

Data Products of Chinese Spaceborne Ocean Observing Systems

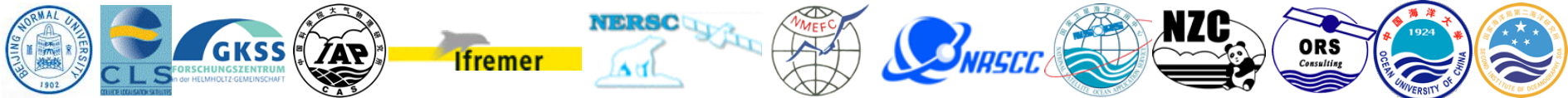
***EC DRAGONESS Project WP2 Second Annual Report
(Activity Report, 01/09/2008—31/08/2009)***

**Ming-Xia HE, Lei Guan, Yunfei Wang, Jin Sha,
Tinglu Zhang, Chuanmin Hu**

**Ocean Remote Sensing Institute
Ocean University of China**



DRAGONESS 2nd Annual Meeting, Qingdao, China, 8-10 September 2009



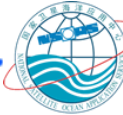
Outline

- **Ocean Data Products of on-orbit Sensors**
- **Operational Retrieval Algorithms of on-orbit Sensors**
 - Ocean Color
 - SST
- **Operational Application of on-orbit Sensors**
 - **The Service System for Monitoring of Floating Green Algae**
 - **Operational System for Monitoring of Water Quality in Zhejiang Coastal Waters**



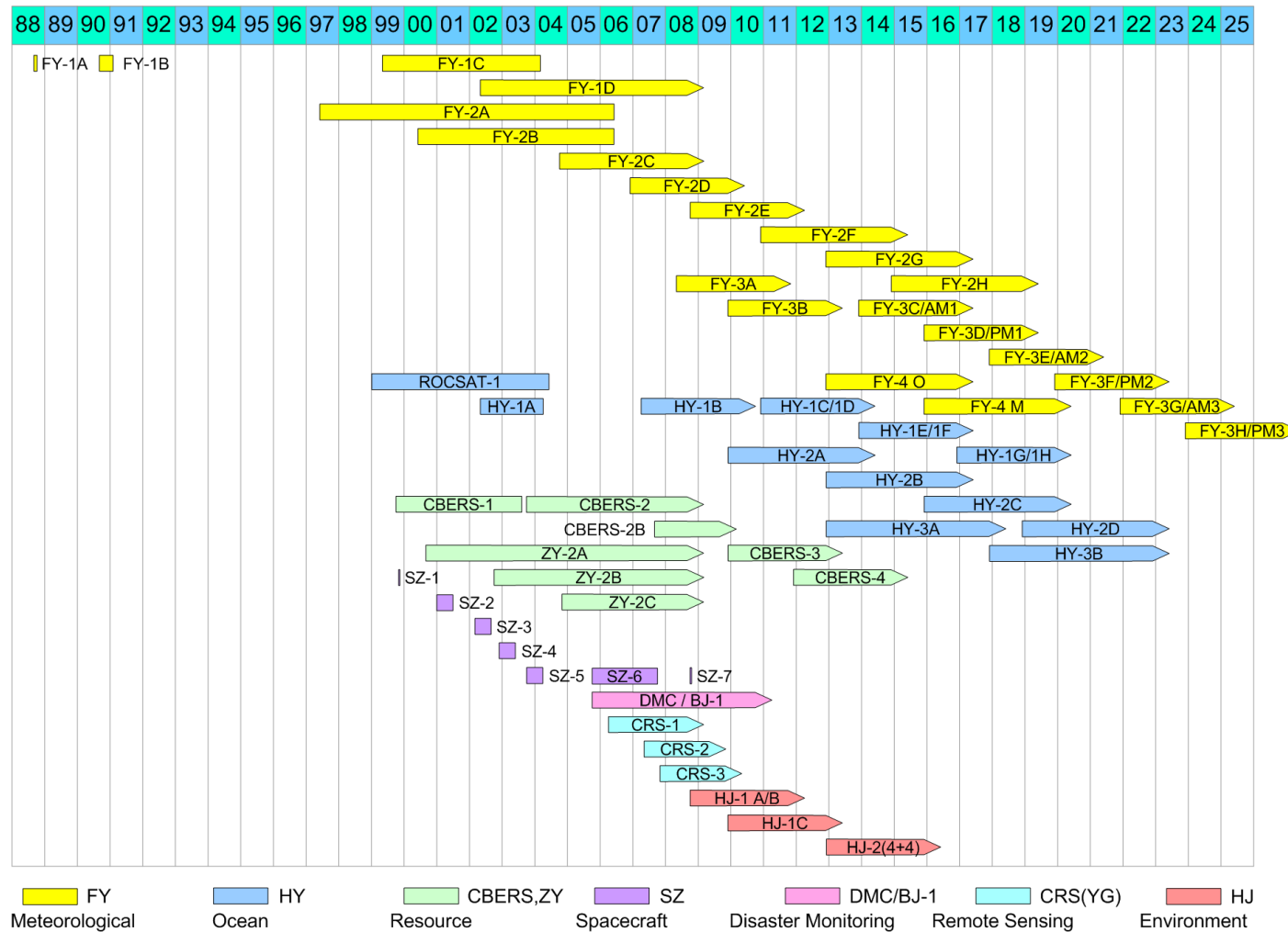


Ifremer



Ocean Data Products of on-orbit Sensors

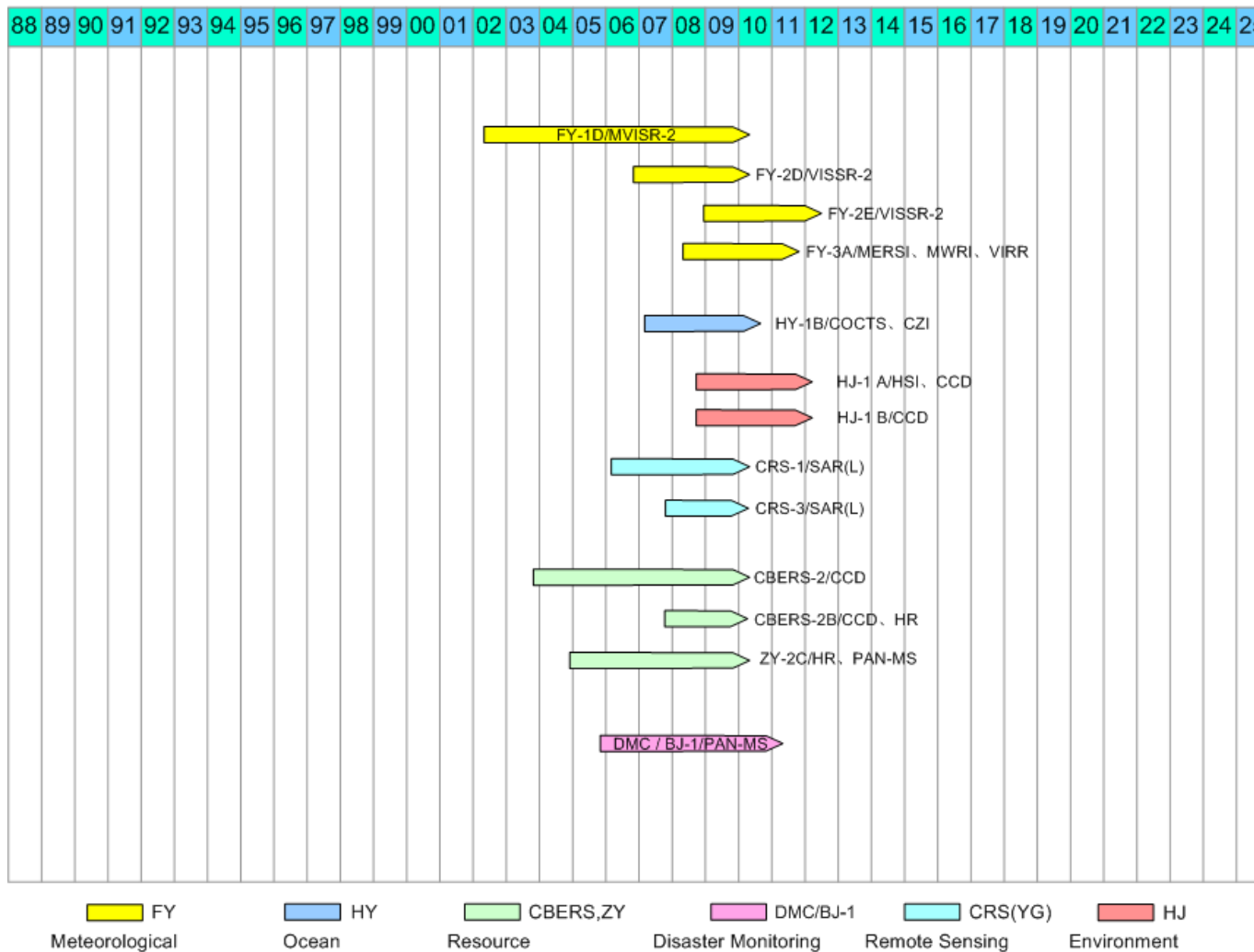
CHINESE SPACEBORNE EARTH OBSERVING SYSTEM

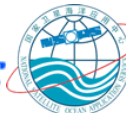


DRAGONESS 2nd Annual Meeting, Qingdao, China, 8-10 September 2009

Ocean Data Products of on-orbit Sensors

CHINESE ON-ORBIT SATELLITE SYSTEM





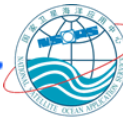
Ocean Data Products of on-orbit Sensors

on-orbit sensors

Chinese on-orbit sensors for ocean

Satellite	Sensor	Launch date	Characteristics	Similar sensor	Application	Note
FY-1D	MVISR-2	2002.5	10 channels, VIS-NIR	AVHRR CZCS	SST, ocean color, meteorology	
FY-2D	VISSR-2	2006.12	5 channels, VIS-NIR	GOES / Imager	SST, meteorology	
FY-2E	VISSR-2	2008.12	5 channels, VIS-NIR	GOES / Imager	SST, meteorology	substitute for FY-2C
FY-3A	VIRR	2008.5	10 channels, VIS-NIR	AVHRR CZCS	SST, ocean color, meteorology	
FY-3A	MERSI	2008.5	20 channels, VIS-NIR	MODIS	ocean color, meteorology	
FY-3A	MWRI	2008.5	5 channels, H,V polarization	TMI	SST, SSW, meteorology coastal zone	
HY-1B	COCTS	2007.4	10 channels, VIS-NIR	OCTS SEAWIFS	ocean color, SST	
HY-1B	CZI	2007.4	4 channels, CCD,20nm,250m		coastal zone	





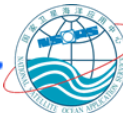
Ocean Data Products of on-orbit Sensors

on-orbit sensors

Chinese on-orbit sensors for ocean

Satellite	Sensor	Launch date	Characteristics	Similar sensor	Application	Note
CRS-1	SAR	2006.4	L-band, 5m, HH		ocean dynamics, sea surface features, coastal zone	
CRS-3	SAR	2007.11	L-band, <5m, HH		ocean dynamics, sea surface features, coastal zone	
HJ-1A	HSI	2008.9	0.49-0.95 μ m, 4nm, 100m	HICO Hyperion	ocean color, vegetation, red tides, oil spill	
HJ-1A	CCD	2008.9	4 channels, 30m	Landsat7	coastal zone, SST	
HJ-1B	CCD	2008.9	4 channels, 30m	Landsat7	coastal zone, SST	
CBERS-2	CCD	2003.10	5 channels, 20m	Landsat7 Spot5	coastal zone	
CBERS-2B	CCD	2007.9	5 channels, 20m	Landsat7 Spot5	coastal zone	
CBERS-2B	HR	2007.9	high resolution camera, 2m	QuickBird	coastal zone	
ZY-2C	HR	2004.11	high resolution camera, 2m	IKONOS	coastal zone	
ZY-2C	PAN-MS	2004.11	4 channels, 5m	IKONOS	coastal zone	
DMC-BJ1	PAN-MS	2005.10	3 channels, 4m	Landsat7	coastal zone	





