismanaged plastic waste in the world<sup>1</sup>

Annual leakage of 0.14 to 0.37 million tonnes of plastic waste into the ocean<sup>1</sup>

<sup>1</sup>Jambeck, J. R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., Narayan, R., & Law, K. L. (2015). Plastic waste inputs from land into the ocean. *Science*, 347(6223), 768–771. <https://doi.org/10.1126/science.1260352>



Lebih 300 Kg Sampah Dikutip Di Pantai Batu Buruk

Country / location						People	KG	KM of coast	Total items collected
Malaysia						12,817	36,895.48	1,463.15	546,614
Cigarette butts	Food wrappers (candy etc.)	Straws stirrers	Plastic forks Knives spoons	Plastic beverage bottles	Plastic bottle caps	Plastic grocery bags	Other plastic bags	Plastic lids	Plastic cups plates
148,691	139,958	21,715	81,841	47,004	9,132	12,111	2,759	15,915	6,836

# SIMULATION MODEL IN ASEAN COUNTRIES FOR MARINE LITTER

Sampling and quantifying the sample are **MOST COMMON method**

However, **SIMULATION** method are only applied in Indonesia and Vietnam<sup>1</sup>

Simulation model method needs experts in hydrodynamic modeler to predict the trajectory of marine litter.

	BRN	KHM	IDN	LAO	MYS	MMR	PHL	SGP	THA	VNM
Review (literature/ social media)	Red	Red	Green	Red	Red	Red	Green	Green	Red	Red
Sampling	Green	Red	Green	Red	Green	Red	Green	Green	Green	Green
Monitoring	Red	Red	Green	Red	Green	Red	Red	Green	Red	Red
Quantification	Green	Red	Green	Red	Green	Red	Green	Green	Green	Green
Identification	Green	Red	Green	Red	Green	Red	Red	Green	Green	Red
Laboratory experimental work	Red	Red	Green	Red	Red	Red	Red	Green	Red	Red
Simulation model	Red	Red	Green	Red	Red	Red	Red	Red	Red	Green

Legend

- Method employed in marine plastics research
- Method not employed in marine plastics research

<sup>1</sup>Y Lyons, ML Neo, A Lim, YL Tay and Vu Hai D from NUS (2020) Status of Research, Legal and Policy Efforts on Marine Plastics in ASEAN+3: A Gap Analysis at the Interface of Science, Law and Policy, COBSEA and NUS



# National marine litter policy and action plan 2021 by ministry of environment and water

## Pillar I

Policy Adoption  
and  
Implementation

## Pillar II

Deployment of  
Technologies,  
Innovation and  
Capacity  
Building

## Pillar III

Improve  
Monitoring and  
Data Collection  
on Marine  
Litter

## Pillar IV

CEPA  
(Communication, Education &  
Public  
Awareness) and  
Outreach.

