IPReM

Greater Caribbean 2023

IDENTIFICATION | PROTECTION | RESTORATION | MANAGEMENT

JUNE 28th-30th, PANAMA

Science and technology for sustainablebeaches in a climate change scenario

ACS AEC
ASSOCIATION OF CARIBBEAN STATES
ASOCIACION DE ESTADOS DEL CARIBE
ASSOCIATION DES ETATS DE LA CARAIBE

CARIBBEAN SEA COMMISSION
Preserving what connects us

KOICA
Korea International Cooperation Agency

CITMA
MINISTERIO DE CIENCIA TECNOLOGIA Y MEDIO AMBIENTE

REPÚBLICA DE PANAMÁ
GOBIERNO NACIONAL
MINISTERIO DE AMBIENTE

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KIOST
KOREA INSTITUTE OF
OCEAN SCIENCE & TECHNOLOGY

Project Review
&
Future Collaboration

Dr. Yeon S. Chang

OUTLINE

1. Project review

- Video Monitoring System (VMS)
  in Hellshire Beach, Jamaica

2. Future collaboration possibilities

- Additional VMS application
- Other KIOST's research capacities

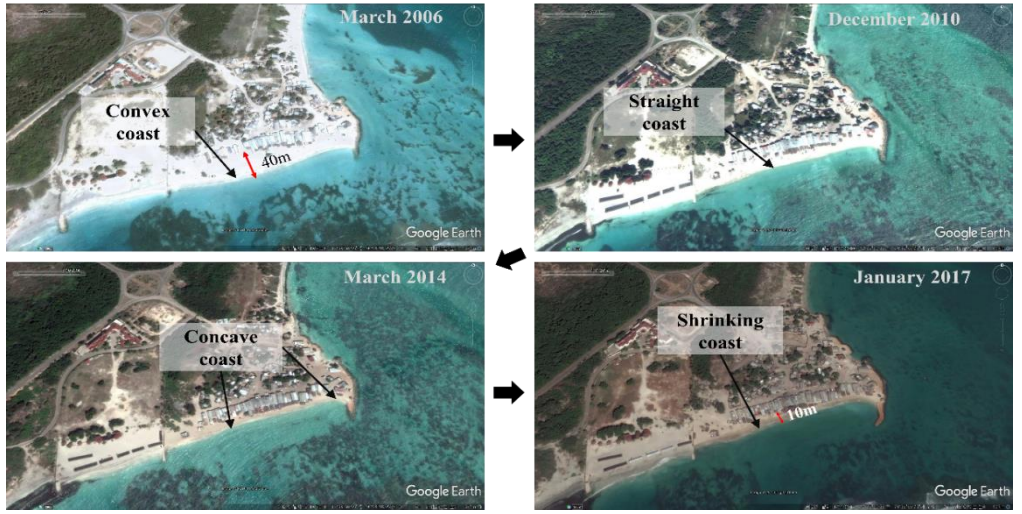
3. Scholarship opportunity for ACS

- LPEM (London Protocol Engineering Master)

Video Monitoring System (VMS)

1. Background

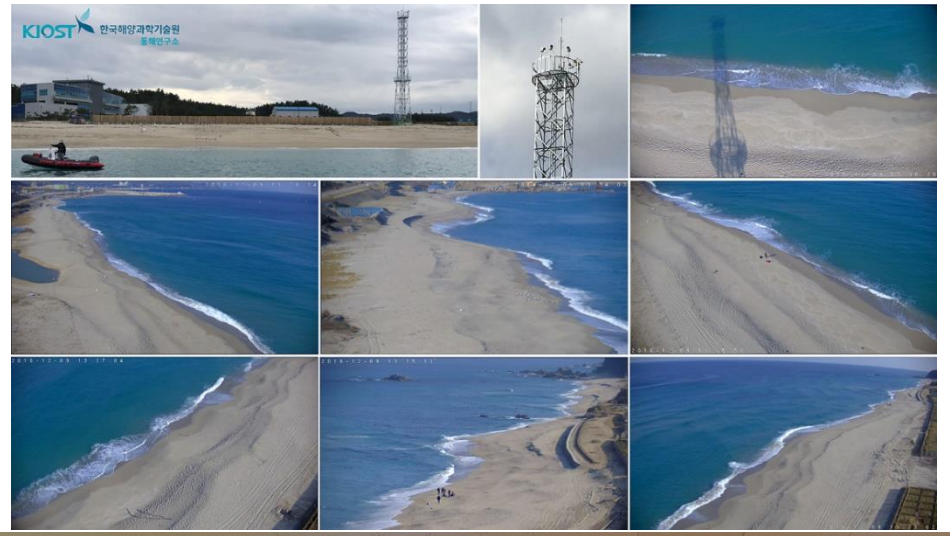
- Established as a component of the project, “Impact of Climate Change on the Sandy Shoreline of the Greater Caribbean”
- Hellshire Beach a popular public beach conveniently located for the residents and weekend visitors from Kingston.
- Severe erosion in Hellshire Beach, Jamaica



Video Monitoring System (VMS)

2. Goals

- Establish a Video Monitoring System (VMS) in Hellshire Beach;
- VMS is a set of cameras, hardware, computers, software and internet system;
- to observe/monitor long-term variation of beach status;
- to analyze/understand causes of erosion;
- for setting-up of beach protection/conservation plans.



Video Monitoring System (VMS)

3. Progress

- Initial plan: **scheduled to be built in 2020**
- Delay due to COVID-19; constructed in July, 2022
- Coverage extension: south & north shores of Hellshire Beach

Video Monitoring System (VMS)

4. Construction of VMS

- Video monitoring tower
  - VMS built on a 30m metal tower
  - A set of cameras (six) was installed at the top of the tower,
  - An electric pole was additionally installed with one camera to increase the coverage of the VMS



Video Monitoring System (VMS)

4. Construction of VMS

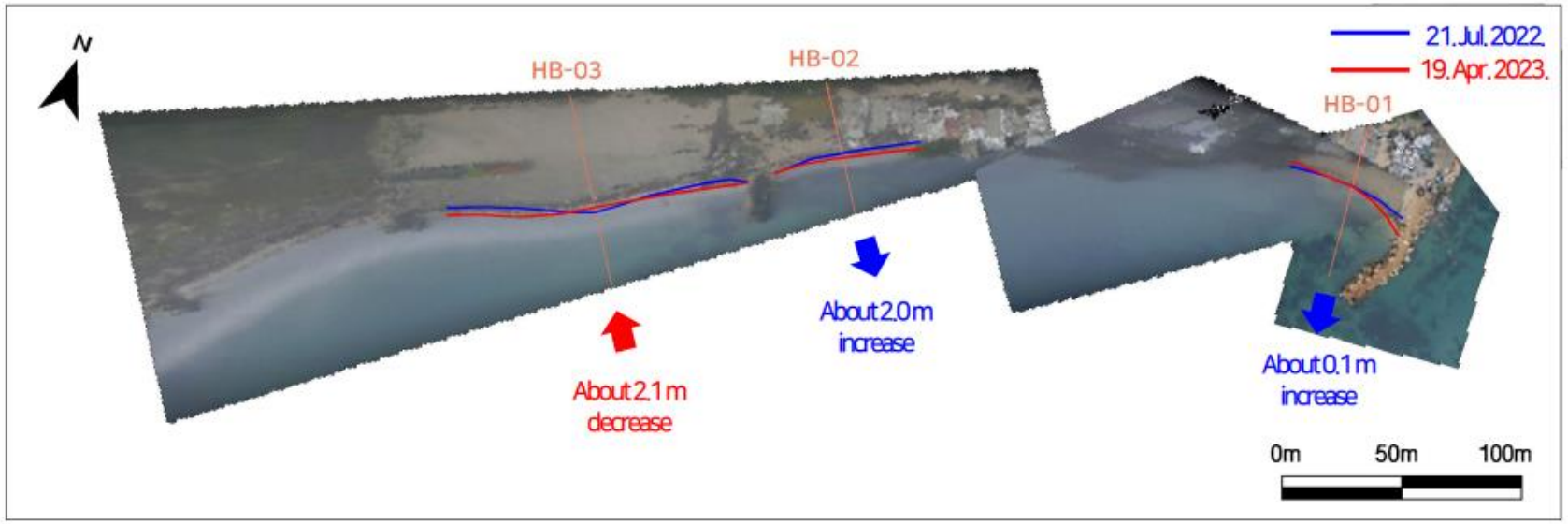
- VMS consists of cameras, PCs, internet & power cables, and wireless device

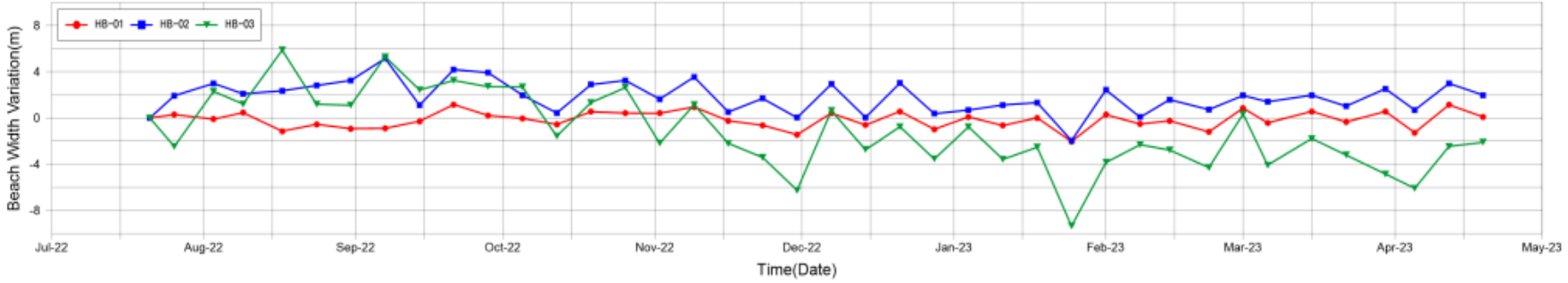





Video Monitoring System (VMS)