Ocean Data Products of on-orbit Sensors

FY-3A / MERSI Channel Characteristics

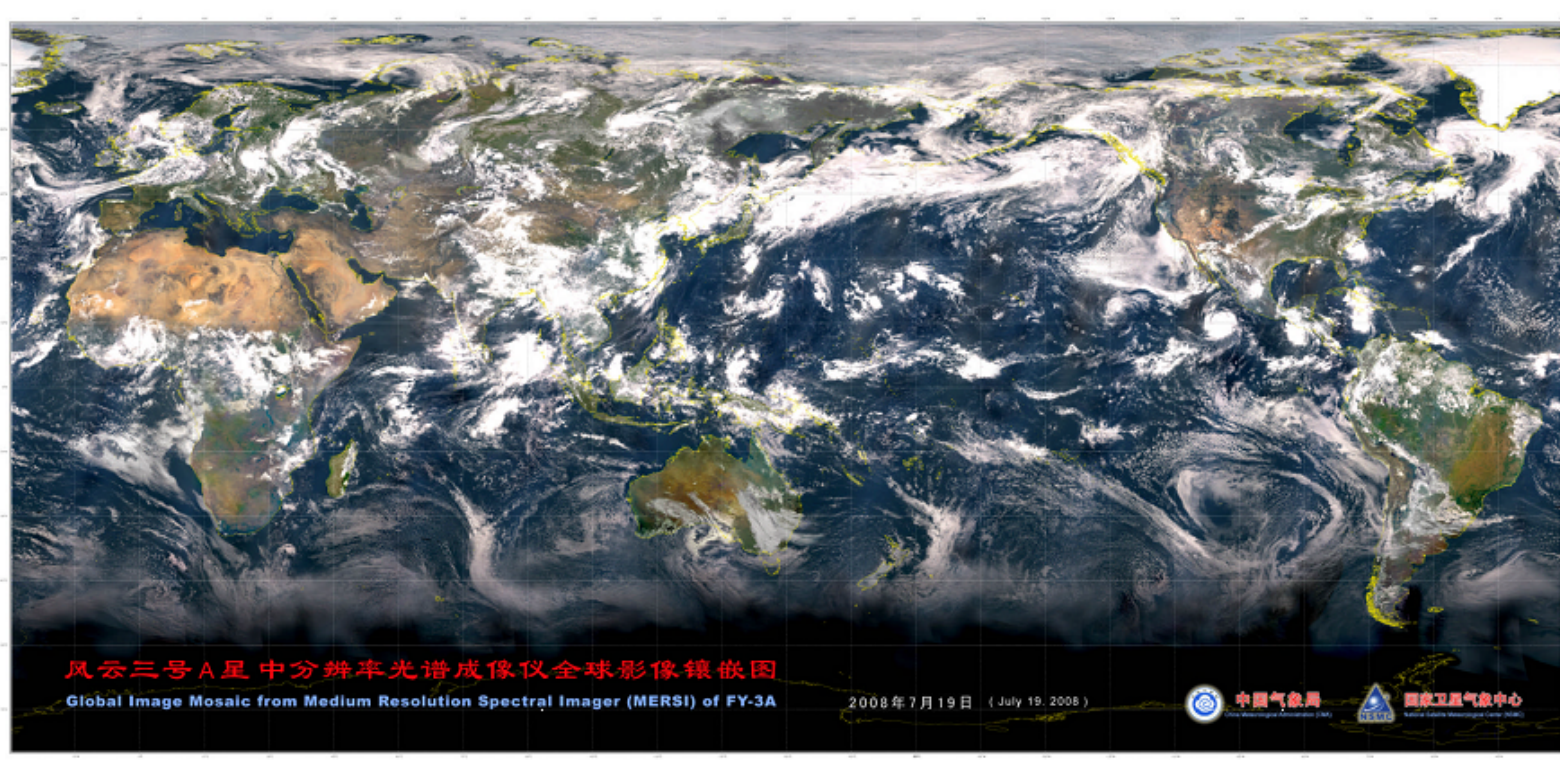
ocean data
products of
FY-3A / MERSI

Channel No.	Central wavelength (μm)	Band width (μm)	Sub-point Resolution (m)	NE $\Delta T \rho$ (%) T(300K)	Dynamic Range (ρ)(K)
1	0.470	0.05	250	0.29	100%
2	0.550	0.05	250	0.20	100%
3	0.650	0.05	250	0.20	100%
4	0.865	0.05	250	0.23	100%
5	11.25	2.5	250	0.20	330k
6	0.412	0.02	1000	0.045	80%
7	0.443	0.02	1000	0.042	80%
8	0.490	0.02	1000	0.045	80%
9	0.520	0.02	1000	0.043	80%
10	0.565	0.02	1000	0.046	80%
11	0.650	0.02	1000	0.042	80%
12	0.685	0.02	1000	0.037	80%
13	0.765	0.02	1000	0.036	80%
14	0.865	0.02	1000	0.037	80%
15	0.905	0.02	1000	0.037	90%
16	0.940	0.02	1000	0.034	90%
17	0.980	0.02	1000	0.039	90%
18	1.030	0.02	1000	0.047	90%
19	1.640	0.05	1000	0.073	90%
20	2.130	0.05	1000	0.068	90%



Ocean Data Products of on-orbit Sensors

ocean data products of FY-3A / MERSI

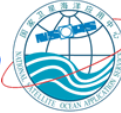


A global image mosaic from MERSI with natural color and resolution of 3km



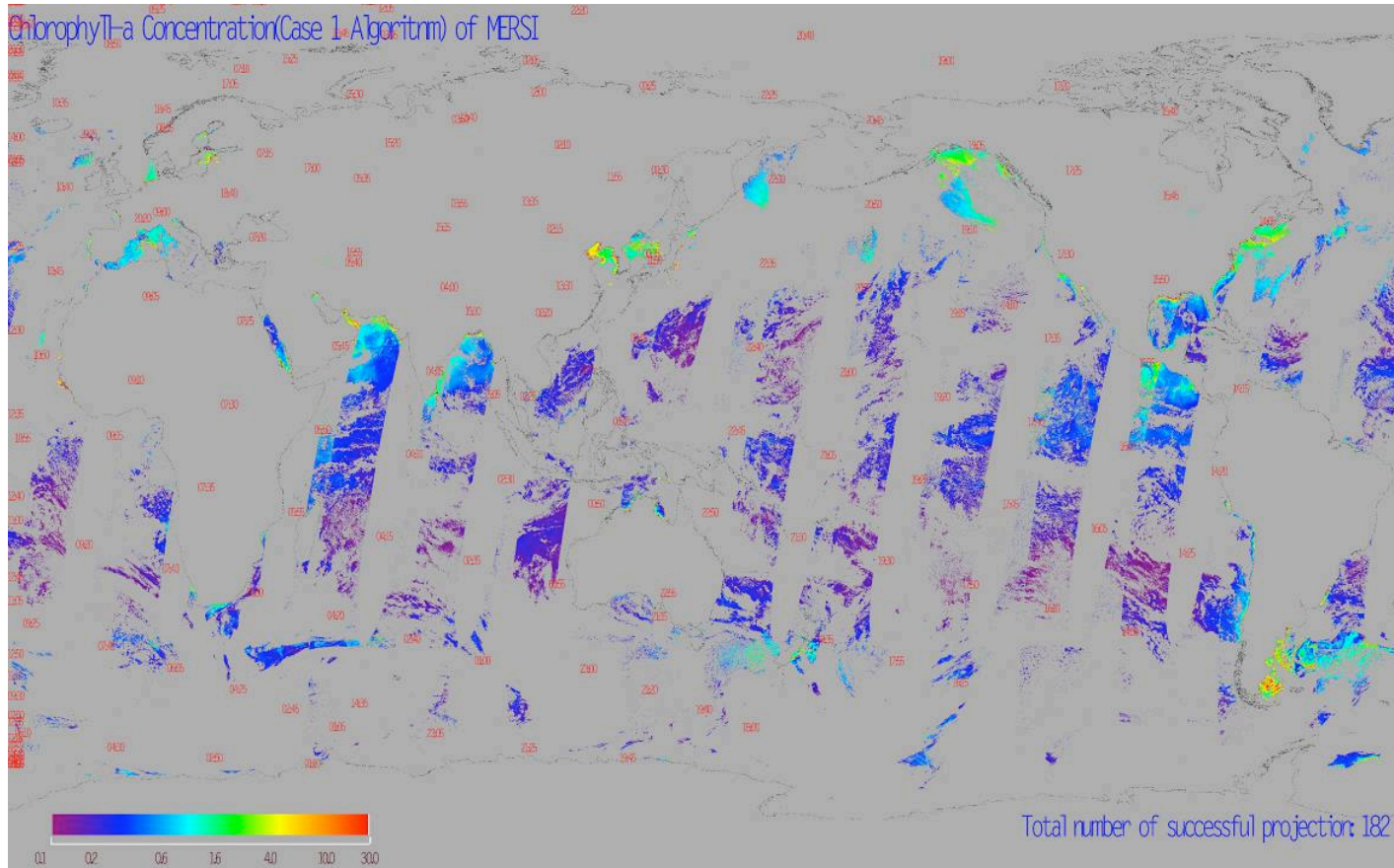


Ifremer



Ocean Data Products of on-orbit Sensors

ocean data products of FY-3A / MERSI

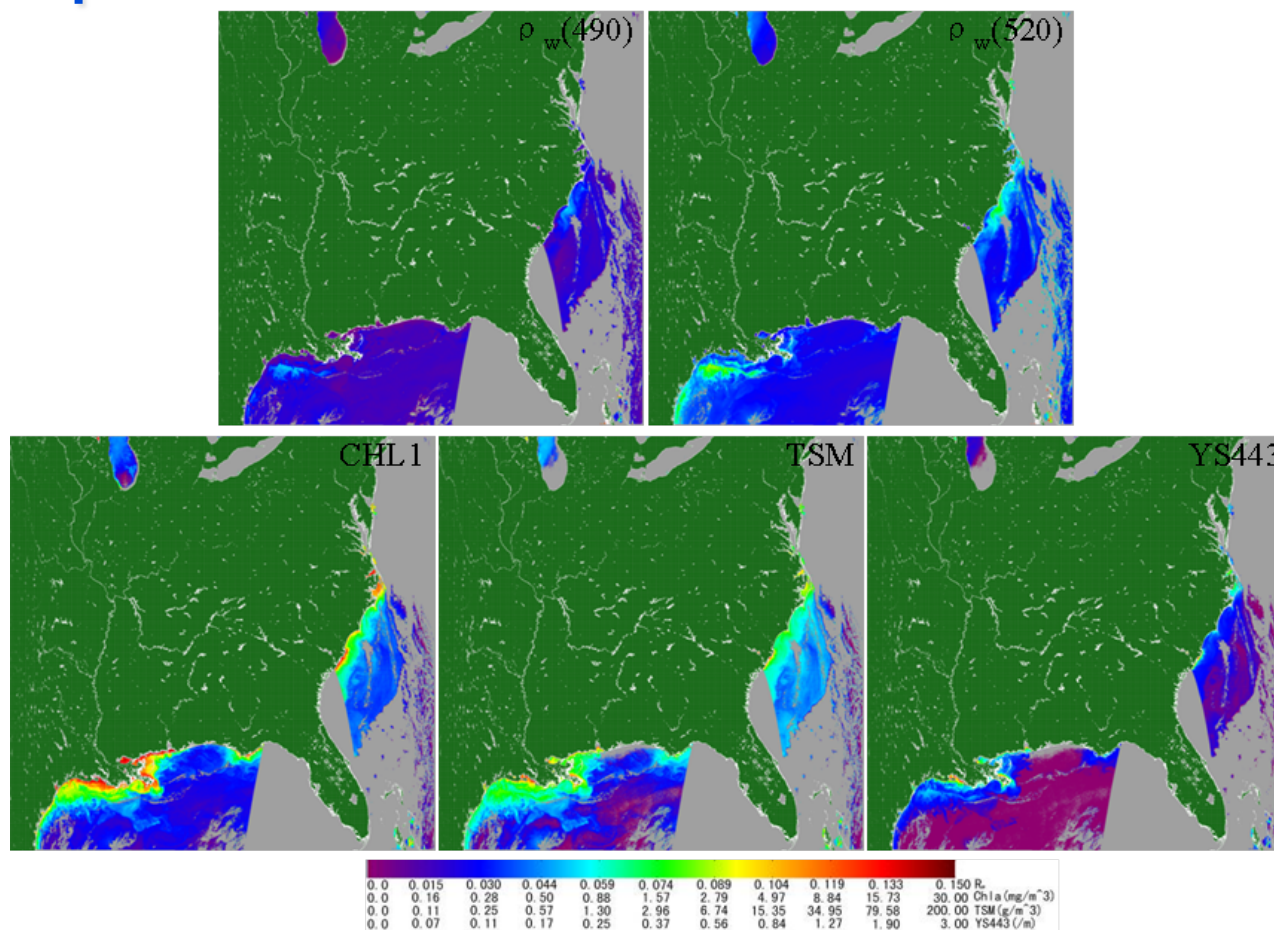


Chlorophyll-a concentration (Case 1 algorithm) image mosaic from MERSI data (7/3/2009)



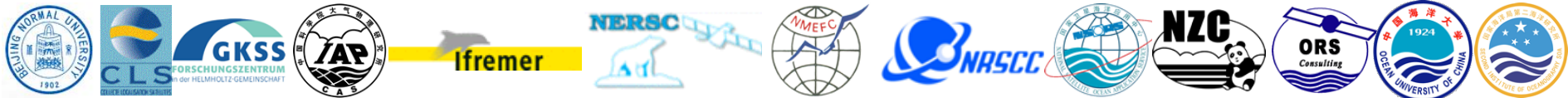
Ocean Data Products of on-orbit Sensors

ocean data products of FY-3A / MERSI



pw(490), pw(520), CHL1, TSM and YS443 images from MERSI ocean color products (27/09/2008 16:10 GMT)