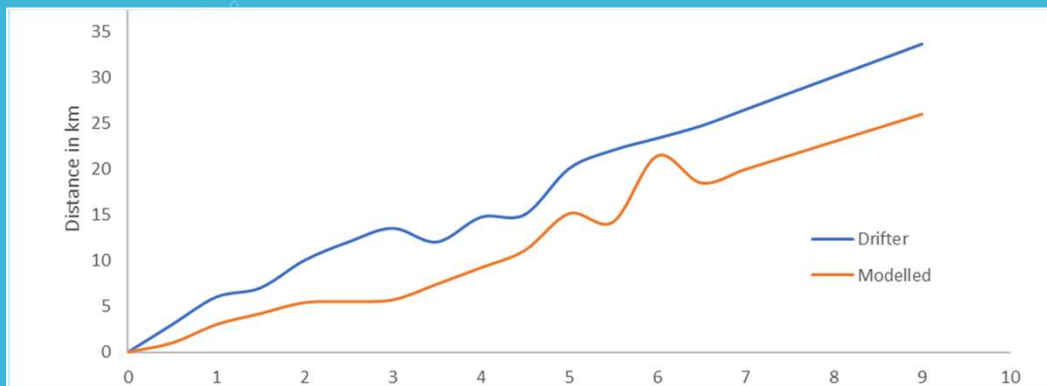
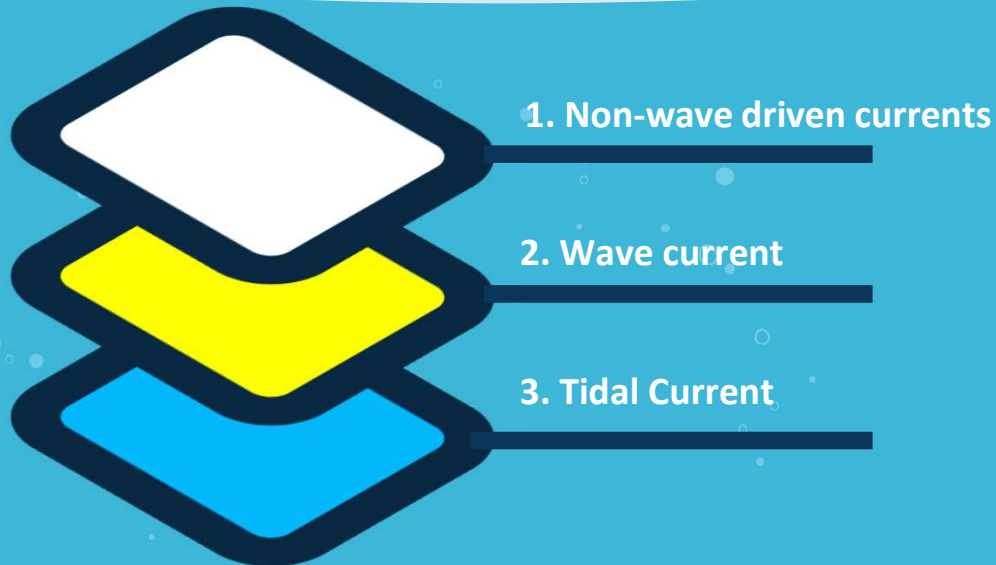
## Pillar V

Adopting  
whole-of-nation  
and multi-  
stakeholders  
approach in  
harmonizing  
cross-cutting  
objectives

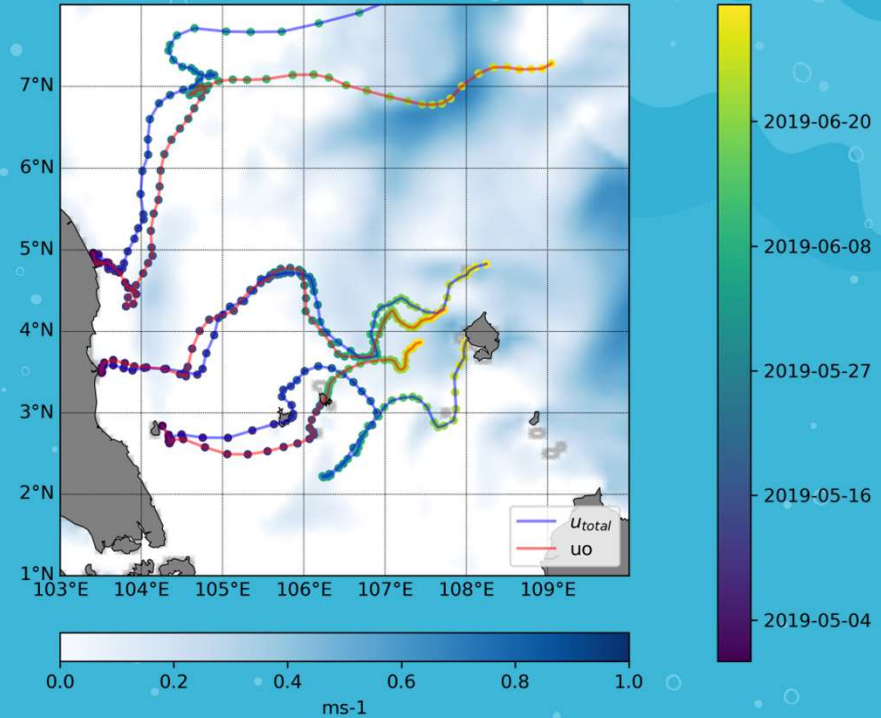
**Medium Term:** Explore and adopt **latest tracking technologies for sources, pathways** (source and non-source points) and impact for evidence-based actions.

