Annex X

Development of educational materials for utilization of remote sensing data for marine environment conservation

1 Background

The National Reports on Ocean Remote Sensing in the NOWPAP Region and the Integrated Report on Ocean Remote Sensing for the NOWPAP Region were published in 2005 and they provided comprehensive understanding on the status of remote sensing of the Northwest Pacific Region.

Based on suggested activities and recommendation made in these reports, remote sensing information network such as Ocean Remote Sensing Portal Site, Web Site on Oil spill Monitoring were further developed to provide useful information on remote sensing for the NOWPAP Region. In 2007, Eutrophication Monitoring Guidelines by Remote Sensing for the NOWPAP Region were made targeting coastal managers in local governments and professional researchers and aiming to translate satellite remote sensing techniques into information and tools that are useful for monitoring of eutrophication. Furthermore, an intensive training course on remote sensing data analysis in the Northwest Pacific Region was conducted at Nagasaki University as a joint activity with IOC/WESTPAC.

Recognizing these milestones and considering mid- and long-term strategies of CEARAC and goals of WG3/WG4, CEARAC proposed to develop educational materials for utilization of remote sensing data for marine environment conservation for the 2008-2009 biennium at the 12th NOWPAP IGM and 6th CEARAC FPM, and it was approved.

2 Objective

Objective of this activity is to develop the educational materials for utilization of remote sensing data for marine environment conservation (educational materials), targeting at students, young researchers and coastal managers in the NOWPAP region, in order to further promote the use of remote sensing as a marine environmental monitoring tool.

3 Status of implementation

3.1 Concept of the educational materials

In order to achieve the above objective, the concept of the educational materials was set to deepen understanding of the Eutrophication Monitoring Guidelines by Remote Sensing for the NOWPAP Region.

The educational materials will function as a web service, which provides links to existing useful information available in English and the languages of the NOWPAP member states. The existing information on the web should be collected in terms of complementing further understanding of the contents given in the Eutrophication Monitoring Guidelines by Remote Sensing for the NOWPAP Region.

In the future, contents of the educational material will not be limited to eutrophication

monitoring by remote sensing but be extended to other remote sensing applications for marine environment conservation.

3.2 Table of contents of the educational materials

In line with the concept of the educational materials, a table of contents of the educational materials was prepared by extracting key words from the Eutrophication Monitoring Guidelines by Remote Sensing for the NOWPAP Region. The following table 1 shows the list of key words extracted.

Table 1. Key words extracted from the Eutrophication Monitoring Guidelines by Remote Sensing for the NOWPAP Region.

[Section]	[Keyword]
Introduction	Eutrophication
	Aquatic ecosystem
	Harmful algal bloom
	Red tide
	OSPAR
	NEEA
	MAP
	HELCOM
	Satellite remote sensing
Satellite data	Monitoring parameters
	Sensors
	Obtaining data
	Data processing method
In situ data	Monitoring parameters and measurement methods
	Determination of sampling points
	Monitoring frequency and timing
	Requisites for monitoring and analysis
Monitoring and assessment of eutrophication	Accuracy evaluation
	Integration with the existing monitoring system
Challenges and prospects	Algorithm development
	High resolution data and information system
	New sensor

3.3 Collection and organization of existing information

Existing information were collected from lecture materials at the First NEAR-GOOS – NOWPAP Joint Training Course on Remote Sensing Data Analysis and other sources shown in table 2. The collected information was then organized to match up with the table of contents of the educational materials (Annex 1).

Table 2. Information sources referred to collect existing educational materials.

Organization	Websites providing educational materials (URL)
IOC	Ocean Teacher (http://www.oceanteacher.org/)
IOCCG	IOCCG (http://www.ioccg.org/)
NASA	Ocean Color Web (http://oceancolor.gsfc.nasa.gov/)
NOAA	NOAA Coastal Remote Sensing (CRS) Program (http://www.csc.noaa.gov/crs/)
ESA	ESA Earthnet (http://earth.esa.int/)
NPEC	Marine Environmental Watch System (http://www.nowpap3.go.jp/jsw/eng/)
CEARAC	Website on oil spill monitoring (http://cearac.poi.dvo.ru/en/)

3.4 Development of pilot version of educational materials

Upon collection of existing educational materials, pilot version of the web-based educational materials was temporarily constructed on the following website. Fig. 1 shows the top page image of the pilot version.

