DRAGON in support of harmonizing European and Chinese marine monitoring for Environment and Security System

DRAGONESS

BILATERAL EU-P.R. OF CHINA PROJECT 2007-2010

3rd Annual Meeting, 17-18 May 2010

Guilin, China

AGENDA

DAY 1 – Monday 17 May – Sovereign Hotel

- 10:00-10:15 Welcome
- 10:15-12:00
  - Status of 2nd year annual reporting
  - Brief 3rd year Project Overview
  - Management Reporting – Status
  - Cost reporting – Status
  - Group photo

- **Lunch: 12:00 – 14:00**

AGENDA

DAY 1 – Monday 17 May – Sovereign Hotel

- 14:00-18:00 (15:45-16:15 Break)

  Presentation of Activity Reports by WP numbers

  – *WP1- Review of In situ observing system*
  – *WP2- Review and utilization of spaceborne system*
  – *WP3- Level of data integration*
  – *WP4- Information production and services*
  – *WP5- Capacity building*
  – *WP6- Workshop, Summer school and Symposium*

  – 18:00 Dinner — Green Lotus Hotel
  – 19:00-21:00 WP 5 Discussion — Sovereign Hotel

AGENDA

DAY 2 – Tuesday 18 May – Green Lotus Hotel

- 8:30-10:30: Dragon 2 Symposium Opening Session
- 10:30-11:00: Break & photo call
- Lunch: 12:00 – 14:00
- 15:00-16:00: Dragon 2 ID 5334 Session
- 16:00-17:30

  WP6- Workshop, Summer school and Symposium

  Review of Action Items

  Other Contract Formalities

  Agree date of final delivery of input to:
  - Activity Report
  - Management Report
  - Cost Report

  AOB

- **17:30 – Adjourn 18:00 Banquet Green Lotus Hotel**

2nd ANNUAL PROJECT REPORTING STATUS

Common requests regarding the Form C include:

a) Subcontract/audit certificate. For year 2 the amount in box 6 is related to cost for audit year 2.Those who were not refunded audit cost for year 1 in the 1st annual payment should request this in the 2nd annual payment by including it under subcontracting in Box 2.

b) Confirm the conversion rate in an addendum to the audit certificate. The original signed addendum should also be sent me by express.

NERSC

The amount declared under subcontracting/management activities in box 2 is lower than the audit certificate costs mentioned in box 6. Could you please provide us with further information on this issue.

In box 4 you answered positively to the question regarding the interest generated by the pre-financing but declare that the amount is 0,00 EUR. Could you please clarify.

Thank you for mentioning explicitly the conversion rate and for sending an addendum to the audit certificate mentioning also the conversion rate applied.

GKSS

Could you please confirm that no costs were incurred for this period? ✓

ORS

Could you please confirm the project number, the indirect costs model and that no resources were received from third parties (box 1 is empty)?

May I kindly remind you that the audit certificate costs must be declared under management activities/subcontracting costs. Could you please clarify if the costs mentioned in box 6 were included in box 2.

IFREMER

Could you please confirm which is the cost model used. Indeed, the use of a flat rate is only authorised when using whether the Full Cost with Flat Rate model (FCF) or the Additional Costs model and not the Full Cost model (FC) as mentioned in the financial statement.

Thank you to confirm that the requested EC contribution amounts to 8.000,00 EUR instead of 37.995,07 EUR.

CLS

Could you please confirm that the requested EC contribution amounts to 12.623,20 EUR instead of 12.793,40 EUR.

NZC

Could you please provide us with further information on the management costs / subcontracting claimed in box 2? Indeed, they are higher than the audit certificate costs declared in box 6.

Thank you for mentioning explicitly the conversion rate and for sending an addendum to the audit certificate mentioning also the conversion rate applied.

ORSI – OUC

Could you please provide us with further information on the management costs claimed in box 2? Indeed, they are higher than the audit certificate costs declared in box 6.

Could you please mention explicitly in the conversion rate used. This comment also applies to the audit certificate. Thank you for sending us an addendum to the audit certificate mentioning the conversion rate.

NSOAS

Thank you for mentioning explicitly the conversion rate and for sending an addendum to the audit certificate mentioning also the conversion rate applied.

May I kindly remind you that the audit certificate costs must be declared under management activities/subcontracting costs. Could you please clarify if the costs mentioned in box 6 were included in box 2.

BNU

May I kindly remind you that the audit certificate costs must be declared under management activities/subcontracting costs. Could you please clarify if the costs mentioned in box 6 were included in box 2.

Could you please mention explicitly in the conversion rate used. This comment also applies to the audit certificate. Thank you for sending us an addendum to the audit certificate mentioning the conversion rate.

MOST

May I kindly remind you that the audit certificate costs must be declared under management activities/subcontracting costs. Could you please clarify if the costs mentioned in box 6 were included in box 2.

Thank you for mentioning explicitly the conversion rate and for sending an addendum to the audit certificate mentioning also the conversion rate applied.

NMEFC

May I kindly remind you that the audit certificate costs must be declared under management activities/subcontracting costs. Could you please clarify if the costs mentioned in box 6 were included in box 2.

Could you please mention explicitly in the conversion rate used. This comment also applies to the audit certificate. Thank you for sending us an addendum to the audit certificate mentioning the conversion rate.

SIOS

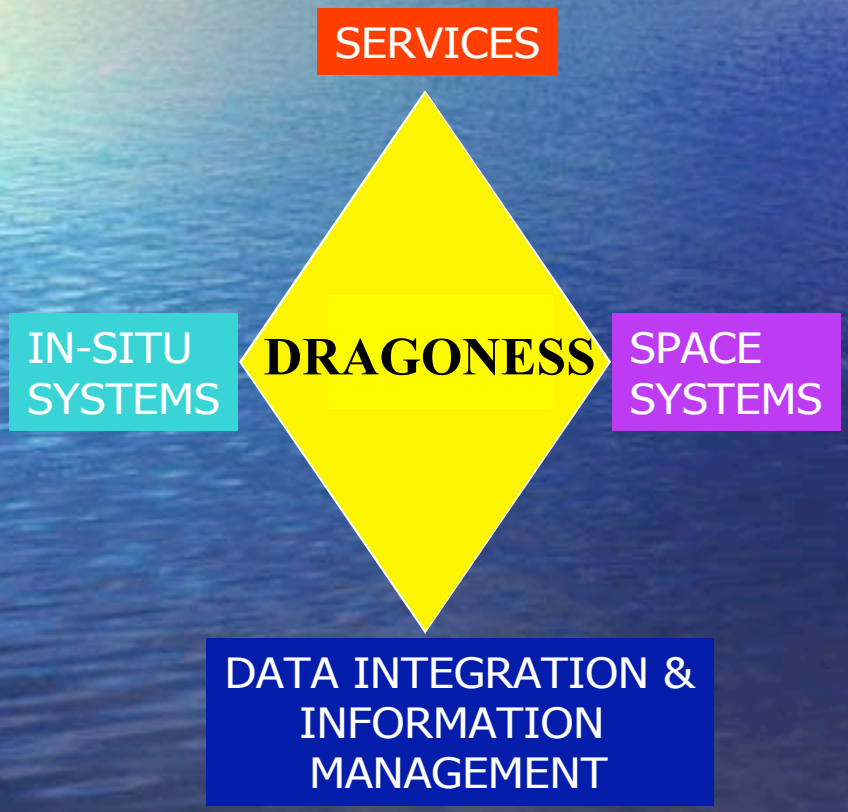
Could you please provide us further information on the adjustment mentioned in box 2.

Thank you for mentioning explicitly the conversion rate and for sending an addendum to the audit certificate mentioning also the conversion rate applied.

3rd ANNUAL PROJECT OVERVIEW

MAIN OBJECTIVE

Establish an inventory of European and Chinese capacities in marine environmental monitoring in the 'frame of the Global Earth Observation System of Systems (GEOSS) and the Global Monitoring for Environment and Security (GMES) diamond.



WP 1 - Review in-situ observing system

WP 2 - Review satellite observing system

WP 3 - Review data management routines

WP 4 - Review information and service provision

WP 5 – Capacity building

WP 6 – Workshop, Summer School, Symposium

WP 1 - Status

- **WP1: Prof. Zhischen Liu and Prof.J. Johannessen et al:**

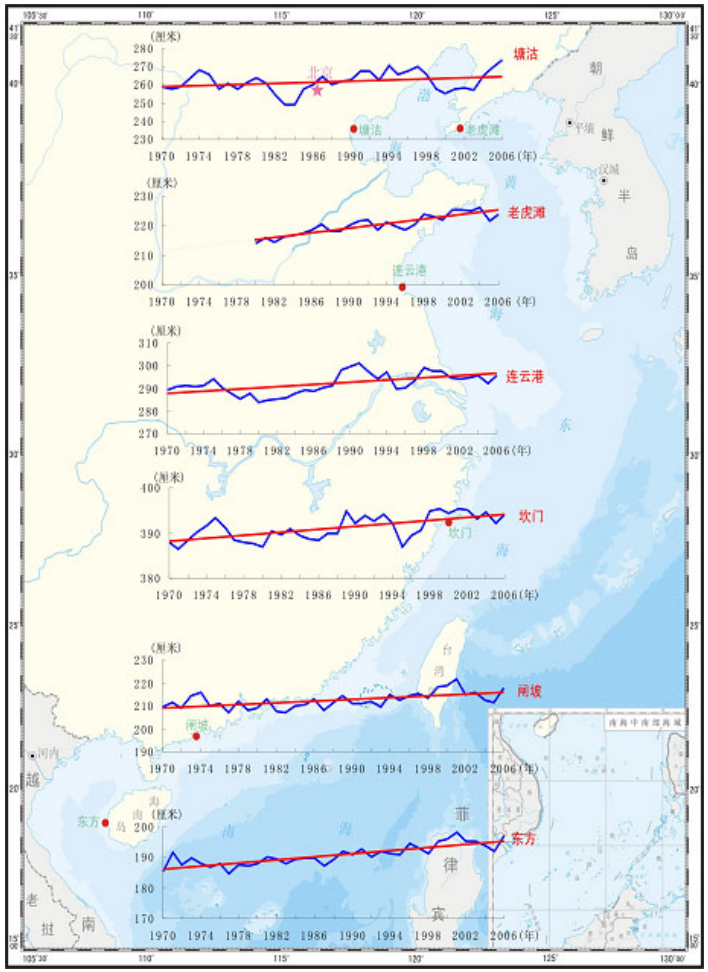
  “Review of in-situ observing system”

  - Overview of Marine Observing Stations
  - Overview of Marine Buoys
  - Overview of Marine Survey ships
  - Overview of Voluntary Observing Ships (VOS)
  - Coriolis Data centre

WP 1 – Status in-situ observation capacity

- At present, China has set up more than 130 marine observation stations along the coast. They are in the possession of the Water Conservancy Bureau, the Transportation and the Geological Department. Most of these observation stations are tide level stations. The stations which observe the wave, temperature, salinity, meteorology and other elements, about 60, are mainly in the possession of the SOA.
- Europe altogether has 11 observation stations (THIS IS NOT CORRECT)
- On marine buoys, the main types of Chinese marine buoy are marine data buoys, special marine buoys, measuring current dive buoys and drifting buoy. As the economic increase in China, it will speed up the step to the marine buoy net's construction. The number of the buoys deployed by Chinese Argo plan has reached 68, and there are now 35 buoys still working. China has been one of the participating countries of international Argo program.
- China has already established a large-scale, full range survey ship team, to meet the basic needs of the survey, including multi-purpose survey ship, professional survey ship and special survey ship. Compared with Europe, Chinese marine survey ship is very similar on the number and tonnage; it has reached the marine survey needs.
- China has not carried out the relevant work on Gliders yet.

Sea level rise

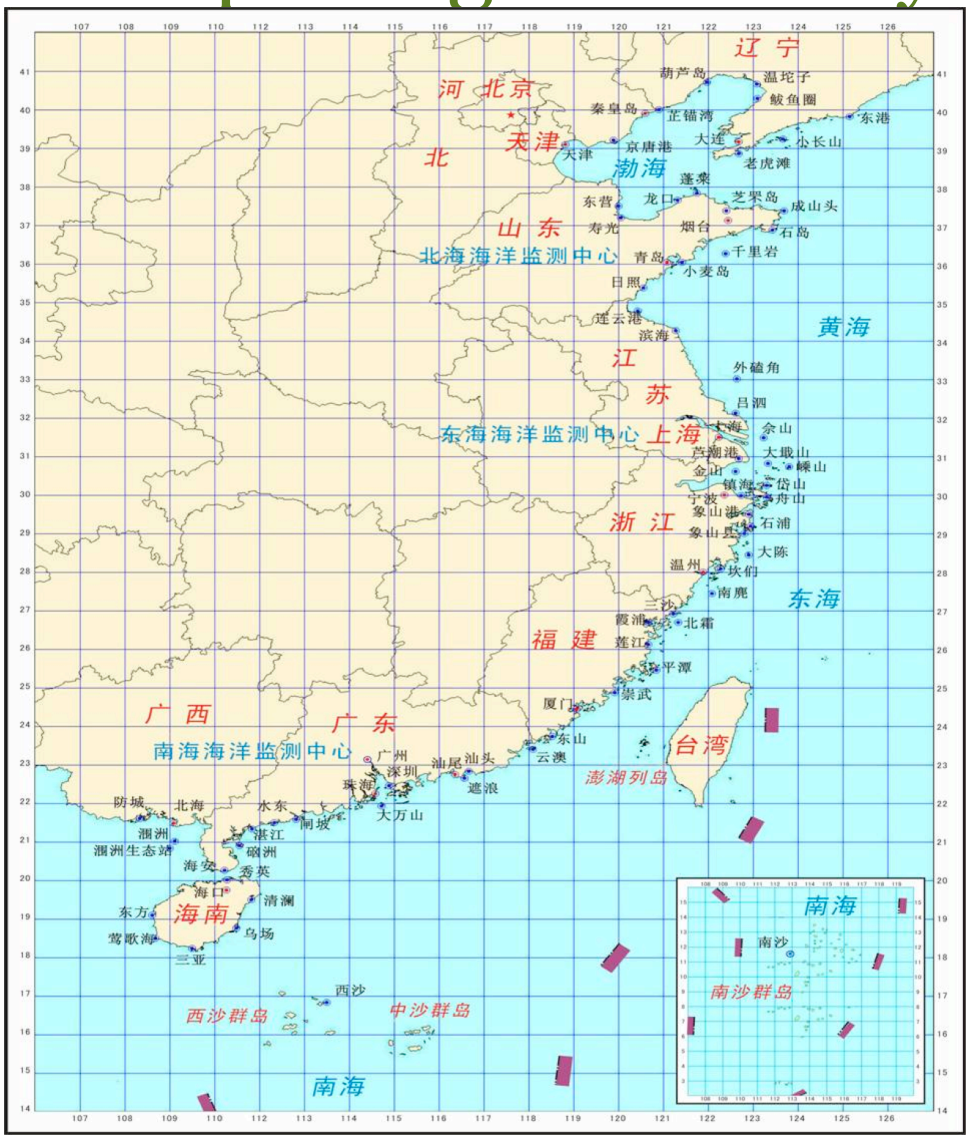


Forecasting Relative to 2006 MSL (mm)

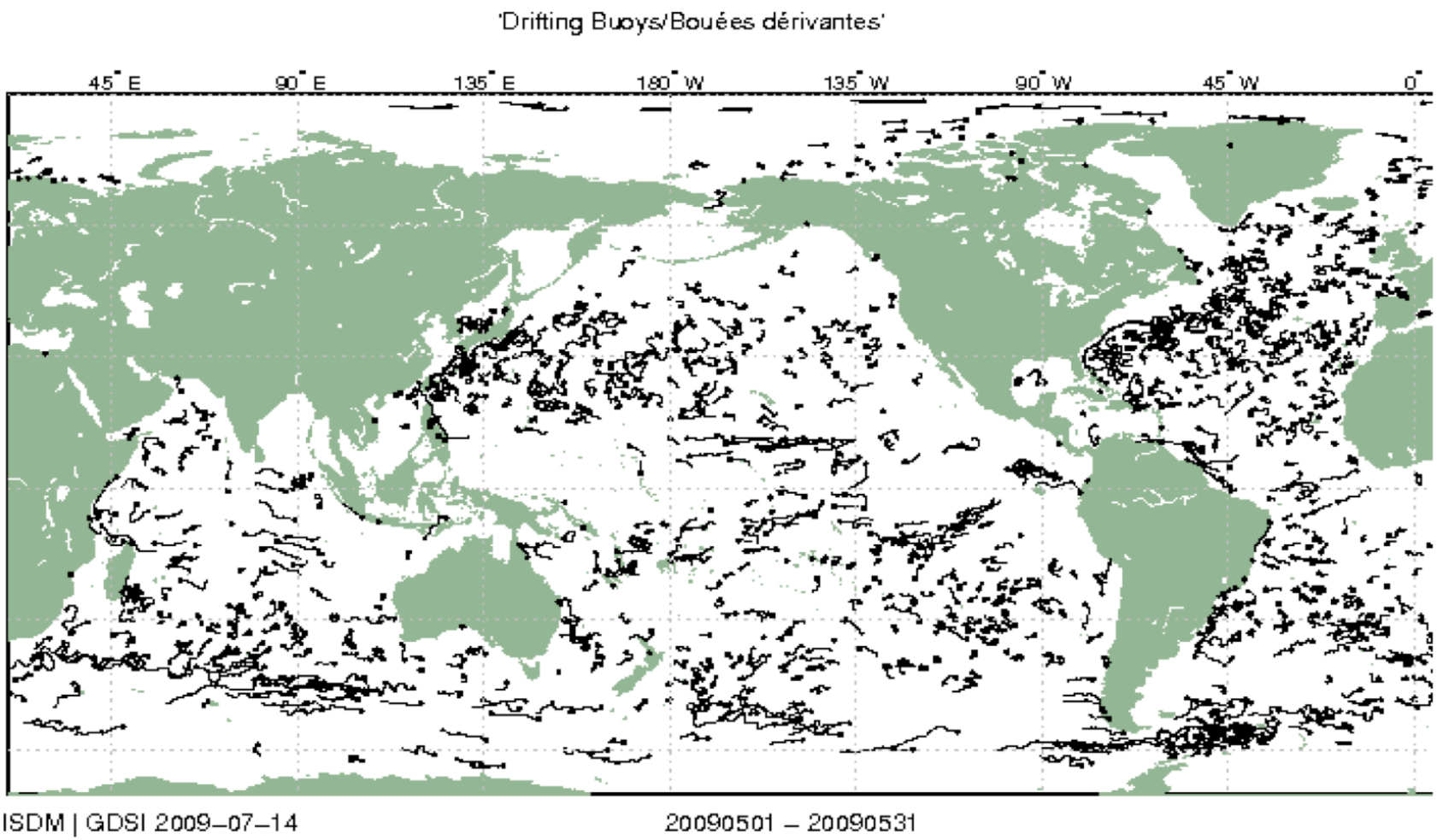
	2009年	2016年
Liaoning	10	34
Hebei	4	12
Tianjin	9	35
Shandong	8	28
Jiangsu	9	30
Shanghai	10	38
Zhejiang	11	36
Fujian	8	23
Guangdong	9	30
Guangxi	11	37
Hainan	12	36
Bohai Sea	8	28
Yellow Sea	9	30
East Sea	11	38
South Sea	10	31
State	9	31