Ocean Data Products of on-orbit Sensors

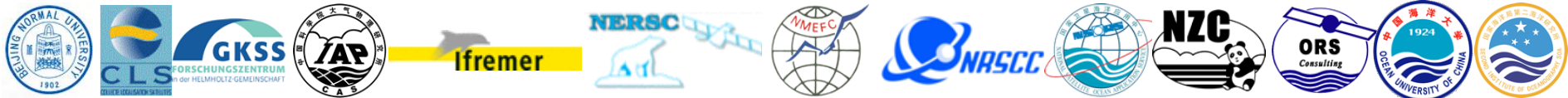
ocean data products of FY-3A / MERSI

<http://fy3.satellite.cma.gov.cn/PortalSite/default.aspx>

I nterface of the software for displaying FY3 data



DRAGONESS 2nd Annual Meeting, Qingdao, China, 8-10 September 2009



Ocean Data Products of on-orbit Sensors

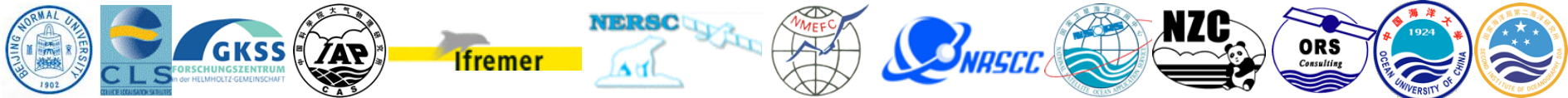
Data Products of MERSI

ocean data products of FY-3A / MERSI

Instrument	Category	Product name / Product type	Res.	Level
Medium Resolution Spectral Imager (MERSI)	Level 1	*FY-3A MERSI L1data (250 m) / L1	250 m	L1
		*FY-3A MERSI L1data (1 km) / L1	1000 m	L1
		*FY-3A MERSI L1data (OBC) / L1	NONE	L1
	Geo-location Data set	MERSI Geographic Lat/Lon projection data set 250 m	250 m	L2
		MERSI Geographic Lat/Lon projection data set 1 km	1000 m	L2
	Atmosphere, Precipitable Water	MERSI daily product for precipitable water over land in China	1000 m	L2
		MERSI daily product for precipitable water over land	5000 m	L2
		MERSI monthly product for precipitable water over land	10 km	L3
		MERSI seasonal product for precipitable water over land	10 km	L3
		*MERSI swath product for precipitable water over land / PWV	1000 m	L2
	Cloud Detection	*MERSI cloud detection product /CLM	1000 m	L2
	Land Surface Reflectivity	*MERSI Land Surface Reflectivity 250 m / LSR	250 m	L2
		*MERSI Land Surface Reflectivity 1km /LSR	1000 m	L2
	Aerosol over Ocean	*MERSI daily product for aerosol over ocean / ASO	1000 m	L2
		MERSI monthly product for aerosol over ocean	1000 m	L3
		MERSI seasonal product for aerosol over ocean	1000 m	L3
	Aerosol over Land	*MERSI daily product for aerosol over land /ASL	1000 m	L2
		MERSI monthly product for aerosol over land	1000 m	L3
		MERSI seasonal product for aerosol over land	1000 m	L3
	Ocean Color	*MERSI daily product for ocean color /OCC	1000 m	L2
		MERSI monthly product for ocean color	1000 m	L3
		MERSI seasonal product for ocean color	1000 m	L3
	Normalized Differential Vegetation Index	MERSI monthly product for vegetation index 250 m	250 m	L3
MERSI monthly product for vegetation index 1 km		1000 m	L3	
MERSI seasonal product for vegetation index 250 m		250 m	L3	
MERSI seasonal product for vegetation index 1km		1000 m	L3	

Note: data products marked with star can be downloaded from the service web for remote sensing data of FY satellites





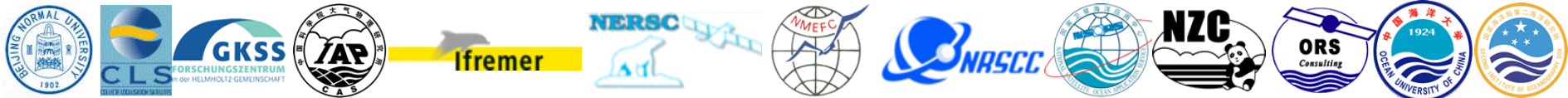
Ocean Data Products of on-orbit Sensors

ocean data products of HY-1B / COCTS

HY-1B / COCTS specification

Spectral range (μm)	B1:0.402~0.422 B2:0.433~0.453 B3:0.480~0.500 B4:0.510~0.530 B5:0.555~0.575 B6:0.660~0.680 B7:0.740~0.760 B8:0.845~0.885 B9:10.30~11.40 B10:11.40~12.50
central wavelength shift	$\leq 2\text{nm}$ (B1~B8)
Sub-point spatial resolution	$\leq 1100\text{m}$
Pixels/ Line	1664
Digitization	10bit
Radiometer	Visible bands :10% Infra-red bands : $\pm 1\text{K}$ (on-board calibration accuracy , 300K)





Ocean Data Products of on-orbit Sensors

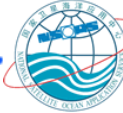
ocean data products of HY-1B / COCTS

ocean data products of HY-1B / COCTS

Level	Products
Level 0	Raw data cocts.L0
Level 1	L1A data with cloud detection and geo-location
	* L1B calibrated geo-located radiances
Level 2	Six normalized water-leaving Radiances (412 nm, 443 nm, 490 nm, 510 nm, 555 nm and 670 nm bands)
	Three aerosol radiance (670 nm, 750 nm and 865 nm bands)
	* chlorophyll a pigment concentration
	CZCS pigment concentration
	* SST
	The ratio of aerosol radiance at 7 th and 8 th bands
	aerosol optical thick (865 nm)
suspended matter concentration	
ocean water diffuse attenuation coefficient	
Level 3	Weekly and monthly products for 16 products of level 2 data

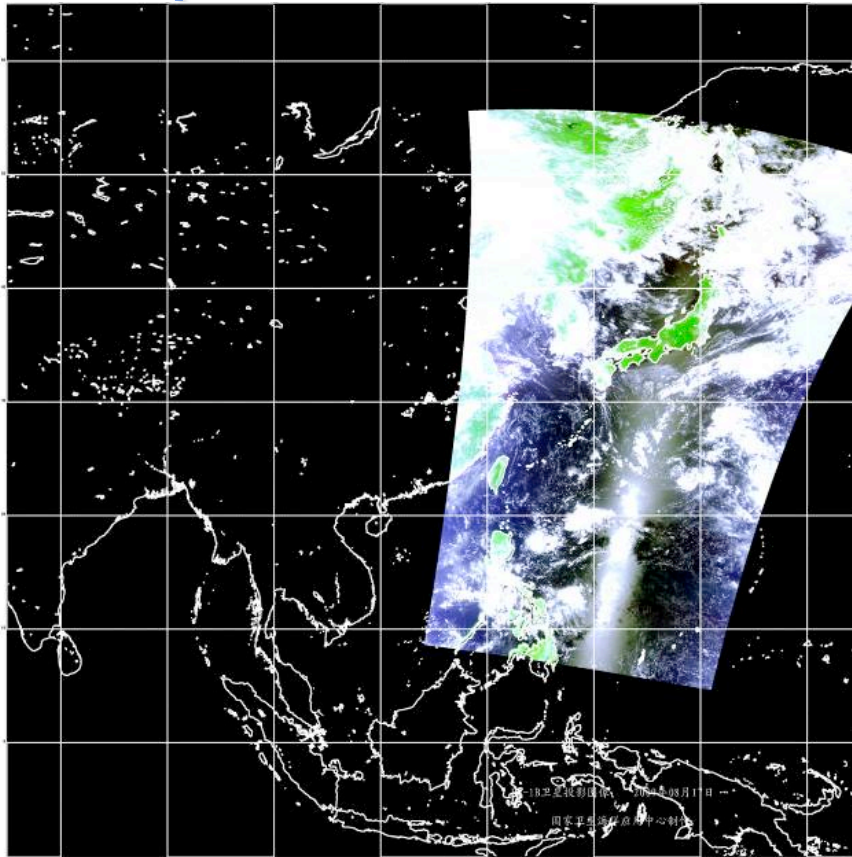


DRAGONESS 2nd Annual Meeting, Qingdao, China, 8-10 September 2009

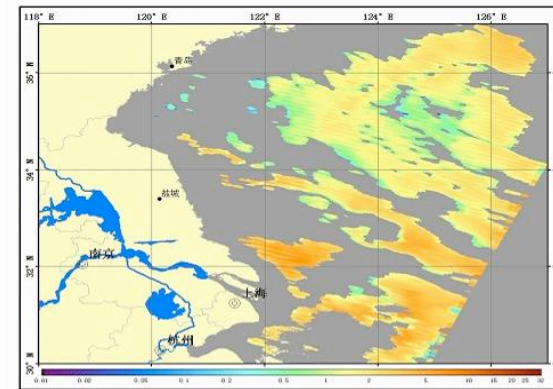


Ocean Data Products of on-orbit Sensors

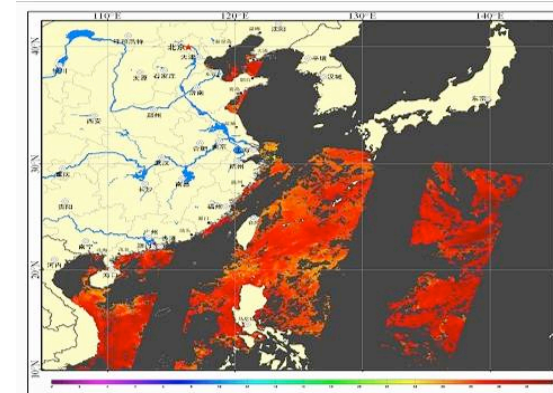
ocean data products of HY-1B / COCTS



HY-1B / COCTS RGB image



HY-1B / COCTS CHL image



HY-1B / COCTS SST image



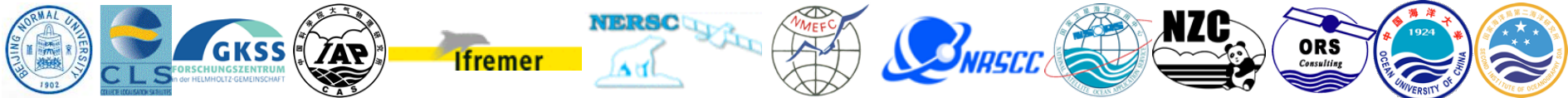
Ocean Data Products of on-orbit Sensors

ocean data products of HJ-1A / HSI

HJ-1 constellation specifications and major orbital characteristics

Parameter \ Satellite	Optical small satellite (HJ-1A、HJ-1B)	SAR small satellite (HJ-1C)
Orbit type	Near circular and near Sun-synchronous	Near circular and near Sun-synchronous
Altitude	650 km	499 km
Inclination	97.95°	97.37°
Repeat cycle	31 days	31 days
Local time at descending node	10:30AM	6:00AM
attitude maintain accuracy	nadir drift $\leq \pm 10\text{Km}$	nadir drift $\leq \pm 20\text{Km}$
A, B star phase distribution	180°(though the ascending node time with A Star front)	





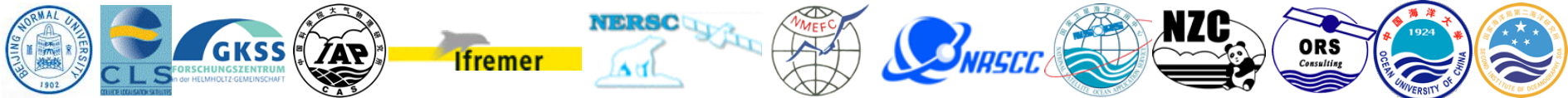
Ocean Data Products of on-orbit Sensors

ocean data products of HJ-1A / HSI

HJ-1A / HSI specification

Parameter	Performance
Swath (km)	≥ 50
Spectral range (μm)	0.458-0.956 μm
Average spectral resolution (nm)	4.57nm
Spatial resolutions (m)	100
Lateral visual field angle	$\pm 30^\circ$
Channel number	110~128, 115
Digitization (bit)	12
S/N	50~100
Dynamic range	134 W/(m ² Sr μm)
MTF	≥ 0.2
Radiometer	<5%, <10%





Ocean Data Products of on-orbit Sensors

ocean data products of HJ-1A / HSI

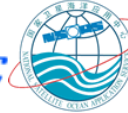
Ocean color products of HJ-1A / HSI

Product	Monitoring area	Data type	Spatial resolution
Chlorophyll a Concentration	Inshore water, estuary, lake	4 days, monthly, seasonal, annual	30m/100m
Suspended matter Concentration	Inshore water, estuary, lake	4 days, monthly, seasonal, annual	30m/100m
Transparence	Inshore water, estuary, lake	4 days, monthly, seasonal, annual	30m/100m
Euphotic depth	Inshore water	4 days, monthly, seasonal, annual	30m/100m
Absorption coefficient of CDOM	Inshore water	4 days, monthly, seasonal, annual	100m/1000m
Ocean primary Productivity	Inshore water	4 days, monthly, seasonal, annual	30m/100m
Nutrition index	Inshore water, estuary, lake	4 days, monthly, seasonal, annual	30m/100m/500m
Eutrophication	Inshore water, lake	monthly	30m/100m
Water quality access of inshore water	Inshore water	seasonal, annual	30m/100m/500m
Water quality access of estuary	estuary	seasonal, annual	30m/100m/500m
Identification of algae and sea grass	Inshore water, estuary, lake	4 days, monthly, seasonal, annual	30m/100m