<Web site address of the pilot version of educational materials>
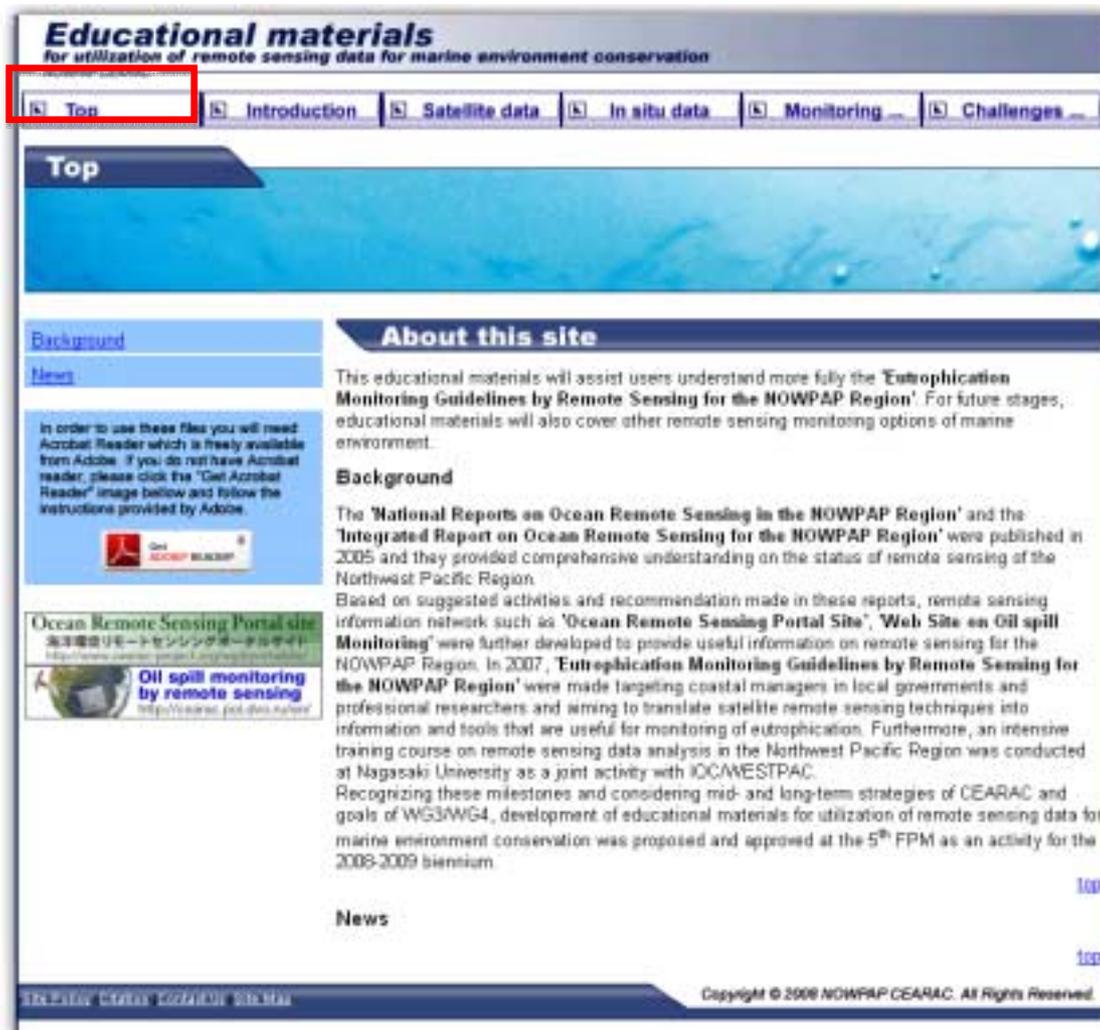http://www.cearac-project.org/wg4/em/index.php

Fig. 1. Top page of the educational materials

4. Future work

In order to enrich information provided through the educational materials, more information available in the languages of the NOWPAP member states will be collected and organized. The following tasks are expected to be coordinated in NOWPAP WG4. CEARAC will conclude MoU with national experts recommended by WG4 experts or WG4 experts themselves to implement these tasks.