SOA buoy network comprising of 60 buoys

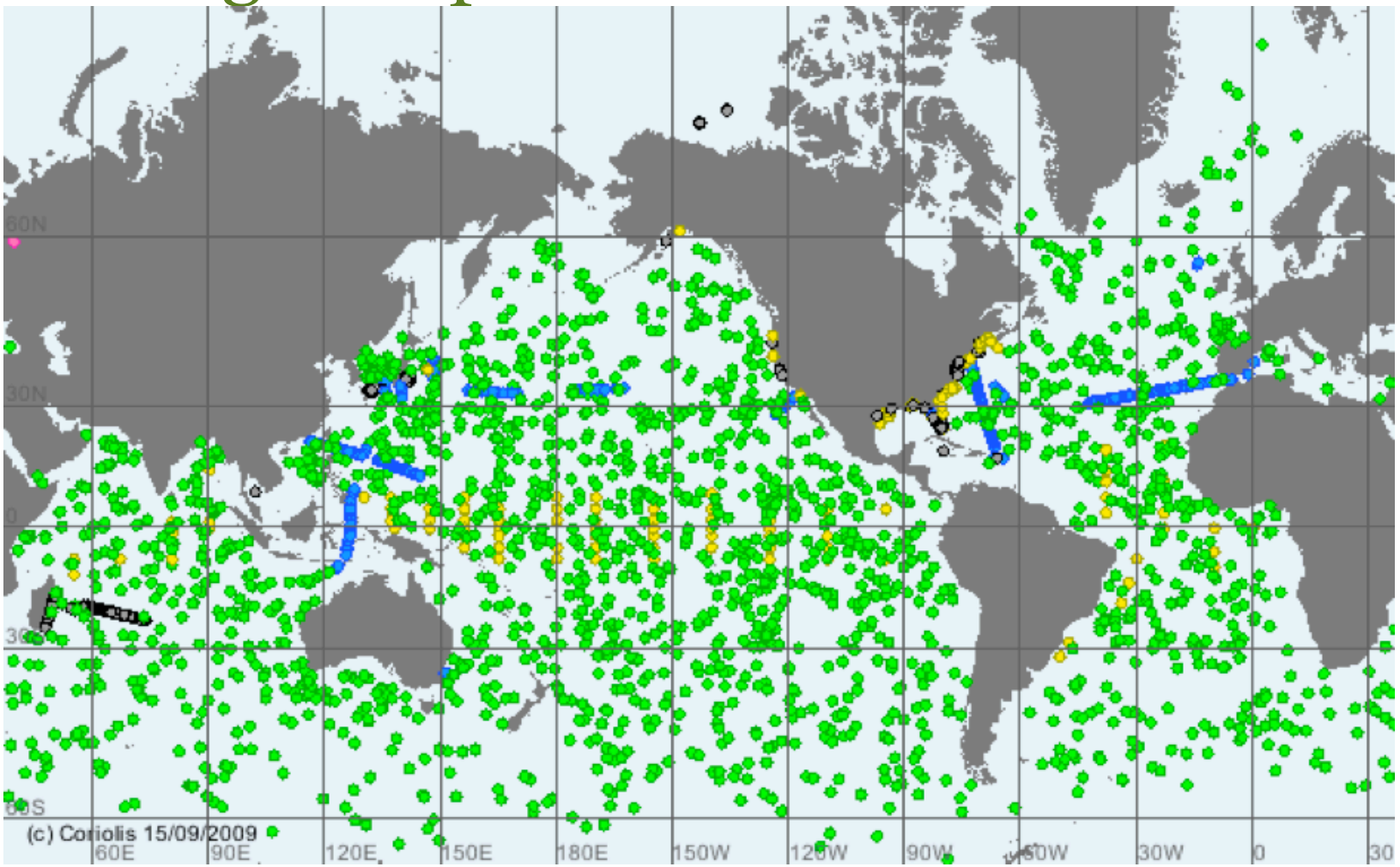
- waves,
- temperature,
- salinity,
- meteorology
- Other quantities



Drifting Buoys

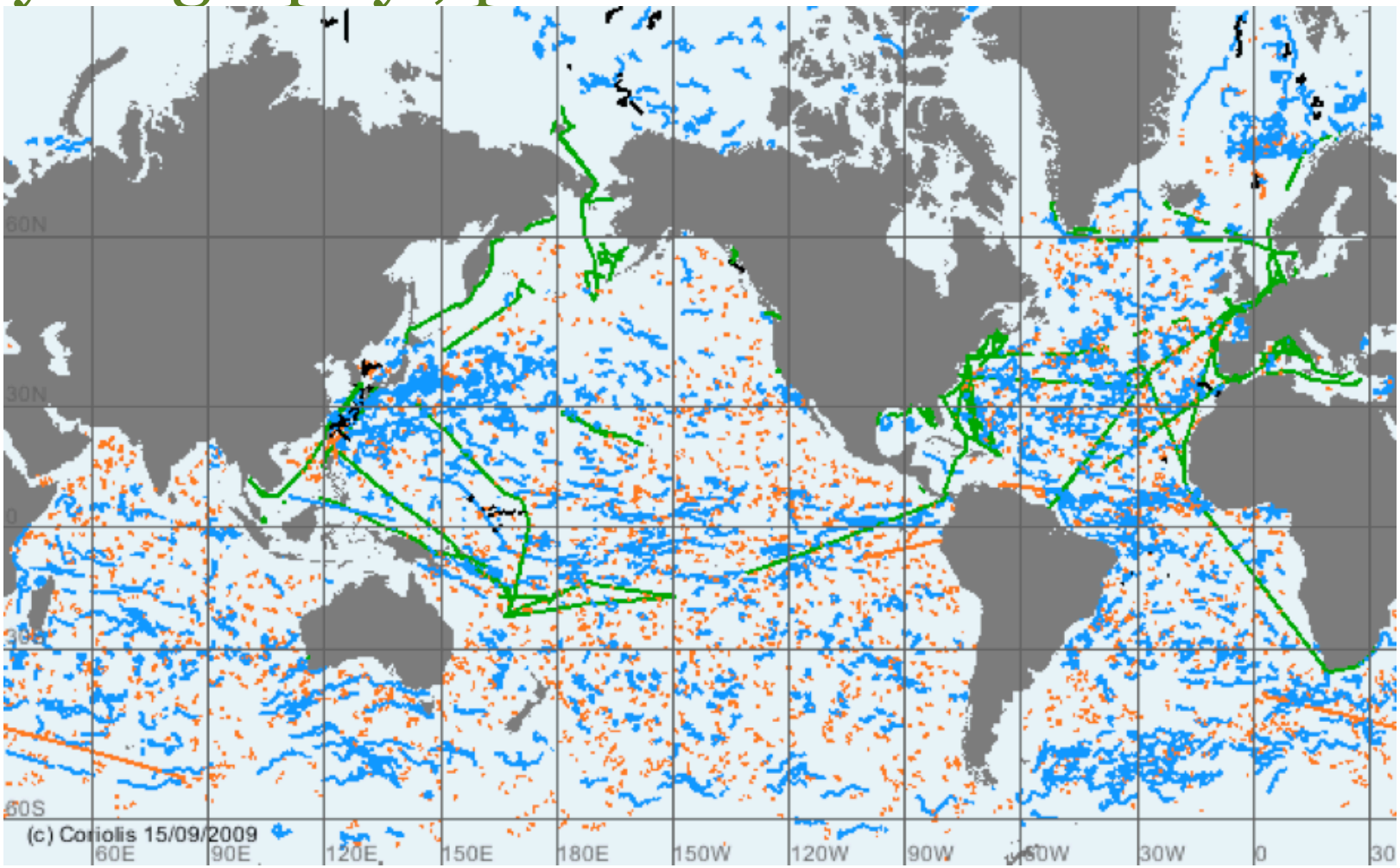


One week of Argo floats, CTD, XBT and mooring data pushed to MERCATOR



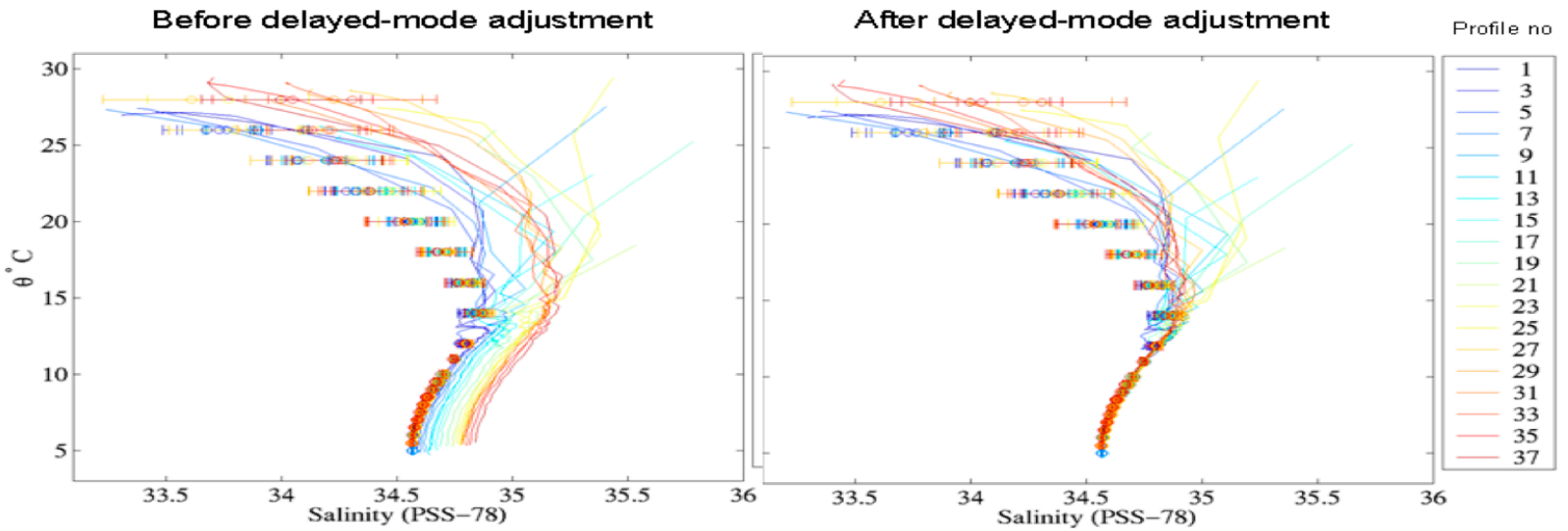
(http://www.coriolis.eu.org)

One week of drifter data and VOS hydrography , pushed to MERCATOR



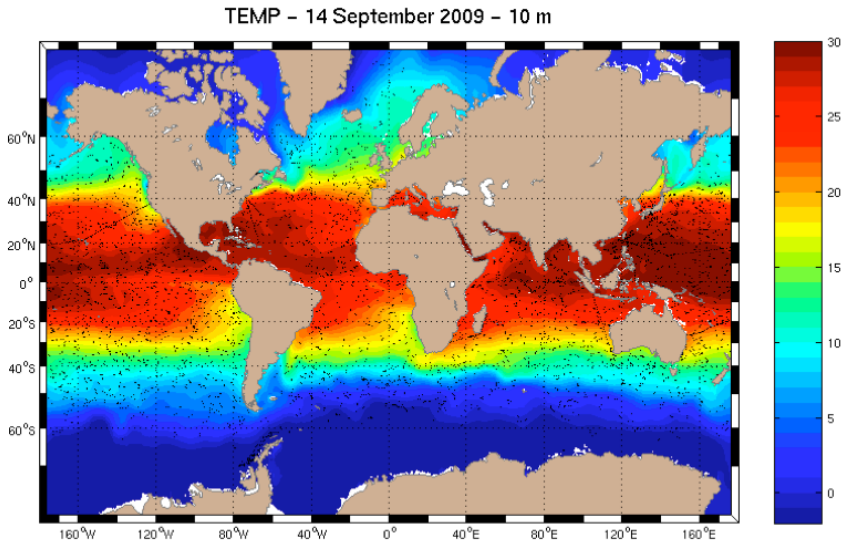
(http://www.coriolis.eu.org)

Example of an Argo float whose salinity measurements (solid lines) have drifted towards higher values over time. Sensor drift is removed in delayed-mode by weighted least squares fit to statistical salinity estimates from reference data (circles with error bars).



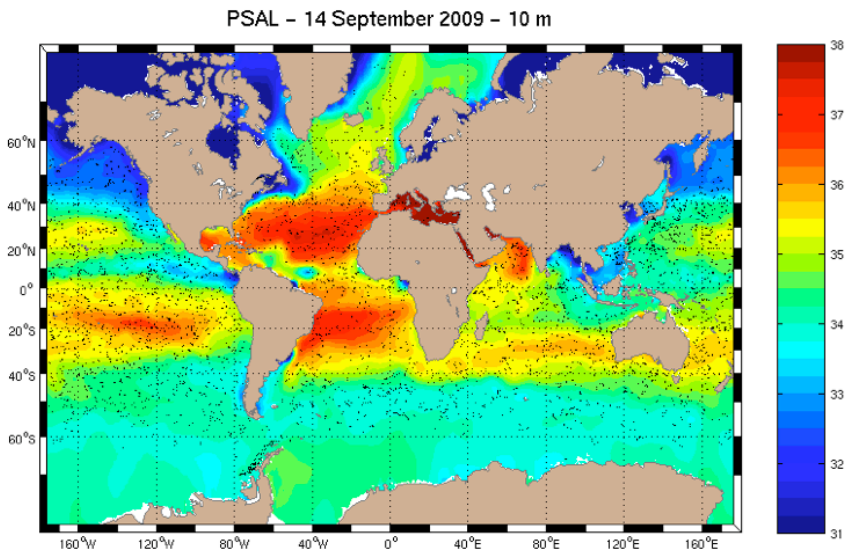
(http://www.coriolis.eu.org)

Weekly temperature and salinity analysis at 10m depth for the Global Ocean available at
http://www.coriolis.eu.org/cdc/objective_analyses.htm



Coriolis

min = −2.19 max = 32.69 count = 6114 last update : 14/09/2009

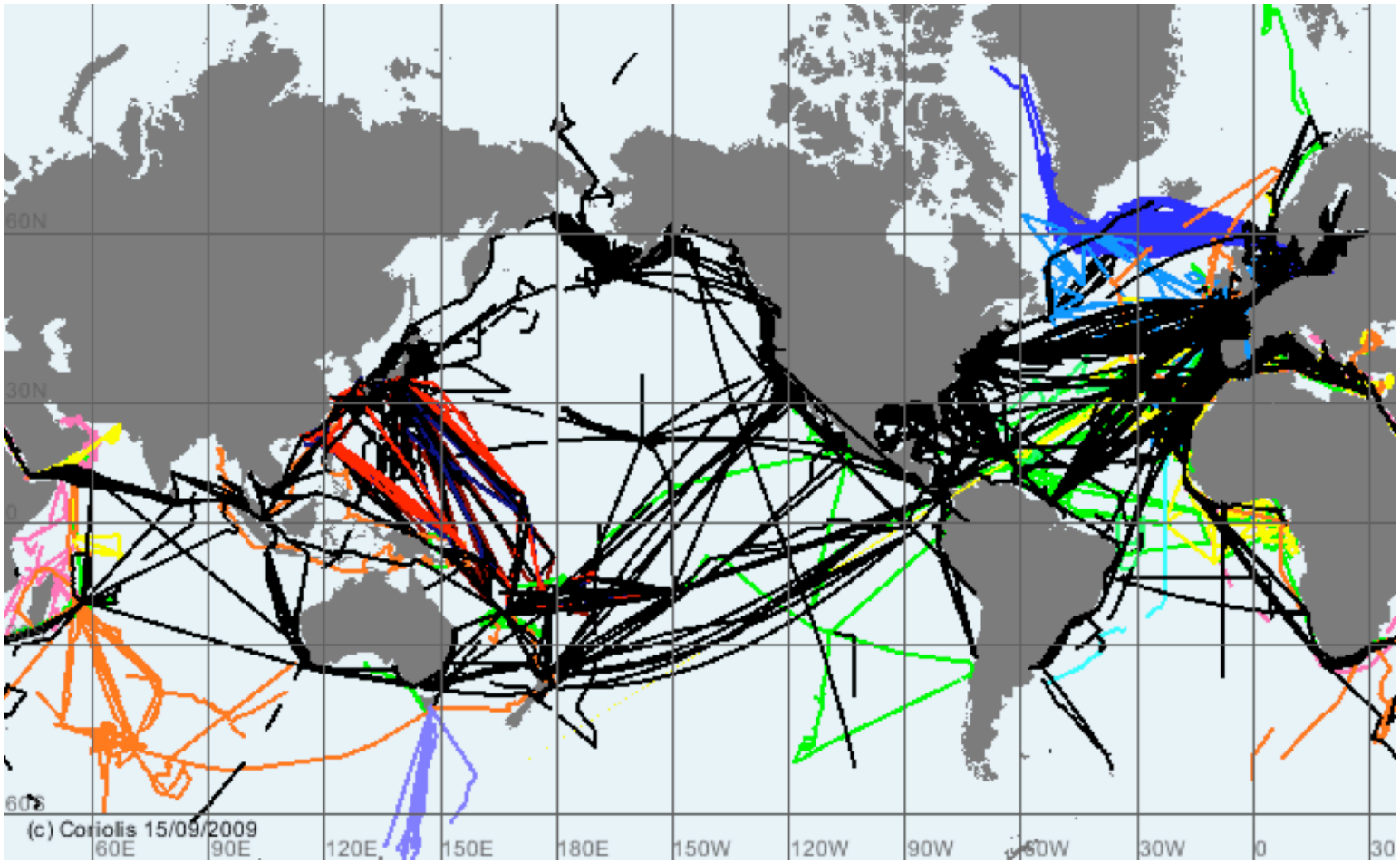


Coriolis

min = 5.00 max = 41.53 count = 5575 last update : 14/09/2009

(http://www.coriolis.eu.org)

Sea-Surface Salinity acquired since 2000 on VOS and research vessels

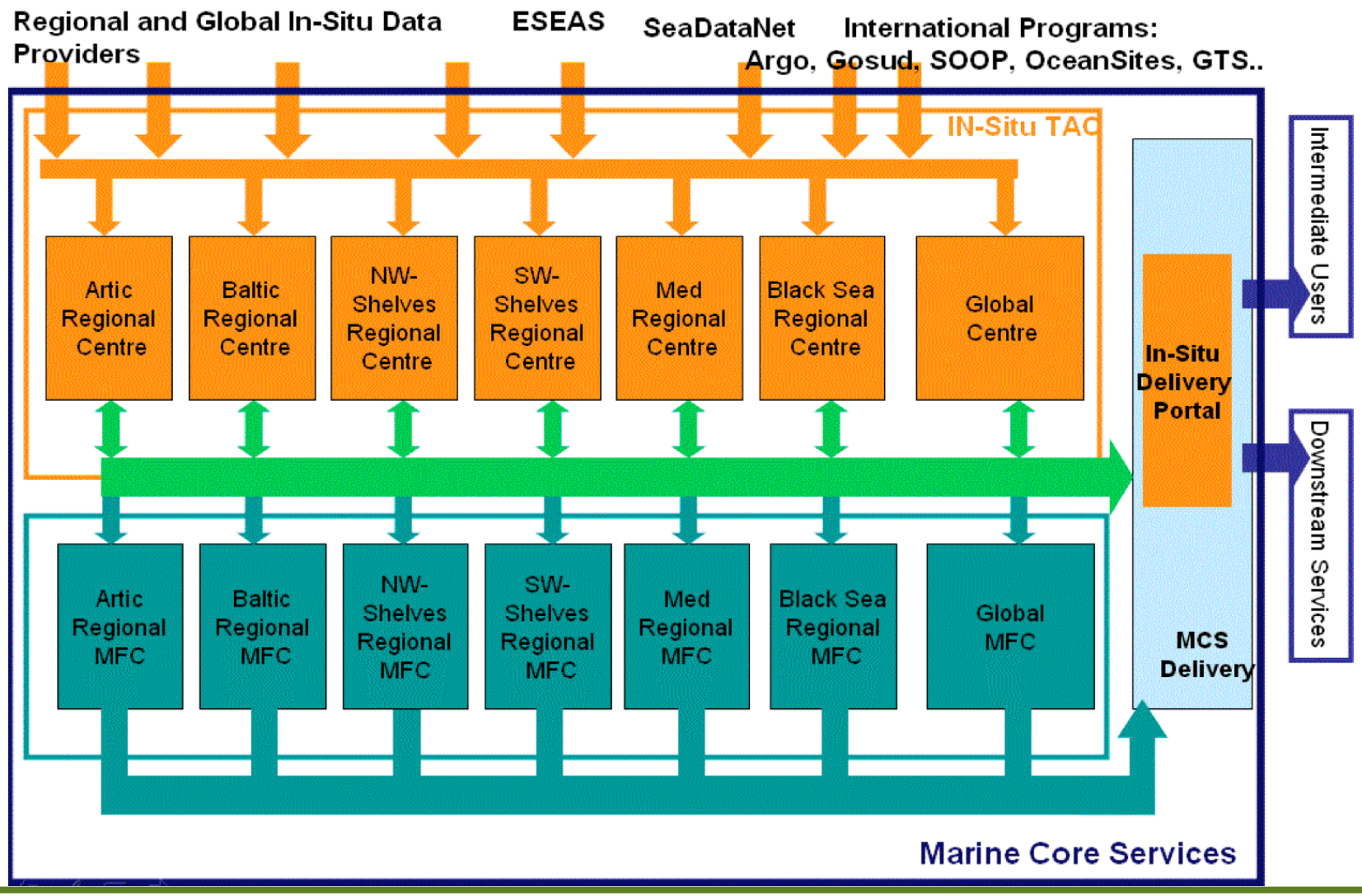


(http://www.coriolis.eu.org)