5. Results



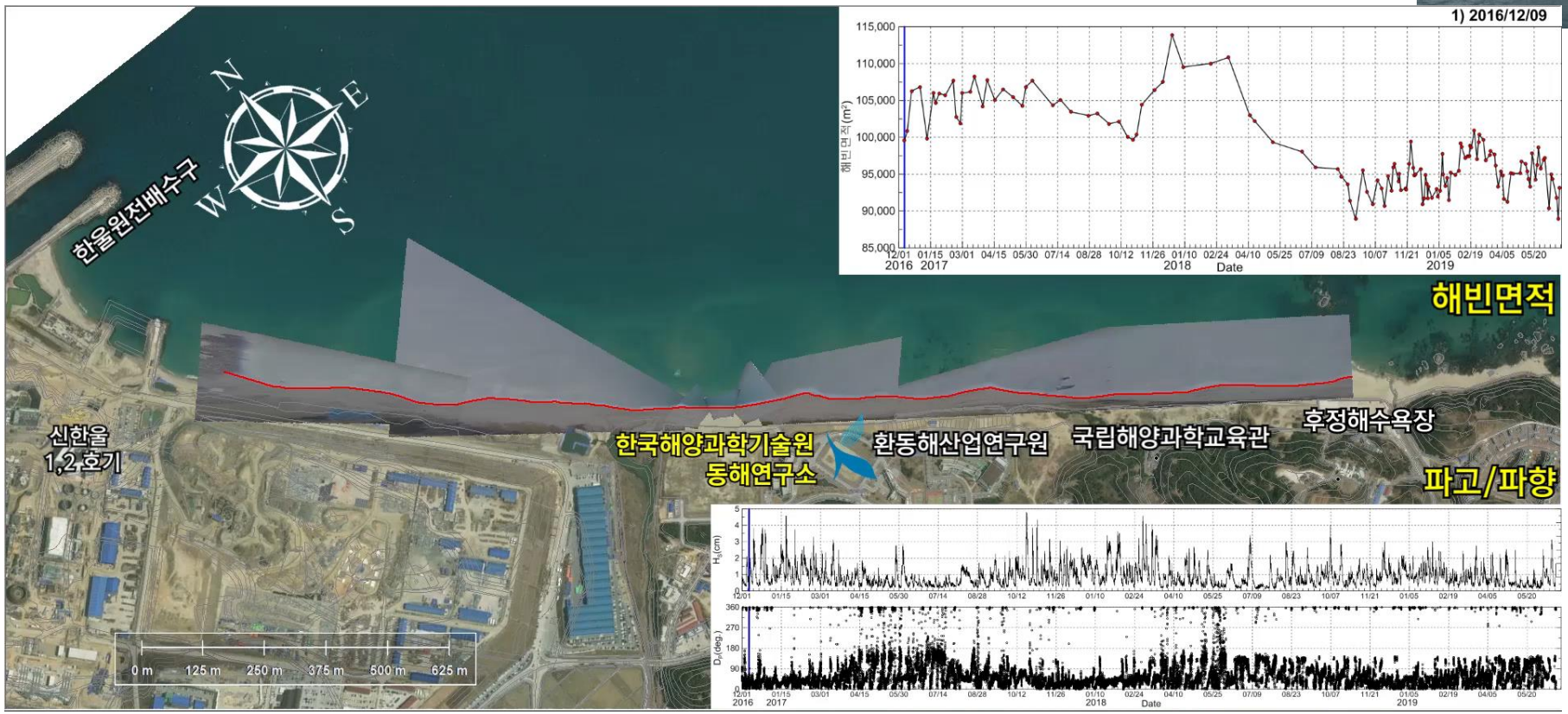


Video Monitoring System (VMS)

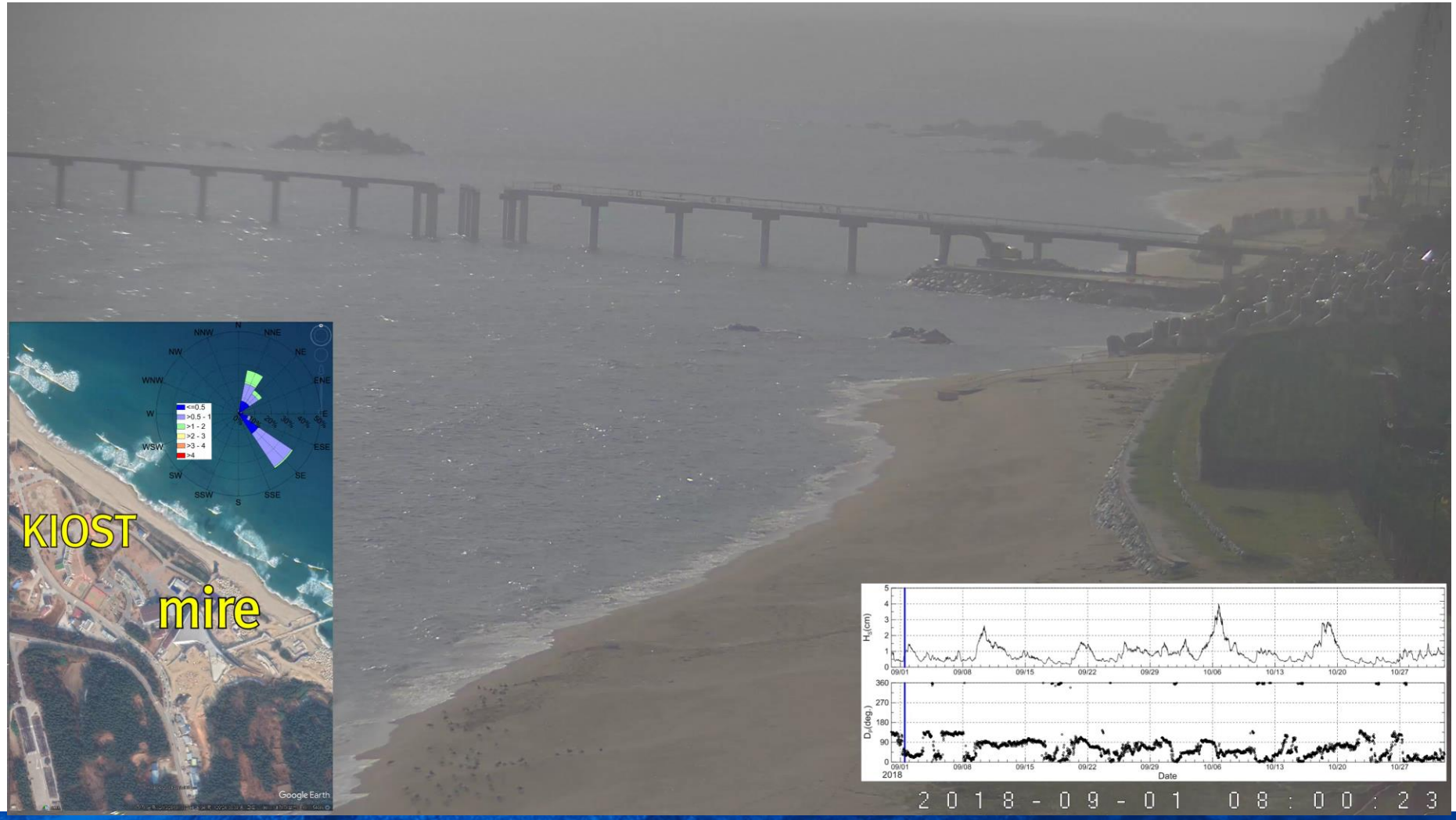
6. VMS Training in Korea



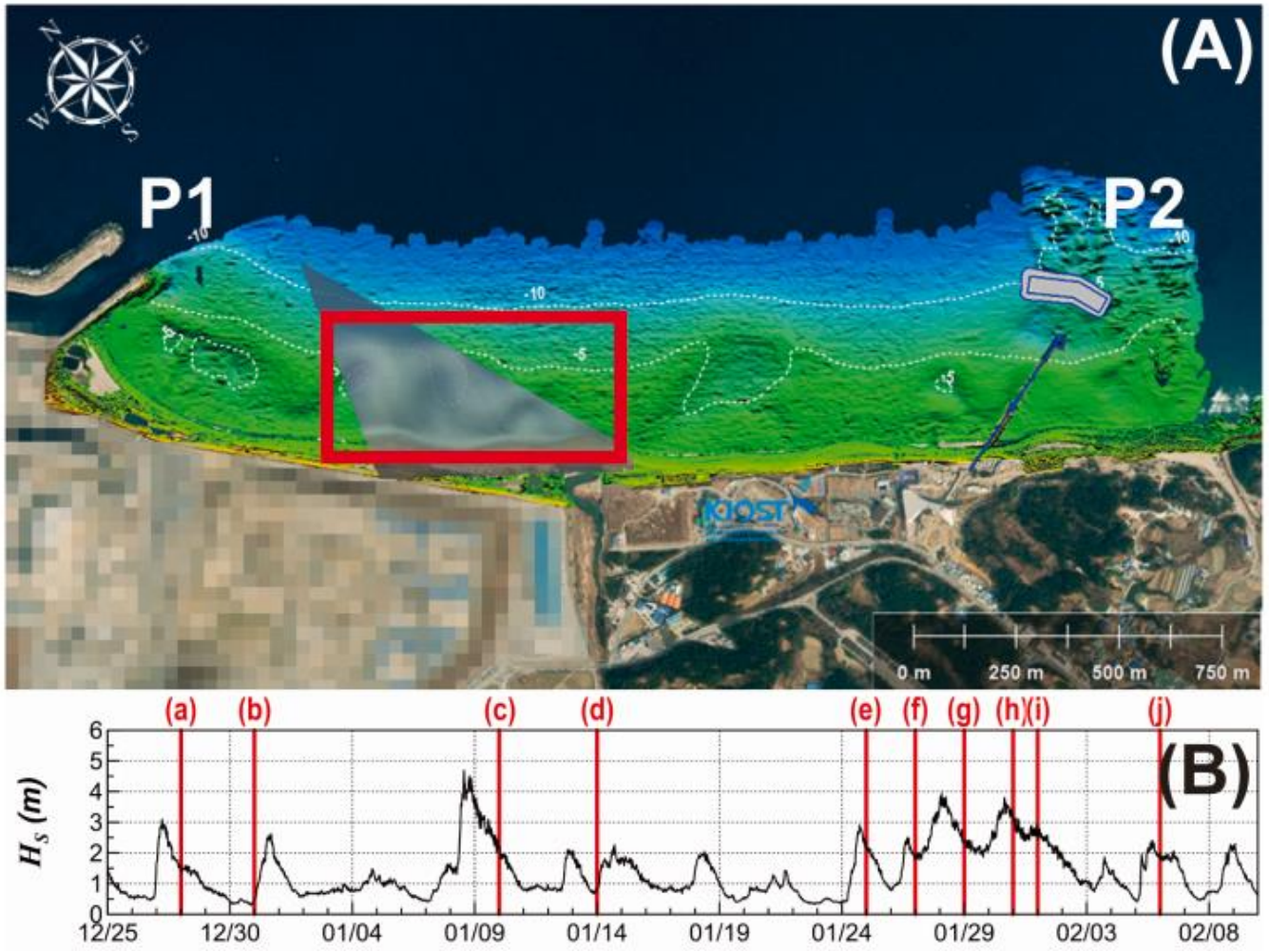

Video Monitoring System (VMS)