<Tasks to be coordinated by NOWPAP WG4>

- Collection of exiting educational materials available in the language of each NOWPAP member state, which matches up with key words shown in table 1.
- Organization of the collected materials following the format attached as Annex 1 and translating titles of collected materials into English by authorization of the authors.

Fig. 2. Completion image of the educational materials.

5. Expected outcome

The developed educational materials will contribute to wider use of remote sensing data among students, young researchers and coastal managers in the NOWPAP member states. In addition, the educational materials will be adequately updated through feedback from users and experts, given at the second NOWPAP training course on remote sensing data analysis and other possible opportunities.

6. Schedule

Schedule of this activity and main body are as follows.

Time		Actions	Main body
2008	Q1	• Preparation of workplan for development of educational materials	CEARAC / consultant
	Q1	• Review of prepared workplan by WG4 experts	WG4 experts
	Mar (6th CEARAC FPM)	• Approval of workplan and budget for development of educational materials	CEARAC / CEARAC FPs
	Q3	• Conclusion of MoU with national experts	CEARAC / National experts
	Q3	• Development of the educational materials	National experts
	Q3 (4th WG3/WG4 Meetings)	• Review of interim progress on the development of educational materials	WG3/WG4 experts
	Q4	• Development of the educational materials (continue)	National experts
2009	Q1	• Development of website contents	CEARAC consultant

7. Budget

Contract	Timing	Output	To be completed	Couterpart	Budget (US$)
MoU for the development of educational materials	2008 Q3	Educationa materials	2008 end of Q4	Expert in China	2,000
				Consultant in Japan	2,000
				Expert in Korea	2,000
				Expert in Russia	2,000
MoU for the development of website contents for the educationa materials	2009 Q1	Website contents for the educational materials	2009 Q1	Consultant	2,000
Total					10,000