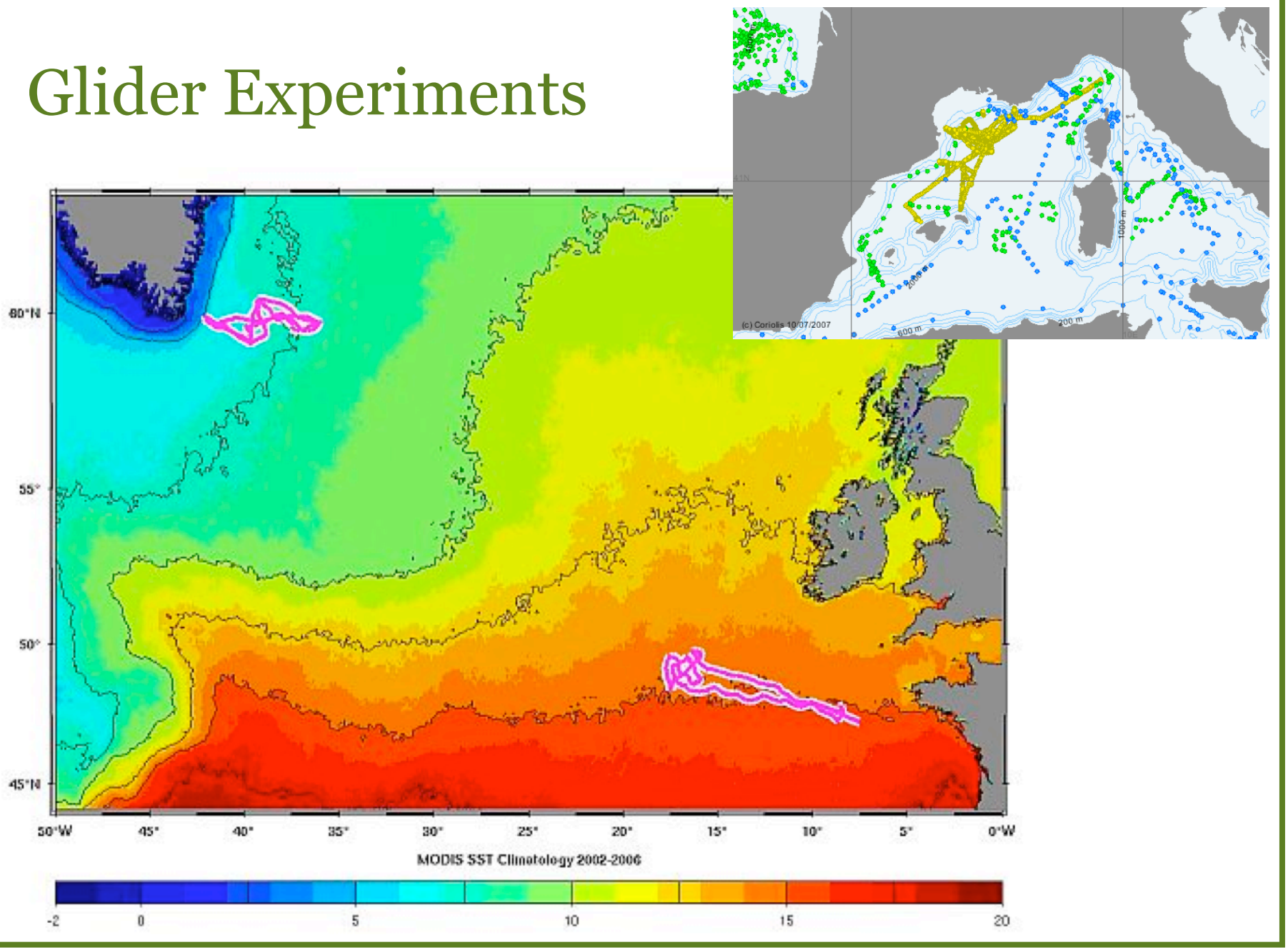
Euro-Argo and MyOcean

- The two projects (Euro-Argo and MyOcean) deal with the in-situ systems required by Global Monitoring for Environment and Security (GMES) for climate research, environment monitoring and operational oceanography.
- Euro Argo aims to develop a sustained European contribution to Argo, an essential component of the global ocean observing system.
- In MyOcean, Coriolis will consolidate and improve its in-situ data services to provide the best data and products required by global and regional data assimilation systems and applications.
- Within the MyOcean in-Situ Thematic Assembly Center (TAC) Coriolis coordinates the overall activities and also provide the in-situ services for the Global Ocean and the IBI area.
- Coriolis will also contribute to the Mediterranean service. A major challenge will be to set up the appropriate collaborations with the relevant international and national entities/projects that collect in-situ data at global and regional level and to sustain these data streams on the longer term.

MyOcean Project - http://www.myocean.eu.org.



Glider Experiments



WP 2 - Status

WP 2: Prof He and Prof. Alpers et al. "Chinese Spaceborne Ocean Observing Systems and Onboard Sensors (1988-2025)"

- 1st year: focus on satellite systems

  Seven satellite series:

  - FY-n (Chinese met. agency, wind/clouds)
  - HY-n (Chinese Ocean Agency)
  - ZY-n (resource)
  - HJ-n (Environment)
  - SZ-n (Spacecraft)
  - CRS-n (Chinese remote sensing)
  - DMC/BJ-1 (disaster management, series of small instruments)

- 2nd and 3rd year: focus on data products, availability and how they are used.
- For second-third year report a table should be made, identifying all Chinese and European missions/sensors, and indicating to which degree data is further used for research and development, assimilation and for routine operations.

WP 2 - Status

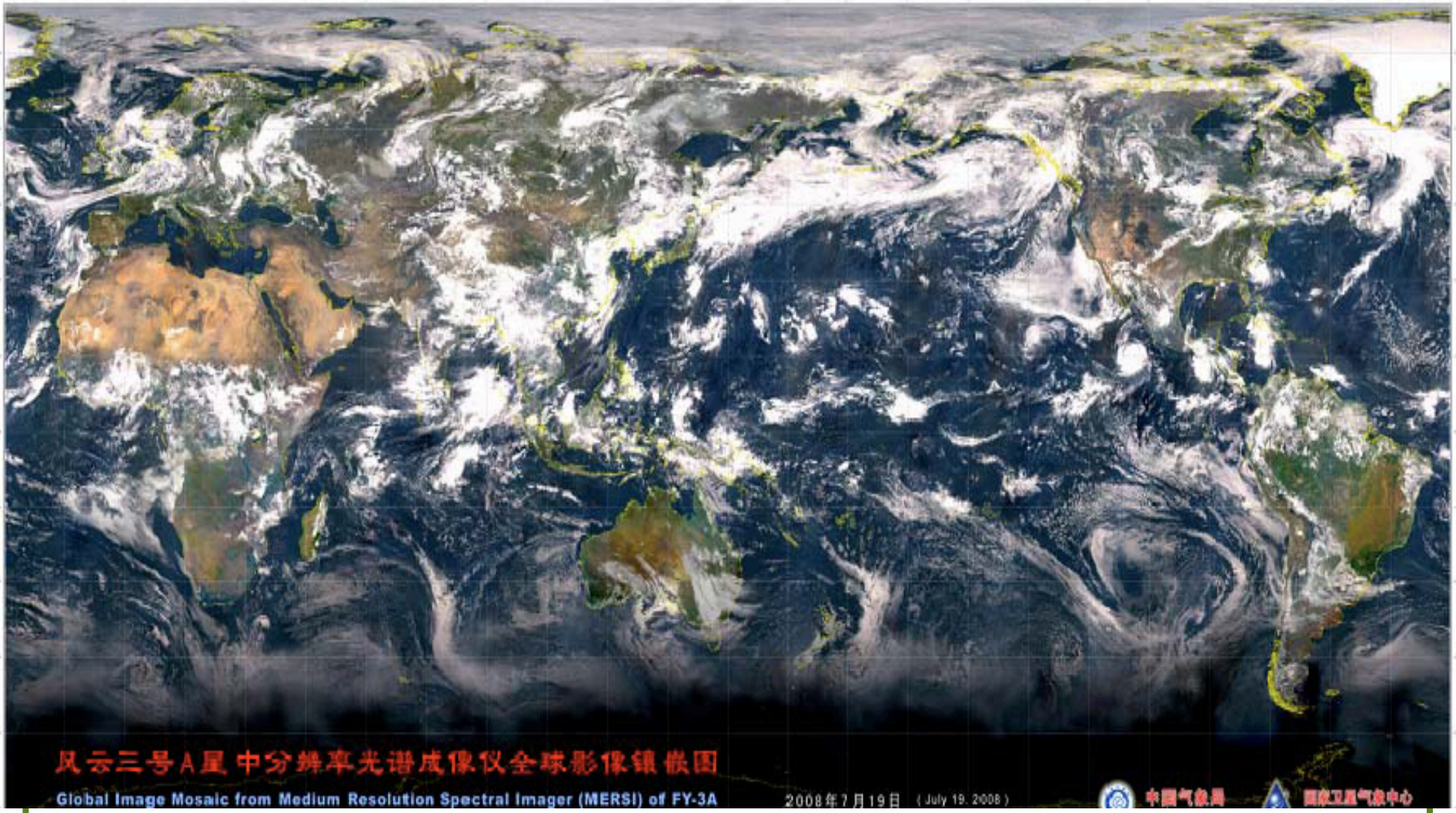
- A summary of 19 sensors used for ocean observation is presented. Ten sensors can be used for quantitative retrieval of ocean environmental parameters. The other nine sensors can be applied to coastal zone observation. The technological specifications and data products of FY-3A / MERSI, FY-3A / MWRI, HY-1B / COCTS, HJ-1A / HIS and several infra-red sensors are introduced respectively.
- Only the services of ocean satellite data products of sea surface temperature (SST) and ocean colour parameters are available at present. There are merely L1 data product provided for hyper-spectral sensors and microwave sensors.
- Operational algorithms for ocean colour parameters and SST are introduced respectively. In fact, they are only preliminary results. It is necessary to research and improve further, and it is also required wide and sufficient validation. The performance and SST products of FY and HY satellites are evaluated. Retrieval algorithms for ocean colour measurements in China seas are also accessed.
- Operational application of satellite ocean colour parameters and SST are used for ocean ecology disaster, monitoring of coastal water quality, numerical prediction of the marine environment. It is concluded that “Monitoring service system for floating green algae in Qingdao coastal water and related environmental parameters”, which is an operational service system of satellite data for non-research users, is pushed by DRAGONESS concept.

WP 2 - Status

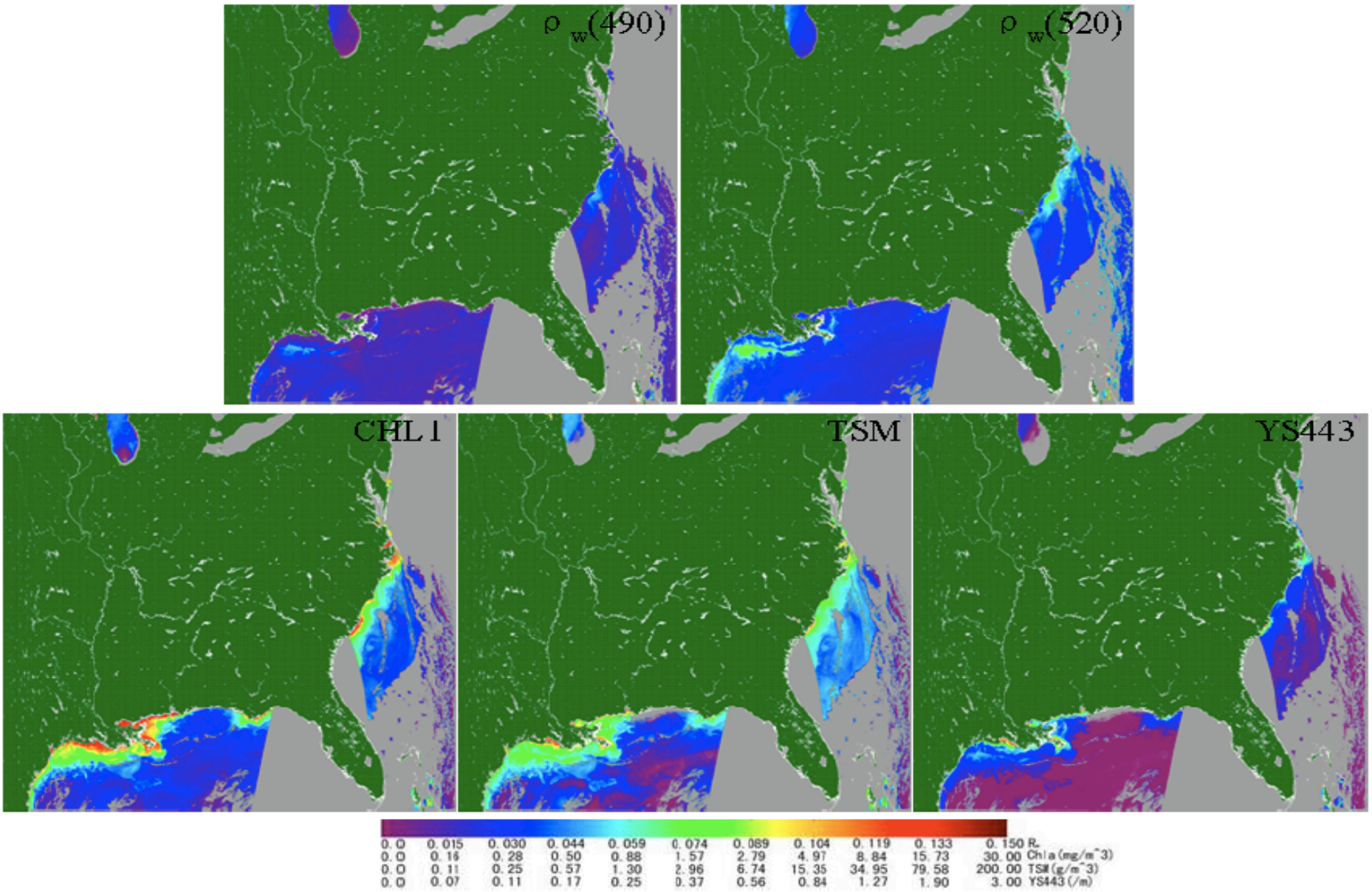
- Ocean data products and operational retrieval algorithms of in-orbit sensors for European spaceborne ocean observing system are presented repetitively. Operational application of ocean data products of in-orbit sensor developed by Europe is also introduced here, including water quality monitoring services provided by Nansen Center, near-real time algae bloom and water quality for the North Sea and the Skagerrak Sea.

Timeline Chinese Satellites

MERSI global image mosaic



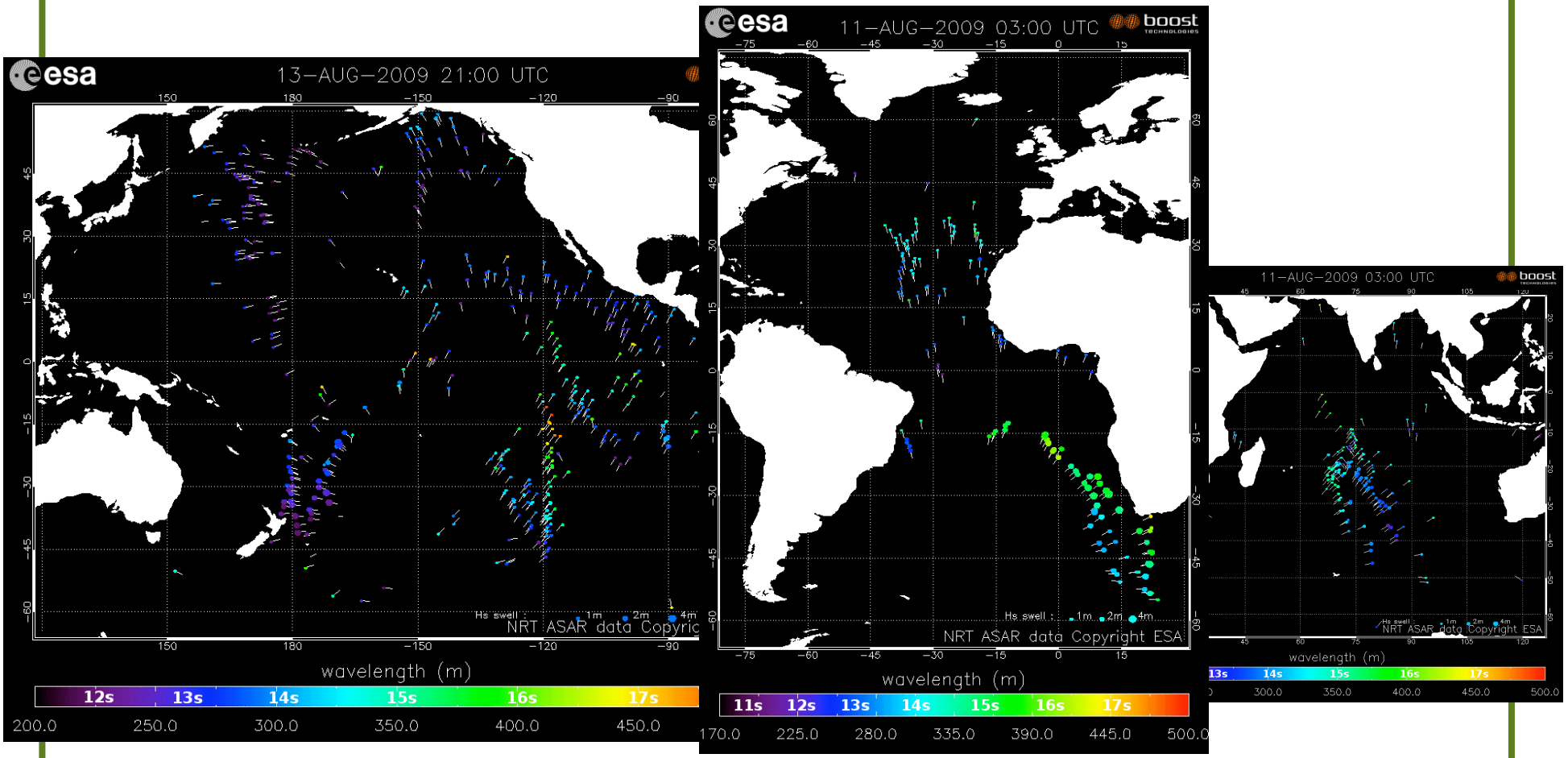
MERSI multichannel regional product



Summary

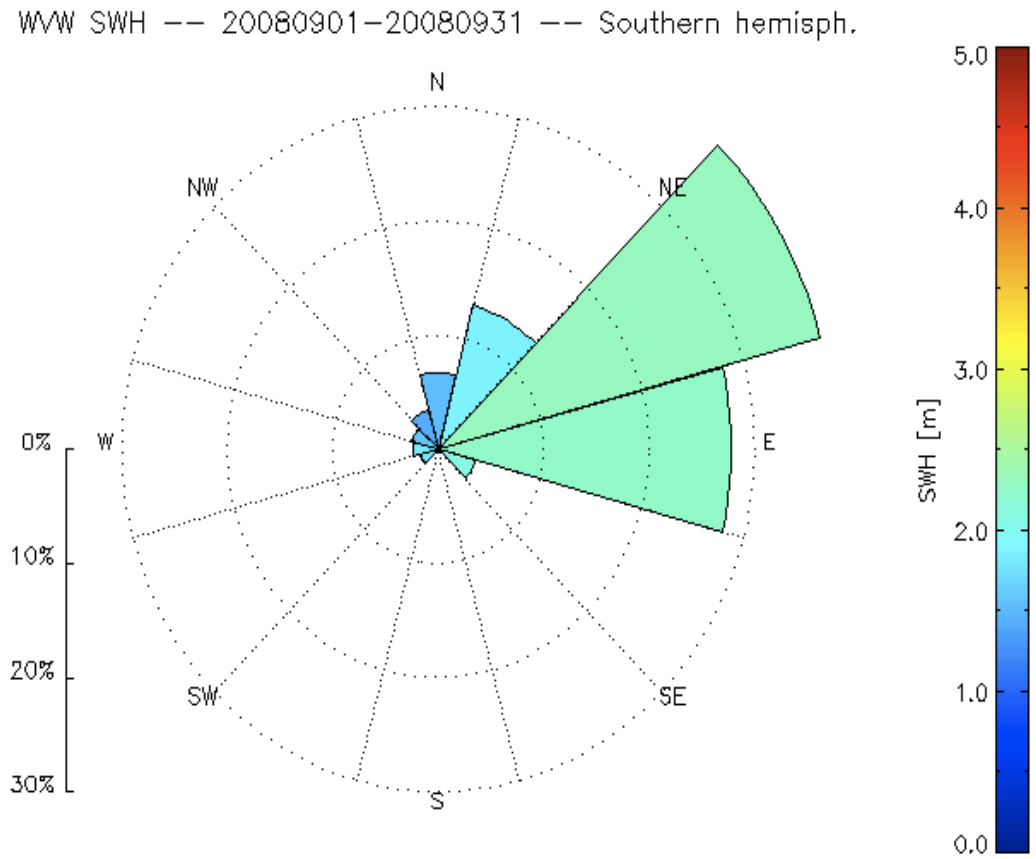
- The FY and HY have been designed with capability to provide SST observation from space. FY-2C, 2D, 2E are currently on orbit. FY-2E was launched in December 2008, replacing FY-2C which has exceeded its duty time.
- The FY-2D infrared split window channels IR1 and IR2 for the observation of SST are analyzed and compared with simultaneous brightness temperature data from MTSAT-1R. The results show poor calibration of FY-2D IR1 and IR2 channels, which are not capable of retrieving valid SST products.
- For HY series satellite, the HY-1B is in-orbit. The FY-2E IR1 and IR2 performance will be analyzed. The HY-1B COCTS SST products are compared with AVHRR and MODIS SST products. The results show negative bias around 1K exists for COCTS SST.
- The FY-3A, a new generation polar orbiting meteorological satellite was launched in 2008. The Visible and InfraRed Radiometer (VIRR) on board FY-3A has infrared split window channels as well as mid-infrared channel for SST retrieval.
- The SST products derived from FY-3A is under investigation.

