EAS CONGRESS 2021

THE EAST ASIAN SEAS CONGRESS

PEMSEA

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1-2 DECEMBER 2021 • Hosted by the Royal Government of Cambodia

Collab 8

Online GIS Training for Marine Spatial Planning and Management

30 September 2021, 12:00 PM - 3:50 PM (GMT+7)
Online via Zoom

ORGANIZERS:

KMI

Korean Maritime Institute

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PROCEEDINGS

1. **Introduction**

   Korea Maritime Institute (KMI) has cooperated with East Asian countries and international entities to further sustainable ocean development and share knowledge and practices. Since marine spatial planning (MSP) through utilizing marine spatial information has been a great agenda for coastal countries of East Asia, the opportunity for deepened discussion on its tools and technologies has become greatly important.

   Through this online training, KMI aims to share relevant experiences on MSP, particularly on the use of Geographic Information System (GIS). This training forms part of the ongoing East Asian Seas Congress 2021, hosted by Cambodia and co-organized by their Ministry of Environment, the Province of Preah Sihanouk, and Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), and is expected to contribute to enhanced cooperation among experts of East Asian Countries.

   The half-day workshop was organized to:

   - To share knowledge upon the GIS technique and data utilized for MSP
   - To discuss and suggest practical approaches to develop cooperation among experts of East Asian countries

2. **OPENING OF THE WORKSHOP**

2.1 **Dr. Jungho Nam**, the Deputy President for Marine Policy Research of Korea Maritime Institute (KMI) welcomed all the participants of the online Geographic Information System (GIS) training for marine spatial planning (MSP) and management. Acknowledging the importance of evidence-based decision-making, he stressed the role of GIS tools and techniques when it comes to developing marine policy. Stating the expansibility of such approaches, Dr. NAM appreciated this training program as an opportunity to share knowledge and to build up cooperation among East Asian countries. As an ending note, he expressed sincere gratitude for the change to contribute to the East Asian Seas Congress 2021 by hosting its collaboration session.

3. **WORKSHOP PRESENTATIONS**

3.1   Marine Spatial Assessment of the ROK

Mr. Tae-Hoon Kim, the researcher of Korea Institute of Ocean Science & Technology (KIOST) introduced the backgrounds of Korea's interests in establishing the MSP system within its political framework.

He stressed the degradation of the ocean environment and the increase of conflicts between the users as the major factor, which induced Korea to develop an MSP mechanism for marine management. He asserted that the key to the MSP system of Korea is to designate Marine Use Zones, which represents the space which is essential for certain marine activities, and there are 9 types of Zones to be designated. The Zones are entitled Fisheries Priority Zone; Mining and Extraction Resources Exploitation Zone; Energy Development Zone; Marine Tourism Zone; Environment and Ecosystem Management Zone; Research and Education Zone; Harbor and Navigation Zone; Military Activity Zone; Safety Management Zone. Adhering to the data-based policymaking, Mr. KIM emphasized that the MSP process starts from collecting marine spatial information.

In the case of Korea, 253 types of marine spatial data are produced by more than 30 institutions. Since the data is collected, data grouping and processing take place. After briefing about the data selection and processing, the presenter introduced Marine Spatial Assessment (MSA) procedure which shall follow the initial data handling. He stated that MSA is to produce score maps to test whether the space is essential to certain marine activities and to provide quantitative results for its value and displayed examples of MSA process for developing Fisheries Priority Zone; Aggregate and Mineral Resource Exploitation Zone; Energy Development Zone; Marine Tourism Zone; and Environment and Ecosystem Management Zone. Moreover, he also provided the examples of big-data analysis that is currently utilized for MSP of Korea. Fishing ships' GPS points and the location information of large ships such as containers or bunkers are the representative examples of the bigdata for MSP.

Lastly, the presenter shared the challenges deriving from the data paucity and the necessity of improving its assessment methodologies for enhanced MSP mechanism.

3.2   Analysis and Visualization of Vessel's Location Data Using Free and Open-source Software

Dr. Cholyoung Lee of KIOST firstly explained the Vessel Monitoring System (VMS) and Automatic Identification System (AIS) of Korea which contain both static and dynamic data, and their purposes in the context of maritime safety. Noting that vessel's location data is firstly produced to ship collision avoidance, but it is now utilized for many other purposes, he stressed the importance of deliberation on the way to utilize existing data systems.

Secondly, Dr. Lee, to shed light on the possibility of data utilization, provided examples of vessel's location data analysis such as thematic map production; route density map; Shetland vessel

tracks; mapping maritime activities; mapping fishing activities; FisherMap; ScotMap; and Global Fishing Watch.