Materials

Annex 1. List of collected information for the educational materials

Number	Name	URL	Organization	Country	Language	Category	Sensor	Application	Keywords	Note
1	DM 204 Environmental Imagery & Satellite Data Management	http://www.oceanteacher.org/oceanteacher/index.php?module=resource&task=&node=&gen code=content	IOC IODE	Others	English	Education			introduction/satellite remote sensing,satellite data/monitoring parameters-sensors	Ocean Teacher, Digital Library
2	Lecture 1 - Calibration of Ocean-Colour Sensors	http://www.ioccg.org/training/india/DrHeuma ni_ahd_cal.pdf	IOCCG	Others	English	Education			satellite data/sensors	Training Course in Ocean Colour Techniques and Applications (India, Feb. 2001)
3	Lecture 2 - Information Content of Ocean Colour Data	http://www.ioccg.org/training/india/DrHeuma ni_ahd_info.pdf	IOCCG	Others	English	Education			satellite data/monitoring parameters	Training Course in Ocean Colour Techniques and Applications (India, Feb. 2001)
4	Lecture 3 - Principal Component Conversion	http://www.ioccg.org/training/india/DrHeuma ni_ahd_pc.pdf	IOCCG	Others	English	Education			satellite data/monitoring parameters	Training Course in Ocean Colour Techniques and Applications (India, Feb. 2001)
5	Lecture 4 - Validation of Ocean Colour Sensors	http://www.ioccg.org/training/india/DrHeuma ni_ahd_val.pdf	IOCCG	Others	English	Education			in situ data/monitoring parameters and measurement methods	Training Course in Ocean Colour Techniques and Applications (India, Feb. 2001)
6	Lecture 1 - Primary Production and Related Processes	http://www.ioccg.org/training/turkey/DrWatts _lec1.pdf	IOCCG	Others	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
7	Lectures 2 & 3 - Modelling Primary Production on a Local and Global Scale	http://www.ioccg.org/training/turkey/DrWatts _lec2.pdf	IOCCG	Others	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
8	Software Demonstration - Primary Production Software Demonstration	http://www.ioccg.org/training/turkey/DrWatts _SoftwareDemo.pdf	IOCCG	Others	English	Education			satellite data/data processing method	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
9	Lecture - Satellite Orbits / Basic Radiometric Quantities and Definitions	http://www.ioccg.org/training/turkey/DrLynch _lecture2.pdf	IOCCG	Others	English	Education			satellite data/data processing method	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
10	Lecture 1 - Radiative Transfer in Oceans	http://www.ioccg.org/training/turkey/DrKopel ovich_Topic1.pdf	IOCCG	Others	English	Education			satellite data/data processing method	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
11	Lecture 2 - Oceanic Optical Properties and Models	http://www.ioccg.org/training/turkey/DrKopel ovich_Topic2.pdf	IOCCG	Others	English	Education			satellite data/monitoring parameters	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
12	Lecture 3 - Bio-optical Algorithms	http://www.ioccg.org/training/turkey/DrKopel ovich_Topic3.pdf	IOCCG	Others	English	Education			satellite data/monitoring parameters	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
13	Lecture 1 - On SeaWiFS Processing using SeaDAS	http://www.ioccg.org/training/turkey/DrFearn/OcSem 8_session1.pdf	IOCCG	Others	English	Education	SeaWiFS		satellite data/data processing method	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
14	Lecture 2 - On SeaWiFS Processing using SeaDAS	http://www.ioccg.org/training/turkey/DrFearn/OcSem 8_session2.pdf	IOCCG	Others	English	Education	SeaWiFS		satellite data/data processing method	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
15	Lecture 2 - On SeaWiFS Processing using SeaDAS	http://www.ioccg.org/training/turkey/DrFearn/OcSem sion_lec2.pdf	IOCCG	Others	English	Education	SeaWiFS		satellite data/data processing method	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
16	Lecture 1 - Primary production, availability/uptake of nutrients and photo-adaptation of phytoplankton in three interconnected regional seas: Black Sea, Sea of Marmara and Eastern Mediterranean	http://www.ioccg.org/training/turkey/DrYrima 2_lecture1.pdf	IOCCG	Others	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
17	Lecture 2 - Notes on Nutrients	http://www.ioccg.org/training/turkey/DrYrima 2_lecture2.pdf	IOCCG	Others	English	Education			in situ data/monitoring parameters and measurement methods	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
18	Lecture - Optical measurements, phytoplankton pigments, absorption characteristics, cal/val of ocean colour sensors	http://www.ioccg.org/training/turkey/DrClem ovich_lecture.pdf	IOCCG	Others	English	Education			satellite data/data processing method	Remote Sensing of Ocean Colour Course (Turkey, Sep. 2000)
19	Living Ocean Teacher's Guide	http://oceancolor.gsfc.nasa.gov/SeaWiFS/LIVING_OCEAN/	NASA GSFC	US	English	Education	SeaWiFS		introduction/satellite remote sensing	SeaWiFS Project, Teachers Resources
20	Monitoring the Earth from Space with SeaWiFS	http://oceancolor.gsfc.nasa.gov/SeaWiFS/TEACHERS/sanctuary_1.html	NASA GSFC	US	English	Education	SeaWiFS		introduction/satellite remote sensing	SeaWiFS Project, Teachers Resources
21	NEW 2000 Teacher Workshop	http://oceancolor.gsfc.nasa.gov/SeaWiFS/TEACHERS/HTML	NASA GSFC	US	English	Education	SeaWiFS		introduction/satellite remote sensing	SeaWiFS Project, Teachers Resources
22	Faux Shuttle Views From SeaWiFS Data	http://oceancolor.gsfc.nasa.gov/cgi/psirawfromma rsteawifs_image_cookbook/faux_shuttle/	NASA GSFC	US	English	Education	SeaWiFS		satellite data/data processing method	SeaWiFS Project, Teachers Resources
23	General information	http://www.csc.noaa.gov/crs/gen_info.html	NOAA CSC	US	English	Education			introduction/satellite remote sensing	Coastal Remote Sensing Program
24	Present and Future Chinese Satellite Missions for Ocean Remote Sensing	http://wam.esa.int/dragon/ocean_training/L1 andala materials/12_Dragon1stTrain_Oc1 5Oct2007/D1_L1_Pandau_lectur_20071015_V1.pdf	ESA	Europe	English	Education	CMOTS,CZ I		satellite data/monitoring parameters,new/prospect/new sensor	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct. 2007)