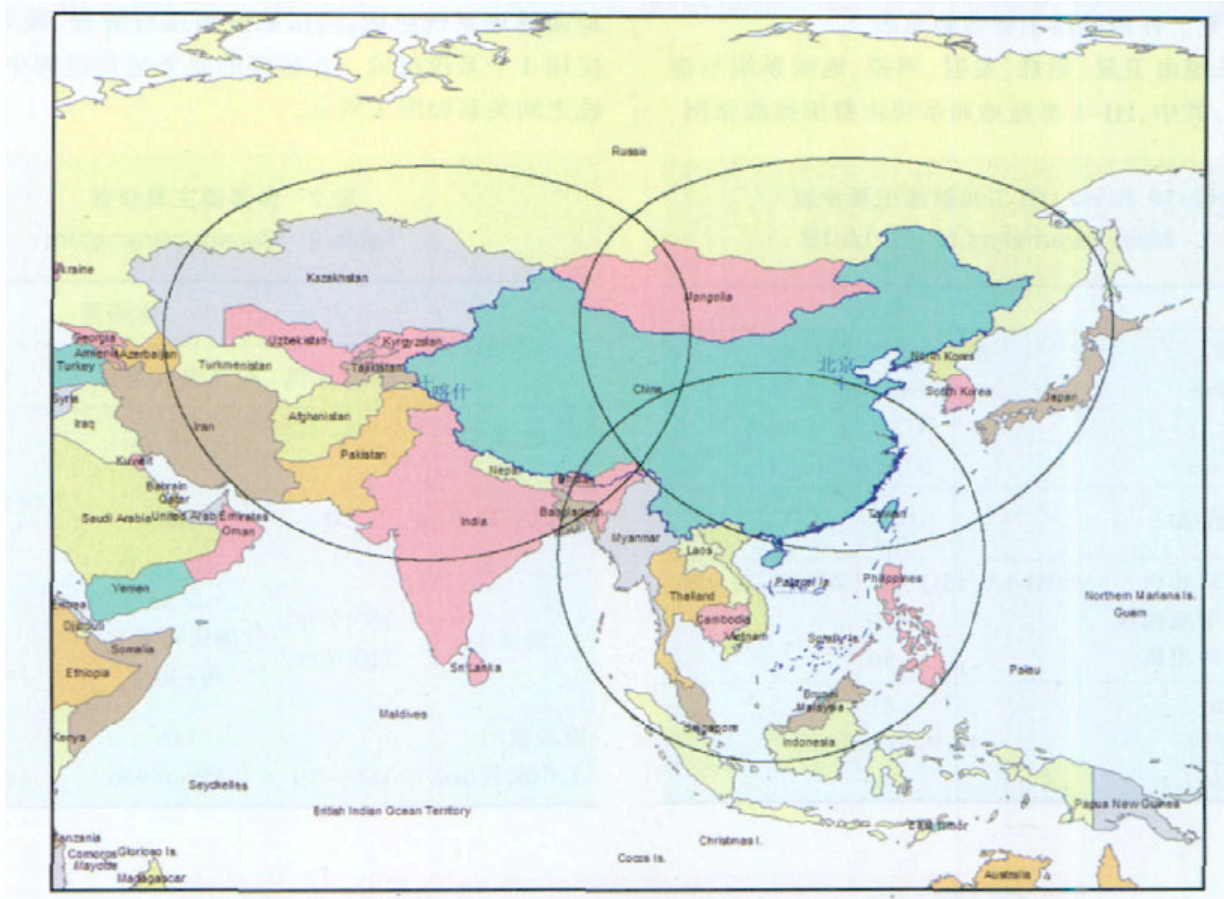


Ifremer



Ocean Data Products of on-orbit Sensors

ocean data products of HJ-1A / HSI



<ftp://219.142.87.39/>

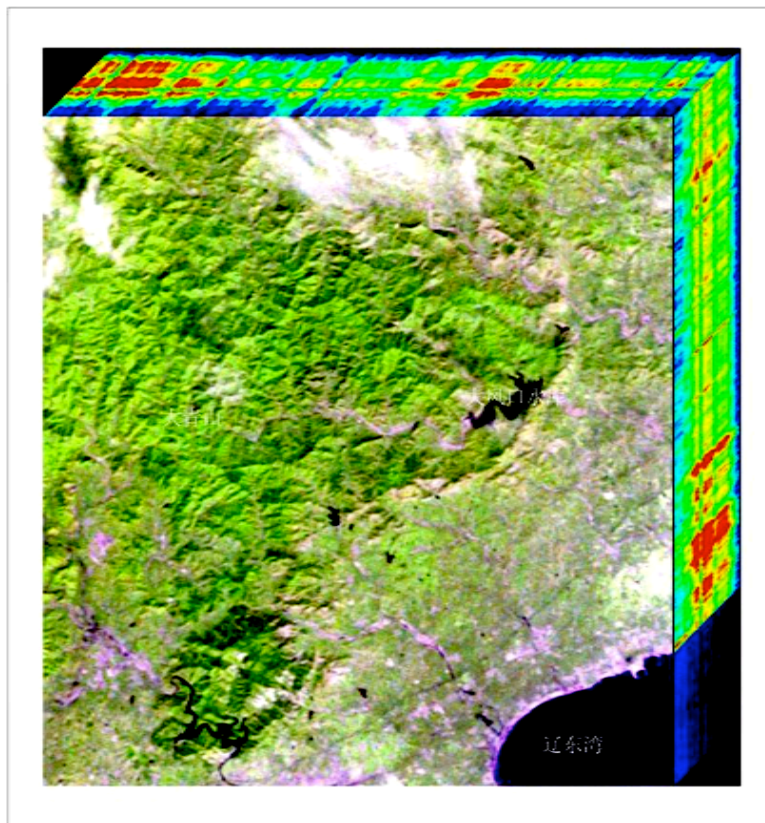
Coverage of Beijing / Keshi / Sanya stations



DRAGONESS 2nd Annual Meeting, Qingdao, China, 8-10 September 2009

Ocean Data Products of on-orbit Sensors

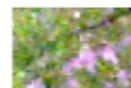
ocean data products of HJ-1A / HSI



图例



山区植被



道路

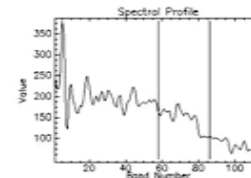
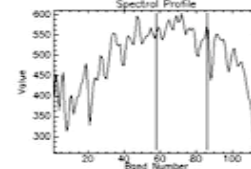
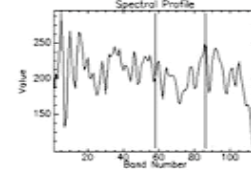
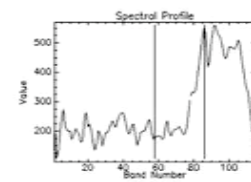


海洋



水库

光谱曲线



卫星平台: HJ-1A
有效载荷: HSI相机
空间分辨率: 100米
合成波段: R(78)G(86)B(56)
成像时间: 2008年9月16日

环境保护部环境卫星中心筹备办公室制作

Hyper-spectral image of HJ-1 for ecosystem monitoring in the Liaodong Bay



Ocean Data Products of on-orbit Sensors

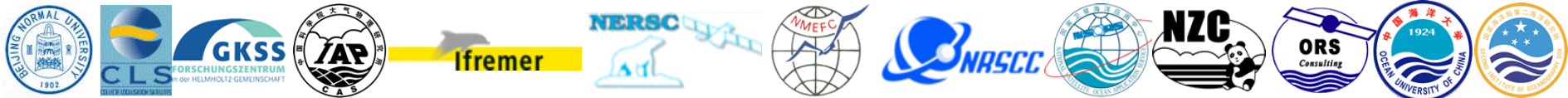
summary

Summary of Data Products of six sensors for Ocean Observing System

Satellite / Sensor	Planned data products for ocean	Operational data products for ocean	Data browser		Data order		Similar Sensor
			website	manual	website	manual	
FY-3A / MERSI	ocean color	L1 chlorophyll concentration aerosol optical thick	✓		✓		MODIS
FY-3A / MWRI	SSW SST	L1	✓		✓		TMI
HY-1B / COCTS	ocean color SST	L1 chlorophyll concentration SST aerosol optical thick water leaving radiance diffuse attenuation coefficient suspended matter concentration	The first three*	other		✓	OCTS, SeaWIFS
HJ-1A / HIS	ocean color	L1	✓*		✓*		HICO, Hyperion
CRS-1 / SAR (L)	ocean dynamics sea surface target	L1				✓	
CRS-3 / SAR (L)	ocean dynamics sea surface target	L1				✓	

Note: * presents the products only for the China sea





Operational Retrieval Algorithms of on-orbit Sensors

ocean color: Bio-Optical retrieval algorithms

Up to now, no technical documents of
HY-1B / COCTS and FY-3A / MERSI

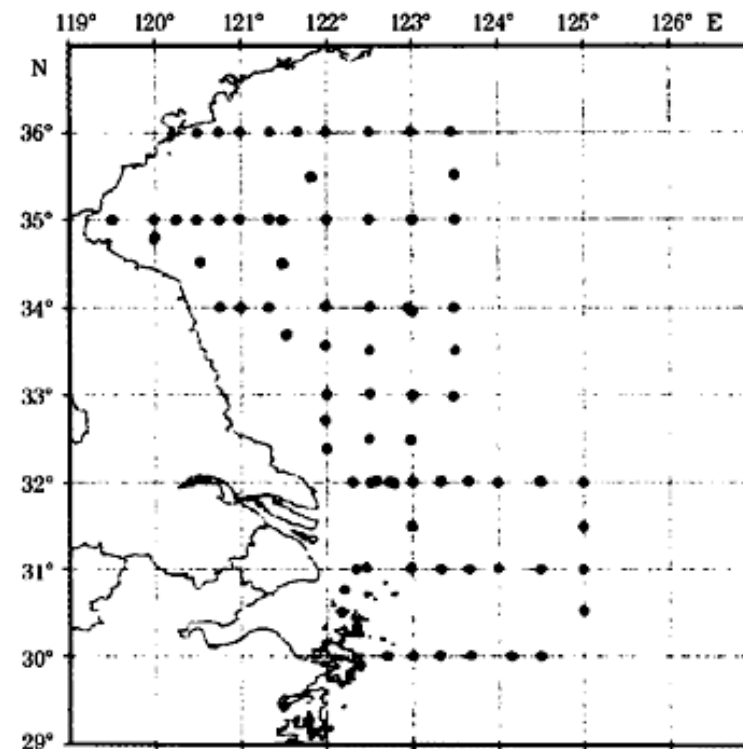
For HY-1B / COCTS,

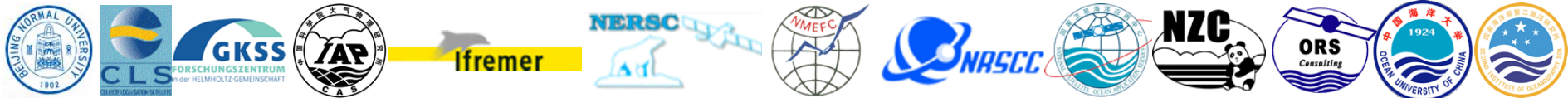
Case I: SeaWiFS OC4v4

Case II: Statistical inversion models for the Yellow
Sea and the East Sea were developed by
Tang et al, basing on Tassan algorithm and
in-situ data (Apr. 2003)

For FY-3A / MERSI, Case I: MODIS OC3M ;

Case II: the same as HY-1B / COCTS





Operational Retrieval Algorithms of on-orbit Sensors

ocean color: Bio-Optical retrieval algorithms

CHL

$$\begin{aligned}
 & \ln \left(\frac{R_{rs}(443)}{R_{rs}(670)} \right) = a \\
 & \ln \left(\frac{R_{rs}(443)}{R_{rs}(670)} \right) = c_0 + c_1 \ln \left(\frac{R_{rs}(443)}{R_{rs}(670)} \right) + c_2 \ln \left(\frac{R_{rs}(443)}{R_{rs}(670)} \right)^2
 \end{aligned}$$

Where, $a = -1.0$, $c_0 = -0.37457$, $c_1 = -3.7278$, $c_2 = -3.0679$.

TSM

$$\begin{aligned}
 & \ln \left(\frac{R_{rs}(670)}{R_{rs}(443)} \right) = s_0 + s_1 \ln \left(\frac{R_{rs}(670)}{R_{rs}(443)} \right) + s_2 \ln \left(\frac{R_{rs}(670)}{R_{rs}(443)} \right)^2
 \end{aligned}$$

Where, $s_0 = 0.638188$, $s_1 = 23.93439$, $s_2 = -0.53107$.