Thirdly, he shared information about free and open-source software (FOSS) which enables anyone to use, copy, and study. Software such Spark, R, QGIS and Kepler.gl are the easily accessible tools when utilizing location data. R & RStudio is a tool for statistical computing and graphics. QGIS and Kepler.gl are the tools for geospatial assessment and visualization. Since the Kepler.gl providing free online access is an advanced geospatial visualization tool, Dr. LEE personally gave a demonstration for data analysis through the software and taught the participants to know its functions in detail.

3.3   Marine Spatial Assessment for Developing Marine Energy in Indonesia

Dr. Hansan Park, the co-director of Korea-Indonesia Marine Technology Cooperation Center, presented about the marine spatial assessment for developing marine energy in Indonesia. He stressed the usefulness of the assessment due to the growing challenges from climate change and degradation of marine environment.

His case study upon marine energy in Indonesia provided potential sites to be considered for development when it comes to tidal energy; thermal energy; and wave energy. The candidate for tidal energy development was selected by spatial assessment to draw space where average tidal range is above 2m/s. Moreover, in consideration of the difference of temperature > 20 Celsius, the thermal energy potential was drawn. Lastly, resulting from the marine spatial assessment for wave value, the south area of Java Island was suggested for wave energy development.

However, the presenter pointed out that the lack of ground survey data, which is necessary for enhancing reliability and accuracy of assessment outcome presented a significant challenge for his case study. In this context, he introduced the maritime satellite developed by Korean government as a means to expand the data pool for spatial assessment.

3.4   Methodology for Analyzing Satellite Data for Marine Management of Timor-Leste

Mr. Sujin Son at first explained the concept of Land Cover Map which is a type of spatial information produced by classifying the shape of the earth's surface topographic features. According to his presentation, Land Cover Classification of Korea consists of 3 types: level-law, mid, high- cover map.

To produce information for marine management of Timor-Leste, he utilized the satellite image of the coast-resolution of black and white (0.5m) and color (2m). To produce information for policymaking, satellite image shall be processed, as the images are taken with various wavelengths. Mr. Son asserted that the raw satellite image contains distortions which requires orthorectification. Moreover, geometric correction and image fusion and spectral transformation are required for the pre-processing of the satellite images.

He explained that a training data set is required for land cover classification after pre-processing. The training data set, for this purpose, was built according to Korea's National Classification Standard. The process automatically takes place by utilizing machine learning techniques. In the end, quality inspection is necessary to correct the errors. The inspection was conducted in three stages-inspection of the land cover classification, interim inspection of the land cover map, and final land cover map inspection.

4.   OPEN FORUM

The floor was opened for questions from the presentations. The attendees' interest in MSP spurred a series of discussions as summarized below:

QUESTION 1: Participants raised a question to the first presenter concerning the data collection process for MSP.

Mr. Tae-Hoon Kim answered that the raw data was produced by many institutions under the Korean government, and it is all collected through the government's big data platform. However, marine information is produced in many types, there should be data-processing procedures to standardize the data.

QUESTION 2: An anonymous participant addressed a question to the 4th presenter, Mr. Son, about the possibility to locate marine debris through the satellite image assessment.

Mr. Sujin Son asserted it is theoretically possible by labelling the marine debris when building a data set. However, he added that there are limitations to locate the debris and utilize the information for a policy purpose. For example, the assessment cannot provide real time location information which is necessary if it aims to clear the debris. Moreover, he assumed that the size of the debris is important since the satellite image may not identify a small pile of debris.

5.   CLOSING REMARKS

5.1   Dr Choi Kim, director of MSP Research Center appreciated all the participants for their active engagement. Moreover, she expressed great gratitude towards the presenter for their time and efforts. Lastly, she is looking forward to a face-to-face meeting next time, and remarked that KMI will find another opportunity to learn from each other and discuss MSP and its relevant techniques and tools.

The Program

Time (Korea Time)	Theme	Presenters
14:00 - 14:15	**Opening Remarks** and video play introducing MSP of the ROK	KMI
14:15 - 14:55	**Presentation 1** Marine Spatial Assessment of the ROK	KIOST Tae-Hoon KIM
14:55 – 15:45	**Presentation 2** Analysis and Visualization of Vessel's Location Data Using Free and Open-Source Software	KIOST Cholyoung Lee
15:45 – 16:00	**Q&A**	
16:00 - 16:10	**Break**	
16:10 – 16:50	**Presentation 3** Marine spatial assessment for developing marine energy in Indonesia	MTCRC HANSAN PARK
16:50 – 17:30	**Presentation 4**	SUNDOSOFT Sujin SON

Time (Korea Time)	Theme	Presenters
	Methodology for analyzing satellite data for marine management of Timor-Leste	
17:30 – 17:45	**Q&A**	
17:45 – 17:50	**Closing Remarks**	KMI

A copy of the presentation files can be accessed [here](#).