Materials

Number	Name	URL	Organization	Country	Language	Category	Sensor	Application	Keywords	Note
25	Present and Future ESA Satellite Missions for Ocean Remote Sensing	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY1-15Oct2007/D1_L2_ESA-EOmissions10-07.pdf	ESA	Europe	English	Education	A1SR,AA TSR,MER IS		satellite data+new+sensor+challenges and prospects+new sensor	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
26	Dragon Projects in Ocean Research: Ocean Colour Studies	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY1-15Oct2007/D1_L4_ocean_colour_studies_doeffel20070922.pdf	ESA	Europe	English	Education	MERIS		challenges and prospects/algorithm development	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
27	System and Data Products of ERS and ENVISAT, Access to ERS and ENVISAT data	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY1-15Oct2007/D1_L5_Regner_System_and_data_products_1.pdf	ESA	Europe	English	Education	MERIS,A SAR,AAT SR		satellite data+sensors+obtaining data	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
28	Lecture 1 - Introduction into Ocean Colour remote sensing using MERIS	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY2-16Oct2007/D2_L1_color_lecture_1.doeffel20070921_eng.pdf	ESA	Europe	English	Education	MERIS		satellite data/monitoring parameters+sensors,challenges and prospects/new sensor	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
29	Lecture 2 - Atmospheric correction and Coastal Water Algorithms	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY2-16Oct2007/D2_L2_ocean_color_lecture_II_doeffel20070921_eng.pdf	ESA	Europe	English	Education	MERIS		satellite data/monitoring parameters+sensors,challenges and prospects/new sensor	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
30	Practical 1: MERIS data and BEAM Toolbox principles	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY2-16Oct2007/D2_P1_MERIS_Products_1.pdf	ESA	Europe	English	Education	MERIS		satellite data/obtaining data	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
31	Lecture 3 - The use of MERIS, MODIS and SeaWIFS data for ocean color applications in coastal areas	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY2-16Oct2007/D2_L3_PanDelu_lecture_2007106_v1.pdf	ESA	Europe	English	Education	MERIS,M ODIS,Sea WIFS		Introduction/new+rogue+eutrophicat ion+satellite remote sensing satellite data/monitoring parameters in situ data/monitoring parameters and measurement methods,challenges and prospects/algorithm development	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
32	Practical 2: Practical exercises with MERIS, MODIS and SeaWIFS data for ocean color applications in coastal areas	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY2-16Oct2007/D2_P2_BEAM_training_4.pdf	ESA	Europe	English	Education	MERIS		satellite data/data processing method	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
33	Practical 2: Practical exercises with MERIS data using the BEAM and MAPPI software 1	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY2-16Oct2007/D2_Pan-Delu_MAPP_practice_V1.pdf	ESA	Europe	English	Education	MERIS,M ODIS,Sea WIFS,CO CTS		satellite data/data processing method	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
34	Lecture 1 - Measuring SST from Space	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY3-17Oct2007/D3_L1_DL/L1_OTC07_lectures.pdf	ESA	Europe	English	Education	A1SR,AA TSR		satellite data/monitoring parameters,monitoring and assessment of eutrophication/integration with the existing monitoring system	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
35	Lecture 2 - SST Observations of Large-Scale Ocean Processes	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY4-18Oct2007/D4_L2_CO_lecture.pdf	ESA	Europe	English	Education			satellite data/monitoring parameters,monitoring and assessment of eutrophication/integration with the existing monitoring system	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
36	Practical Session-The AATSR Global Analyser	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY4-18Oct2007/D4-18Oct2007/OLJ-LAGA_Exercise_notes.doc	ESA	Europe	English	Education	AATSR		satellite data/data processing method	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
37	Practical Session: Biko-an Introduction to SST Image Analysis	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY4-18Oct2007/D4_P1_CO_lecture_1.pdf	ESA	Europe	English	Education	AATSR		satellite data/data processing method	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)
38	Lecture 1 - Observations, Models and Environmental Prediction	http://earth.esa.int/dragon/ocean_training/lecture_Material/DAY4-18Oct2007/D4_L1_DL1_OTC07_lecture.pdf	ESA	Europe	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct 2007)