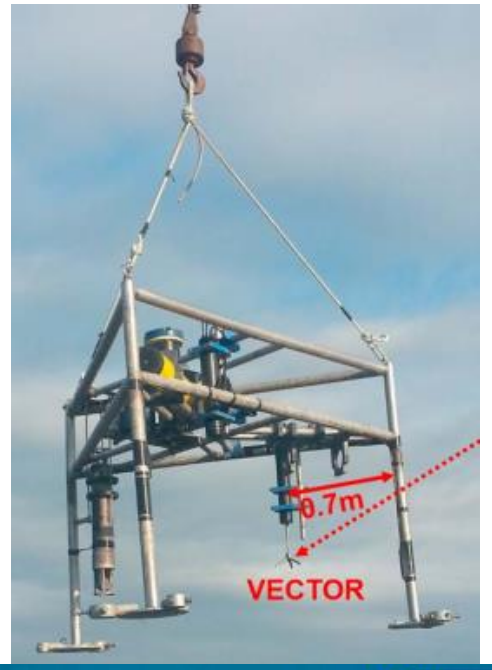


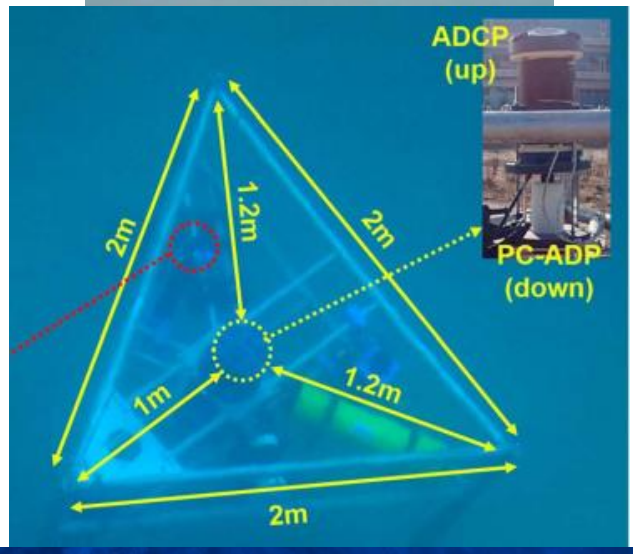
Video Monitoring System (VMS)



Video Monitoring System (VMS)



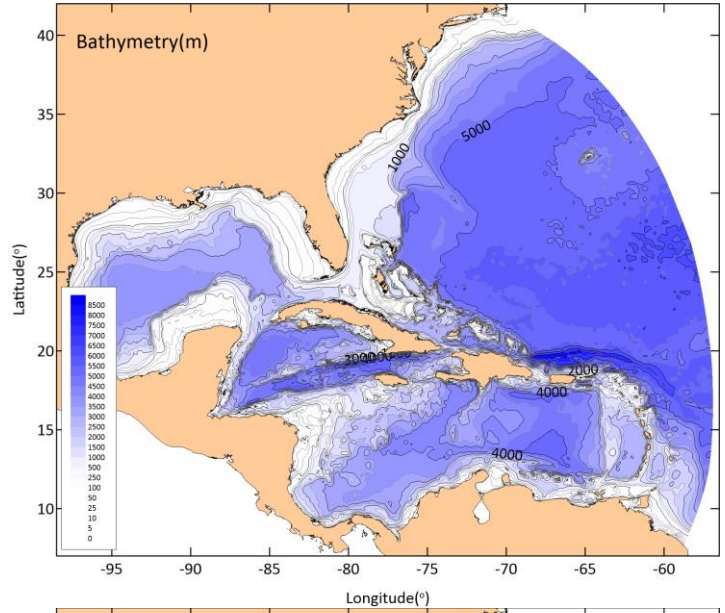


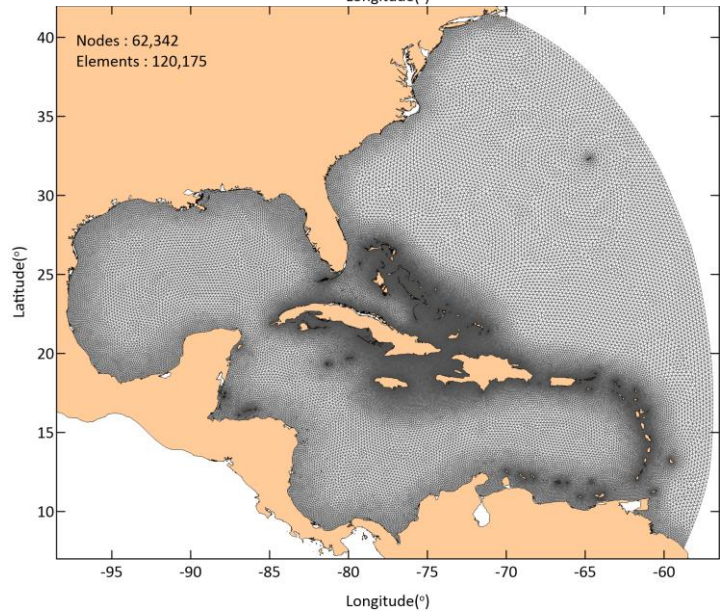


VMS – Numerical Simulation

6. Model – Telemac2D

Category	Content
Objective	Generating Tide and Wave boundary conditions to be applied to the Southeastern JAMAICA model
Applied Model	Telemac2d(Tide), Tomawac(Wave)
Simulation Area	56.90~97.83 ºW, 7.66~41.50 ºN
Atmospheric Forcing	NCEP-GFS 0.25º data(3 hours interval) - Wind, Atmospheric Pressure
Tidal Forcing	TPXO9 15 harmonic components(M2, S2, N2, K2, K1, O1, P1, Q1, Mm, Mf, M4, MN4, MS4, 2N2, S1)
Bathymetry Data	ETOPO 2022 15 Arc-Second Resolution Data
Grid Resolution	Size : 2~28km, Nodes : 62,342, Elements : 120,175
Simulation Periods	Jan. 01. 2022 ~ Dec. 31. 2022(1 year)

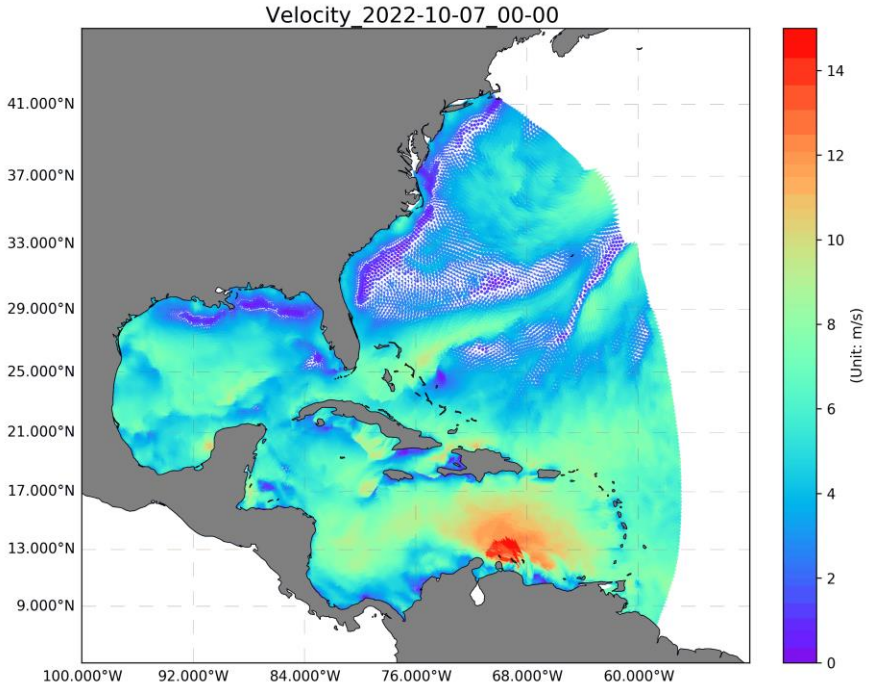


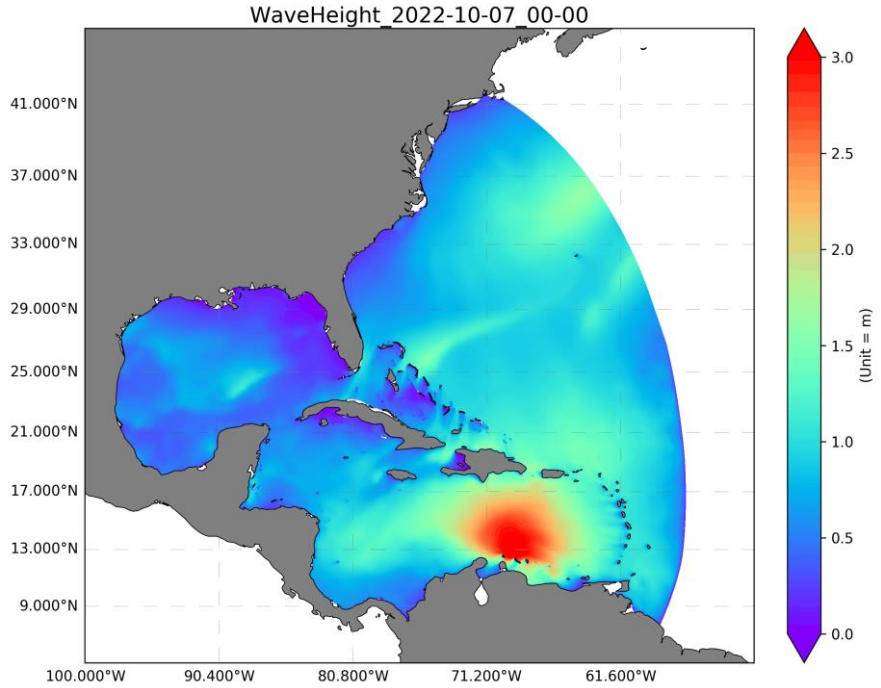


VMS – Numerical Simulation

6. Model – Wave simulation results

✓Hurricane Julia (Oct. 07-10. 2022)