CDOM

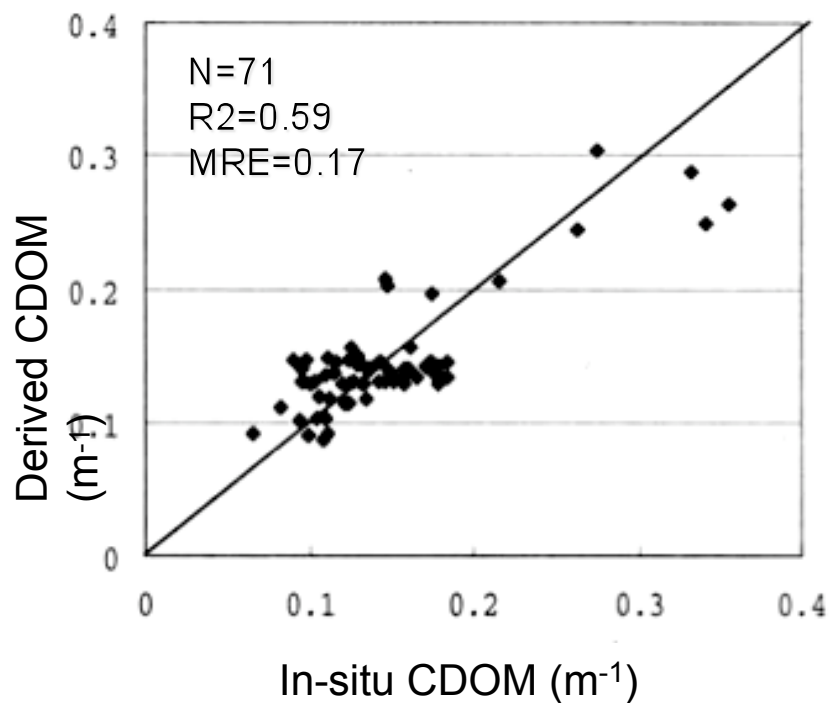
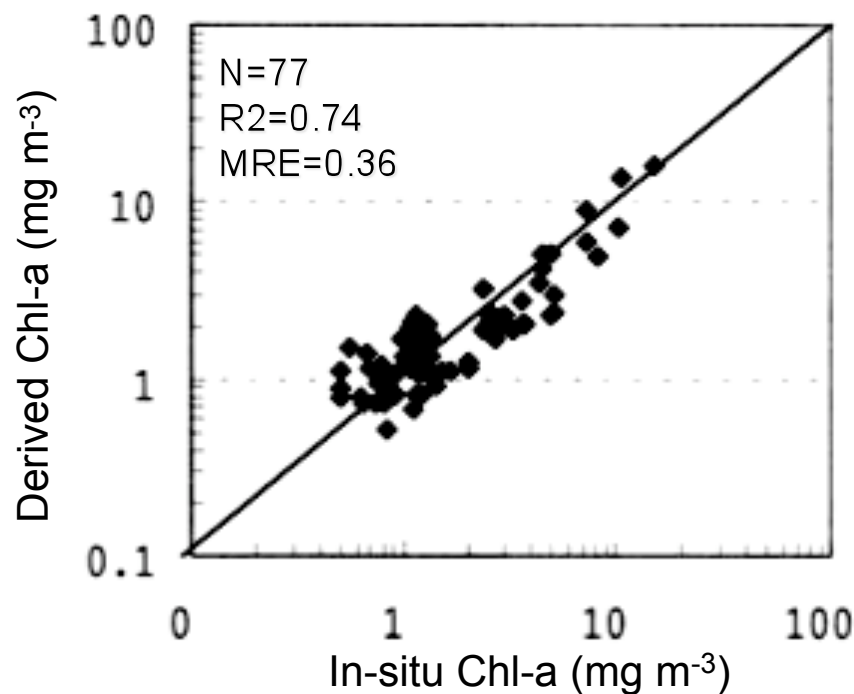
$$\begin{aligned}
 & \ln \left(\frac{R_{rs}(412)}{R_{rs}(670)} \right) = d \\
 & \ln \left(\frac{R_{rs}(412)}{R_{rs}(670)} \right) = y_0 + y_1 \ln \left(\frac{R_{rs}(412)}{R_{rs}(670)} \right) + y_2 \ln \left(\frac{R_{rs}(412)}{R_{rs}(670)} \right)^2 + y_3 \ln \left(\frac{R_{rs}(412)}{R_{rs}(670)} \right)^3 + y_4 \ln \left(\frac{R_{rs}(412)}{R_{rs}(670)} \right)^4
 \end{aligned}$$

Where, $d = 0.23$ which is a regional coefficient,
 $y_0 = -0.93942$, $y_1 = 5.01$, $y_2 = 62.62175$, $y_3 = 231.1851$, $y_4 = 269.3769$.



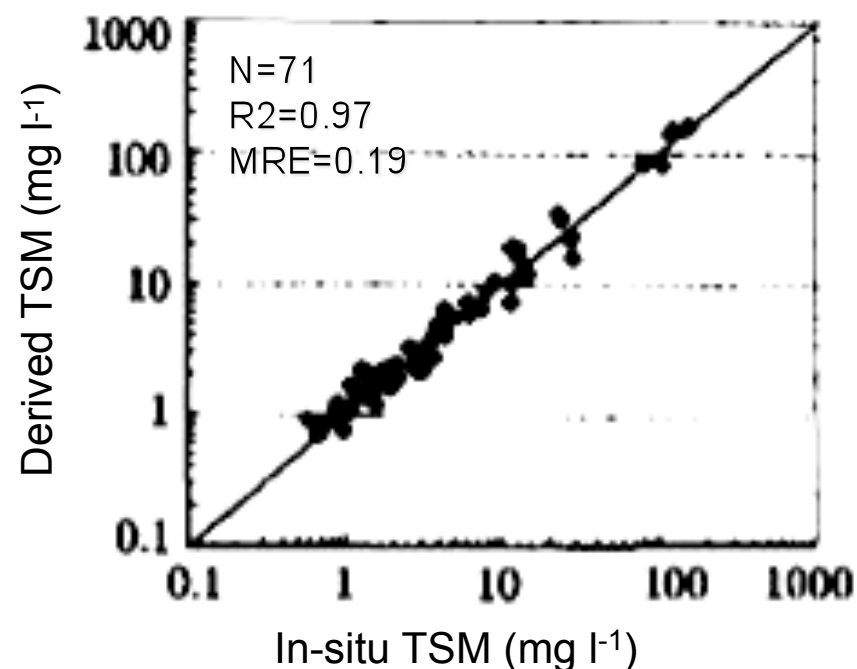
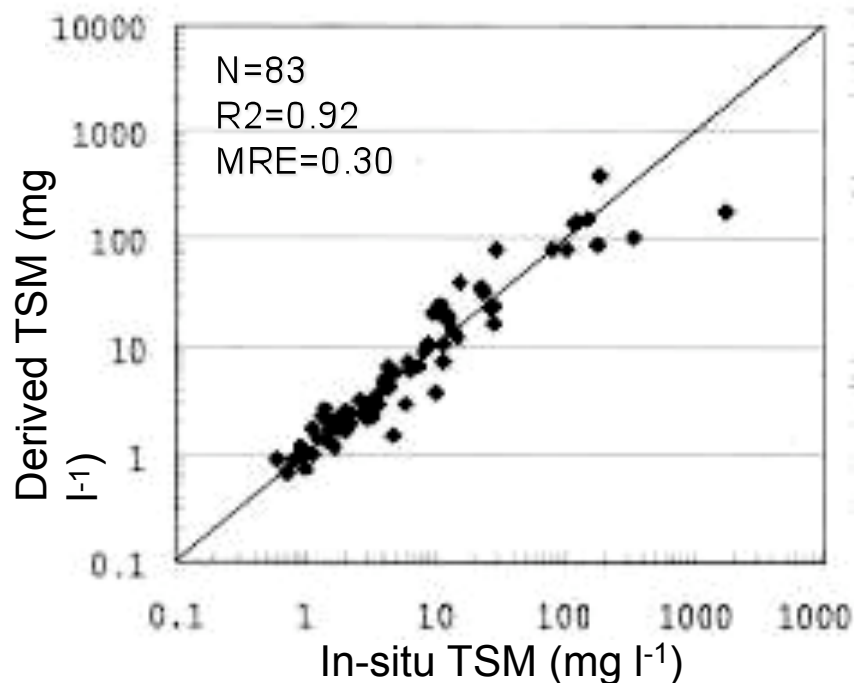
Operational Retrieval Algorithms of on-orbit Sensors

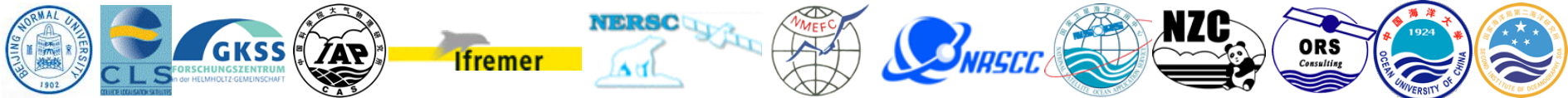
ocean color: Bio-Optical retrieval algorithms



Operational Retrieval Algorithms of on-orbit Sensors

ocean color: Bio-Optical retrieval algorithms





Operational Retrieval Algorithms of on-orbit Sensors

ocean color: Atmospheric correction algorithms

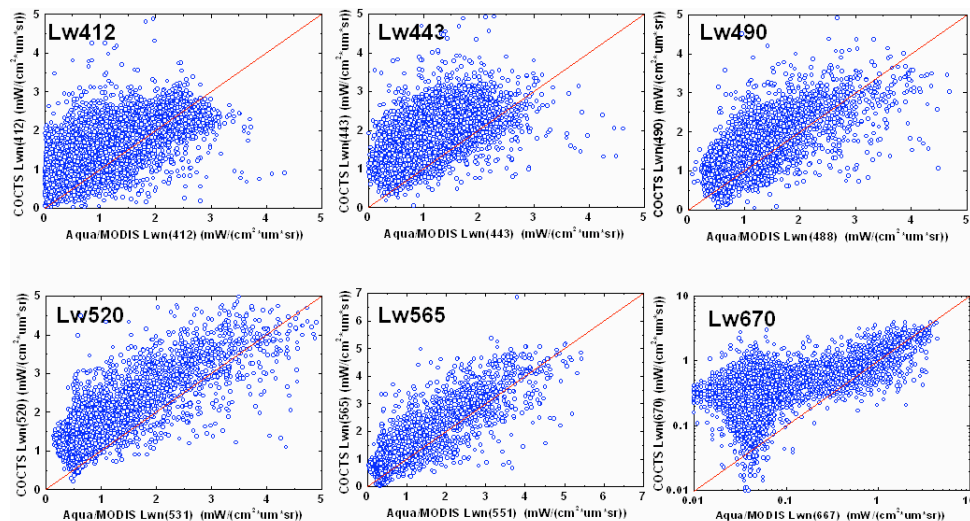
HY-1B / COCTS:

standard atmospheric correction algorithm Gordon-Wang method

Turbid water area atmospheric correction algorithm assuming $L_w(412)=0$

FY-3A / MERSI:

standard atmospheric correction algorithm Gordon-Wang method



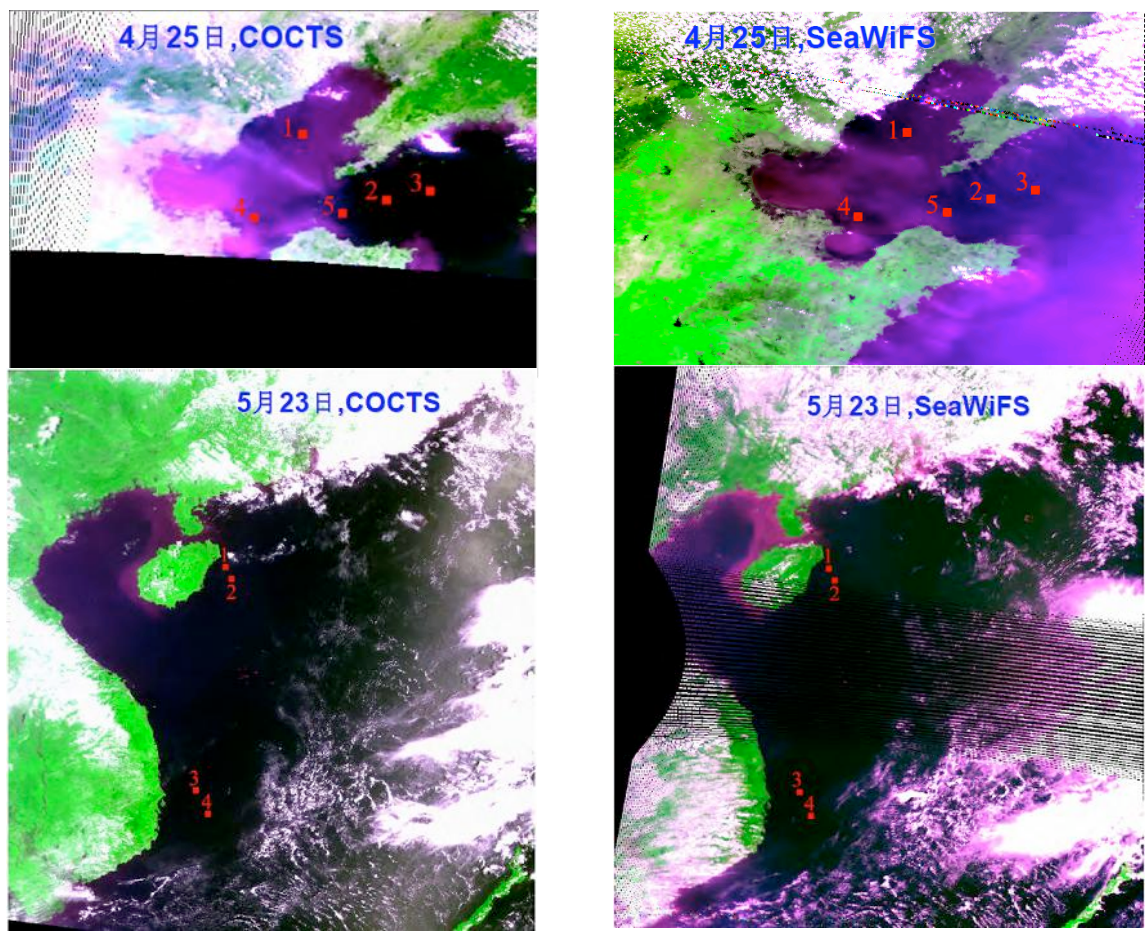
The water leaving radiance comparison between HY-1/COCTS and Aqua/MODIS