**Short Term:** Assess national marine litter hotspots.

# IMPROVEMENTS MADE IN TRAJECTORY MODEL



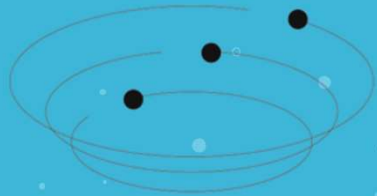
Particle trajectories over 90 days for different hydrodynamic forcing



- Including full forcings into simulation **IMPROVES** the performance of particle trajectory.
- **REDUCES** the overestimation of residence time and velocity of particle<sup>1</sup>

<sup>1</sup>Urbina, J. M. F. (2021). Eindhoven University of Technology Department of Applied Physics Lagrangian transport time scales in the Dutch Wadden Sea and their variability due to wind.

# LAGRANGIAN TRANSPORT



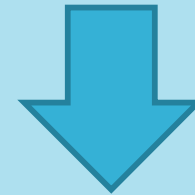
## OceanParcels

Parcels (Probably A Really  
Computationally Efficient Lagrangian  
Simulator)

Linear interpolation of flow field data  
in space and time

### Integration of 4<sup>TH</sup> Order of Runge Kutta

$$\vec{x}(t + \Delta t) = \vec{x}(t) + \int_t^{t+\Delta t} \vec{v}(\vec{x}(\tau), \tau) d\tau$$



$$\vec{v}_{total} = \vec{v}_{geo} + \vec{v}_{ekman}$$

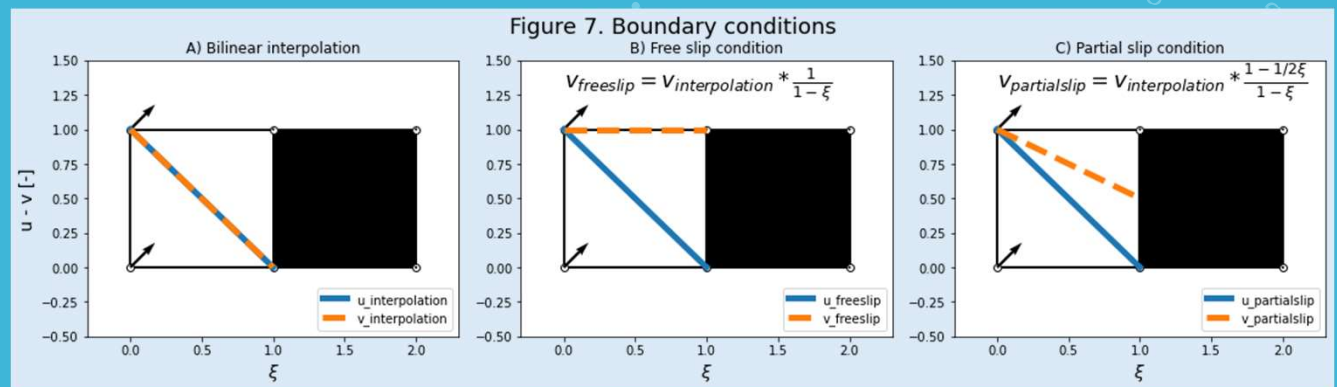
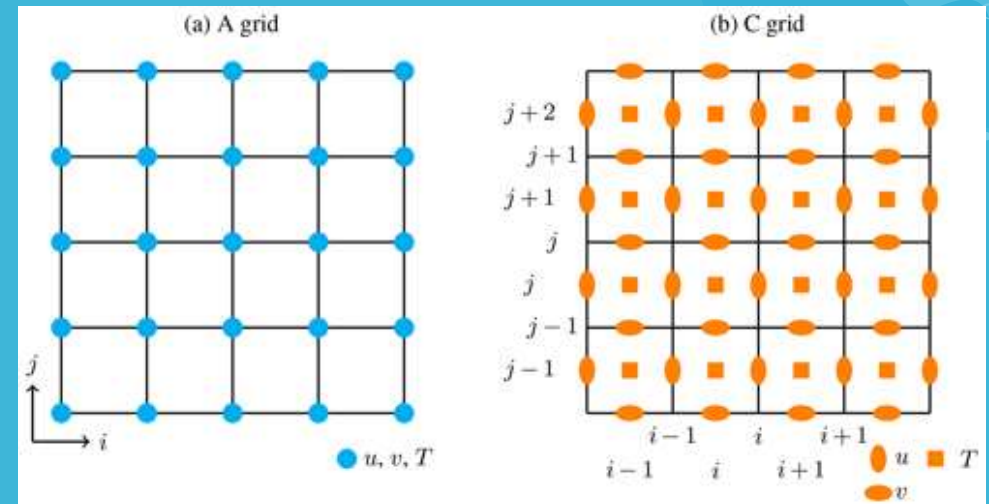
$$\vec{v} = \vec{v}_{total} + \vec{v}_{stokes} + \vec{v}_{tide}$$