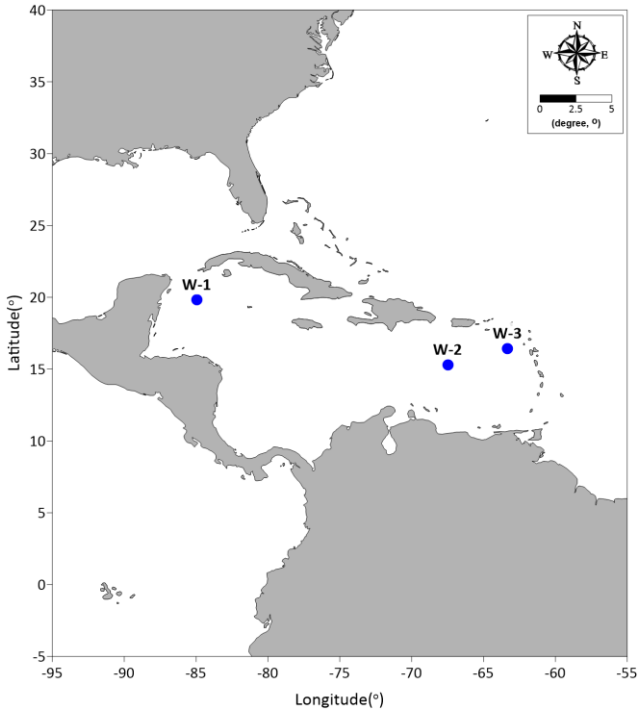




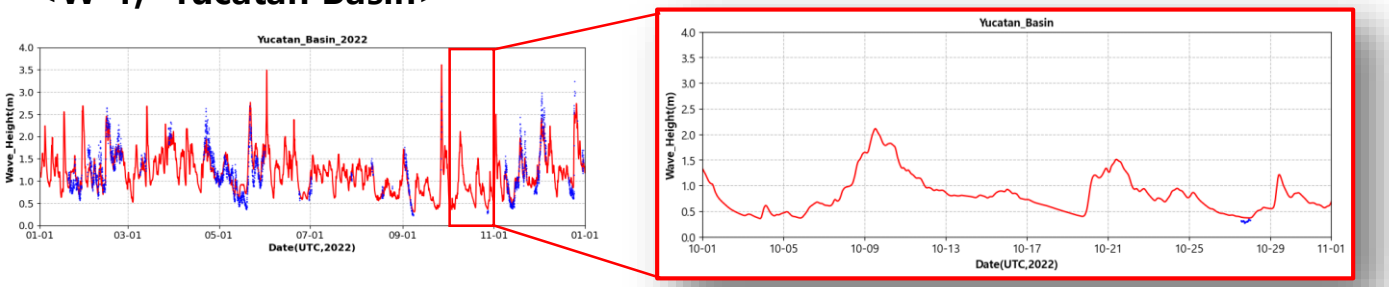
VMS – Numerical Simulation

6. Model results

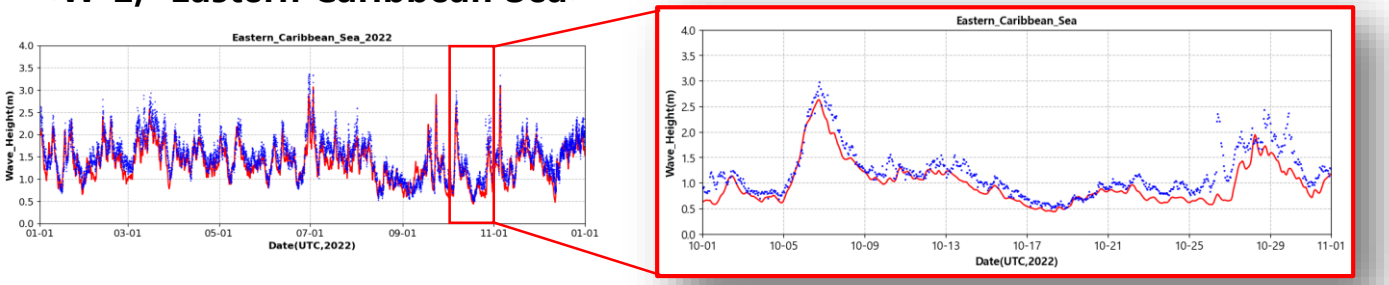
✓Hurricane Julia (Oct. 07-10. 2022)