DRAGONESS 2nd Annual Meeting, Qingdao, China, 8-10 September 2009

Operational Retrieval Algorithms of on-orbit Sensors

ocean color: on-orbit radiometric calibration

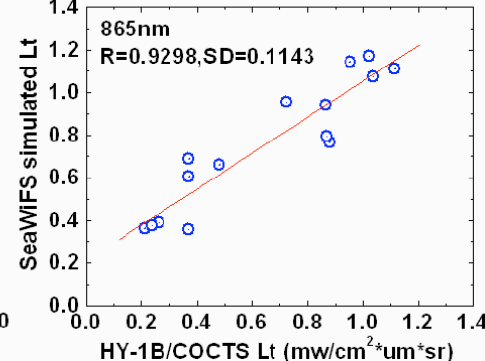
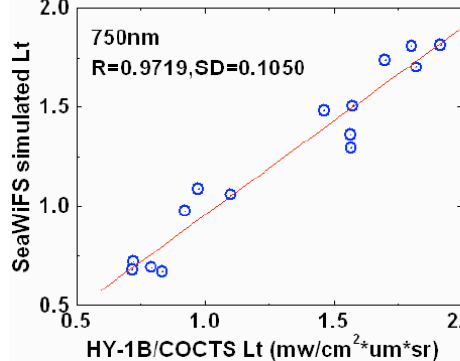
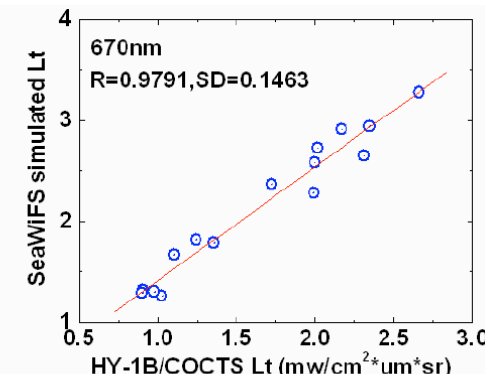
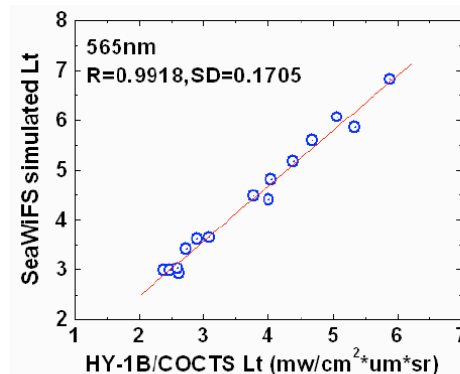
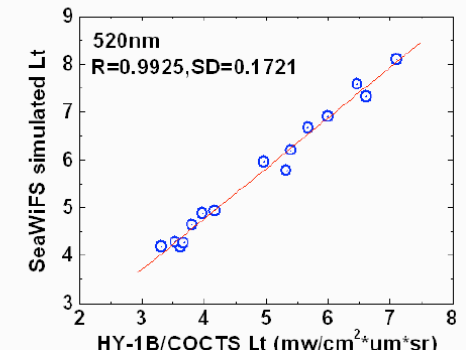
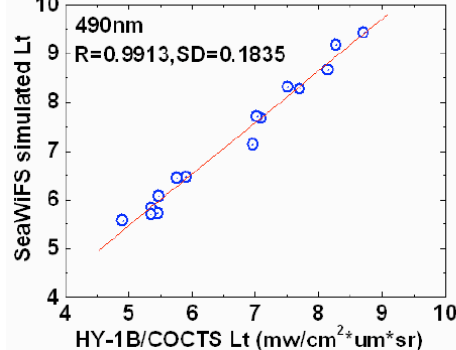
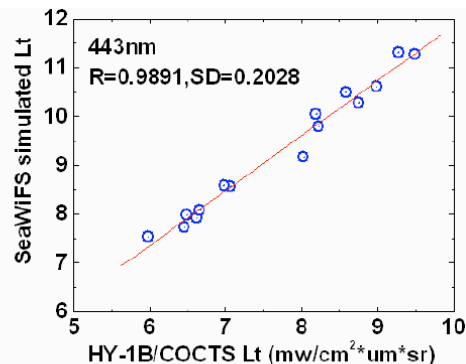
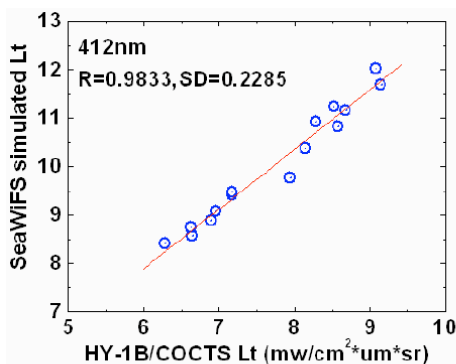


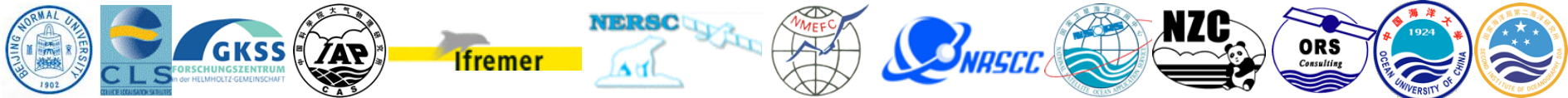
Parts of Locations for cross –calibration between COCTS and SeaWiFS



Operational Retrieval Algorithms of on-orbit Sensors

ocean color: on-orbit radiometric calibration





Operational Retrieval Algorithms of on-orbit Sensors

ocean color: summary

On-orbit Radiometric calibration:

HY-1B / COCTS: cross-calibration between COCTS and SeaWiFS

HY-3A / MERIS: cross-calibration between MERIS and MODIS

Operational application of cross-calibration? Unknown

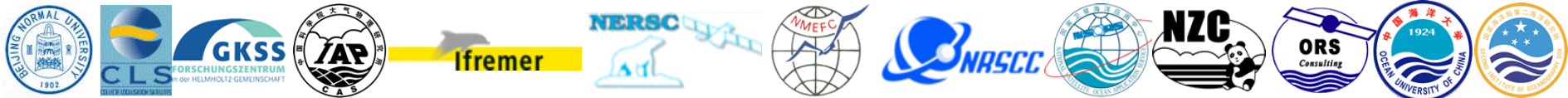
Periodic calibration updates? No

Atmospheric correction algorithms:

Standard Gordon & Wang model for Case I; Partial correction for Case II

Aerosol models applicable for Chinese atmospheres? Unknown.





Operational Retrieval Algorithms of on-orbit Sensors

ocean color: summary

Bio-optical inversion algorithms:

Ocean: HY-1B / COCTS: OC4 (SeaWiFS)

FY-3A / MERSI: OC3M (MODIS)

Coastal water: statistical inversion models in the Yellow Sea and in the East Sea (COCTS & MERSI).

Empirical band combinations

Preliminary results

Lack validation, mainly due to lack of high quality in situ data

No error estimates

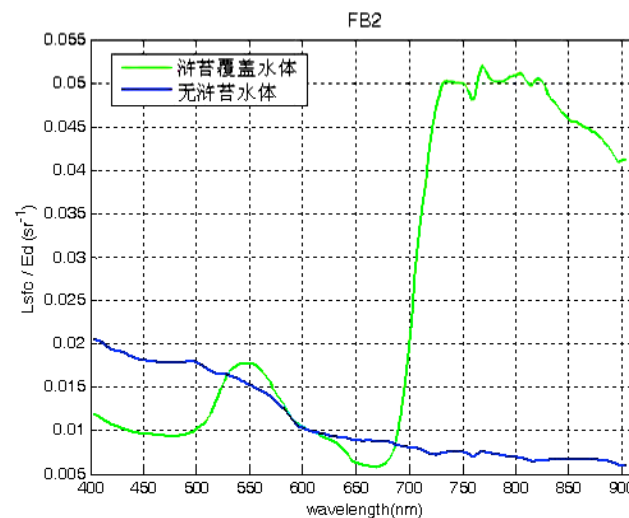
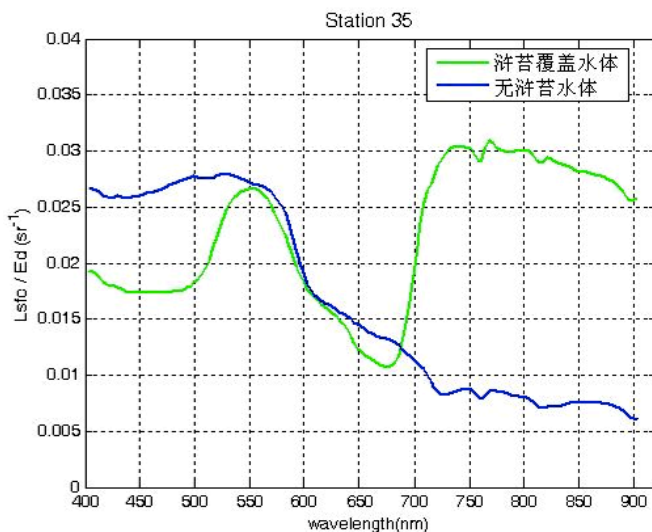
Data availability:

Varies. Mostly low-level data



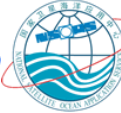
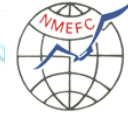
Operational Application of on-orbit Sensors

The Service System for Monitoring of Floating Green Algae



photos and spectra of floating green algae in Qingdao and Subei coastal water (Jul. 2008)



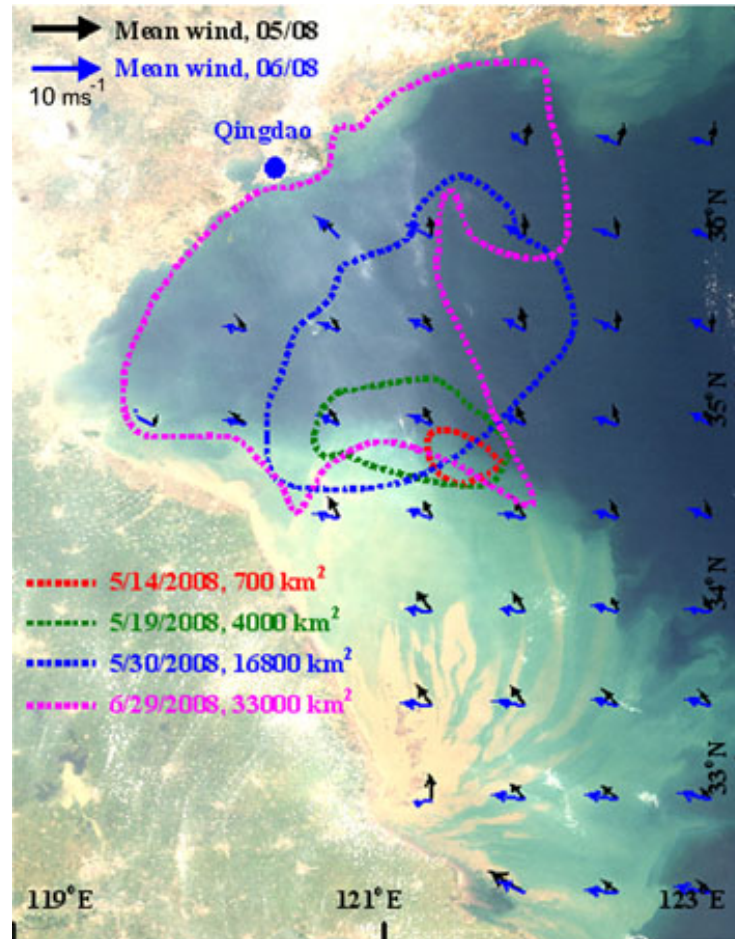


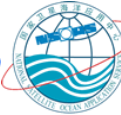
Operational Application of on-orbit Sensors

The Service System for Monitoring of Floating Green Algae

Floating green algae observation in the sea area outside Qingdao with time series images of MODIS