Variables	Dataset	Spatial Resolution	Temporal Resolution
<b>C-GRID</b> Geostrophic currents	GlobCurrent V3 Geostrophic Currents	0.25 degree	24 hr
<b>C-GRID</b> Ekman currents	GlobCurrent V3 Ekman current	0.25 degree	24 hr
<b>A-GRID</b> Stokes currents	SMOC CMEMS Global waves	0.083	3 hr
<b>A-GRID</b> Tidal currents	FES Tidal current	0.083	3 hr

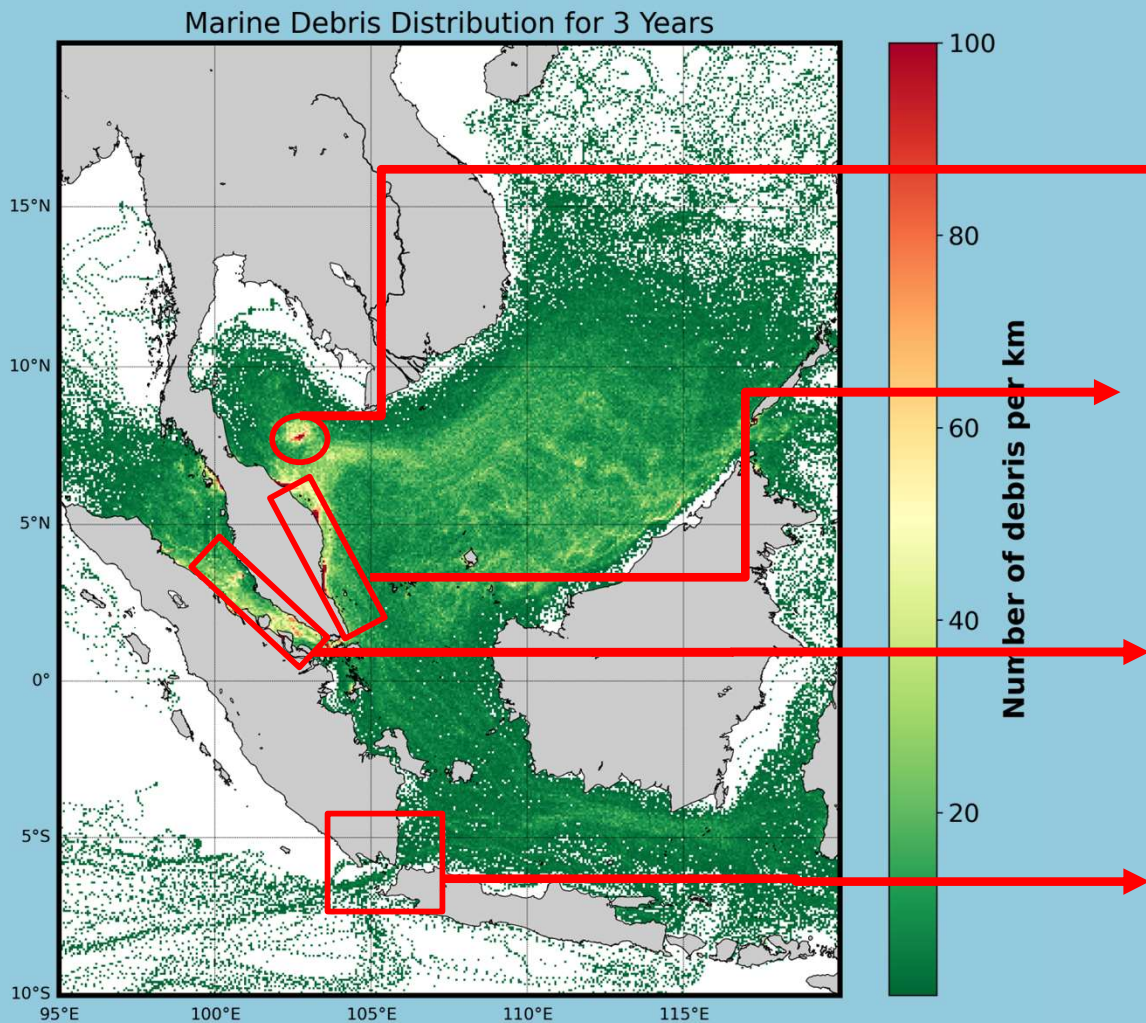
# PREVENT PARTICLE STUCK IN A-GRID IN STOKES AND TIDAL FIELD

Implementation of partial and free slip instead bi-linear interpolation.