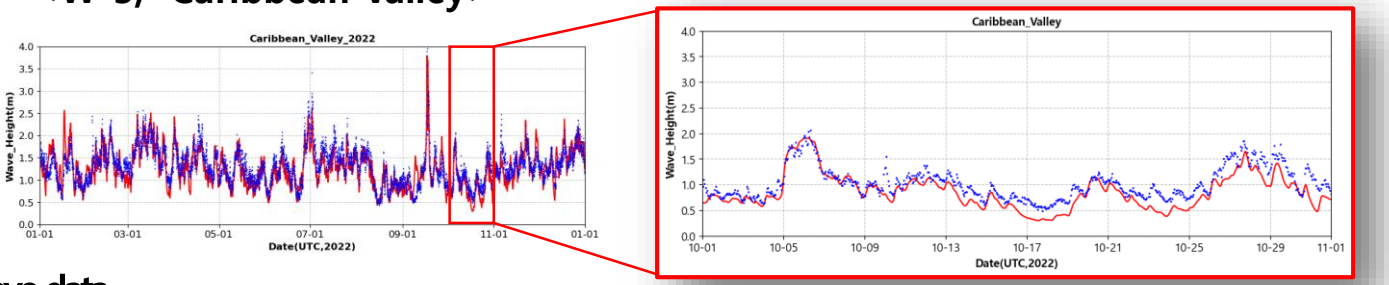
<W-1, Yucatan Basin>



<W-2, Eastern Caribbean Sea>



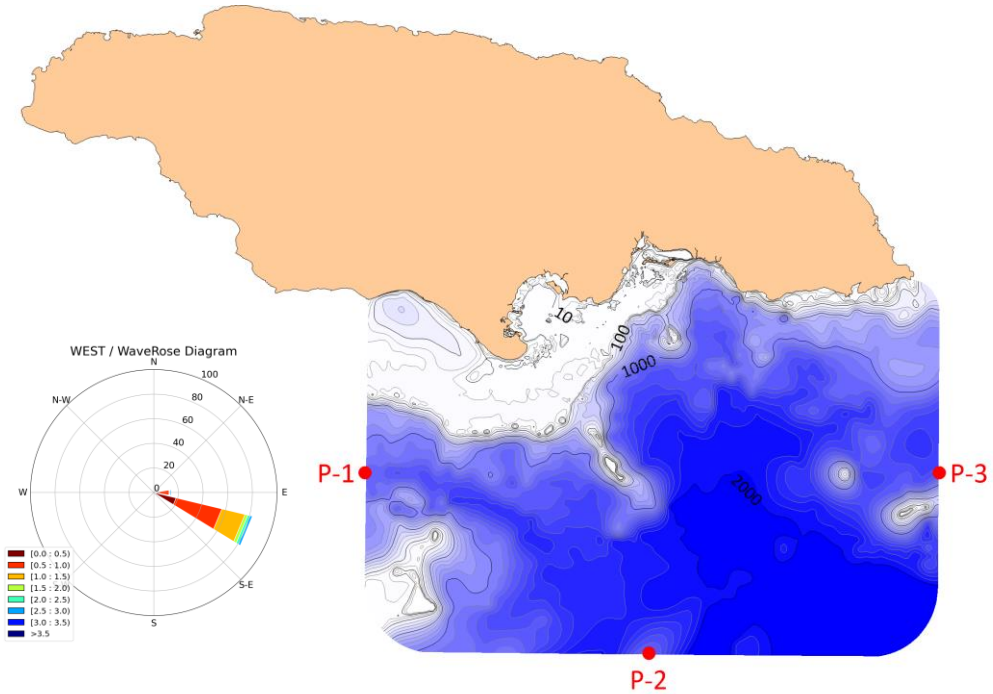
<W-3, Caribbean Valley>

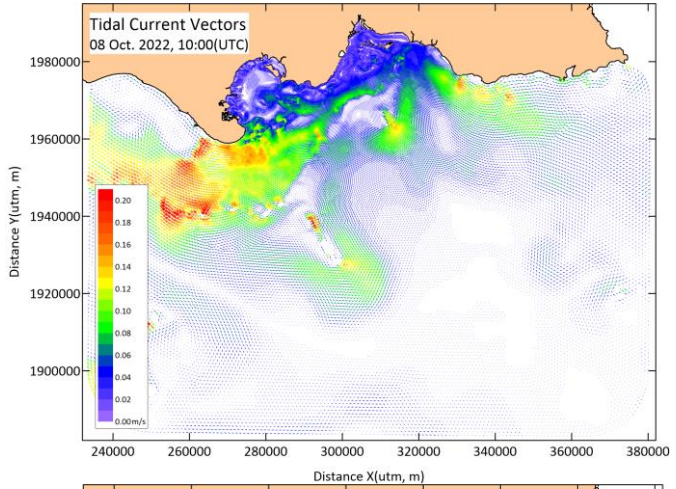


✓Comparison with NOAA NDBC(National Data Buoy Center) wave data

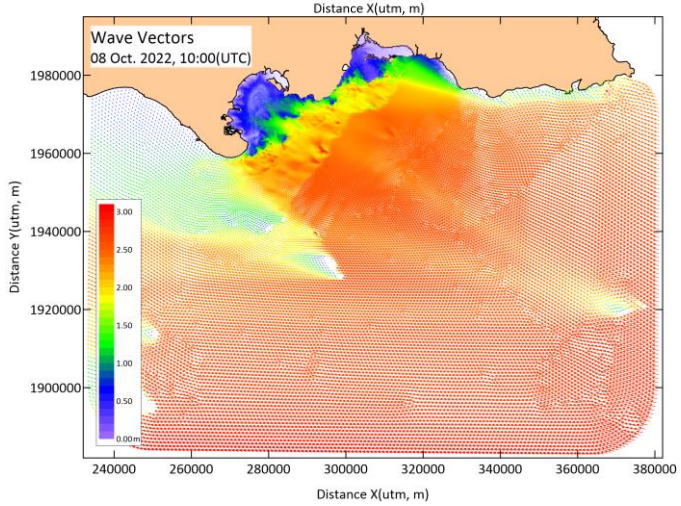
VMS – Numerical Simulation

6. Model – Nesting (L1)





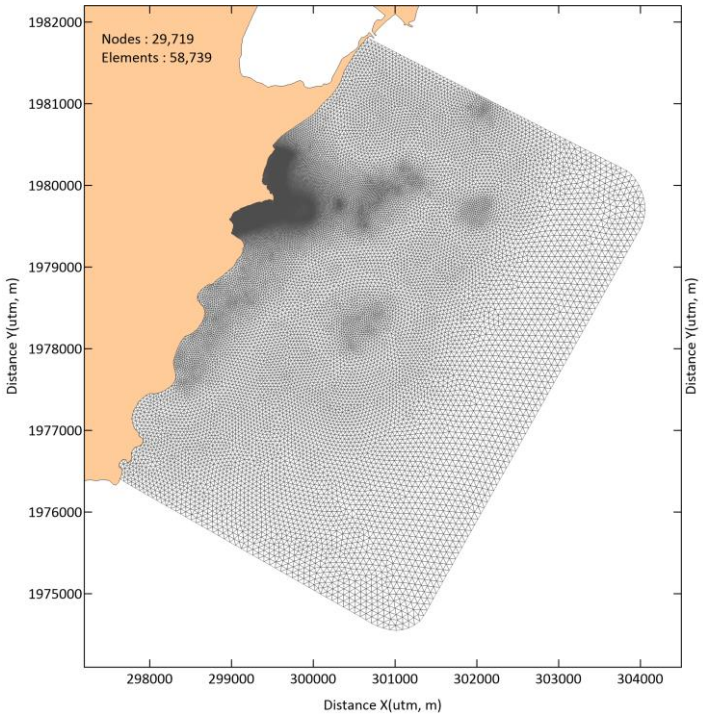
Tidal Current

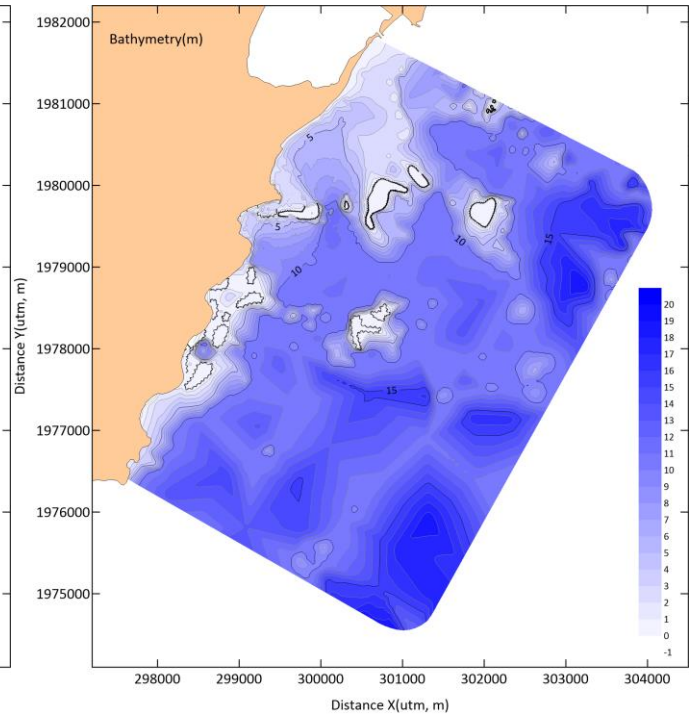


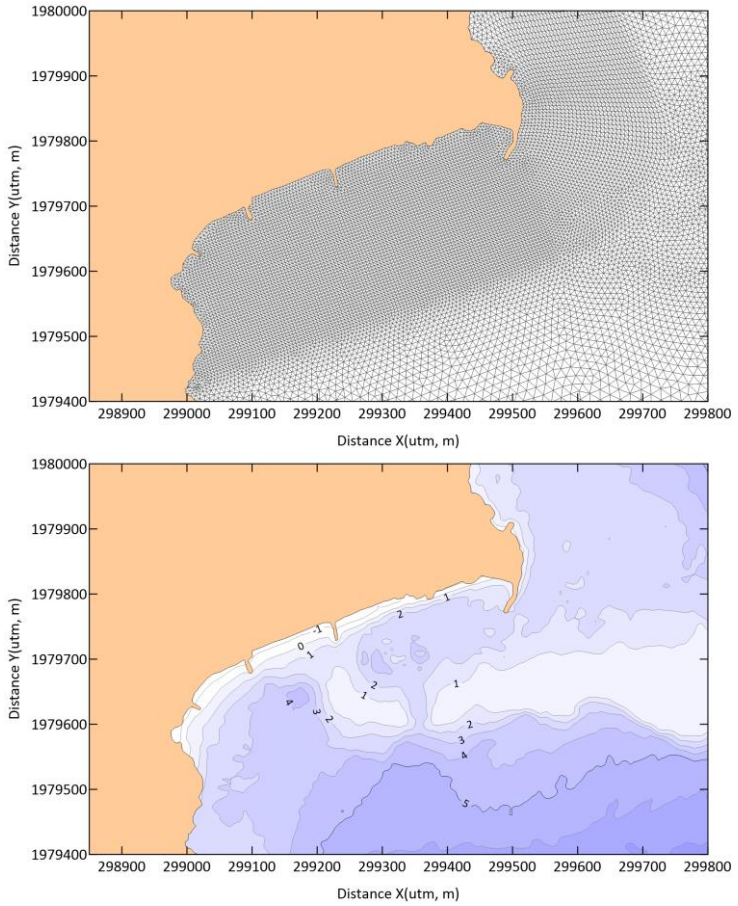
Wave height

VMS – Numerical Simulation

6. Model – Nesting (L2)



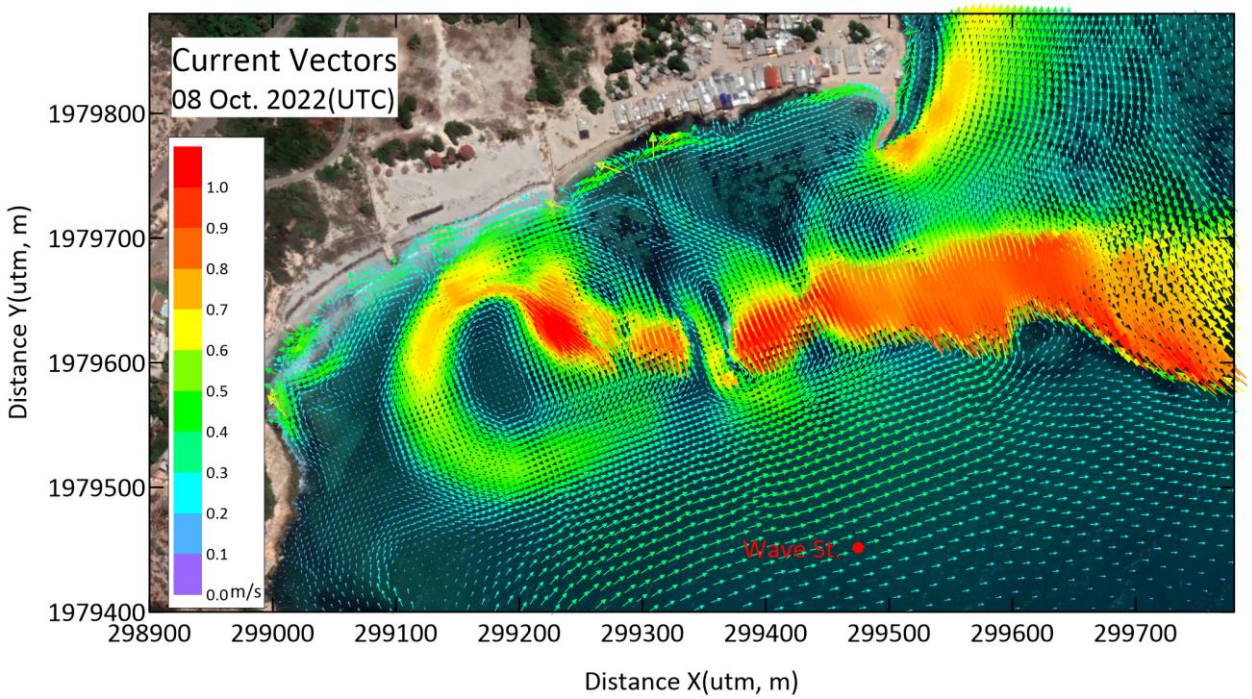


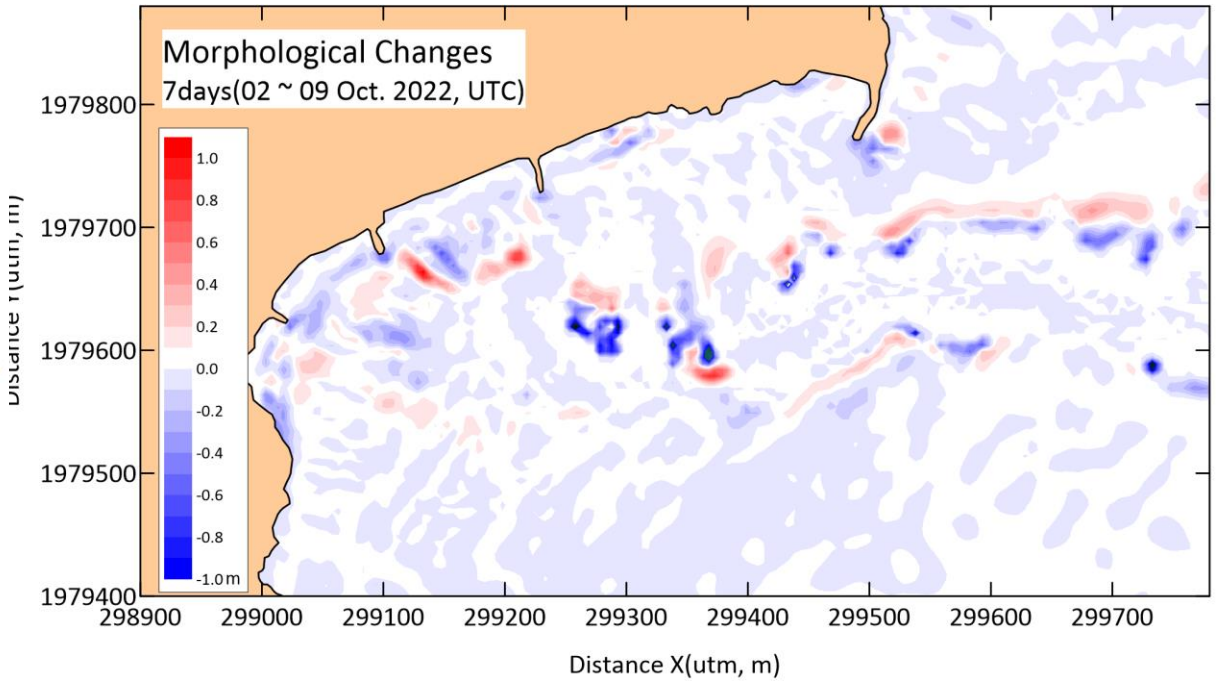


VMS – Numerical Simulation

6. Model – Nesting (L2)