Fireworks



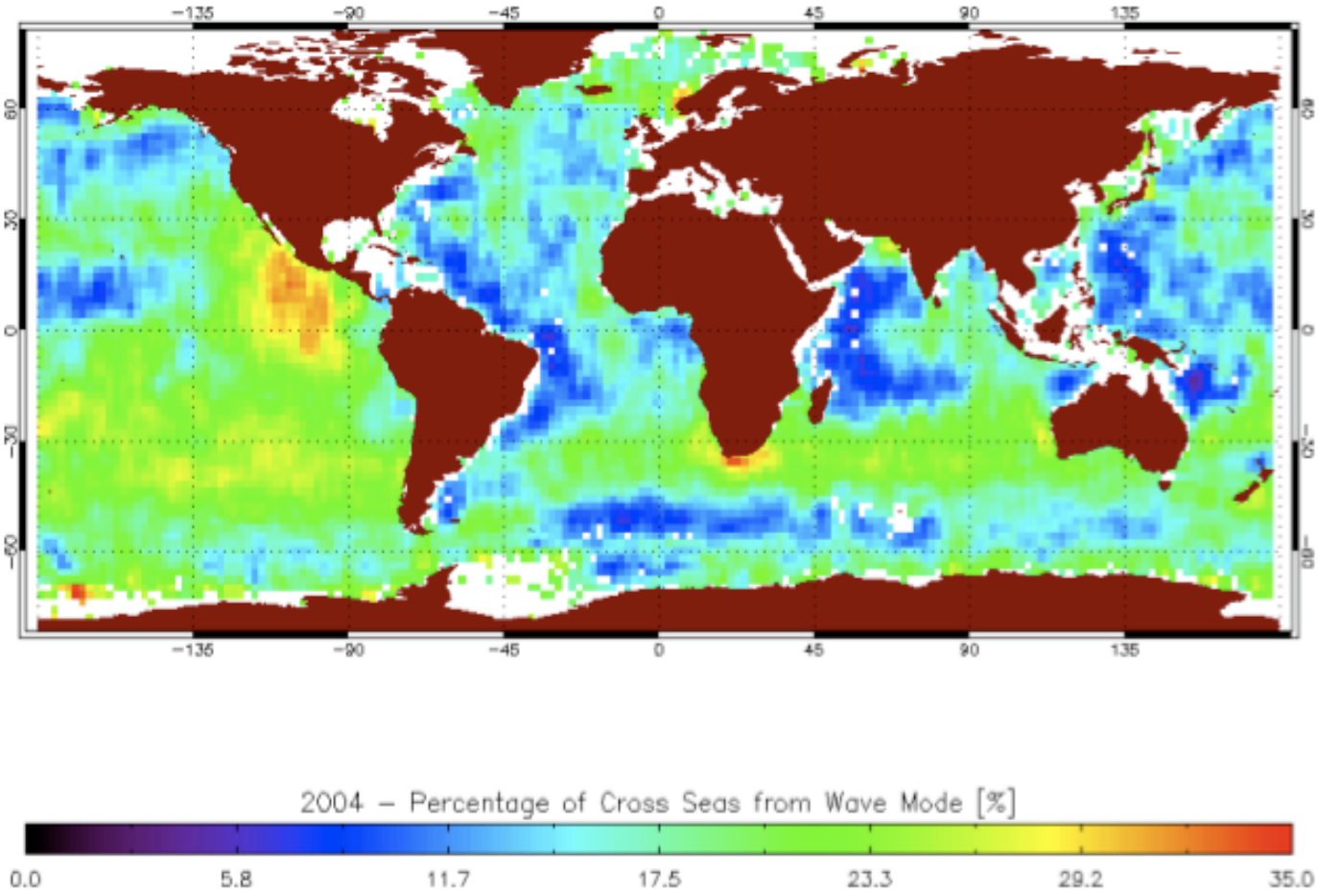
Courtesy Chapron & Collard, http://soprano.cls,fr

