

## **Proposal for 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 critical 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 (Ref 2), 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.

<b>year</b>	<b>Venue</b>	<b>Number of trainees</b>	<b>Nationality of trainees</b>
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>

Now that methodologies and tools for monitoring and assessment of coastal environment in the NOWPAP regions are getting substantial, CEARAC plans to organize the fifth training course on remote sensing data analysis to help capacity building in the NOWPAP region.

## 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. As CEARAC has been working on assessment of eutrophication and mapping seagrass using remote sensing and these are closely interrelated, these topics will be the main focus of the training course. 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

### i. Venue

University or institute in a NOWPAP member state

### ii. Time

Fall in 2020

### iii. Expected participants

Young researchers, students and national/local government officials (approx. 25 people)

### iv. Tuition

Tuition is free; however, participants are required to pay accommodation and transportation fees by themselves. Limited financial support (part of accommodation fee) will be available.

Selection of funded trainees is conducted by the Organizing Committee.

v. Period

The training course is a 7-day long with lectures and hands-on sessions on remote sensing techniques for marine and coastal environmental monitoring and assessment. All lectures and sessions are conducted in English. Trainees are asked to bring their own computers.

- Processing and analysis of ocean colour data for eutrophication assessment (3 days)
  - Lectures
    - Satellite Biological Oceanography
    - Introduction of ocean color sensors
    - Application of Ocean Colour Sensor (eutrophication, red tide and HAB)
  - Hands-on training
    - Developing time-series data (daily average, monthly average), dealing with quality flags
    - Validation of satellite data with ground truth data
    - Time-series analysis (extracting trend and/or data in regions of interest)
- Processing and analysis of optical sensors for mapping seagrass beds (3 days)
  - Lectures
    - Seagrass beds and coastal ecosystems
    - Theory of detection seagrass beds by remote sensing
    - Basics of image classifications
  - Hands-on training
    - Preparation of ground truth data as training data sets
    - Classification of satellite images
    - Accuracy validation
- Group work and presentation (1 day)
  - Participants are divided into several groups depending on their interests. Each group will decide the subject/theme and work on their own to give a group presentation in the afternoon by using lessons learned from the course.

#### **4. Application and selection of trainees**

Announcement of the training course will be posted on the CEARAC website. Applicants will send an application form to CEARAC Secretariat describing their expectation from the course. The Organizing Committee that consists of the people recommended by CEARAC FPs will screen applications and select candidate trainees.

#### **5. Cooperation with NOWPAP Partners and other relevant organizations/institutes**

As the past training courses already proved that the NOWPAP budget of this activity (USD 20,000) may not be enough to cover all of the expenses, and therefore collaboration with other organizations/institutions including mobilization of financial resources is inevitable. CEARAC Secretariat will contact IOC/WESTPAC, PICES, IOCCG (International Ocean Colour Coordinating Group) and others which co-organized and/or supported past four training courses and ask for the similar support for the next training course. CEARAC Secretariat will also communicate with NOWPAP RCU and other RACs, and other relevant organizations such as YSLME and GEO (the Group of Earth Observation) to ask for smooth organization of the training course.

Another group CEARAC Secretariat will approach is private sectors such as Google LLC and Avenza Systems Inc., asking for support of the course as their tools are planned to be used in the training course.

## 6. Schedule

The timeline of this activity is shown below.

Time		Action	Main body
2019	September	Proposal/Adoption at CEARAC FPM 17	CEARAC and CEARAC FPs
	December	Proposal/Approval of NOWPAP workplan and budget for the 2020-2021 biennium at NOWPAP IGM 24	CEARAC and NOWPAP National FPs
2020	Spring	Review of workplan at CEARAC FPM 18	CEARAC and CEARAC FPs
	Q2	Open announcement on CEARAC website	CEARAC and organizing Committee
		MoU with local organization on logistical support	CEARAC and local host
		Screening/Selection of candidate trainees	Organizing committee and CEARAC
Q3	Organization of Training Course	Organizing committee and CEARAC	

## 7. Budget

USD 20,000\* (NOWPAP Trust fund)

\*The total budget will be increased by mobilizing extra fund from NOWPAP Partners and others.