- Results of Morphological Change





Future Collaboration

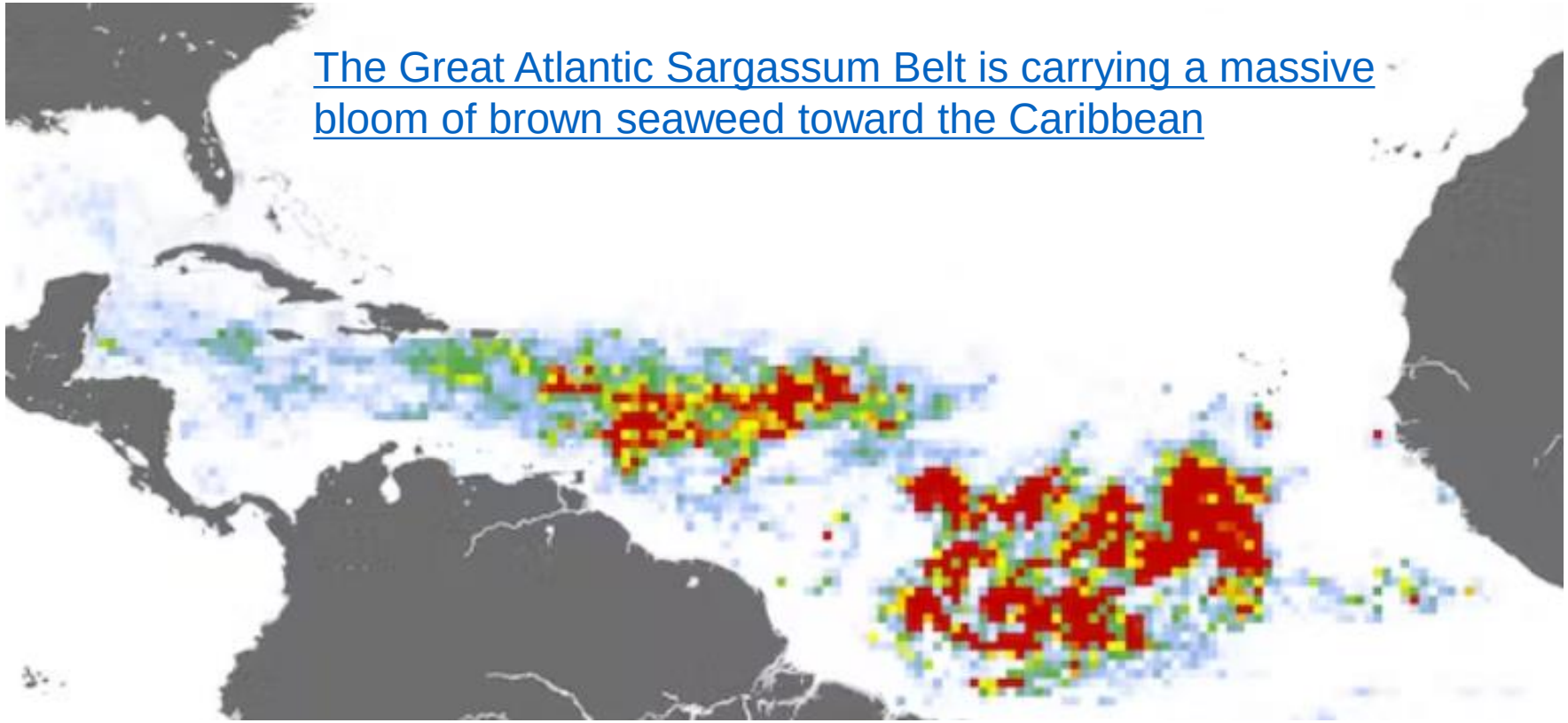
1. Application of VMS

- VMS outcome could be enhanced via efficient design
- By using buildings in beach side, instead of 30m tower construction

Haeundae Beach, Busan, Korea

Future Collaboration

1. Application of VMS – Sargarssum



The Great Atlantic Sargassum Belt is carrying a massive bloom of brown seaweed toward the Caribbean

Satellite image of sargassum concentrations in the Atlantic during the month of March. USF/NOAA, CC BY-ND

https://theconversation.com/the-great-atlantic-sargassum-belt-is-carrying-a-massive-bloom-of-brown-seaweed-toward-florida-and-the-caribbean-202570