Higher Order Products - Wave Rose

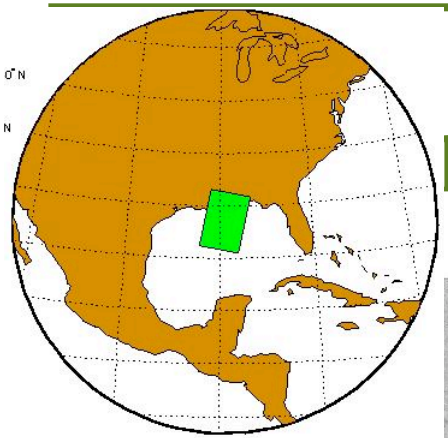


Courtesy NORUT

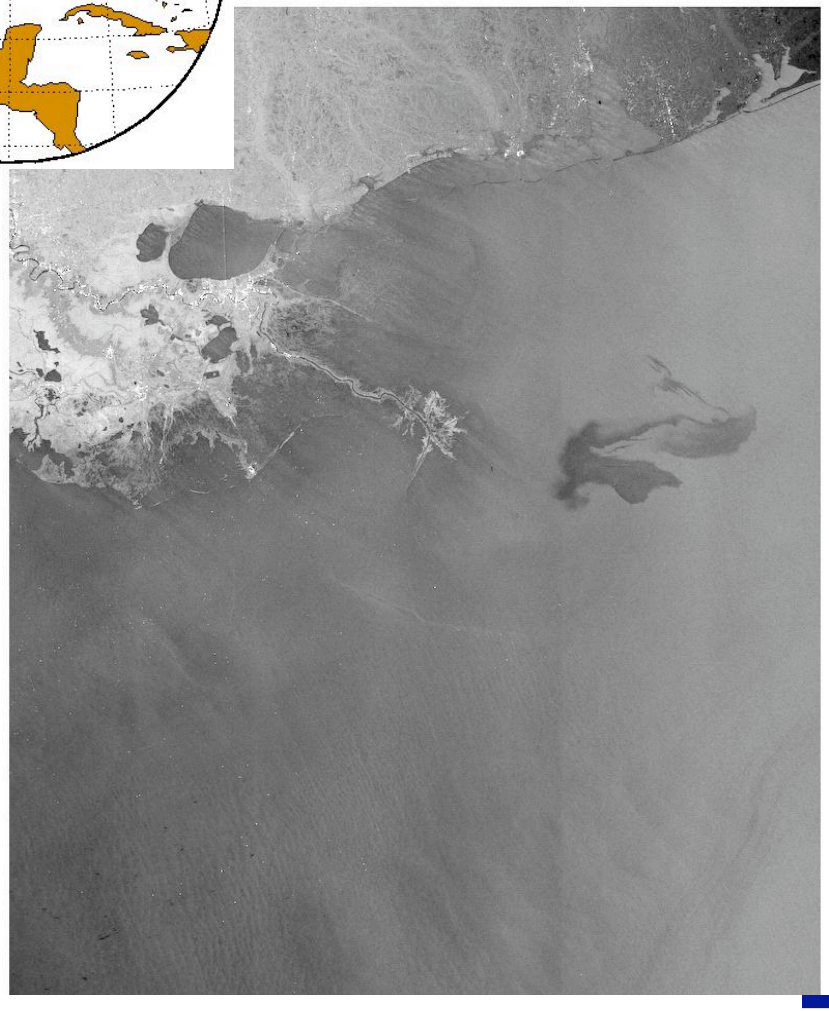
Higer Order Products - Crossing Seas

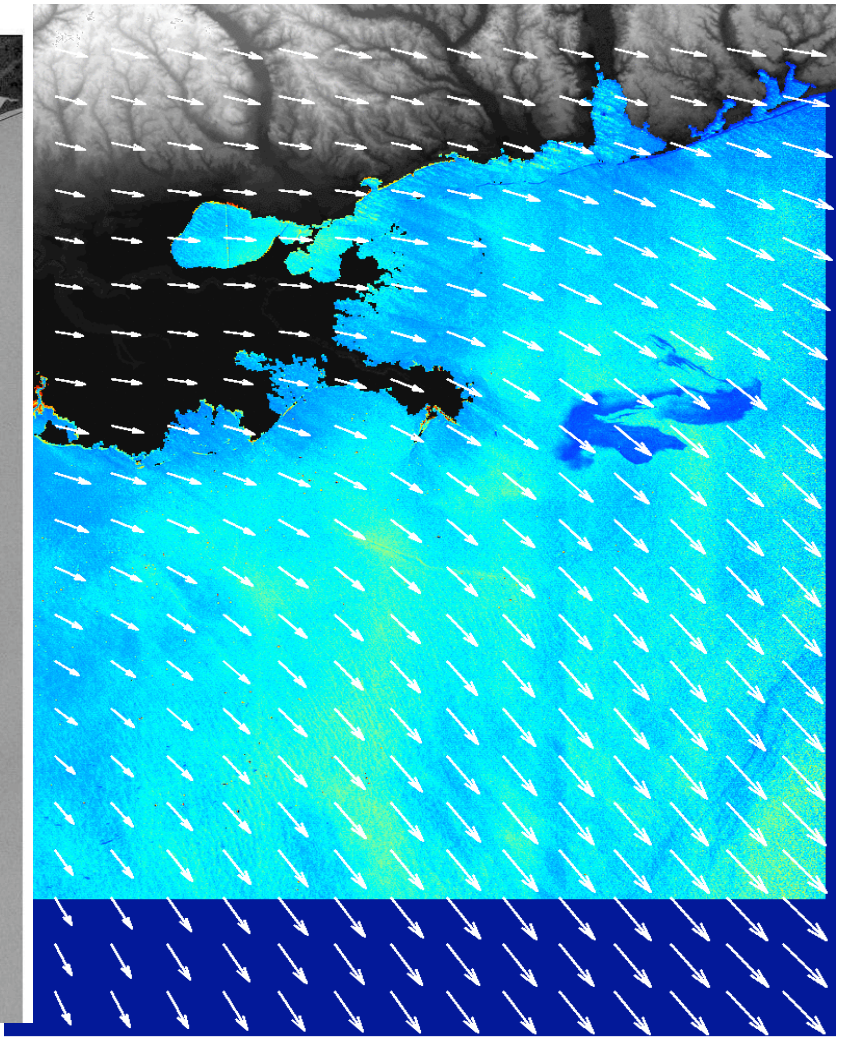


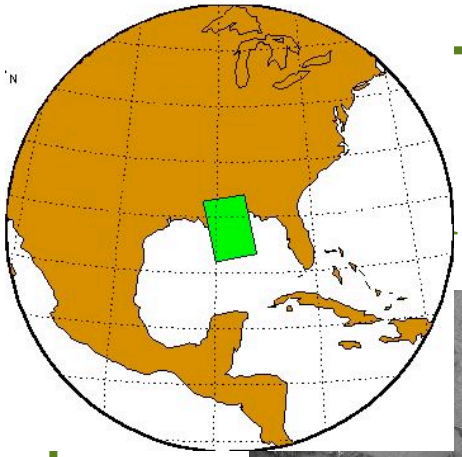
Courtesy CLS-NORUT



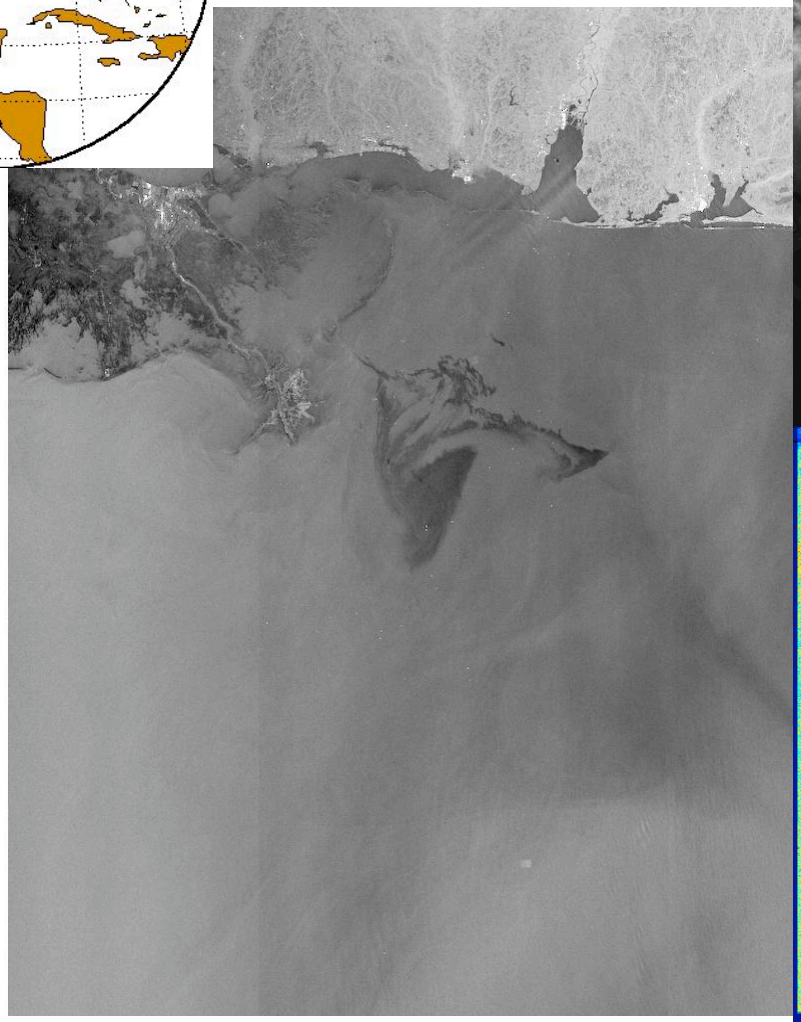
l spill in the Gulf of Mexico

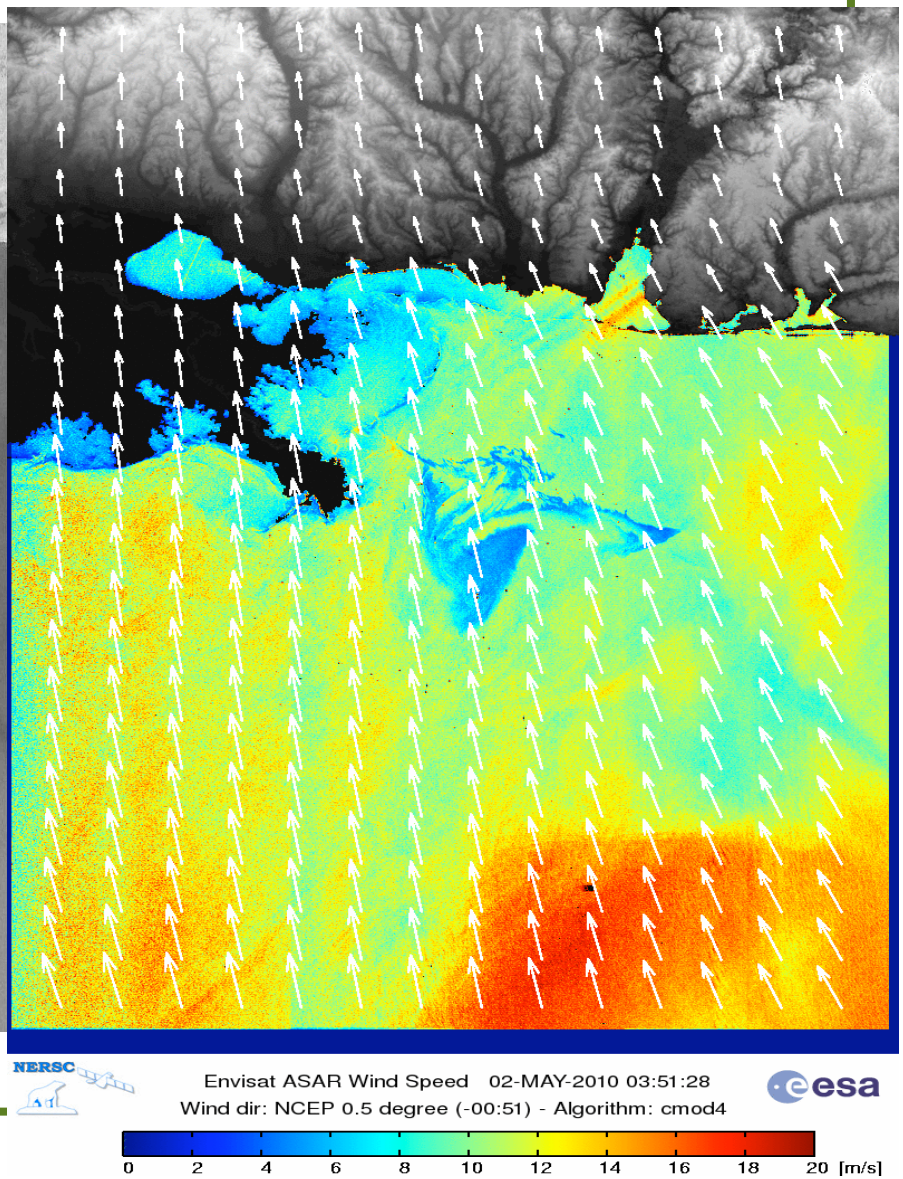




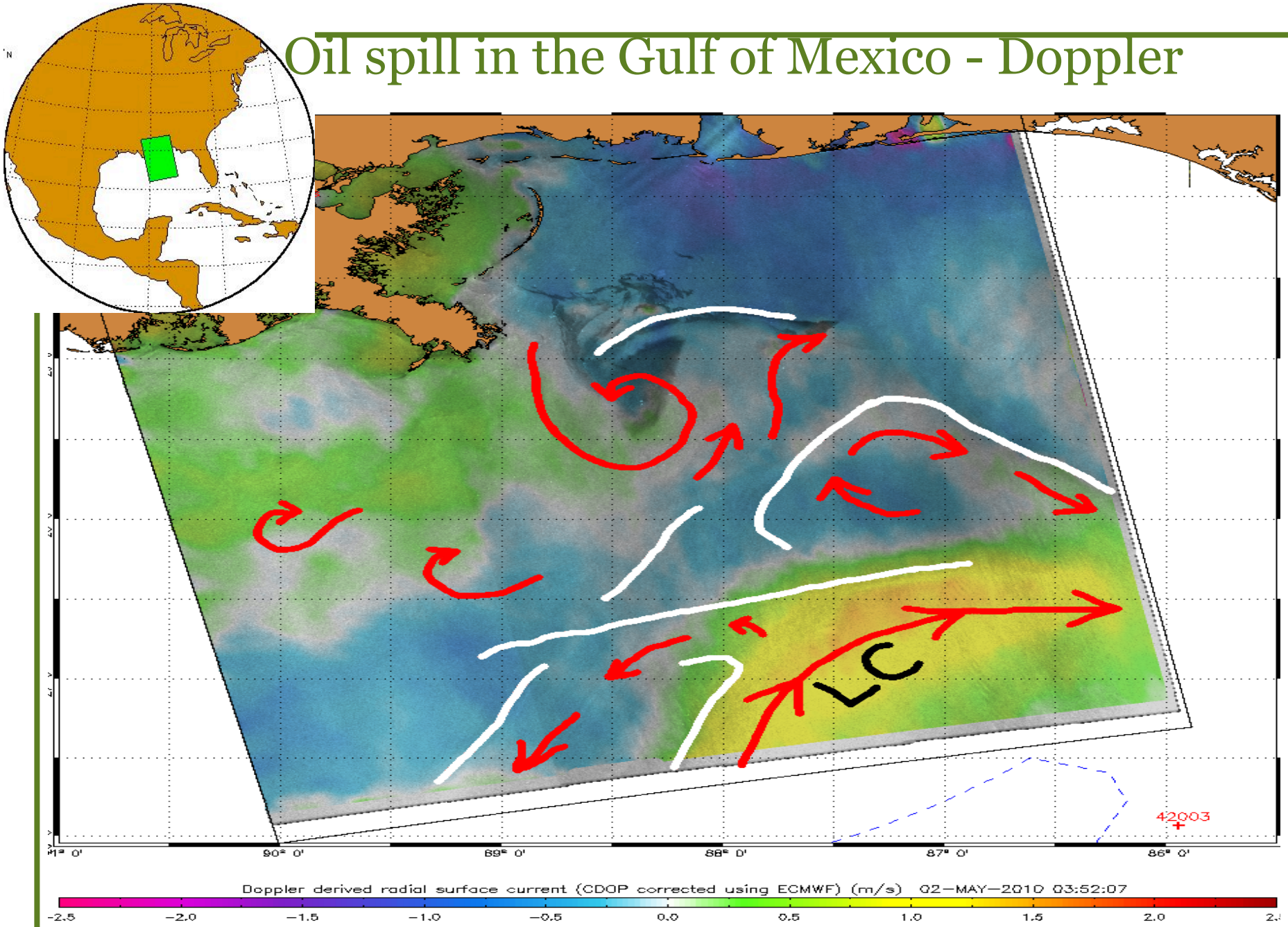


spill in the Gulf of Mexico



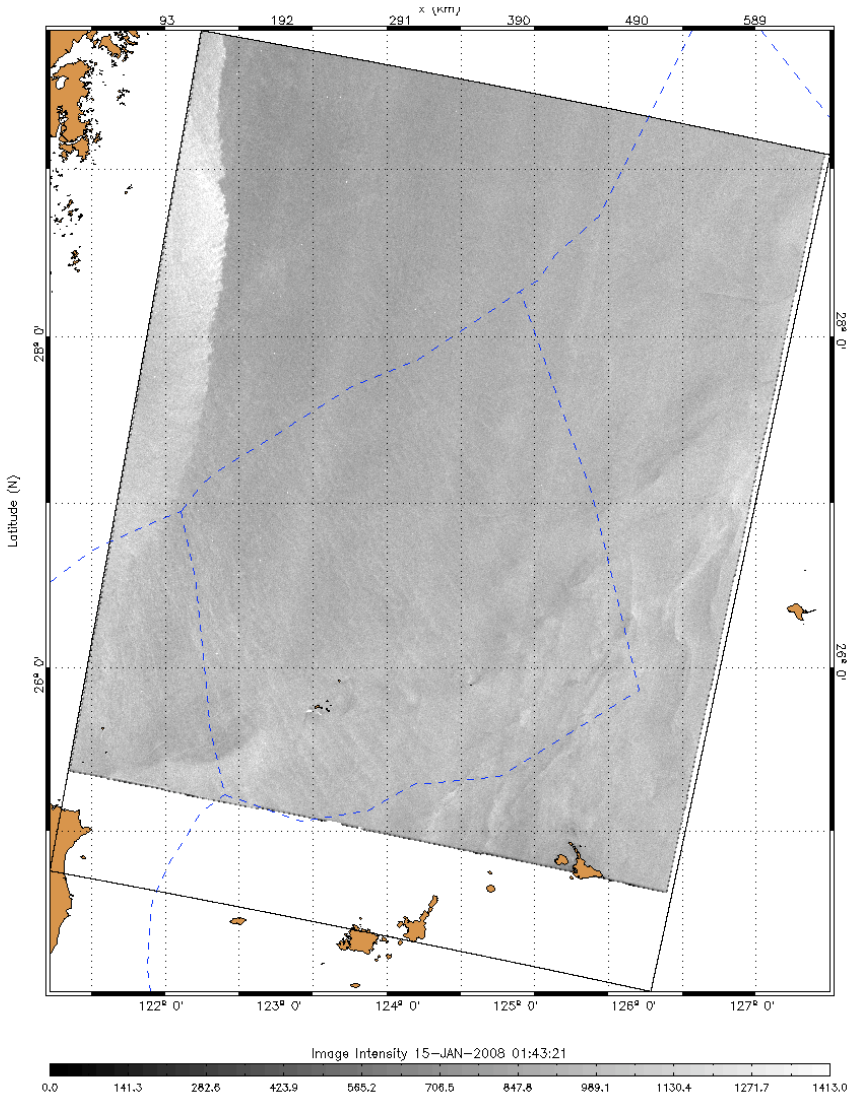


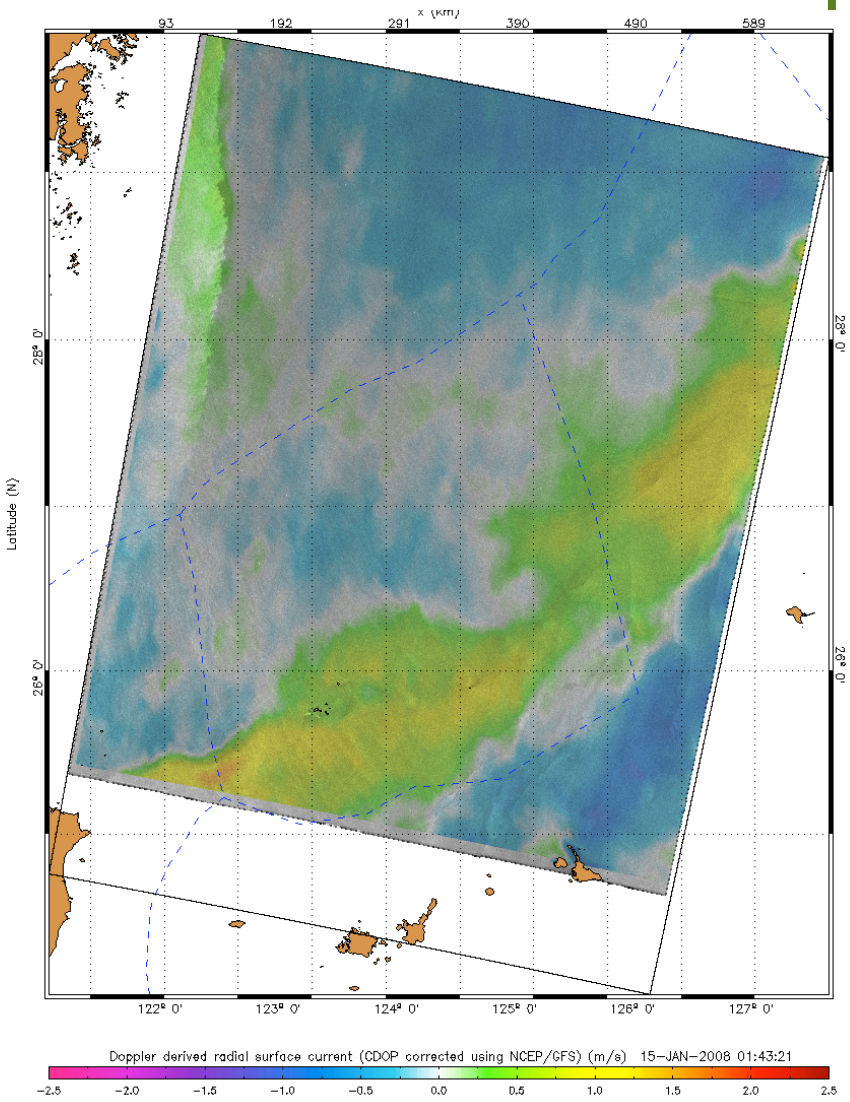
Oil spill in the Gulf of Mexico - Doppler



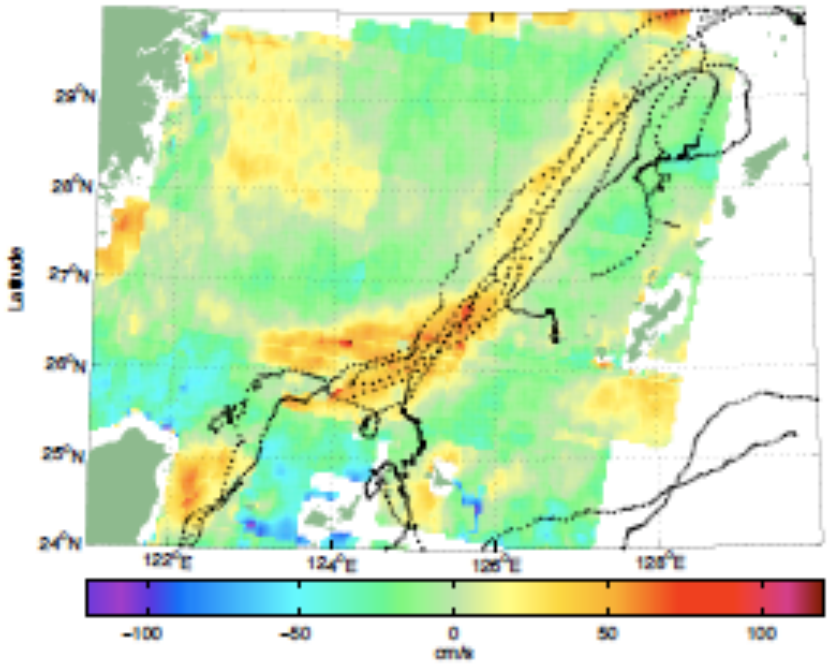
Courtesy Chapron & Collard, http://soprano.cls,fr

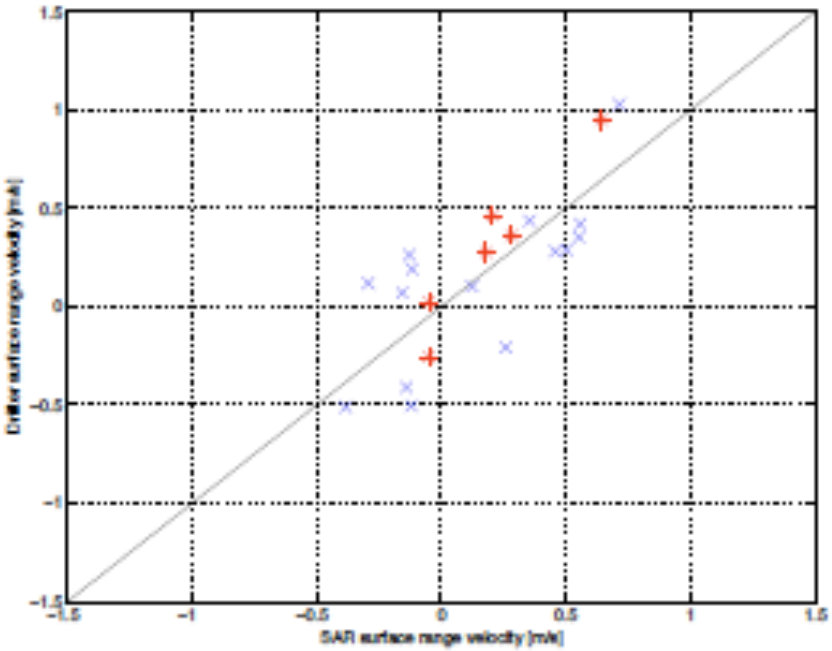
Range Doppler surface velocity



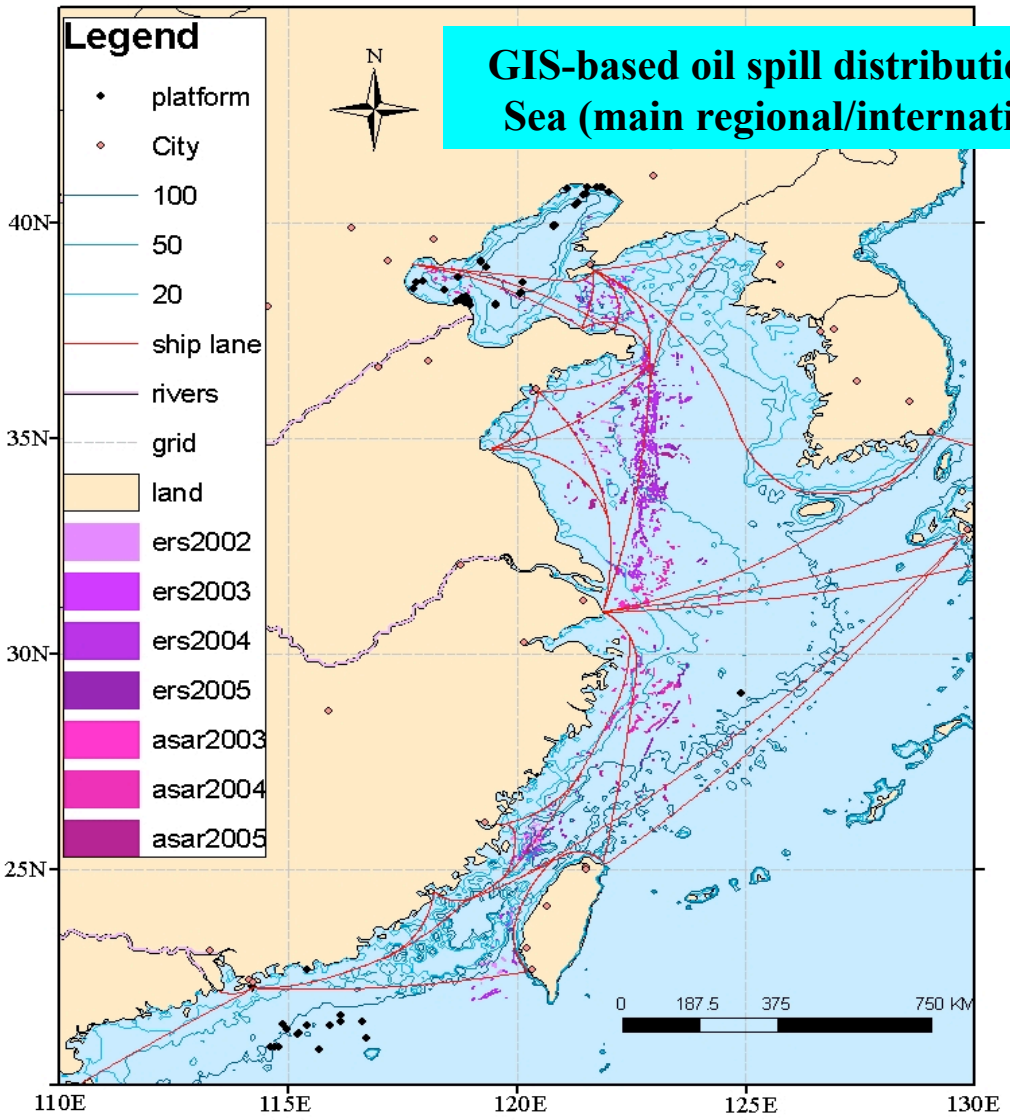


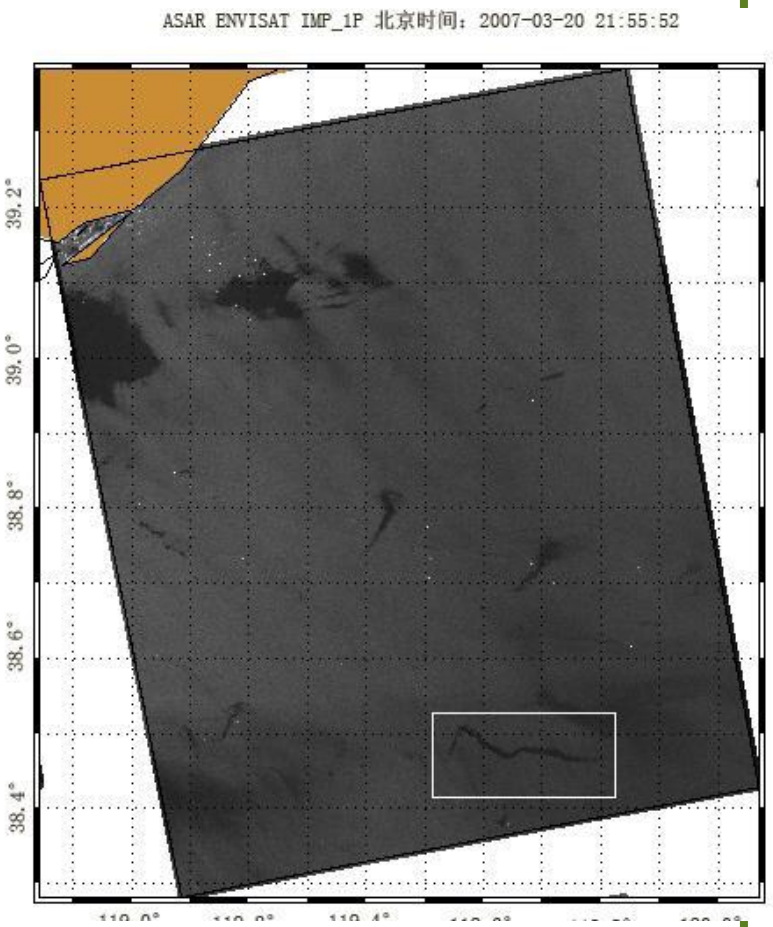
Range Doppler surface velocity and comparison to surface drifters

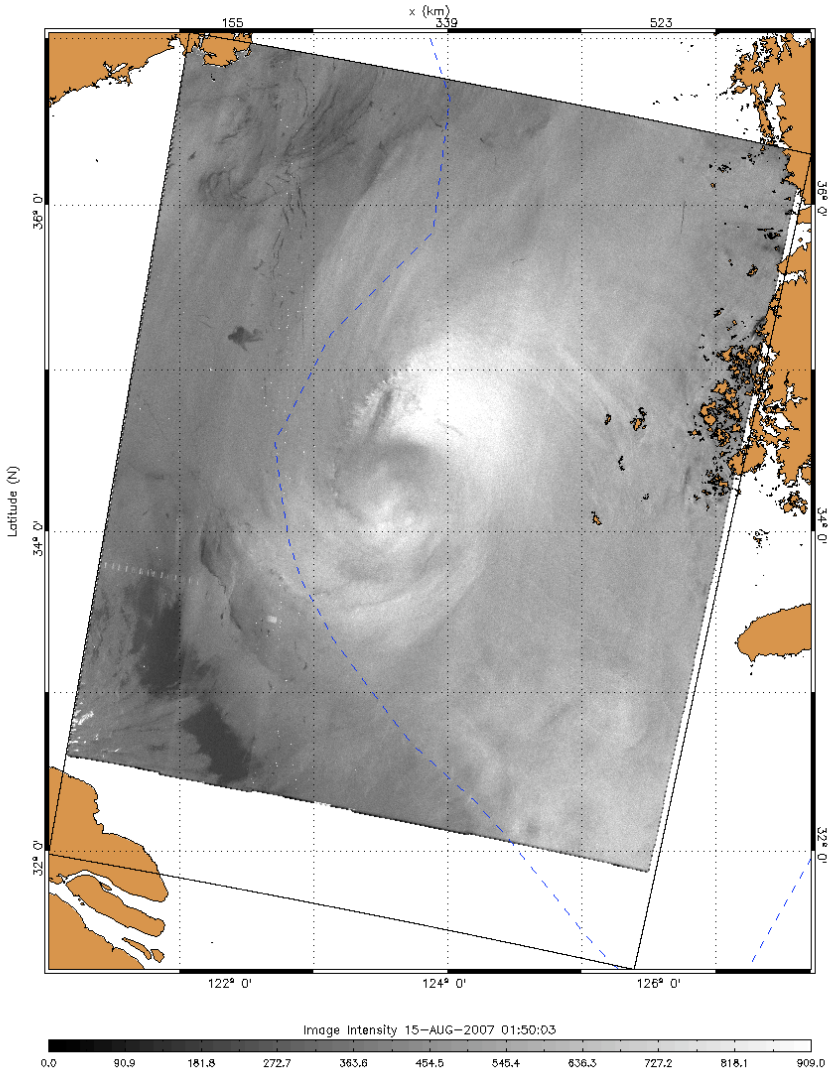


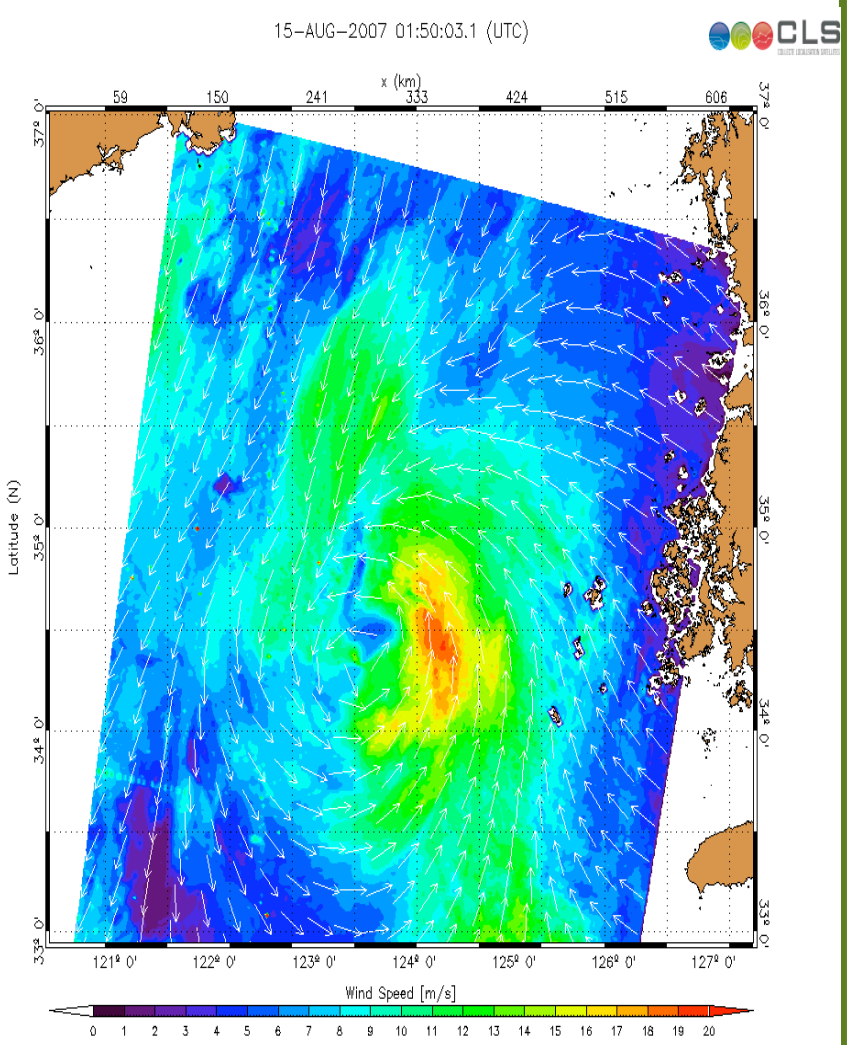


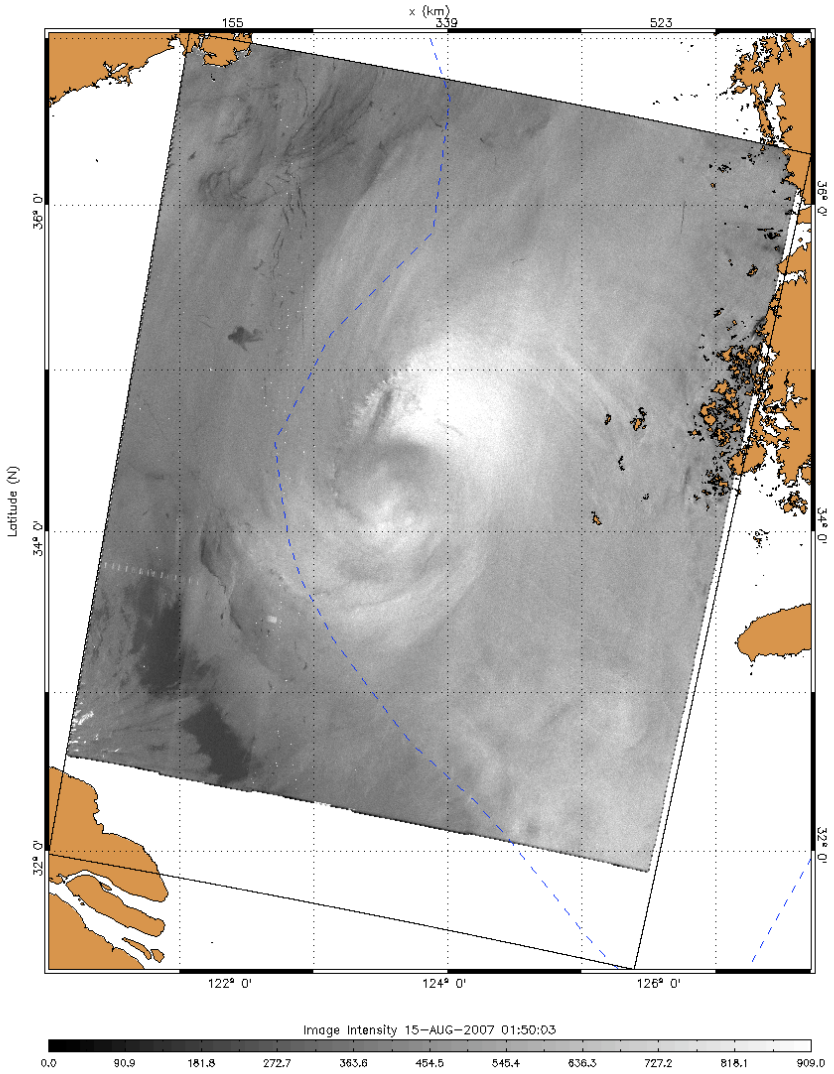
GIS-based oil spill distribution map for the Yellow Sea and East China Sea (main regional/international ship routes are shown by solid lines).