Displacement method by making land and ocean node to distribute velocity along nearshore



# MARINE LITTER ACCUMULATION ALONG EAST COAST OF PENINSULAR MALAYSIA



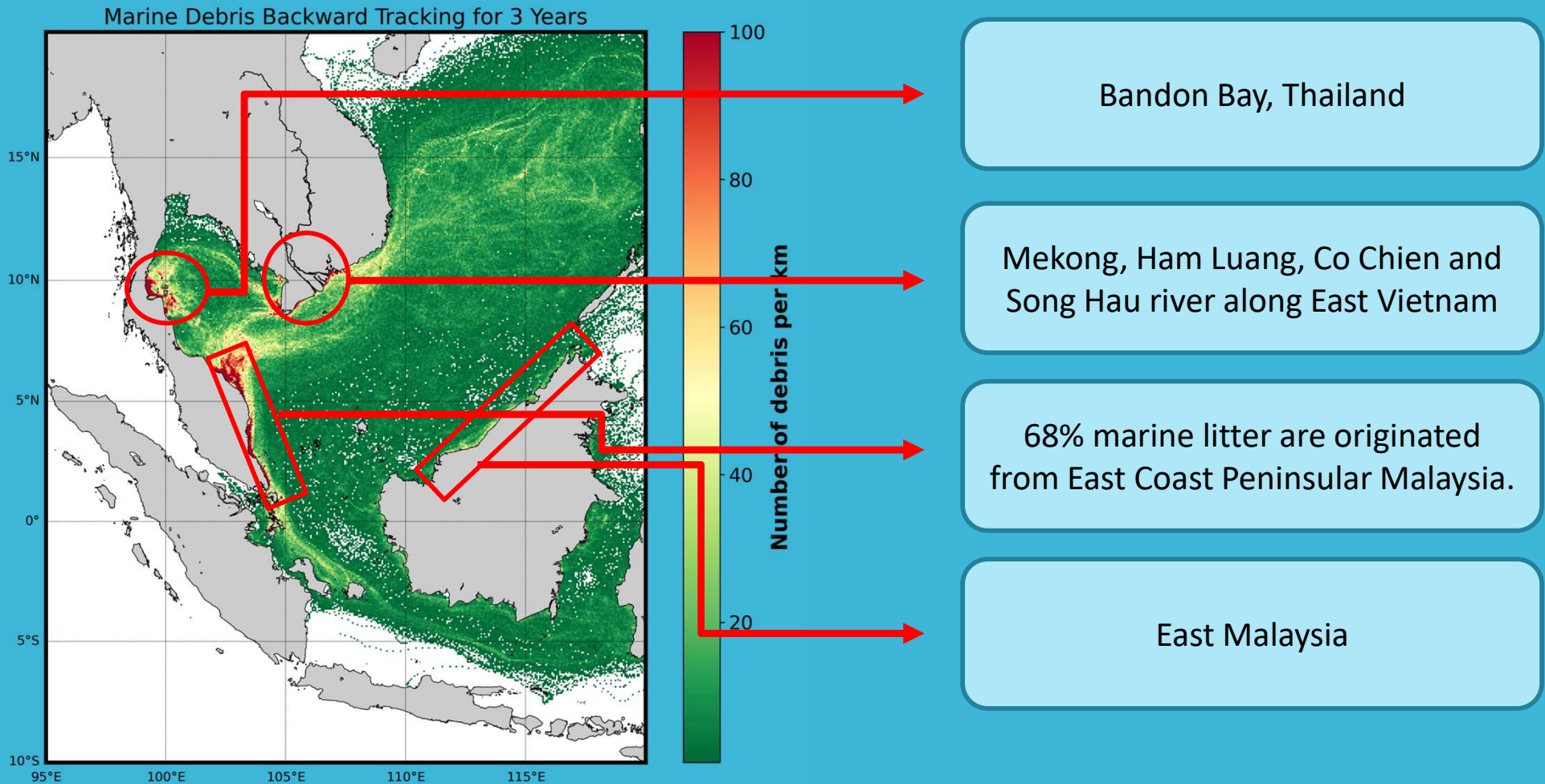
Anticyclonic eddy current is common in Gulf of Thailand. This eddy traps the litter forming marine litter patch.