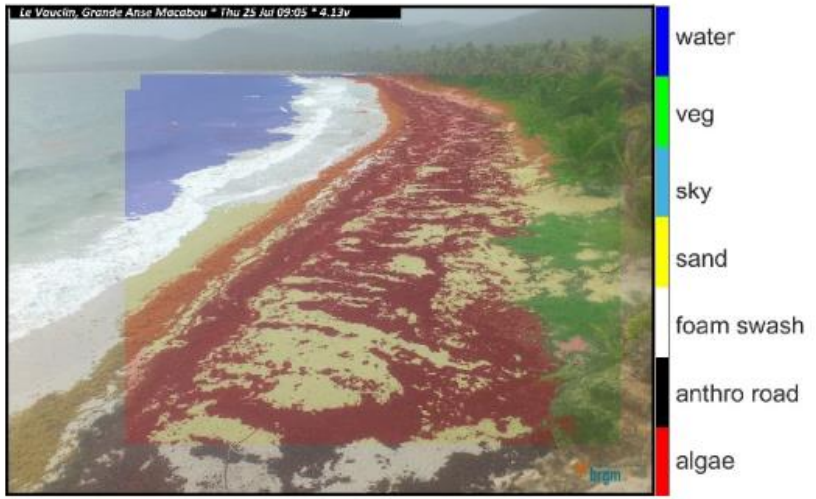
Future Collaboration

1. Application of VMS

- VMS can be used for

Sargassum Monitoring

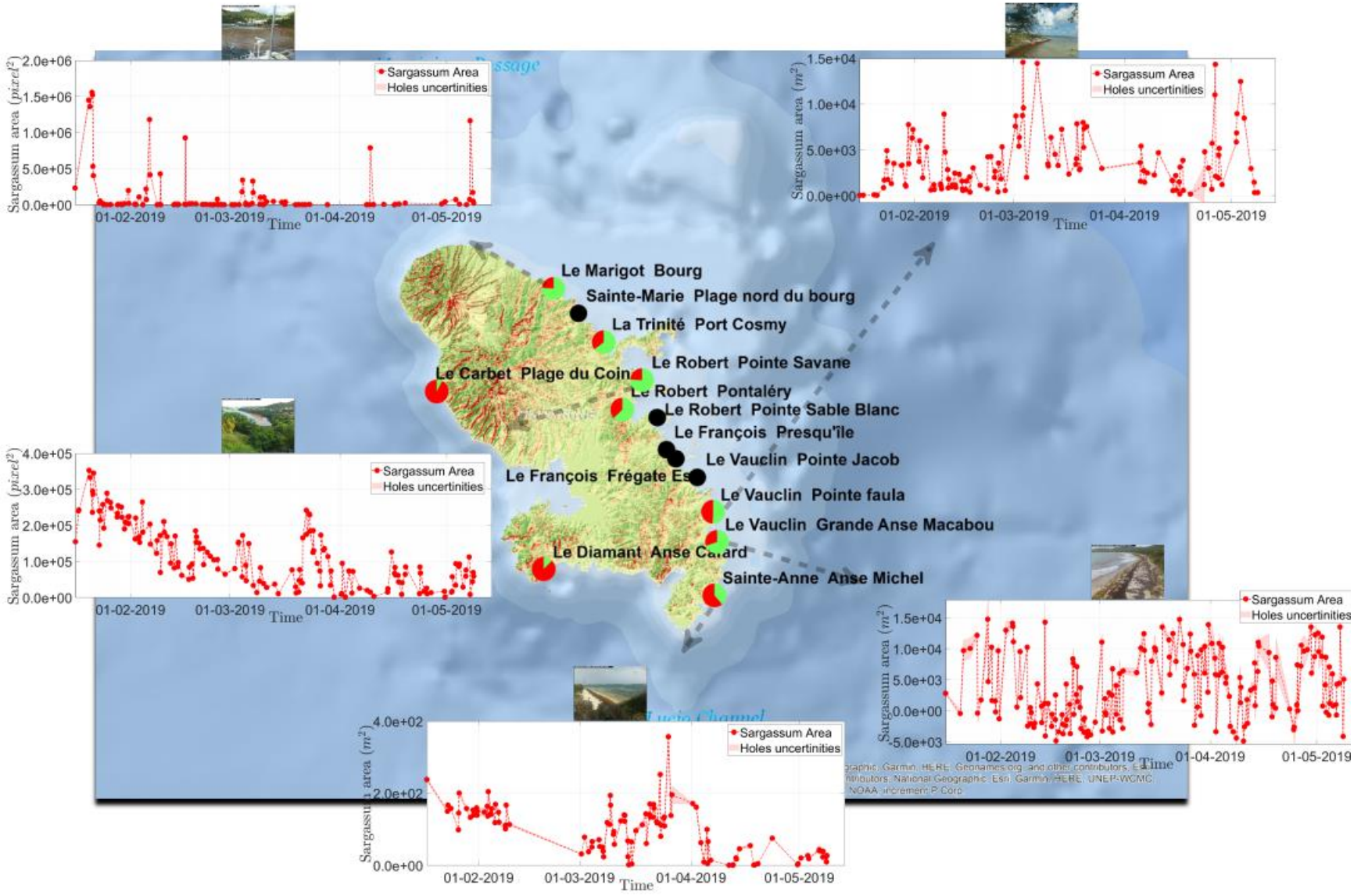
Extracted from
"Assessment of a Smartphone-Based Camera System for Coastal Image Segmentation and *Sargassum* monitoring"
J. Mar. Sci. Eng. 2020



1. Application of VMS

Sargassum Monitoring

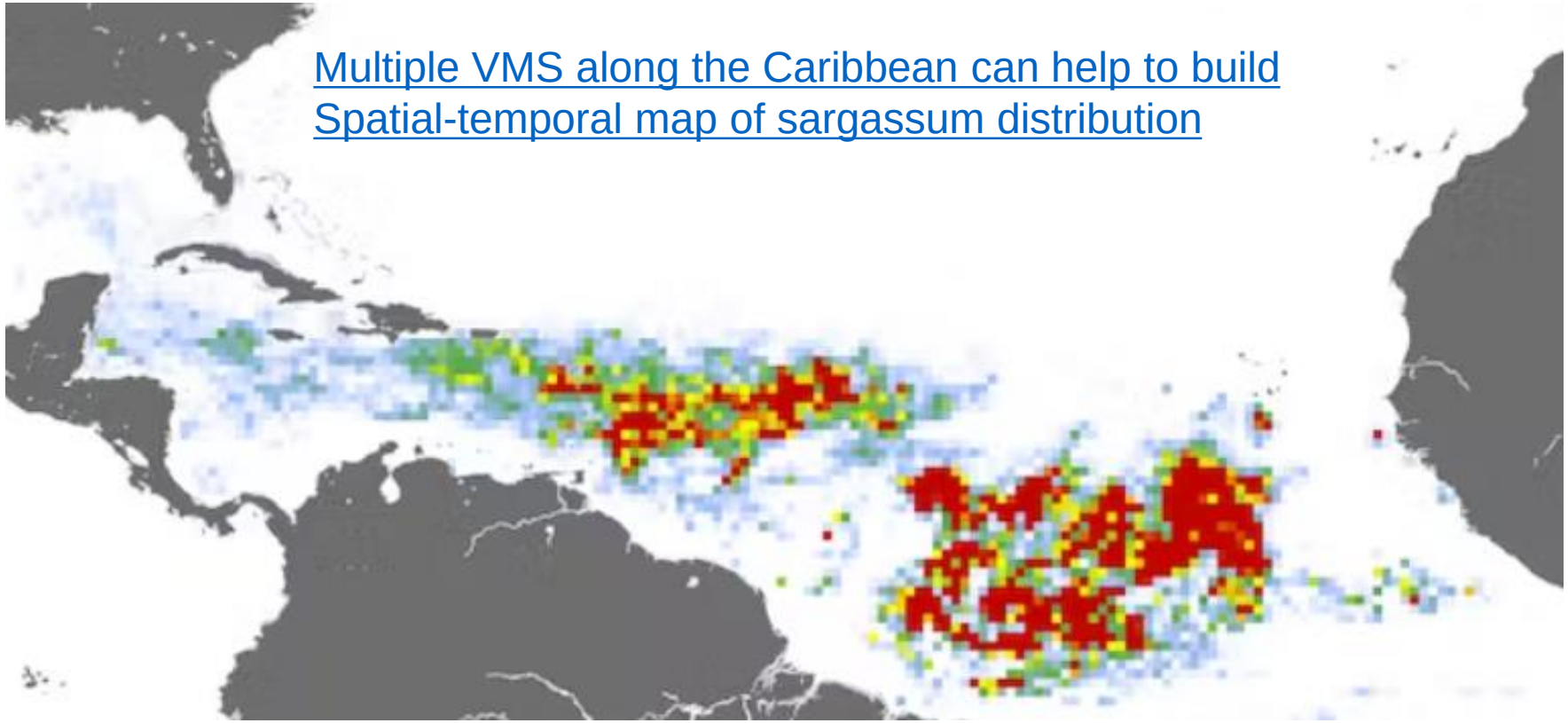
- **Martinique Island, Lesser Antilles**



Future Collaboration

1. Application of VMS – Sargarssum

Multiple VMS along the Caribbean can help to build Spatial-temporal map of sargassum distribution

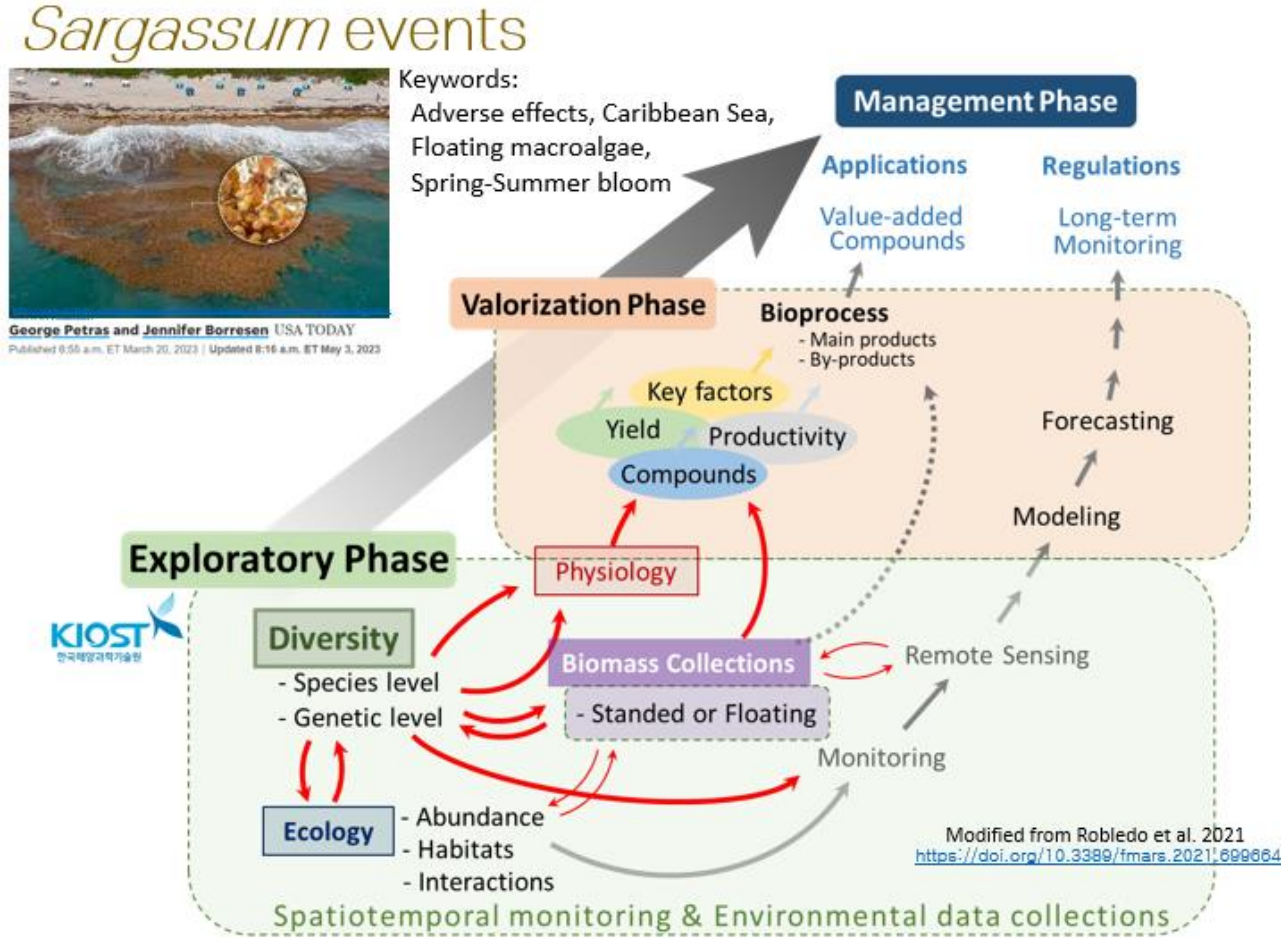


Satellite image of sargassum concentrations in the Atlantic during the month of March. USF/NOAA, CC BY-ND

https://theconversation.com/the-great-atlantic-sargassum-belt-is-carrying-a-massive-bloom-of-brown-seaweed-toward-florida-and-the-caribbean-202570

