

## Report on organization of the 5th NOWPAP training course on remote sensing data analysis

### 1. Background

Improving skills and/or knowledge of ocean remote sensing in the NOWPAP region is one of the essential things pointed out in the past CEARAC FPMs and in the integrated reports on ocean remote sensing for the NOWPAP region (2005, 2011). In the NOWPAP Medium-term Strategy (MTS) 2018-2023 approved in 2018, capacity building of stakeholders is also an important issue to be resolved. In Priority Area 2: Assess status of the marine and coastal environment in the MTS, it is required to present the status of marine and coastal environment based on reliable information and data. The MTS also suggests strengthening science-policy interface and RACs' role as information and/or technical resources for policy- and decision-makers, for which meetings to conduct scientific analysis, capacity building and training, and communication and public outreach are crucial.

CEARAC has organized four training courses on remote sensing data analysis from 2007 to 2013 (Table 1) and provided technical support to 91 trainees in total, and about 77% of them are still working on related fields (from questionnaire and independent survey by CEARAC). Since the last training course in 2013, CEARAC has been developing methodologies and tools for coastal environment assessment using remote sensing techniques. NOWPAP Eutrophication Assessment Tool (NEAT) enables preliminary assessment of eutrophication and helps identify potential eutrophic zones in the NOWPAP region. A manual for mapping seagrass and seaweed beds distribution with satellite images was developed, and a tool to map seagrass beds are being developed for its completion by 2019. CEARAC has started regular processing of a regionally tuned chlorophyll-a concentration data that is ready for time series analysis. The Marine Environmental Watch Project website and other websites of CEARAC (Table 2) has been updated to provide useful information required to monitor and assess coastal environment of the NOWPAP region.

Table 1 Past training courses on NOWPAP remote sensing data analysis.

year	Venue	Number of trainees	Nationality of trainees
2007	Nagasaki, Japan	23	NOWPAP members, India, Indonesia, Thailand, Viet Nam

2008	Jeju, Korea	23	NOWPAP members, France, Thailand
2011	Qingdao, China	22	NOWPAP members, India, Indonesia, the Philippines
2013	Vladivostok, Russia	23	NOWPAP members, Cameroon, Canada, Oman

Table 2 CEARAC Websites on ocean remote sensing.

Website	URL
Marine Environmental Watch Project Homepage	<a href="https://ocean.nowpap3.go.jp">https://ocean.nowpap3.go.jp</a>
Marine Environmental Watch GIS prototype	<a href="https://cloudgis.nowpap3.go.jp/">https://cloudgis.nowpap3.go.jp/</a>
Maps of potential eutrophic zones and seagrass distribution	<a href="https://map.nowpap3.go.jp/maps/view">https://map.nowpap3.go.jp/maps/view</a>
Mapseagrass Project	<a href="https://mapseagrass.org">https://mapseagrass.org</a>
Seagrass Mapper	<a href="https://mapseagrass.users.earthengine.app/view/seagrass_mapper">https://mapseagrass.users.earthengine.app/view/seagrass_mapper</a>
Seagrass Trainer	<a href="https://seagrasstrainer.mapseagrass.org/#/">https://seagrasstrainer.mapseagrass.org/#/</a>

As for a part of 2020-2021 activities, CEARAC plans to organize the fifth training course on remote sensing data analysis; however, due to COVID-19 pandemic, it is quite difficult to organize it in a conventional style with all participants gathering in one place. Therefore, CEARAC is proposing to hold a webinar style training course instead.

## 2. Objectives

Objectives of this activity is to organize a training course to provide an opportunity to learn the latest techniques for analysis and interpretation of satellite data for assessment of the coastal environment. The course will also function to efficiently collect necessary ground truth dataset which is essential for improving the NOWPAP Eutrophication Assessment Tool (NEAT) and web-based service for mapping seagrass distribution.

### 3. Outline of the training course

#### 3.1 Development of a webinar website

CEARAC will develop a webinar website in the data analysis menu of the Marine Environmental Watch Project website. Materials used in the training course will be uploaded to the webinar site so as for trainees to easily access necessary information during the training. The webinar website will function with an online meeting tools such as Zoom.

#### 3.2 Organization of a webinar

A webinar on remote sensing data analysis will be held for young researchers, students and governmental officials (approx. 25 people maximum) in the NOWPAP member states to learn monitoring and assessment of the marine environment. The training course has two main themes: (1) monitoring and assessment of water quality by ocean colour remote sensing; and (2) mapping seagrass by optical sensors. Each theme is composed of six lessons of 90-minutes in length (Table 3). The training is conducted in English. All lessons are provided for free and trainees can decide to take all lessons or take only one theme.

Table 3. Schedule of the webinar on remote sensing data analysis.

Day	Lesson	Monitoring and Assessment of Water Quality by Ocean Colour Remote Sensing
1	1	Satellite Biological Oceanography (L)
	2	Processing data-quality flags (H) Validation of satellite data with ground truth data (H)
2	3	Introduction to ocean color sensors (L)
	4	Processing time-series data (daily average, monthly average) (H)
3	5	Application of ocean color sensor (eutrophication, red tide and HAB) (L)
	6	Time-series analysis (extracting trend and/or data in regions of interest) (H)

Day	Lesson	Seagrass Mapping by Optical Sensors
1	1	Seagrass beds and coastal ecosystems (L)
	2	Preparation of training data sets from ground truth data (H)
2	3	Theory of detecting seagrass by remote sensing (L)
	4	Classification of satellite images (H)

3	5	Basics of image classifications (L)
	6	Accuracy assessment (H)

(L=lecture, H=hands-on analysis)

#### 4. Application and selection of trainees

Announcement of the training course will be posted in the webinar website, and those who are interested will send an application form to the Secretariat of CEARAC. Applicant will be selected by the organizing committee consists of the people recommended by CEARAC FPs.

#### 5. Cooperation with other relevant organizations

In the past four training courses, CEARAC received financial support from the North Pacific Marine Science Organization (PICES), IOC Sub-Commission of the Western Pacific (IOC/WESTPAC), the International Ocean Colour Coordinating Group (IOCCG), and some local universities. CEARAC will contact these organizations for conducting the fifth training course in a co-operative manner.

#### 6. Schedule

The timeline of this activity is shown below.

Time	Action	Main body	
2021	July	Conducting an online trial course (webinar)	Experts in the member states and IOC/WESTPAC
	Aug.	Review of the planned webinar training course at FPM18	CEARAC FPs and CEARAC
	Sep.-Oct.	Development of the webinar website	CEARAC
	Nov.	Announcement/Opening application	Organizing Committee, CEARAC FPs and CEARAC
	Dec.	Organization of the webinar training course (Two 3-day sessions)	Organizing Committee and CEARAC

#### 7. Budget

USD 20,000 will be used to subcontract developing a webinar website.