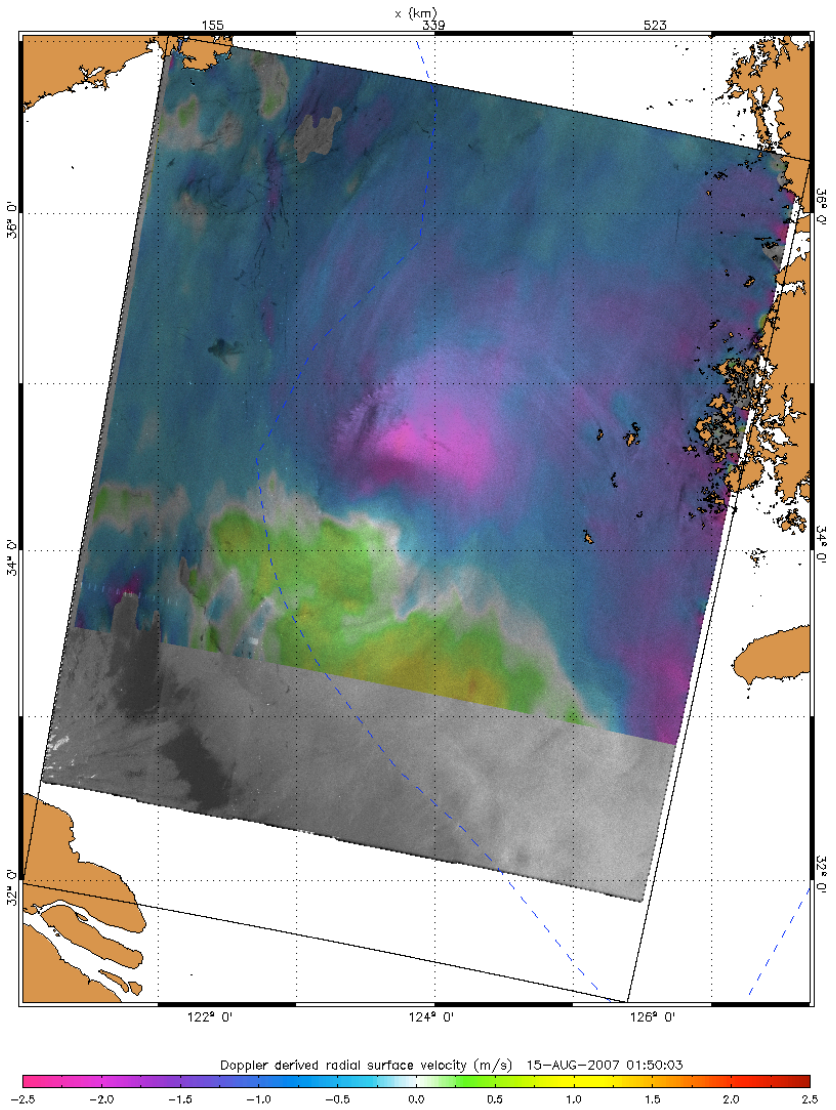




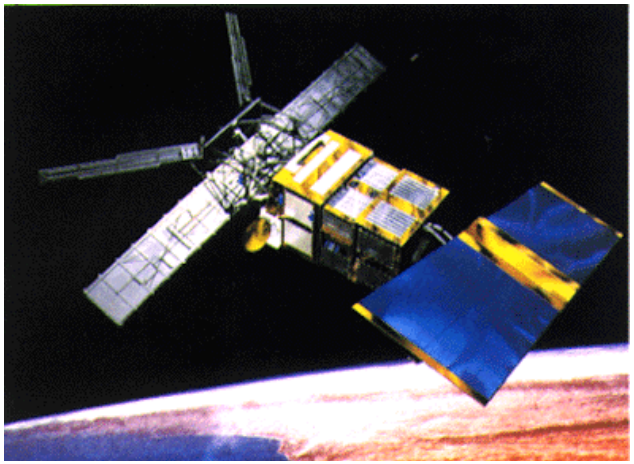

x (km)
155
339
523
Latitude (N)
36° 0'
34° 0'
32° 0'
122° 0'
124° 0'
126° 0'
Image Intensity 15-AUG-2007 01:50:03
0.0
90.9
181.8
272.7
363.6
454.5
545.4
636.3
727.2
818.1
909.0


15-AUG-2007 01:50:03.1 (UTC)
CLS
x (km)
59
150
241
333
424
515
606
Latitude (N)
37° 0'
36° 0'
35° 0'
34° 0'
33° 0'
121° 0'
122° 0'
123° 0'
124° 0'
125° 0'
126° 0'
127° 0'
Wind Speed [m/s]
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20


x (km)
155
339
523
36° 0'
34° 0'
32° 0'
Latitude (N)
122° 0'
124° 0'
126° 0'
Image Intensity 15-AUG-2007 01:50:03
0.0
90.9
181.8
272.7
363.6
454.5
545.4
636.3
727.2
818.1
909.0


x (km)
155
339
523
36° 0'
34° 0'
32° 0'
122° 0'
124° 0'
126° 0'
Doppler derived radial surface velocity (m/s) 15-AUG-2007 01:50:03
-2.5
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
2.5

Time line of ESA Missions



Earth Explorers

ERS 1

Oceans
Cryosphere
Land Surface
Climatology

ERS 2

Global Ozone
+ Land Surface

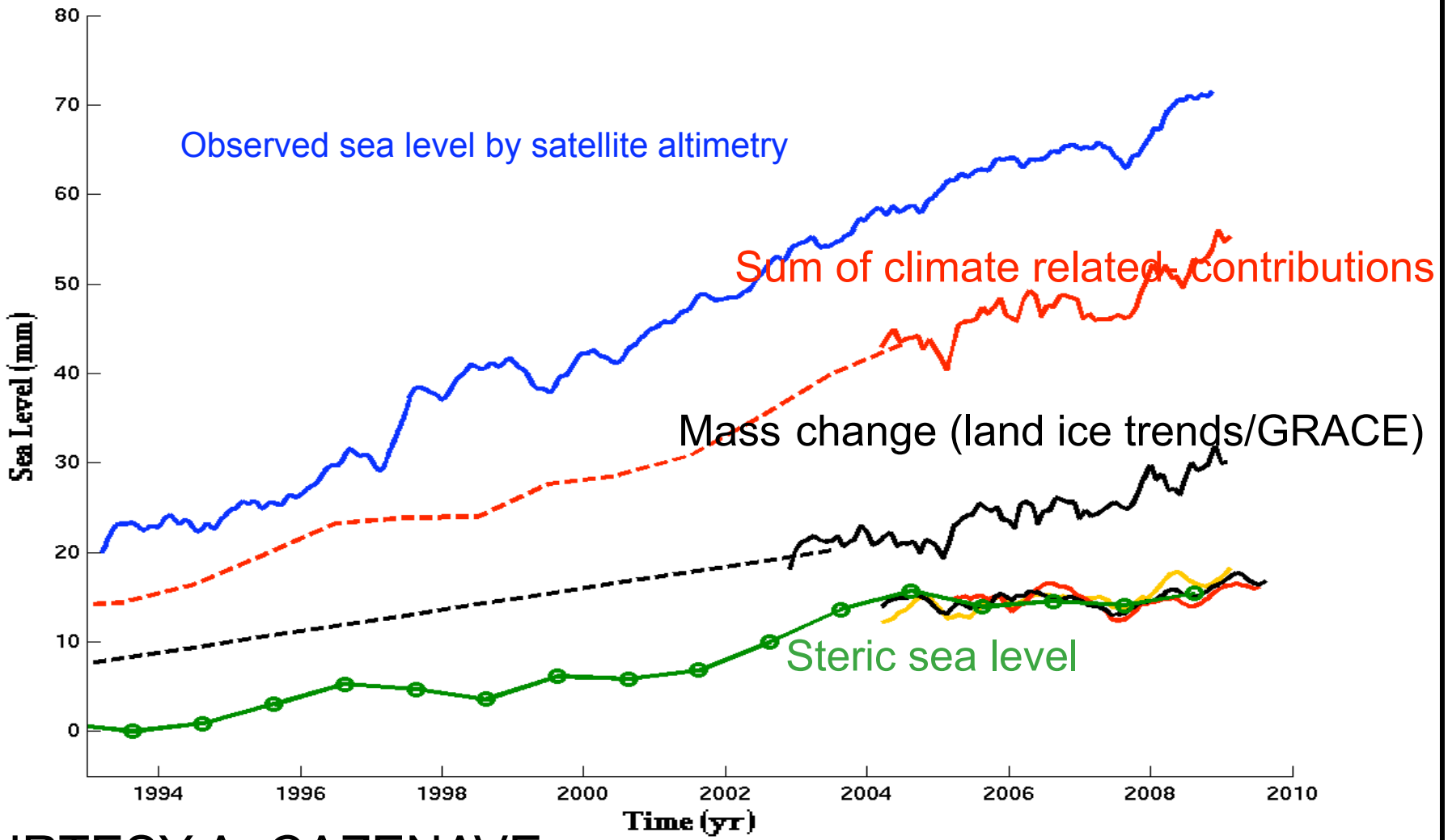
ENVISAT

+ ***Ocean Colour***
+ Atmospheric Constituents

Earth Watch GMES

Domain	Essential Climate Variables (GCOS, 2006)	
Atmosperic (over land, sea and ice)	**Surface:**	Air temperature, Precipitation, Air pressure, Surface radiation budget, Wind speed and direction, Water vapour.
	Upper air:	Earth radiation budget (including solar irradiance), Upper-air temperature (including MSU radiances), Wind speed and direction, Water vapour, Cloud properties
	Composition:	Carbon dioxide, Methane, Ozone, Other long-lived greenhouse gases, Aerosol properties
Oceanic	**Surface:**	Sea-surface temperature, Sea-surface salinity, Sea level, Sea state, Sea ice, Current, Ocean colour (for biological activity), Carbon dioxide partial pressure.
	Sub-surface:	Temperature, Salinity, Current, Nutrients, Carbon, Ocean tracers, Phytoplankton
Terrestrial	River discharge, Water use, Ground water, Lake levels, Snow cover, Glaciers and ice caps, Permafrost and seasonally-frozen ground, Albedo, Land cover (including vegetation type, Fraction of absorbed photosynthetically active radiation (FAPAR), Leaf area index (LAI), Biomass, Fire disturbance	

Sea level budget (1993-2009) Global



COURTESY A. CAZENAVE

ESA's Living Planet Programme

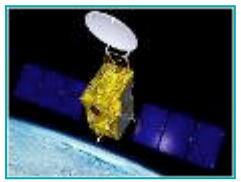
Earth Explorer

Research driven

Core Missions

GOCE
March 17th
2009

ADM-Aeolus
2011

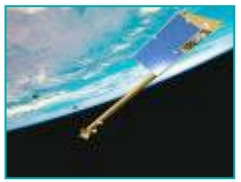


EarthCARE
2013

Opportunity Missions

CryoSat
2-2010

SMOS
11-2009



Swarm
2010

Earth Explorer 7
2016
(BIOMASS P band – core H2O X and Ku band)

Earth Watch

Operational Service driven

Operational Meteorology

- Meteosat
- MSG
- EPS (MetOp)
- MTG
- Post EPS

GMES

- Sentinel 1 A-B
- Sentinel 2 A-B
- Sentinel 3 A-B
- Sentinel 4
- Sentinel 5

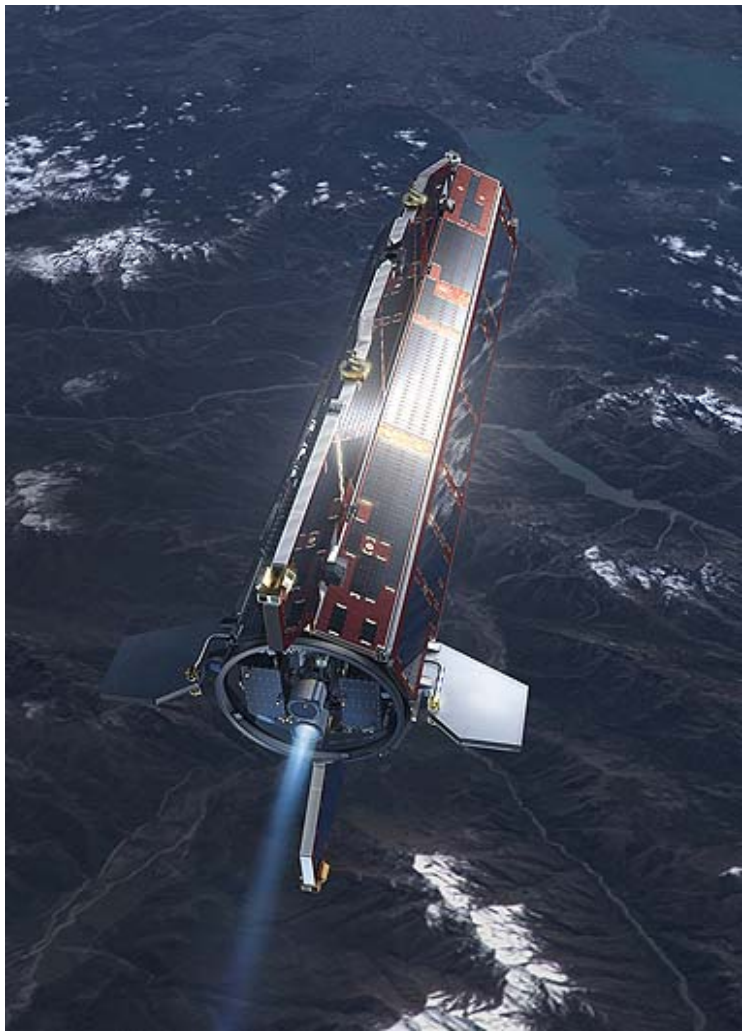
GOCE-SMOS-CRYOSAT 2 measurement goals

Table 4. Connection between the three geophysical quantities, the oceanic processes and the candidate satellite missions.

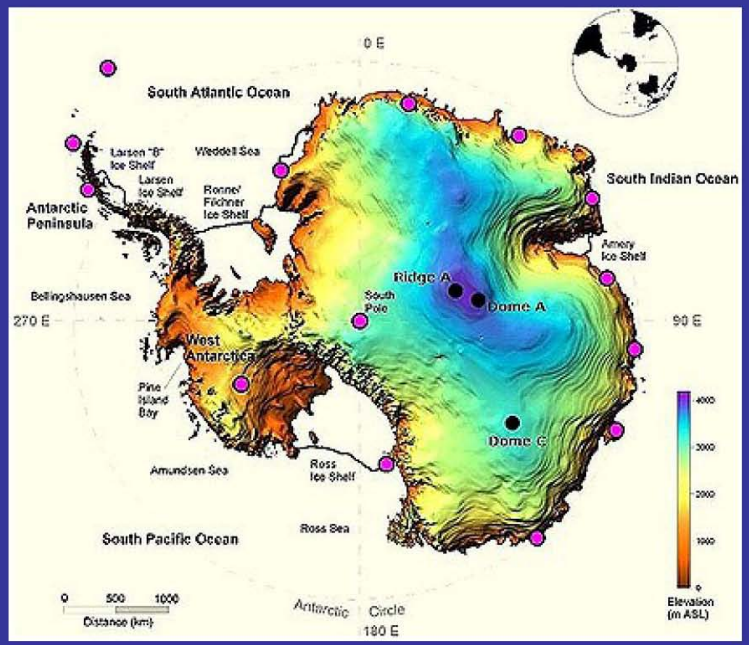
Processes	Parameters		
	Ice mass	Ocean salinity	Marine geoid*
Thermohaline circulation	ICESat, CryoSat	SMOS	GOCE, (GRACE)
Sea level change	ICESat, CryoSat, GRACE, GOCE		GOCE
Air-sea-ice interaction (+ albedo effect)	ICESat, CryoSat		
Evaporation minus precipitation		SMOS, + TRMM follow-on	
Mass and heat transport		(SMOS)	GOCE, (GRACE)
Large-scale frontal dynamics		SMOS	GOCE
Evolution of large-scale salinity event	(ICESat, CryoSat)	SMOS, +TRMM follow-on	

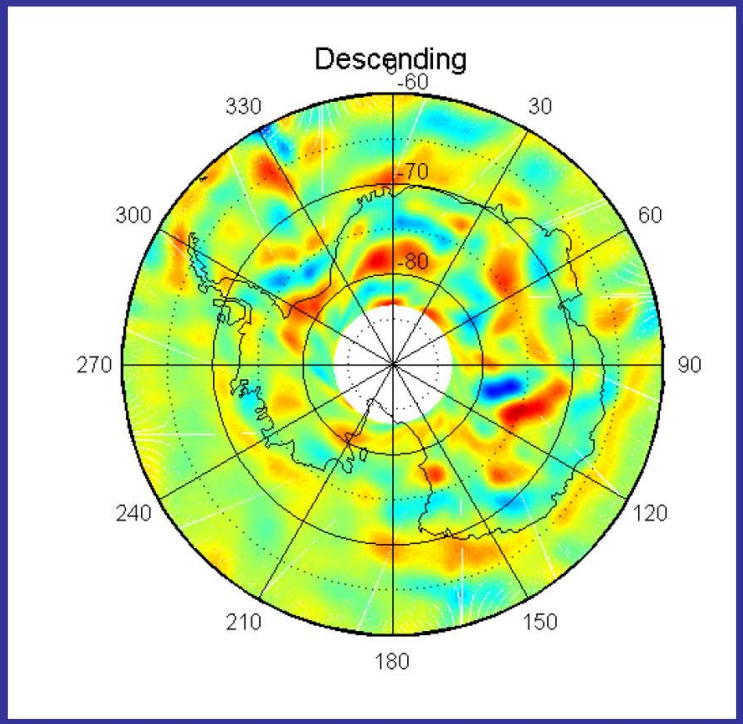
*Note: We are mostly considering the marine geoid in support of radar altimetry.