C.M.Hu and M.X.HE, EOS Transactions AGU, V.89, N23.Aug2008

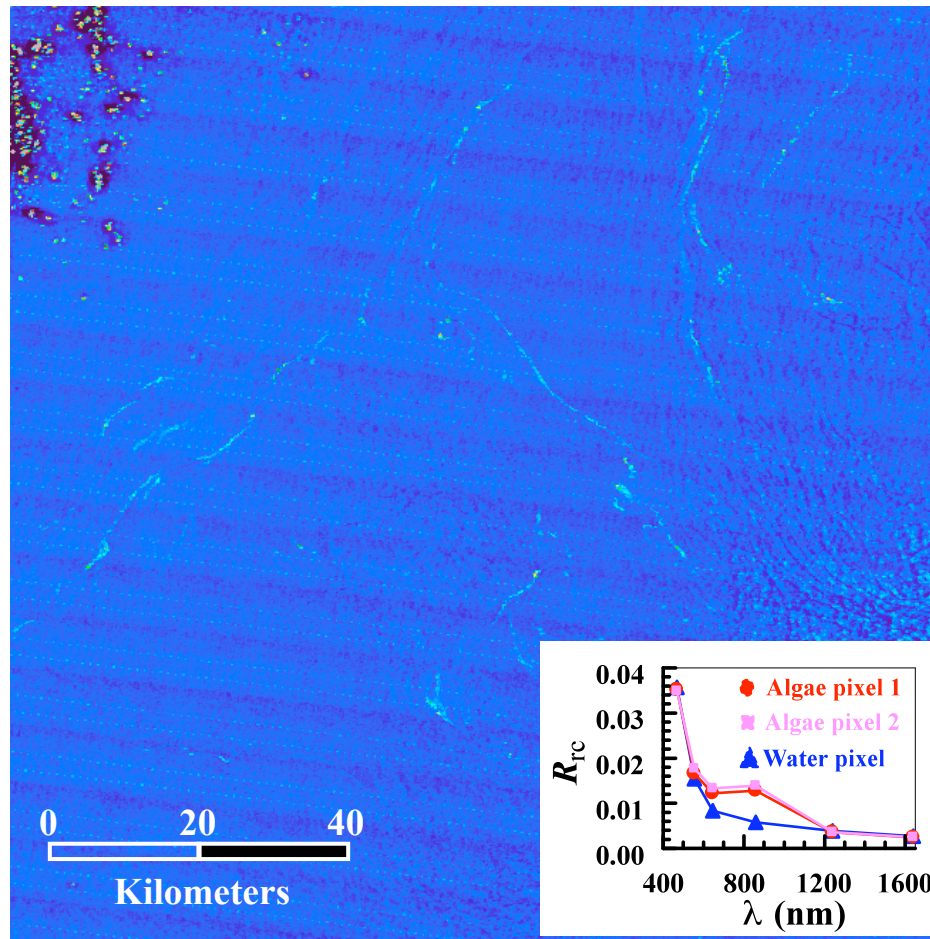
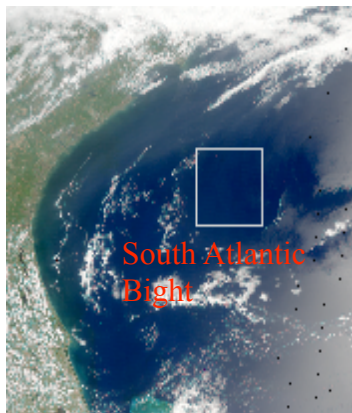


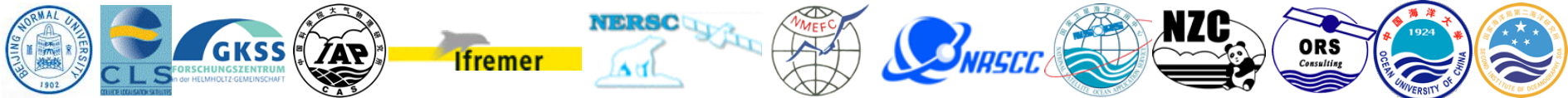


Operational Application of on-orbit Sensors

The Service System for Monitoring of Floating Green Algae

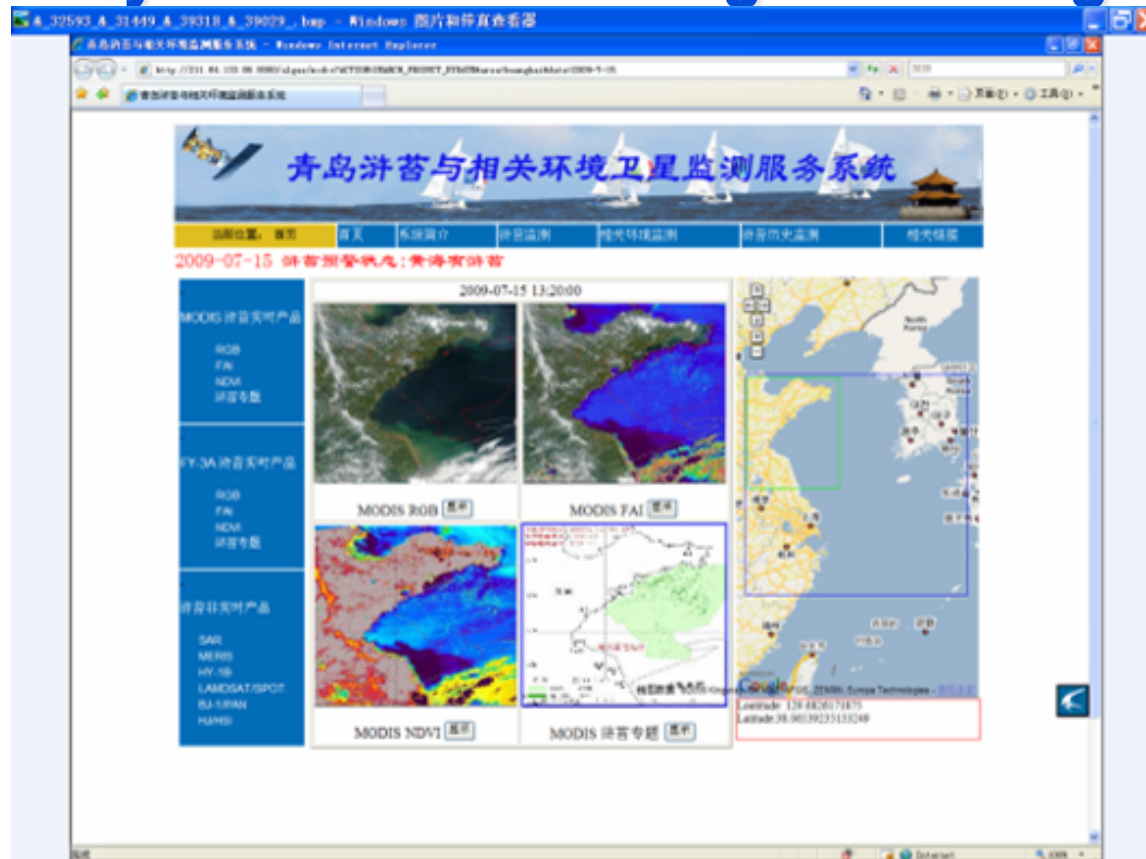
Floating Algae Index (FAI)





Operational Application of on-orbit Sensors

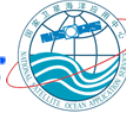
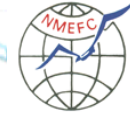
The Service System for Monitoring of Floating Green Algae



The interface of “Monitoring service system for floating green algae in Qingdao coastal water and related environmental parameters”



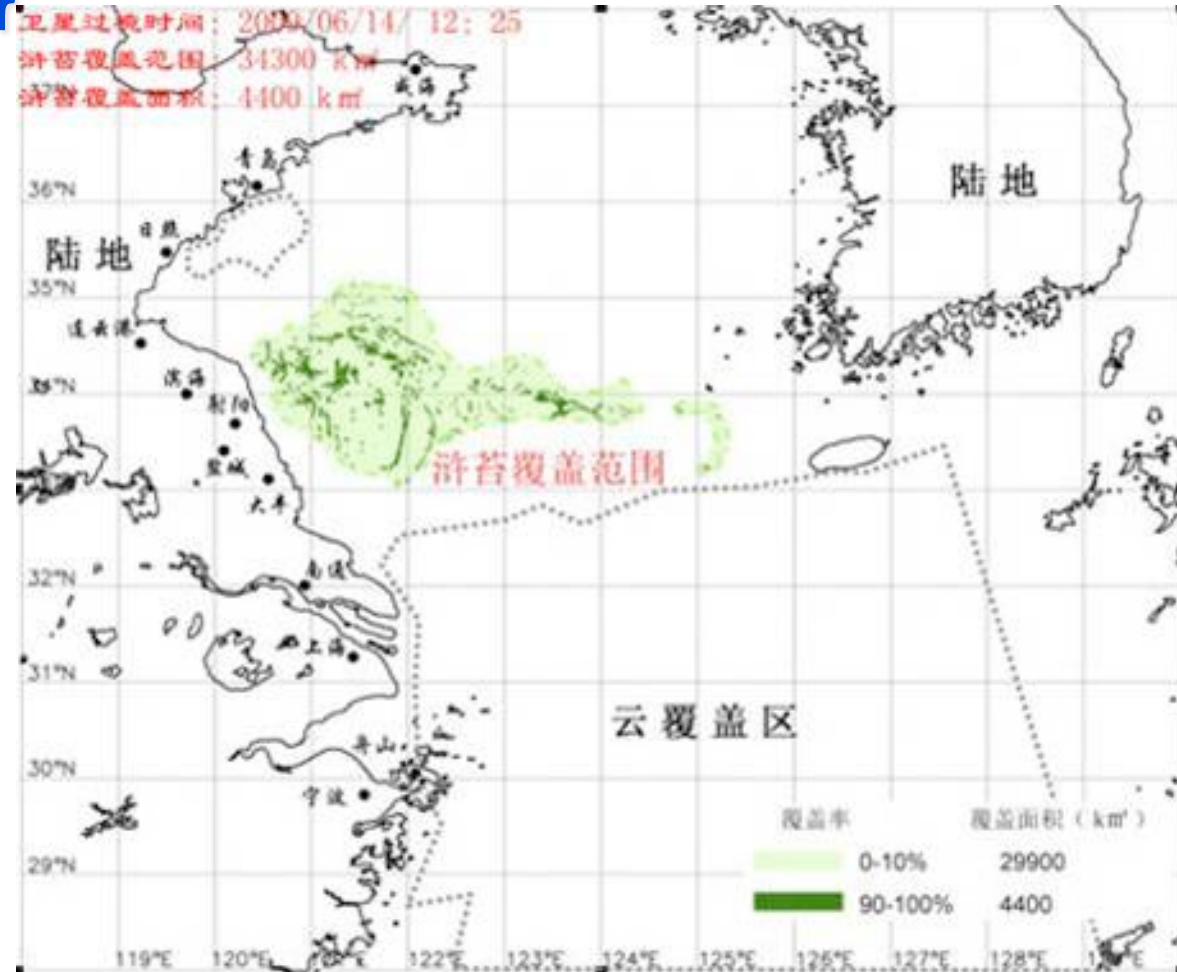
DRAGONESS 2nd Annual Meeting, Qingdao, China, 8-10 September 2009

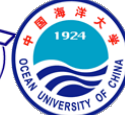
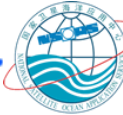


Operational Application of on-orbit Sensors

The Service System for Monitoring of Floating Green Algae

The coverage range (light green) and area (dark green) of floating green algae in the Yellow Sea on Jun.14th, 2009.





Operational Application of on-orbit Sensors

The Service System for Monitoring of Floating Green Algae

A8 青岛新闻·城事 **半岛都市报** 2009年6月25日 星期四
责编 崔瑛 值班主任 段景芳

浒苔“拐弯”了,还要访烟威

距离大公岛66公里几天内将影响岛城前海 浒苔主力也将登陆烟威

受海流和风向的共同影响,黄海海域浒苔聚集区虽然有“拐道”的迹象,但不排除在几天后影响青岛近海的可能。6月24日,国家海洋局北海分局发布的23日监测结果显示,浒苔最北端外沿距离烟台海阳市千里岩岛距离约20公里,距青岛大公岛最近距离66公里。根据预计,东经121°以西海域的浒苔,在偏南风 and 海流共同作用下,会继续向偏北方向漂移,这片浒苔将影响青岛近海海域。未来几天,浒苔除影响青岛外还将“造访”烟台、威海。

较大块浒苔分布增多

北海分局利用卫星、飞机和船舶对浒苔进行了监视监测。6月23日,中国海监B-7772飞机监视监测结果:浒苔分布总面积约1720平方公里,覆盖面积41平方公里。中国海监3843飞机监视监测结果:浒苔分布总面积约13060平方公里,覆盖面积1496平方公里。同时,东海分局中国海监3826

带状浒苔长约10公里,宽约100米,同时有长3海里,宽2海里的绿色片状浒苔分布。据专家介绍,通过飞机和船舶的监测显示,海上较大块浒苔分布范围增多,说明浒苔已经在不断聚集。

距大公岛最近66公里

6月23日,卫星监测结果显示,浒苔分布面积约17400平方公里,覆盖面积约278平方公里,距青岛大公岛最近距离66公里,距海阳市千里岩岛最近距离约20公里,距海阳凤城沿岸最近距离70公里。据专家预计,东经121°以



东海域的浒苔,在偏南风和海流共同作用下,继续向偏北方向漂移,若无持续的东南大风,一般不会对青岛近海海域造成影响;东经121°以西海域的浒苔,在偏南风和海流共同作用下,继续向偏北方向漂移,将影响青岛近海海域。而

据黄海中部及青岛近海未来三天海洋环境预报,6月25日至27日,风向以南向为主。据记者采访了解,未来几天,浒苔在漂移过程中有可能会沉降,但主力仍会对沿海海域带来影响,除青岛外,也会在烟台、威海登陆。