Materials

Number	Name	URL	Organization	Country	Language	Category	Sensor	Application	Keywords	Note
39	Lecture 2 - GODAE: TheGlobal Ocean Data Assimilation Experiment	http://earth.esa.int/dragon/ocean_training/Lecture_Material/DAY9-2004/2007/OM_L2_lelraon_lectured.pdf	ESA	Europe	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct. 2007)
40	Lecture 3 - MERSEA and Diagnoses: Operational Monitoring and Forecasting Systems of the Ocean Physics, Biogeochemistry, and Ecosystems	http://earth.esa.int/dragon/ocean_training/Lecture_Material/DAY9-2004/2007/OM_L3_JU_Dragon_MERSEA_ocean.pdf	ESA	Europe	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct. 2007)
41	Lecture 4 - Using the Next Generation of Sea Surface Temperature data Products for Climate monitoring, NWP and Ocean Forecasting	http://earth.esa.int/dragon/ocean_training/Lecture_Material/DAY9-2004/2007/OM_L4_CD-SST-applications-v1.0.pdf	ESA	Europe	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	ESA-MOST Dragon Programme, 2nd Advanced Training Course in Ocean Remote Sensing (Hangzhou, Oct. 2007)
42	Satellite data downloading procedures	http://www.nowpap3.go.jp/jawleng/software/Software.pdf#definetho4.pdf	NPEC	Japan	English	Education			satellite data/obtaining data	Marine Environmental Protection of Northwest Pacific Region, Data Processing/Analysis
43	Acquiring the physical values from ASCII data format	http://www.nowpap3.go.jp/jawleng/software/Software.pdf#onasciidata.pdf	NPEC	Japan	English	Education			satellite data/data processing method	Marine Environmental Protection of Northwest Pacific Region, Data Processing/Analysis
44	Creating correlation charts using on-site and satellite data	http://www.nowpap3.go.jp/jawleng/software/Software.pdf#correlationcharts.pdf	NPEC	Japan	English	Education			monitoring and assessment of eutrophication/accuracy evaluation	Marine Environmental Protection of Northwest Pacific Region, Data Processing/Analysis
45	Seasonal variations in satellite data and charting changes over time	http://www.nowpap3.go.jp/jawleng/software/Software.pdf#seasonalvariationssatellite.pdf	NPEC	Japan	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	Marine Environmental Protection of Northwest Pacific Region, Data Processing/Analysis
46	Image display procedures using SeaDAS	http://www.nowpap3.go.jp/jawleng/software/Software.pdf#seadasimageresearch.pdf	NPEC	Japan	English	Education			satellite data/data processing method	Marine Environmental Protection of Northwest Pacific Region, Data Processing/Analysis
47	Image display procedures using GRASS	http://www.nowpap3.go.jp/jawleng/software/Software.pdf#grassimageresearch.pdf	NPEC	Japan	English	Education			satellite data/data processing method	Marine Environmental Protection of Northwest Pacific Region, Data Processing/Analysis
48	Introduction - Remote Sensing for the Northeast Asian Seas	http://www.cearac-project.org/wg4/1stRST/DrKawamura_Introduction.pdf	CEARAC, NEAR-GOOS	Others	English	Education			introduction/satellite remote sensing satellite data/monitoring parameters-sensors	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep. 2007)
49	Atmospheric Correction and Bio-optical Algorithm for Ocean Color Remote Sensing 1	http://www.cearac-project.org/wg4/1stRST/MrAsanuma_Atmospheric.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/monitoring parameters	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep. 2007)
50	Atmospheric Correction and Bio-optical Algorithm for Ocean Color Remote Sensing 2	http://www.cearac-project.org/wg4/1stRST/MrAsanuma_Bio-optical.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/monitoring parameters	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep. 2007)
51	Introduction of Satellite Data Distribution System	http://www.cearac-project.org/wg4/1stRST/DataSystem.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/obtaining data	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep. 2007)
52	Operational Oceanographic Data Exchange and NEAR-GOOS Regional Real Time Data Base	http://www.cearac-project.org/wg4/1stRST/Yoshida_Operational.pdf	CEARAC, NEAR-GOOS	Others	English	Education			in situ data/parameters and measurement method	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep. 2007)
53	Introduction of RDMDB (NEAR-GOOS) & Data Management at JODC	http://www.cearac-project.org/wg4/1stRST/MrMukainaka_Introduction.pdf	CEARAC, NEAR-GOOS	Others	English	Education			in situ data/parameters and measurement method	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep. 2007)
54	Introduction to software for satellite data analysis - with an emphasis on SeaWiFS Data Analysis System	http://www.cearac-project.org/wg4/1stRST/MrTerauchi_Introduction.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/data processing method	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep. 2007)
55	The Optic Properties and Regional Ocean Color Algorithms for the Case-II Waters in China Seas	http://www.cearac-project.org/wg4/1stRST/Tang_Optic.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/monitoring parameters, in situ data/parameters and measurement method/challenges and prospects/algorithm development	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep. 2007)
56	Validation of Ocean Color Remote Sensing Data in Korea	http://www.cearac-project.org/wg4/1stRST/DrKim_Validation.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/monitoring parameters, in situ data/parameters and measurement method/challenges and prospects/algorithm development in	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep. 2007)
57	Satellite-based Red-Tide Detection/Monitoring	http://www.cearac-project.org/wg4/1stRST/DrKawamura_Satellite.pdf	CEARAC, NEAR-GOOS	Others	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep. 2007)