ESA's **Gravity** Mission GOCE-launched March 2009



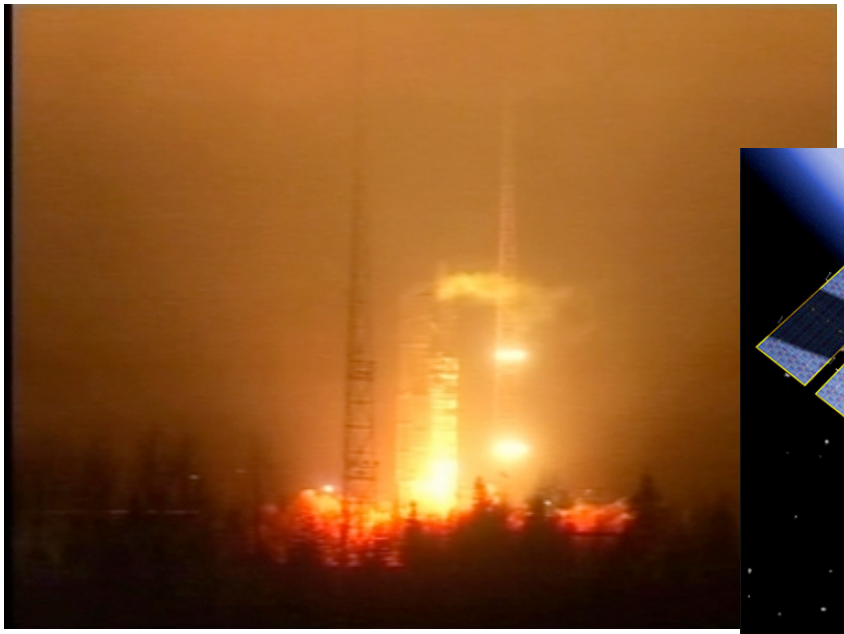
GOCE Gravitational Gradiometry – Preliminary Results





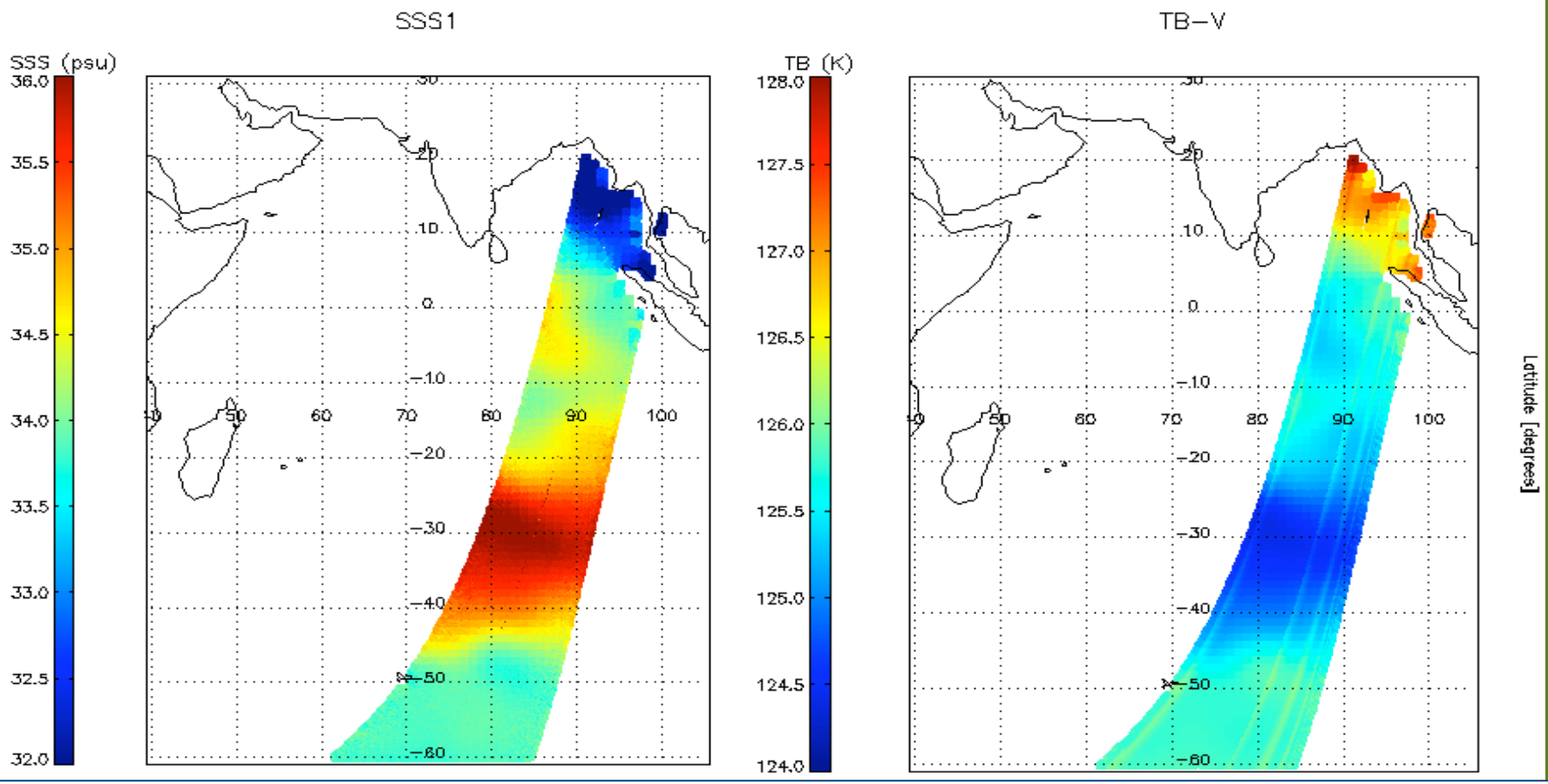
ESA WATER MISSION SMOS *(Soil*

Moisture and Ocean Salinity Explorer) NOV. 2009



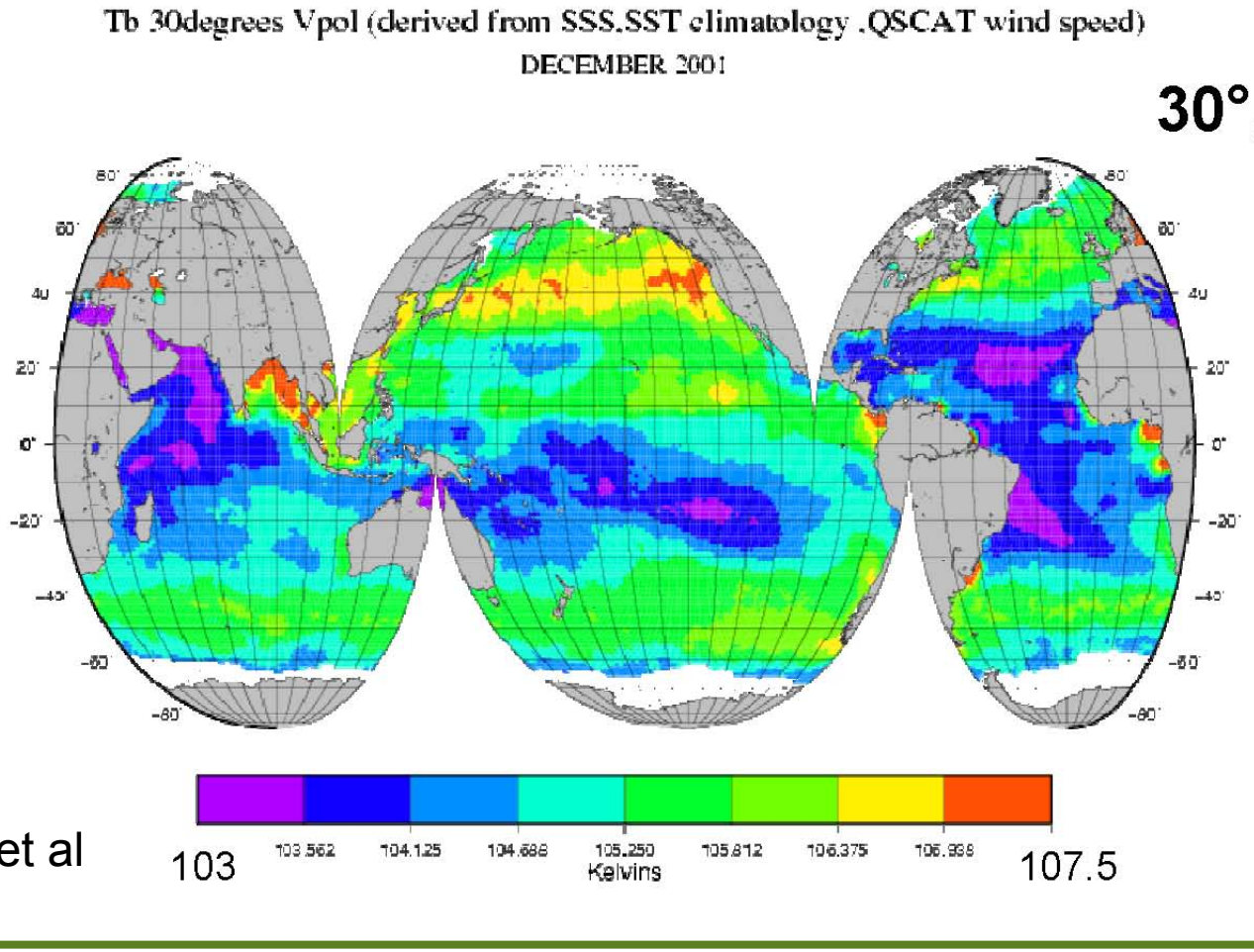
Ocean Salinity

Brightness temperature

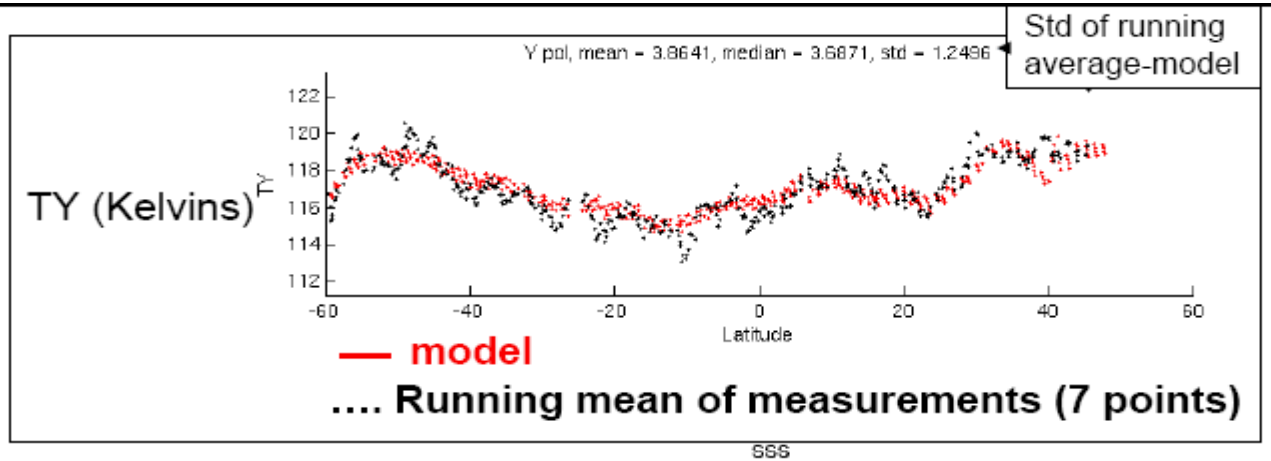


Level 2 Sea surface salinity (simulated) *(left)* and corresponding brightness temperature (V pol) at 42.5º at surface for same overpass (*right)* courtesy ACRI)

Expected geophysical patterns over the global ocean

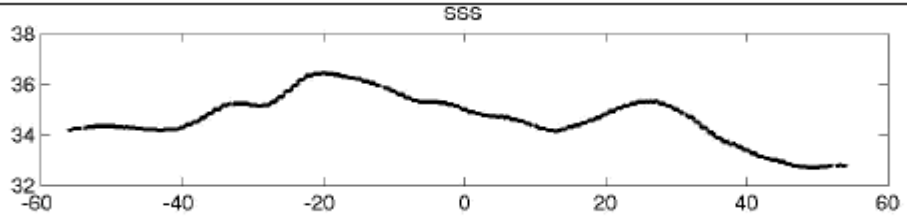


Ocean salinity related brightness temperatures



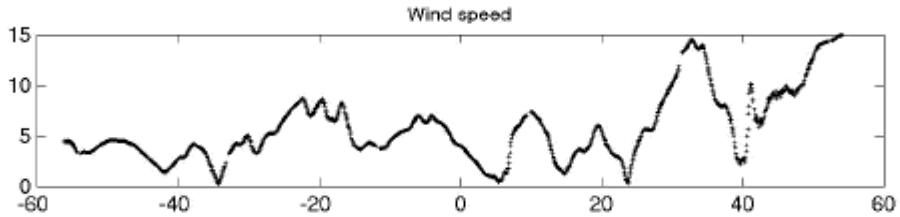
PP - 5 Dec:
14:44:36 to
15:34:37 TU

Climatology
SSS (psu)



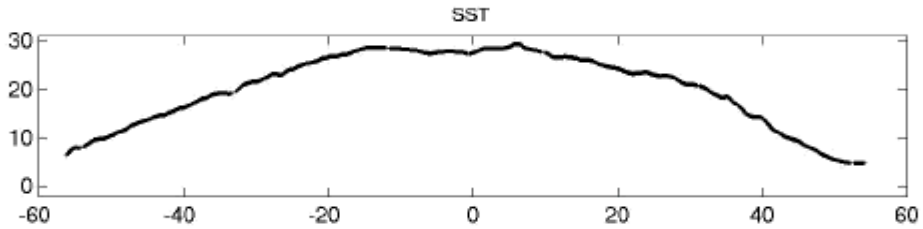
dTv/dSSS~
-0.5K/psu @ 10°C;
-0.8K/psu @ 30°C

ECMWF
wind speed
(m/s)



dTv/dU~0.2K/m/s

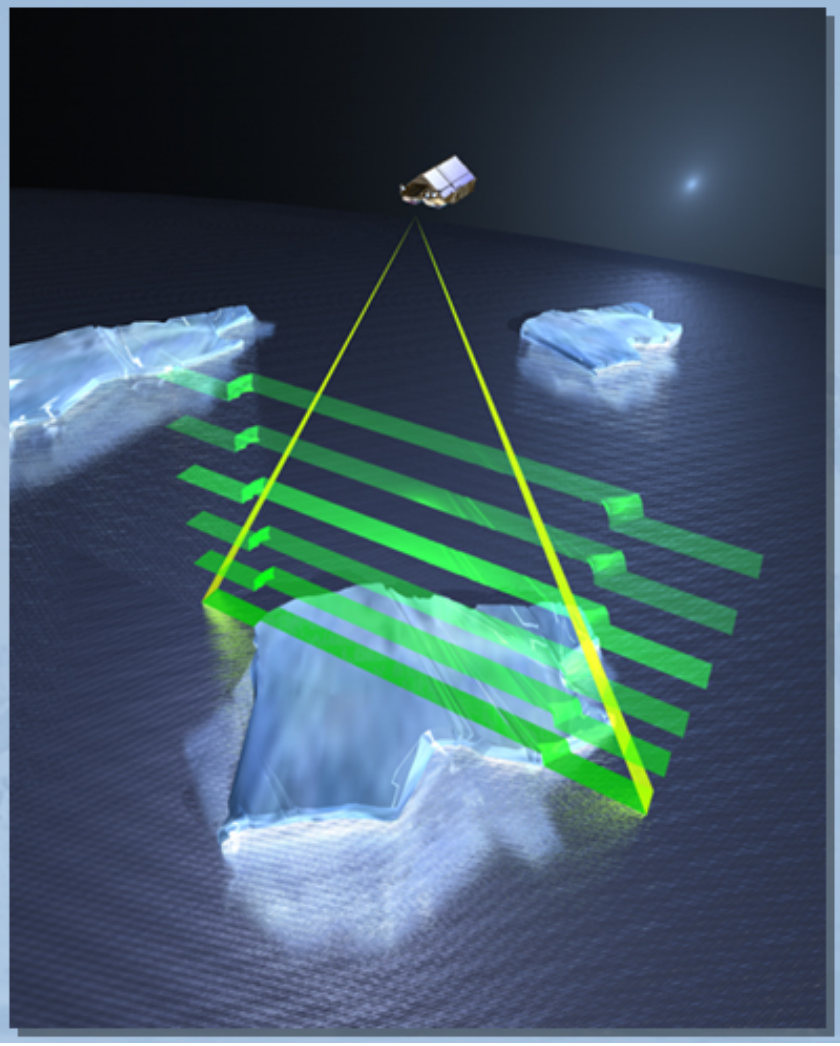
ECMWF
SST (°C)

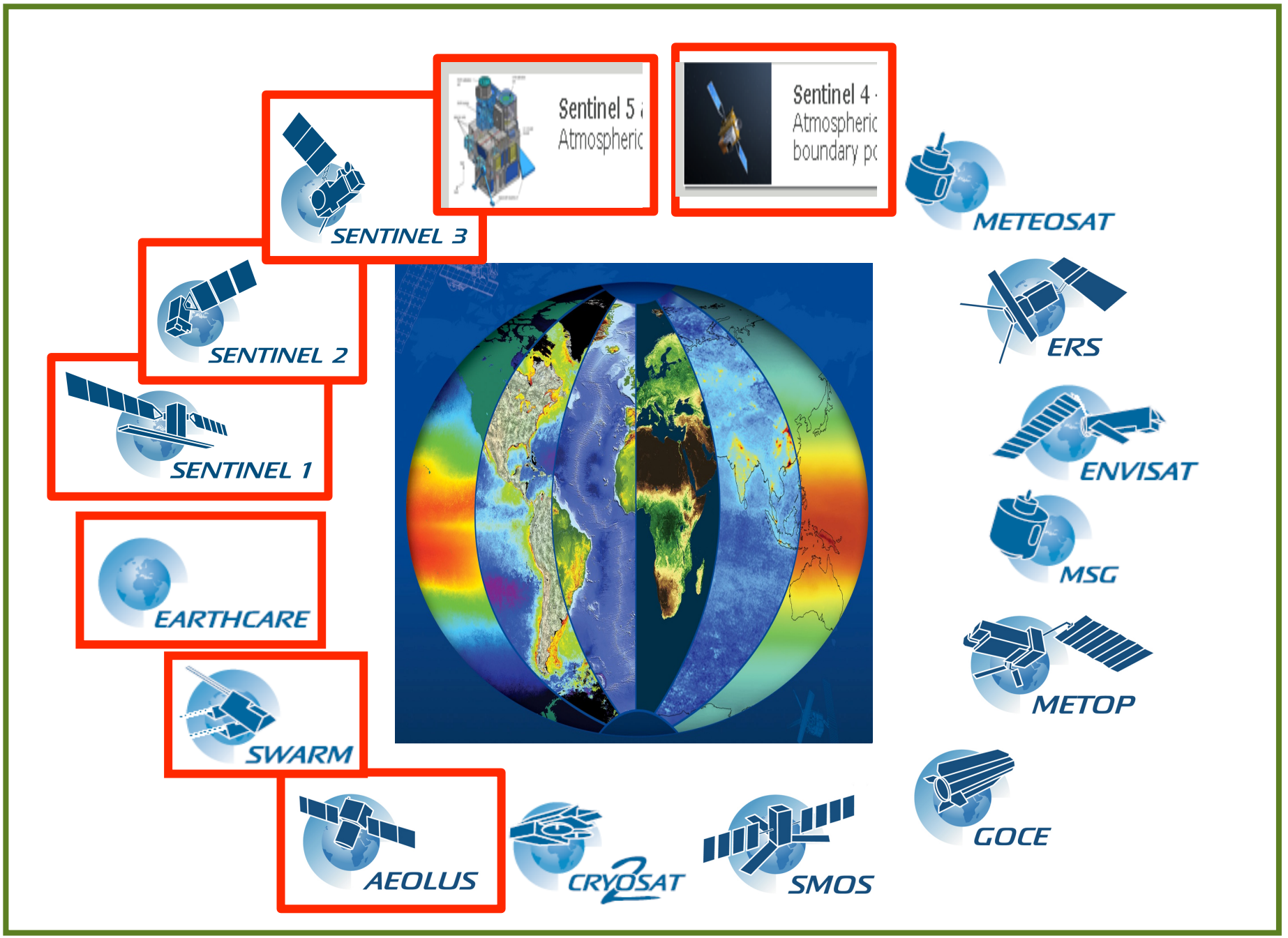


ESA´S ICE MISSION CryoSat

Sea Ice and Ice sheet Mass Measurements

- SAR mode provides 250 m along-track resolution
- Improves discrimination between floes and leads
- Allows small floe detection




Sentinel 5
Atmospheric
Sentinel 4
Atmospheric
boundary pc
SENTINEL 3
SENTINEL 2
SENTINEL 1
EARTHCARE
SWARM
AEOLUS
CRYOSAT
SMOS
GOCE
METEOSAT
ERS
ENVISAT
MSG
METOP

- 1100 Abstracts received
- Scientific sessions dedicated to Oceanography and Sea-Ice
- Special sessions dedicated to the Sentinels and Earth Explorers

Satellite Sensor and Product Levels requested in DRAGON 2

HY-1B	Ocean Colour and Temperature Scanner-COCTS Level 1b and Level 2.
FY-3	VIRR Level 1b and Level 2 MERSI Level 1b and Level 2
HJ-1-C	S-band SAR Level 1b and Level 2 with a ground resolution of 20 m and a swath of 100 km
ALOS	L-band SAR, Level 1b and Level 2, polarimetry mode, steerable beam mode and a ScanSAR mode.
Envisat	The RA-2, AATSR, ASAR and MERIS are sensors with dedicated applications for marine environmental monitoring.
GOCE	Geoid height Level 2 in Earth coordinates.
SMOS	Salinity data at Level 2, every 10 days at 200 km resolution and higher resolution data at more frequent acquisitions on a case-by-case basis.