科学家“组团”黄海探浒

近日,由北海分局组织的黄海绿潮跟踪监测和成灾条件现场实验联合航次,乘向阳红08船从青岛起航,前往黄海开展调查。来自国家海洋局第一海洋研究所、中国海洋大学、中国科学院海洋研究所等单位共计23人参加了联合航次调查。本航次将进行黄海绿潮跟踪监测和成灾条件的现场实验,监测要素包括水文、气象、水质、生物生态和光学等26项,同时开展甲板船基团隔实验、漂浮网围实验和水下摄像,观测绿潮生物群体增长率和光合作用,研究绿藻的生长过程。

本报记者 陈浩杰

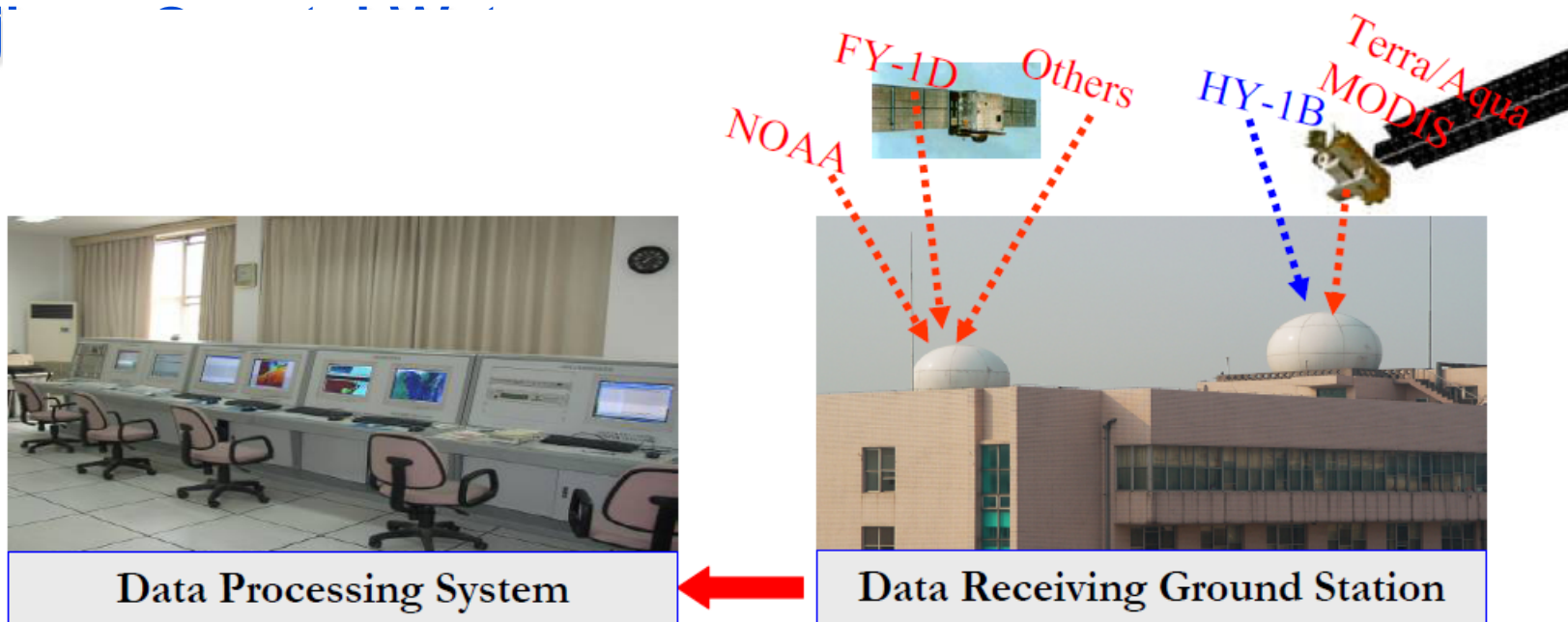
Satellite monitoring images and movement prediction map of floating green algae in the Yellow Sea on 25th Jun, 2009 published by north China sea branch



DRAGONESS 2nd Annual Meeting, Qingdao, China, 8-10 September 2009

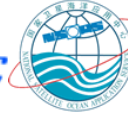
Operational Application of on-orbit Sensors

Operational System for Monitoring of Water Quality in Zhej



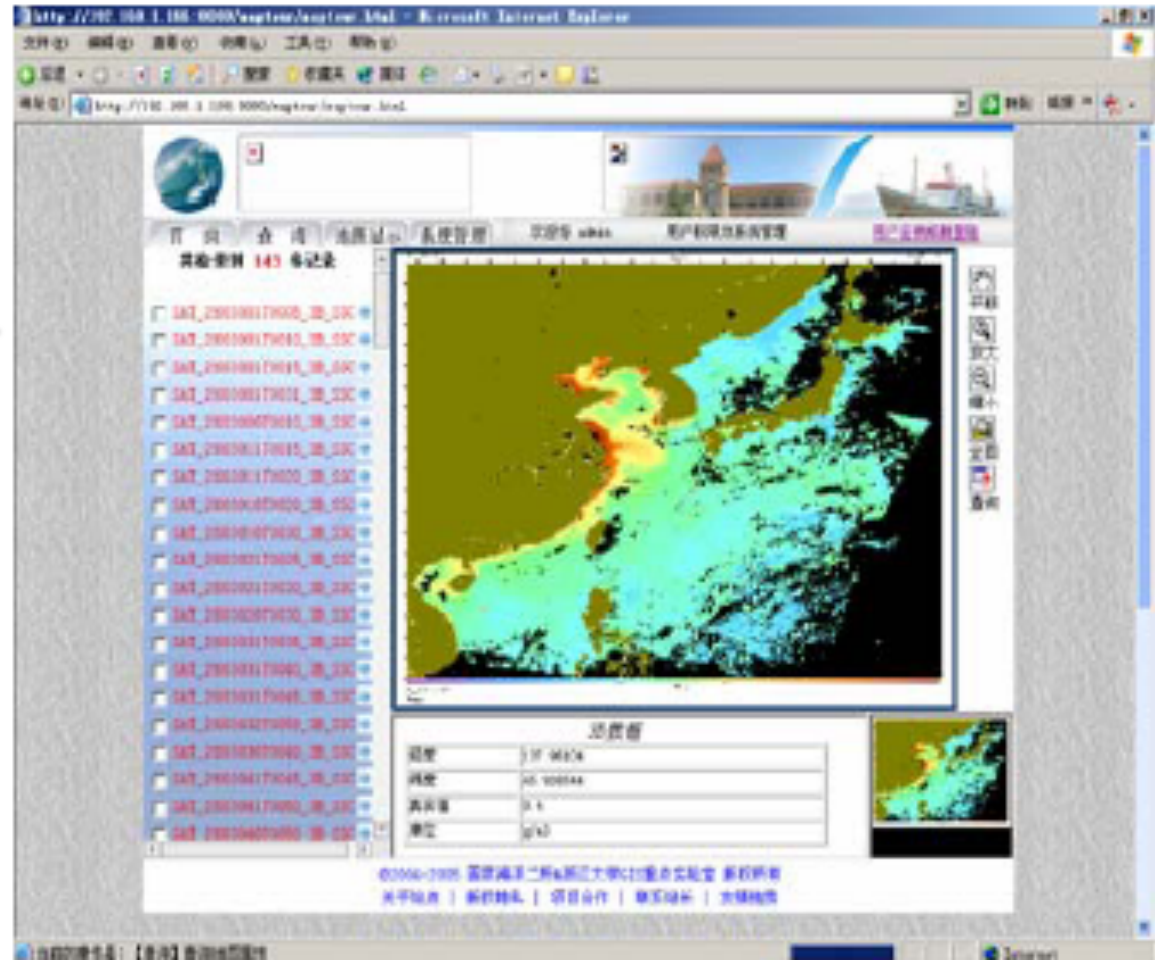
sketch map of data receiving ground station and data processing system





Operational Application of on-orbit Sensors

Operational System for Monitoring of Water Quality in Zhejiang Coastal Water

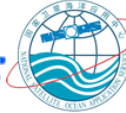


User interface of data distribution



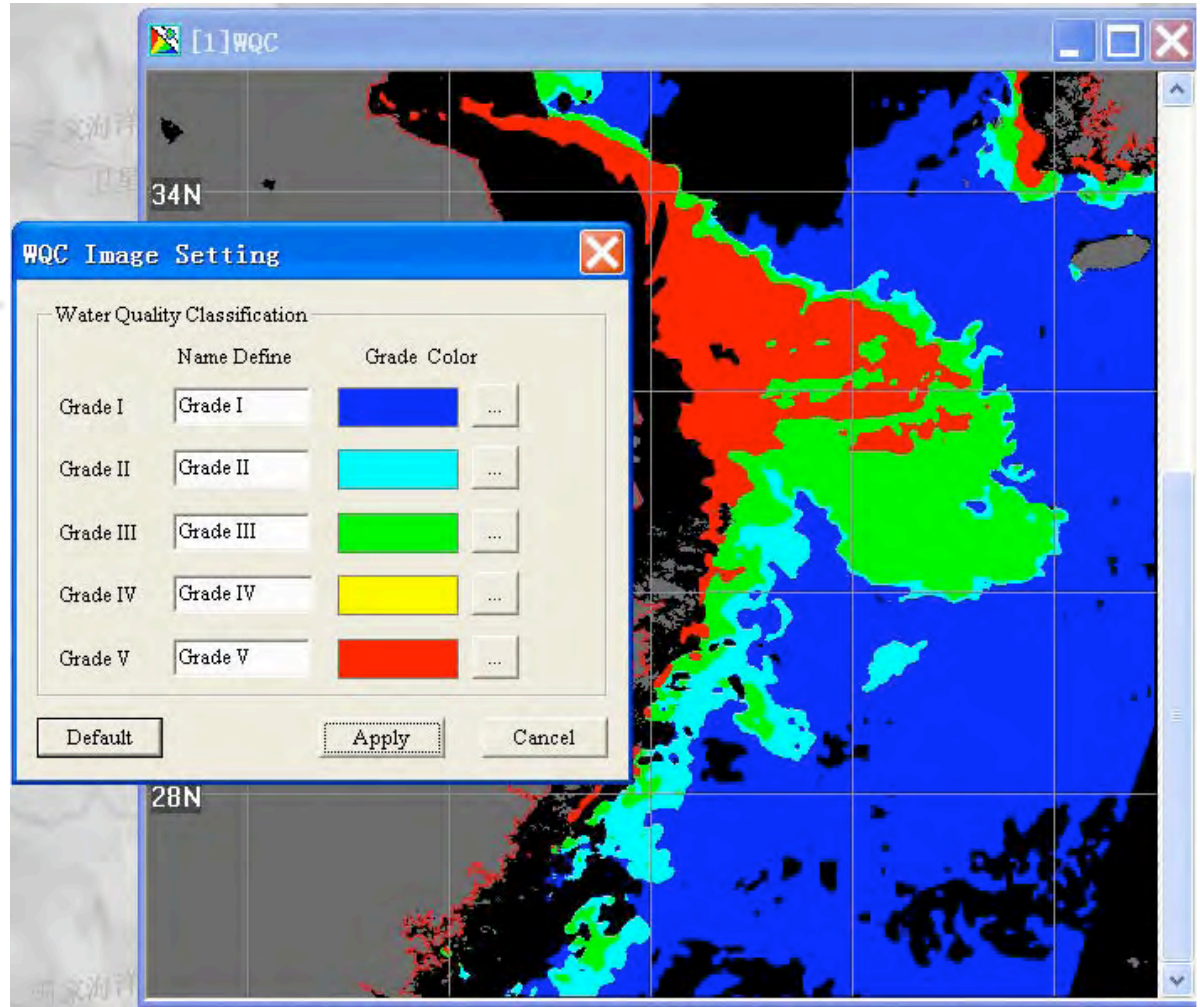


Ifremer



Operational Application of on-orbit Sensors

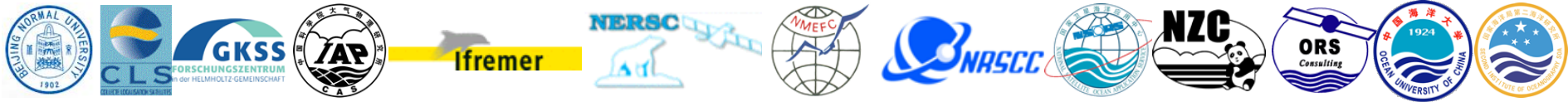
Operational System for Monitoring of Water Quality in Zhejiang Coastal Water



Results of water quality monitoring



DRAGONESS 2nd Annual Meeting, Qingdao, China, 8-10 September 2009



Operational Applications of on-orbit Sensors

Summary

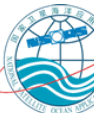
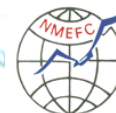
Data products of HY-1B / COCTS and FY-3A / MERIS play a ‘supporting role’ to MODIS in operational use:

- MODIS: freely available with software provided (SeaDAS) for operational use
- FY-3A / MERIS: data volume limited for download, with display software only
- HY-1B / COCTS: data must be manually ordered and downloaded
- No operational algorithms/software available for MERIS & COCTS

Hence, the urgent tasks are:

- Improvement in data sharing service
- Technical reports to document sensor performance and artifacts
- Extensive validation experiments
through coordinated efforts and centralized database
- Improvement in data quality through community effort in algorithm development.





Thank you for your attention

1949-2009



DRAGONESS 2nd Annual Meeting, Qingdao, China, 8-10 September 2009