60% released marine litter from East Coast Peninsular Malaysia settled down in local area.

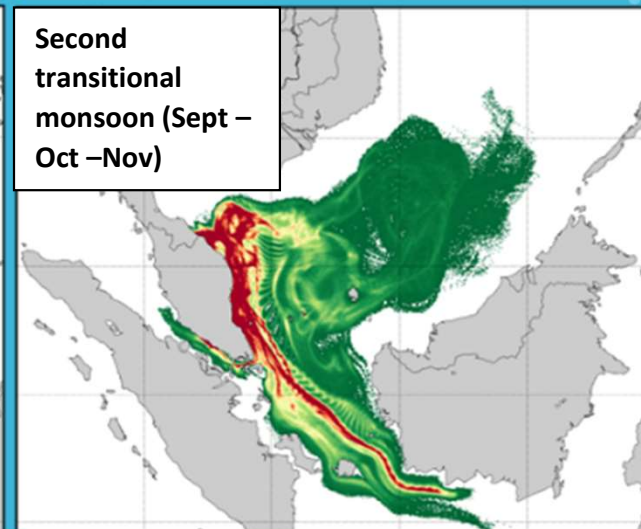
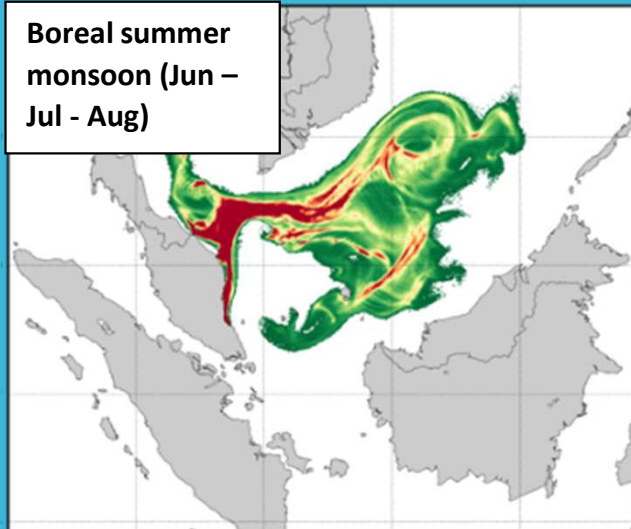
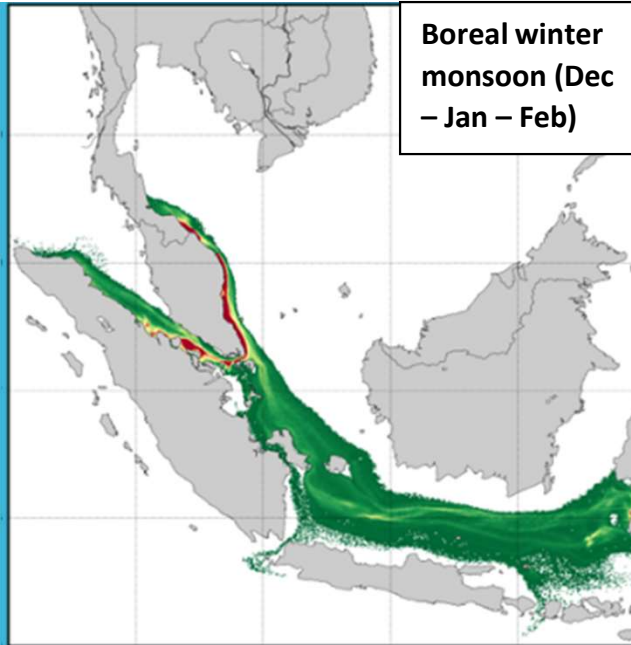
Accumulation of marine litter found along Malacca Strait

Small portion of released marine litter leaked to Indian ocean through Sunda Strait.