Future Collaboration

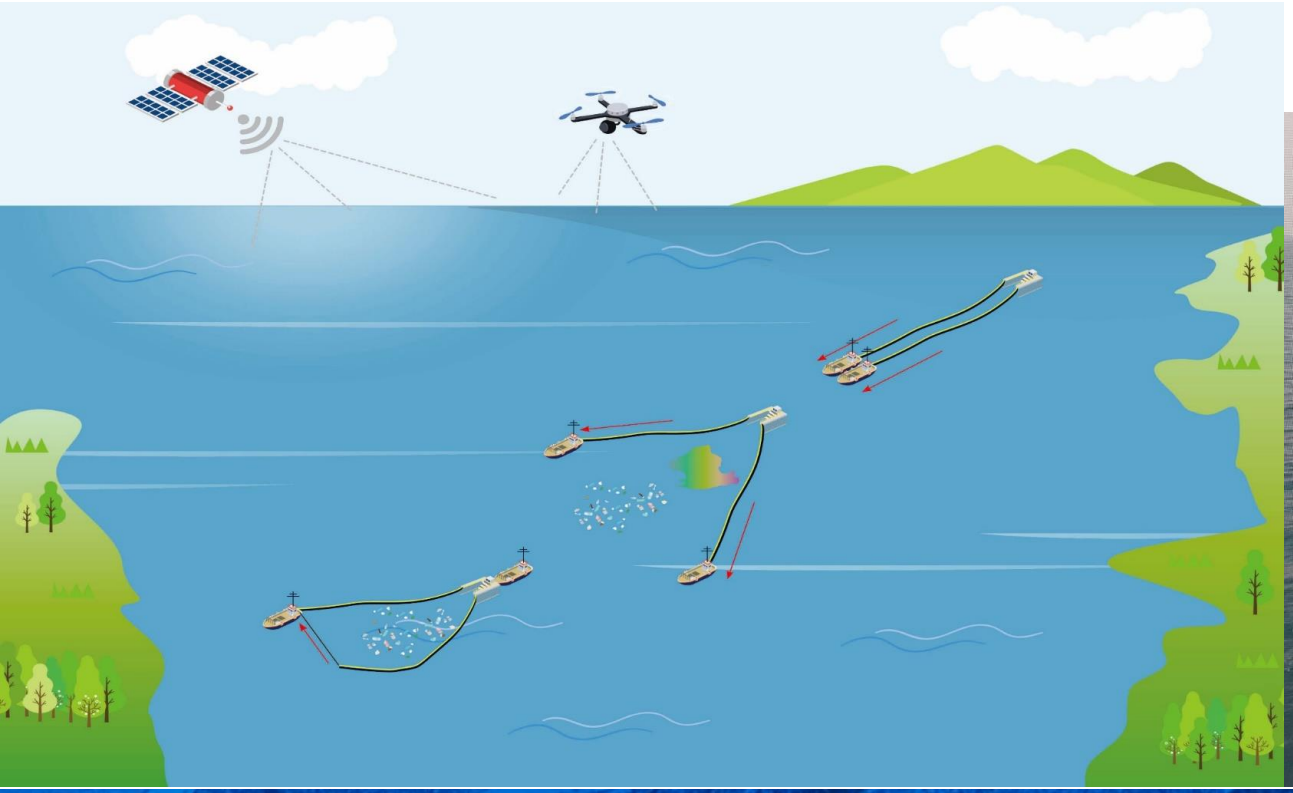
2. Other possibilities with KIOST - Sargassum



Future Collaboration

2. Other possibilities with KIOST - Sargassum

- Floating material collecting device
- Could be applied for debris, plastics, oil spill, and Sargassum



Future Collaboration

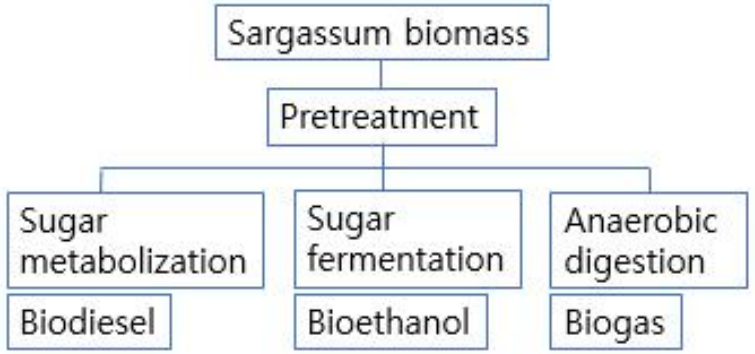
2. Other possibilities with KIOST - Sargassum

- **Potential to Biofuel**

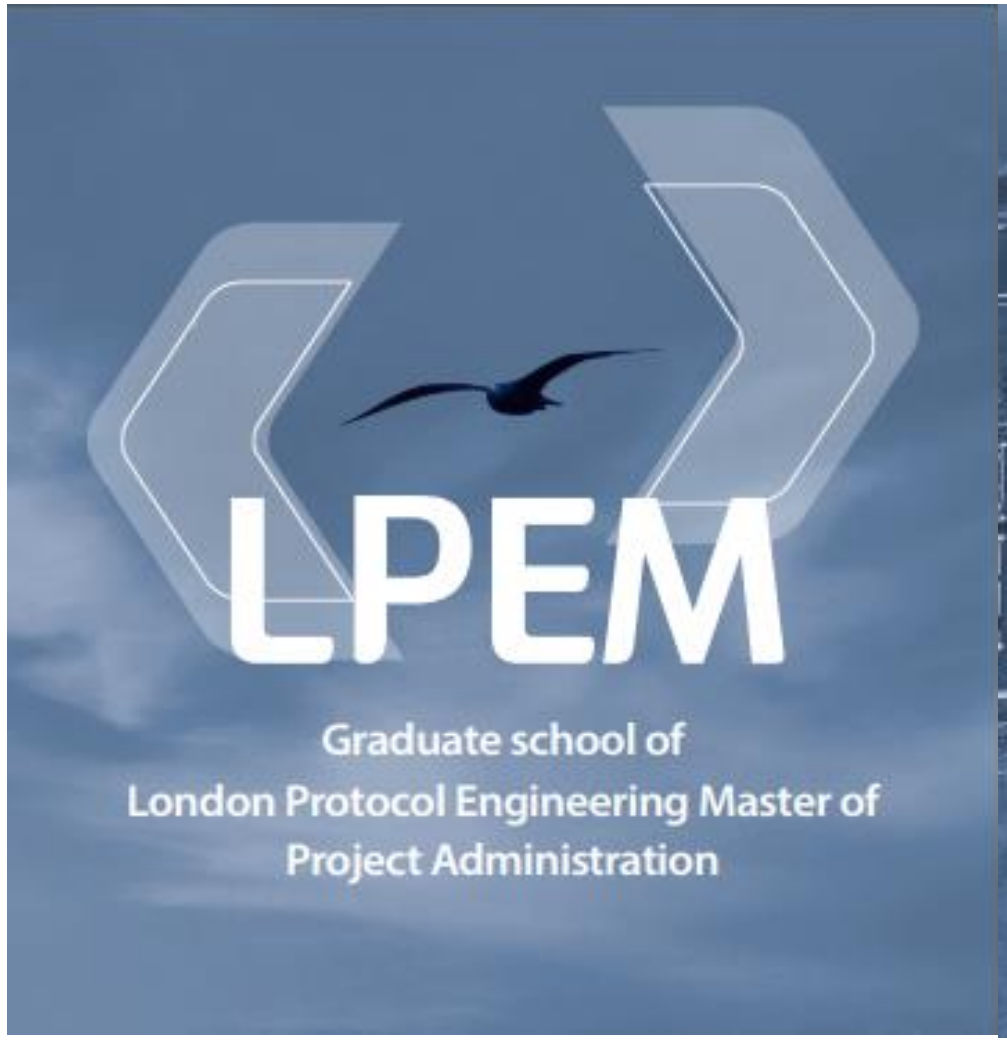
Sargassum (Brown macro algae)

Total solid 89.5%
Carbohydrate 44.6 – 61.2%

Eco-friendly Biofuel



Scholarship Opportunity for ACS



Scholarship Opportunity for ACS

1. Establishment

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

LC-LP.1/Circ.82
24 July 2017

CONVENTION ON THE PREVENTION OF MARINE POLLUTION BY DUMPING OF WASTES AND OTHER MATTER, 1972 AND ITS 1996 PROTOCOL

Notification by the Republic of Korea

1 The Republic of Korea has notified the Secretariat of a new Graduate School of London Protocol Engineering, Master of Project Administration (LPEM), which will commence tuition at the University of Science and Technology in the Republic of Korea in March 2018. Courses will be held in the Korean Institute of Ocean Science and Technology (KIOST) campus in Busan, the Republic of Korea.

Scholarship Opportunity for ACS

2. Invitation

- **Education scholarship opportunity**

- **LPEM : 2-year graduate program (mater's degree)**
- **Funded by the government of ROK**
- **Study area : ocean environment and coastal management**
- **Qualification : government officer; English test; Bachelor's degree**
- **Benefits 1) Dormitory, 2) Tuition, 3) Living expenses, 4) Airfare for a round trip ticket to Busan, Korea :**
- **Currently 3 students from ACS countries (Colombia [1], Jamaica [2]) & 1 graduate (Jamaica [2021])**
- **More students are welcome from ACS**
- **For more information :**

Contact : ACS (Ana Leticia Ramirez Cuevas)

KIOST (Dr. Yeon Chang yeonschang@kiost.ac.kr)

Scholarship Opportunity for ACS

Scholarship Opportunity for ACS

1. LPEM interview by Chanel Raynor (NEPA)