Materials

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Number	Name	URL	Organization	Country	Language	Category	Sensor	Application	Keywords	Note
58	Case Studies of Red Tide	http://www.cearac-project.org/wg4/1stRST/RedTide.pdf	CEARAC, NEAR-GOOS	Others	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
59	Measurements of Ocean Optical Properties for Sea Truth	http://www.cearac-project.org/wg4/1stRST/Measurements.pdf	CEARAC, NEAR-GOOS	Others	English	Education			in situ data/parameters and measurement method	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
60	Introduction to NGSST and SST Application for Monitoring of Ocean Environment	http://www.cearac-project.org/wg4/1stRST/Dr_Park.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/monitoring parameters /monitoring and assessment of eutrophication/integration with the existing monitoring system	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
61	Hands-on Practice on WIM/WAM - Basic exercise on WIM/WAM	http://www.cearac-project.org/wg4/1stRST/Exercises_WIM_WAM.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/data processing method	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
62	Hands-on Practice on WIM/WAM - Familiarizing with satellite data distribution system	http://www.cearac-project.org/wg4/1stRST/Exercises_Merging.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/obtaining data	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
63	Hands-on Practice on WIM/WAM - Visualizing and projecting satellite data images 1	http://www.cearac-project.org/wg4/1stRST/Exercises_Chl_mosaic_South_China_Sea.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/data processing method	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
64	Hands-on Practice on WIM/WAM - Visualizing and projecting satellite data images 2	http://www.cearac-project.org/wg4/1stRST/Exercises_Altimetry.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/data processing method	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
65	Hands-on Practice on WIM/WAM - Command line programs for time series analysis 1	http://www.cearac-project.org/wg4/1stRST/Exercises_WAM_CP.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/data processing method	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
66	Hands-on Practice on WIM/WAM - Command line programs for time series analysis 2	http://www.cearac-project.org/wg4/1stRST/Exercises_WAM_E_CP_Appendix_South_China_Sea.pdf	CEARAC, NEAR-GOOS	Others	English	Education			satellite data/data processing method	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
67	Hands-on Practice on WIM/WAM - Match up analysis with sea truth measurement data	http://www.cearac-project.org/wg4/1stRST/Exercises_detaching_hats.pdf	CEARAC, NEAR-GOOS	Others	English	Education			monitoring and assessment of eutrophication/accuracy evaluation	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
68	Hands-on Practice on WIM/WAM - Time series analysis of NGSST data	http://www.cearac-project.org/wg4/1stRST/Exercises_Merging_SST.pdf	CEARAC, NEAR-GOOS	Others	English	Education			monitoring and assessment of eutrophication/integration with the existing monitoring system	1st NEAR-GOOS - NOWPAP Joint Training Course on Remote Sensing Data Analysis (Nagasaki, Sep 2007)
69	Remote Sensing Tutorial	http://rst.gsfc.nasa.gov/	NASA GSFC	US	English	Education			introduction/satellite remote sensing	
70	Ocean Color Science Focus	http://disc.sci.gsfc.nasa.gov/oceancolor/	NASA GSFC	US	English	Education	CZCS, SeaWiFS		introduction/satellite remote sensing	
71	Earth Observatory	http://earthobservatory.nasa.gov/	NASA	US	English	Education			introduction/satellite remote sensing	