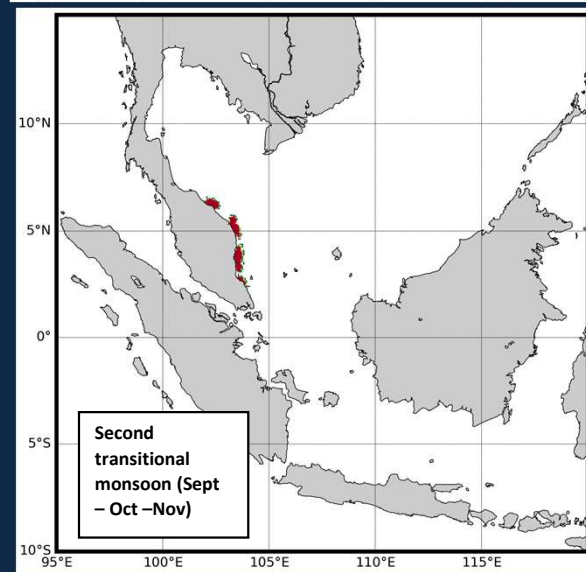
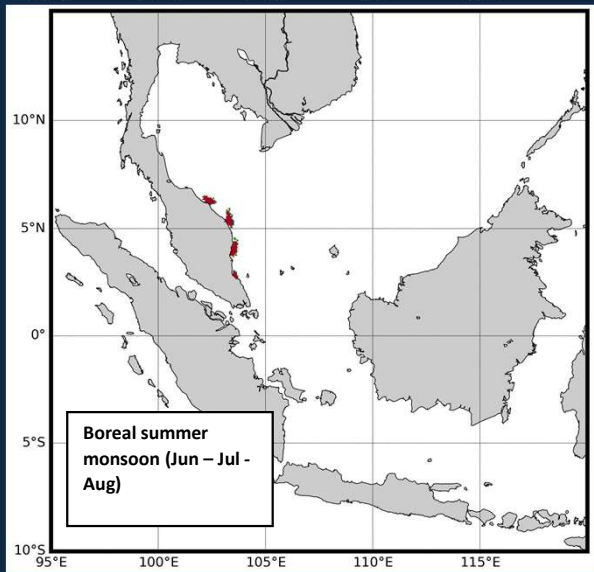
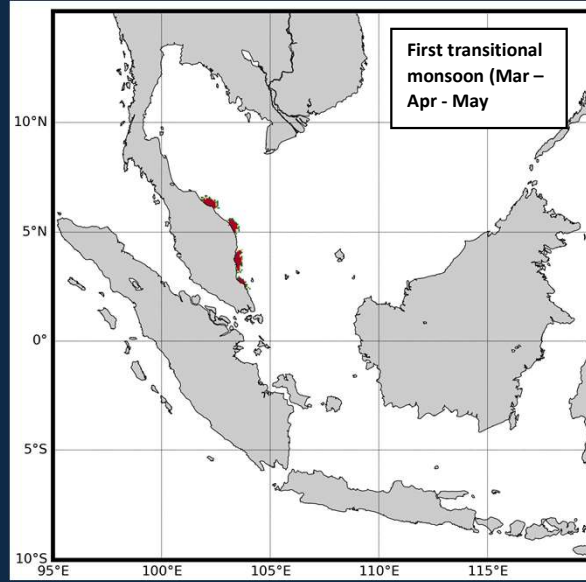
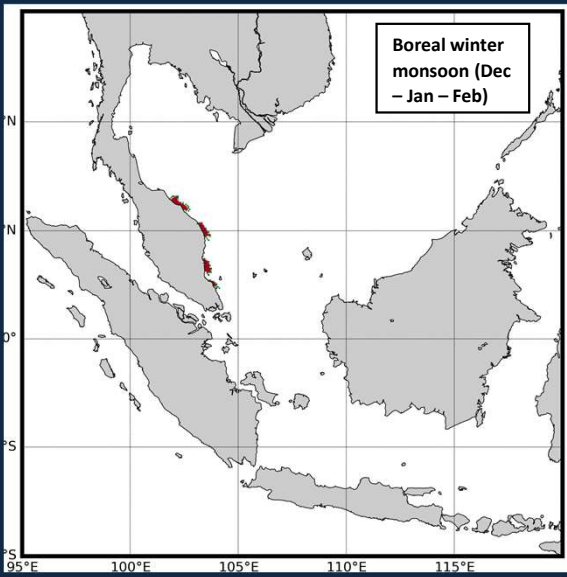
# Possible sources of marine litter along Pahang coastline



# SEASONAL PATTERN







# Limitation

1. Observational data (e.g Drifters)
2. Datasets are independent  
(overestimation of Ekman and stokes currents)