WP 3 - Status

WP 3: Prof Ge Chen et al, Review of Level of Data Integration and Information Management

Following institutions are examined:

- 10 institutions affiliated with SOA
- 5 institutions affiliated with CAS
- 3 institutions affiliated with CMA
- 4 universities under MOE
- 5 military agencies

National Marine Data and Information Service undertake data integration

Example of cruise data sharing between the two largest oceanographic institutes in China, both affiliated with CAS. Generally data sharing is easier between institutions which are under the same administration (e.g. CAS, SOA...)

For Argo: two websites manage Argo data in China today: "China Argo Data Center" and "China Argo Real-Time Data Center"

Data policies (availability and cost) are reviewed for the Chinese, and some international, satellites, and subsequently for in situ data

WP 3 - Status

WP 3: Review of Level of Data Integration and Information Management in Europe

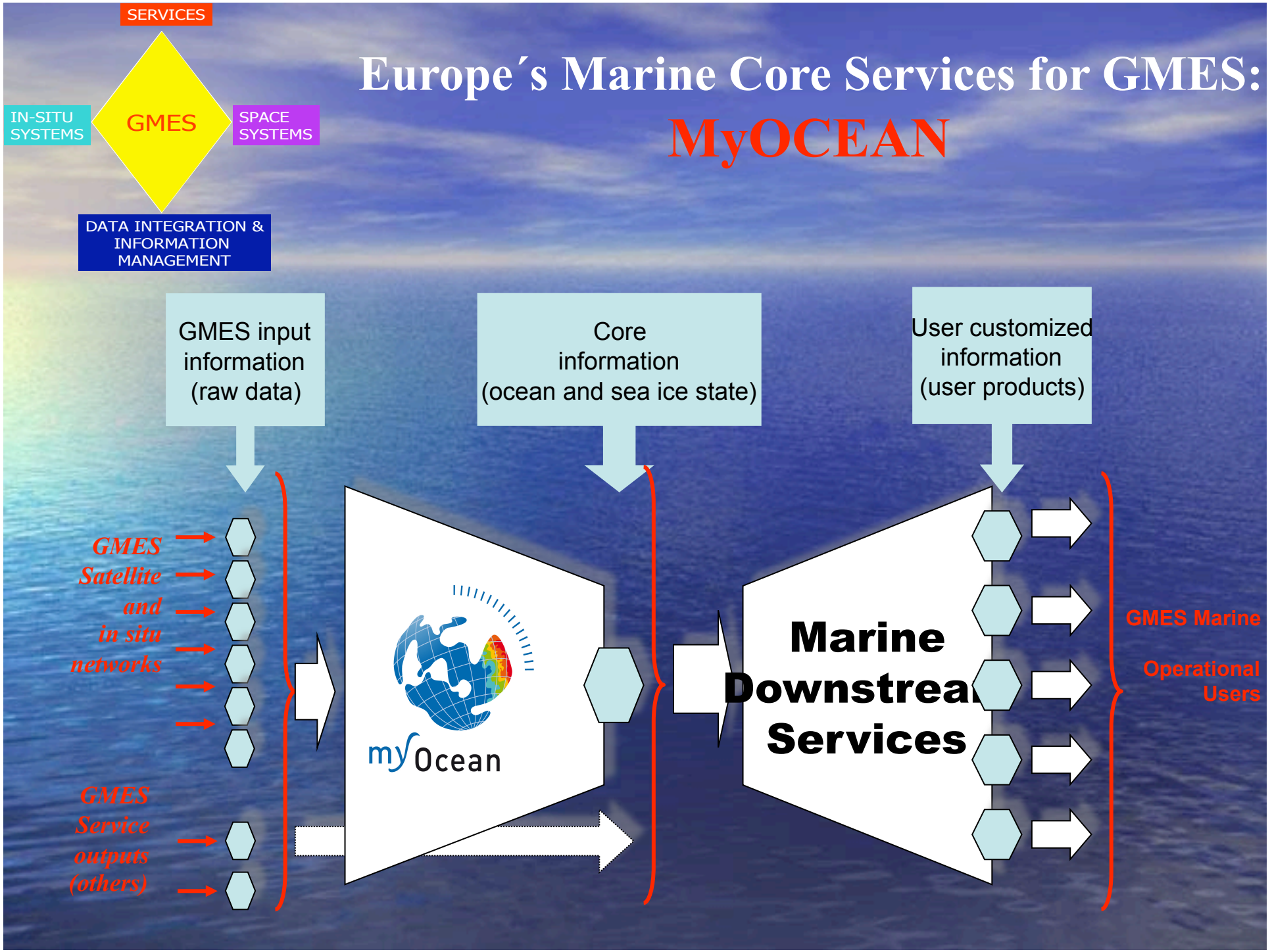
Experiences from MERSEA and GODAE projects (e.g. standards and format) are taken forward and is now implemented in GMES Marine Core Service project MyOcean. Data and products are in principle following OGC (Open Geographic Consortium) standards and data is generally freely available.

MyOcean is user driven with focus on 4 user groups:

- Marine Safety
- Marine Resources
- Marine and Coastal Environment
- Climate, Seasonal and Weather Forecasting

MyOcean has 12 production units

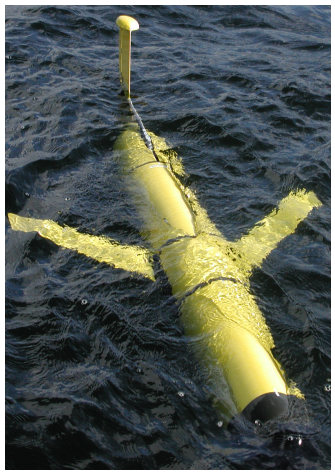
- 5 Thematic Assembly Centers (TAC). Operate servers to which people can connect to get either satellite or in-situ data. Produce information products.
- 7 Modeling and Forecasting Centers. Operational agreements with the TACs to get data for assimilation. Automated push/pull of data.
- One entry point for the users via the MyOcean service and help desk. Provide links

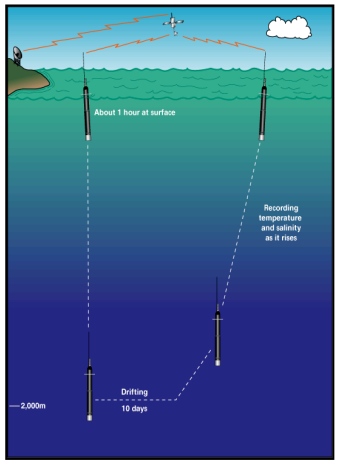

SERVICES
GMES
IN-SITU SYSTEMS
SPACE SYSTEMS
DATA INTEGRATION & INFORMATION MANAGEMENT
Europe´s Marine Core Services for GMES:
MyOCEAN
GMES input information (raw data)
Core information (ocean and sea ice state)
User customized information (user products)
GMES Satellite and in situ networks
GMES Service outputs (others)
myOcean
Marine Downstrea Services
GMES Marine
Operational Users

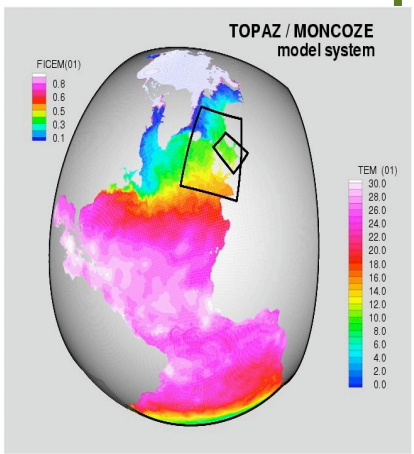
OPERATIONAL OCEANOGRAPHY CAPITALIZES ON

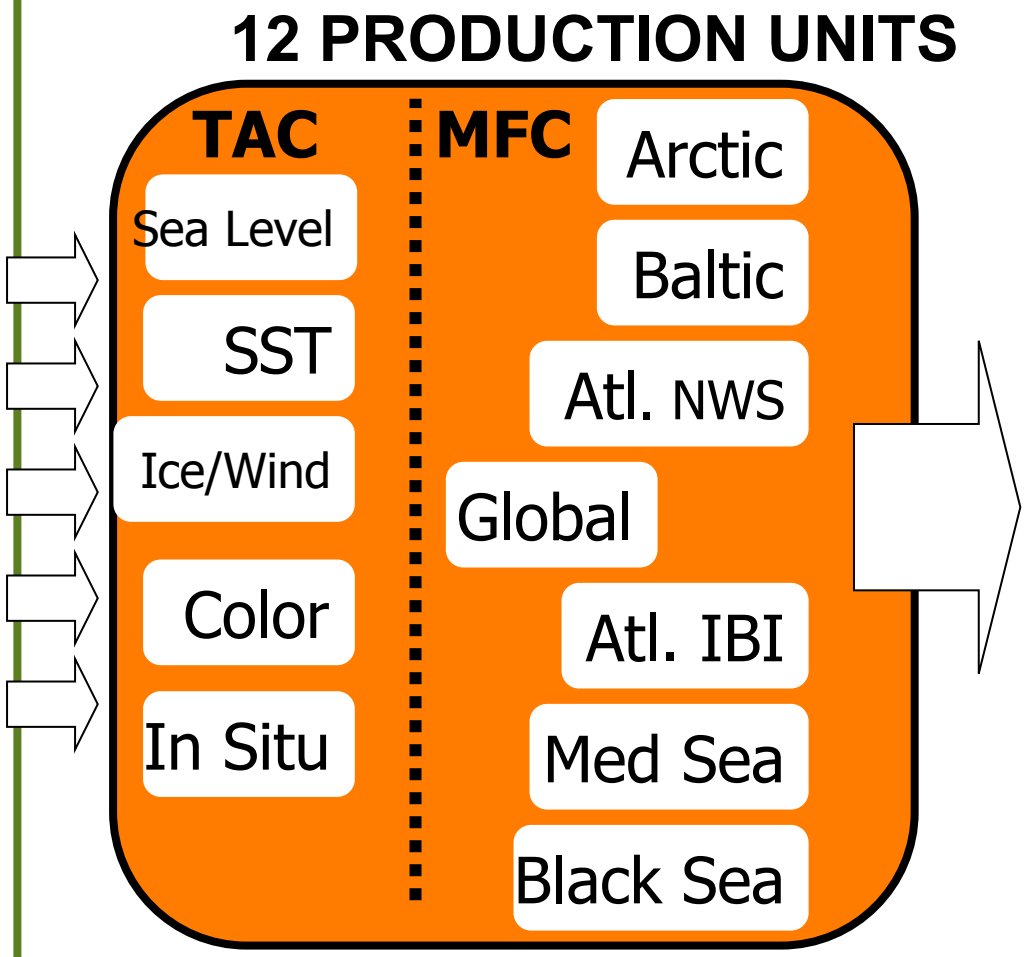
Data collection and analyses using conventional and advanced technology

Models and data assimilation



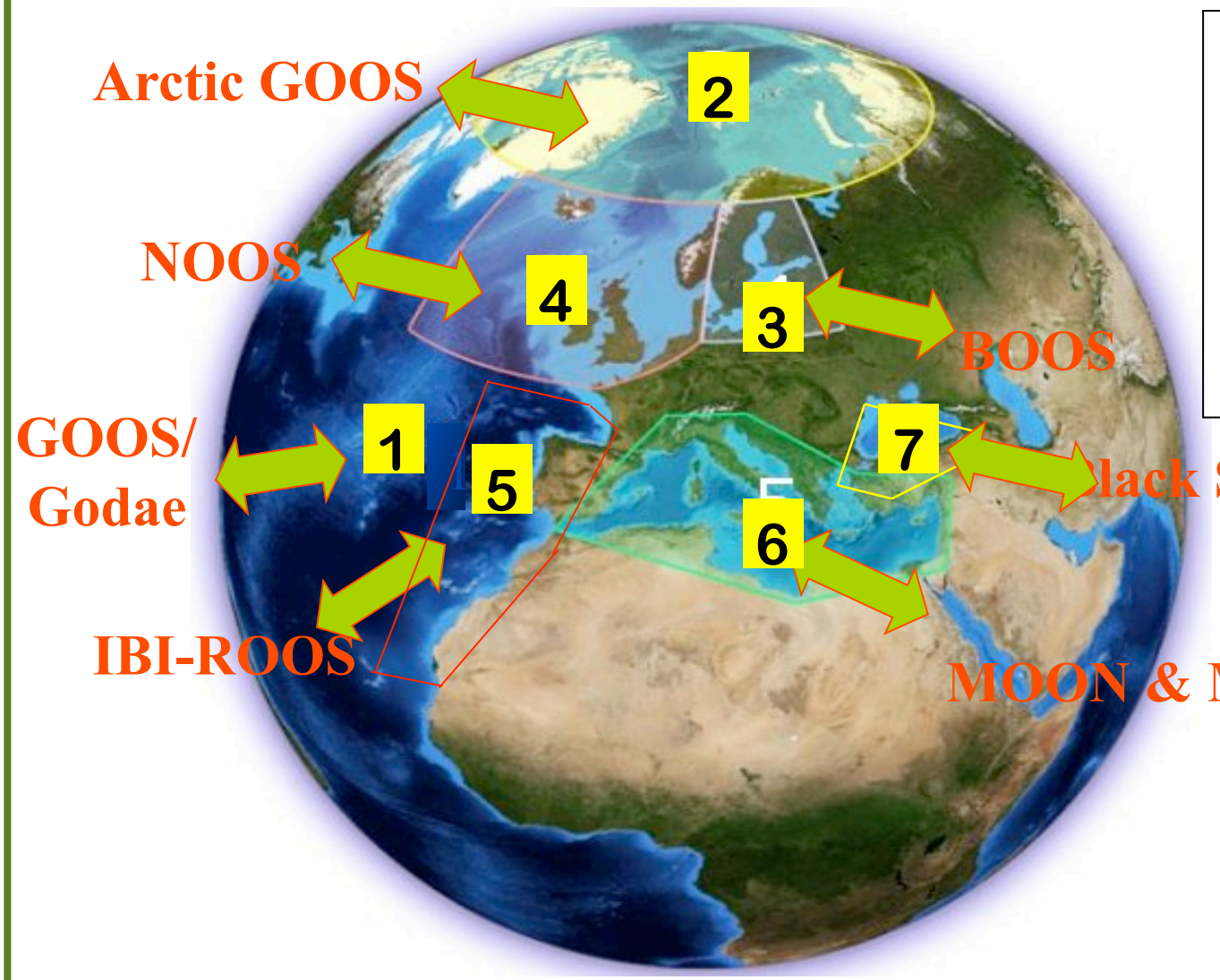






- **5 TAC : Thematic Assembly Centers**
  - "Observations"
- **1 global and 6 regional MFC: Monitoring and Forecasting Centers**
  - "Model / Assimilation"
- Each Production Unit
  - under operational commitments to deliver a service
  - Conducting R&D, Integration, Operations, and Assessment

MyOcean Regions



- 1. Global
- 2. Arctic
- 3. Baltic
- 4. NWS
- 5. IBI
- 6. Med Sea
- 7 Black Sea

MyOcean users, their requirements, their assessment

Area 1
« MARINE SAFETY »
(marine operations,
oil spill combat, ship routing,
defense, search & rescue, …)

Area 3
« MARINE AND COASTAL ENVIRONMENT »
(water quality, pollution,
coastal activities, …)

Area 2
« MARINE RESSOURCES »
(fish stock management,
ICES, FAO, …)

Area 4
« CLIMATE & SEASONAL FORECASTING »
(climate monitoring, ice,
seasonal forecasting, weather
forecasting)

http://www.myocean.eu.org

Project Organization

Board

- **P.Bahurel** (chair, coord), M.Bell (UK), J.She (DK), F.Jacq (FR), J.Johannessen (NO), PY Le Traon (FR), N.Pinardi (IT)

Executive Committee

- Project manager: **F.Adragna** (Mercator Ocean)
- Assisted by the PMO (Project Management Office) : 4 persons
- 17 WP Leaders

Advisory Committee

Core User Group

Scientific Advisory Group

Product Quality Working Group: objectives

- Guaranty consistency of Cal/Val procedures among X.5
- Offer consistent accuracy level for all MyOcean products provided by production units
- Provide a unique and visible product accuracy assessment to users
- Specify Cal/Val procedures to:
  - Be compliant with requirements given by the Description of Work document, in particular, follow the MERSEA IP heritage (both assessment strategy and metrics)
  - Guarantee System Requirement Review and Product Critical Review
  - Allow scientific evaluation of **improvements** from V0 to V2
  - Allow routine scientific assessment of **product accuracy**

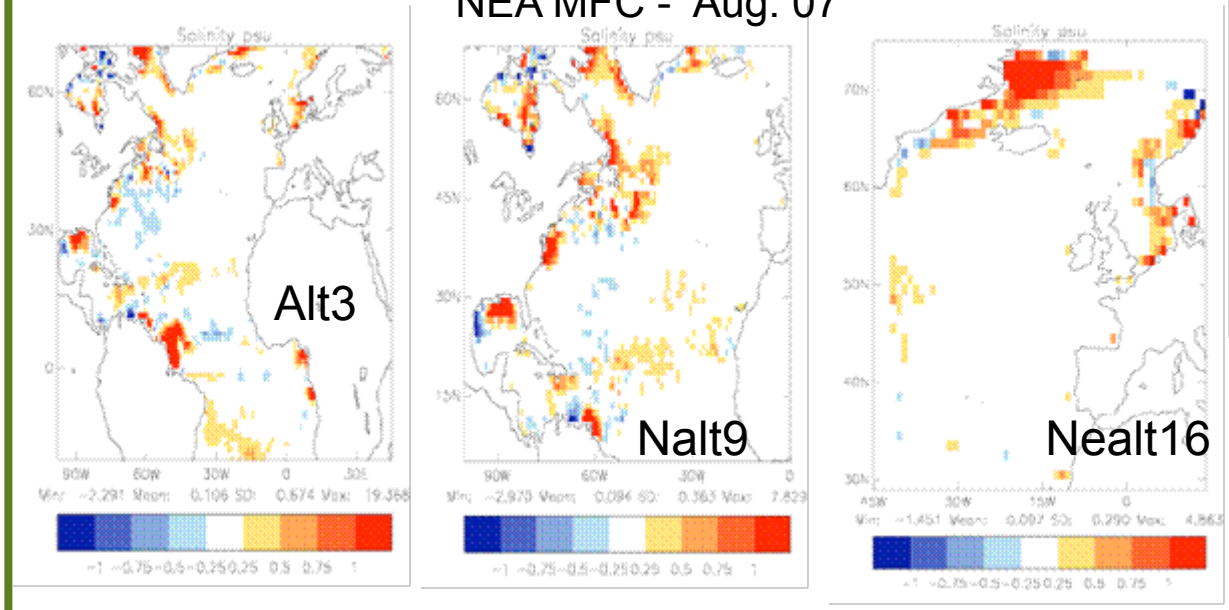
PQCV-WG 1st meeting objectives

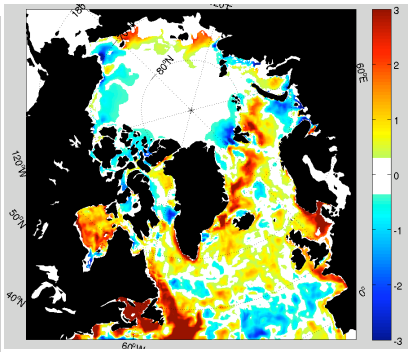
- Overview of V0 Cal/Val plan for each Production Centre
- Discussion on V1 Cal/Val plan among the Production Centre
- External Products targeting for V1
- Discussion and propositions for Cal/Val activities at MYO project level, and possible links with Service Desk
- Prepare and be compliant on V1 MYO management aspects

- *Strengthen at the European level the « MERSEA » milestone, keep learning to work together*
- *Increase the scientific assessment expertise in operational oceanography*
- *Network of scientists, identified in the Production Centres, able to keep on R&D activities for validation*
- *Collaborative work for validation topics in R&D (bio, forecast, ensemble, user oriented metrics…)*

Class 1 consistency in MERSEA: need for homogeneous presentation

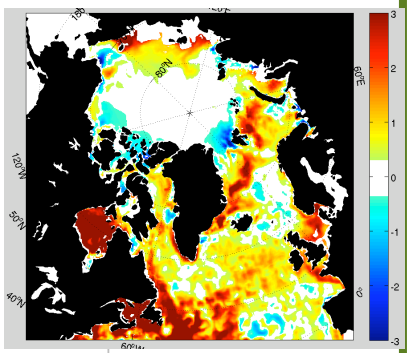
NEA MFC - Aug. 07





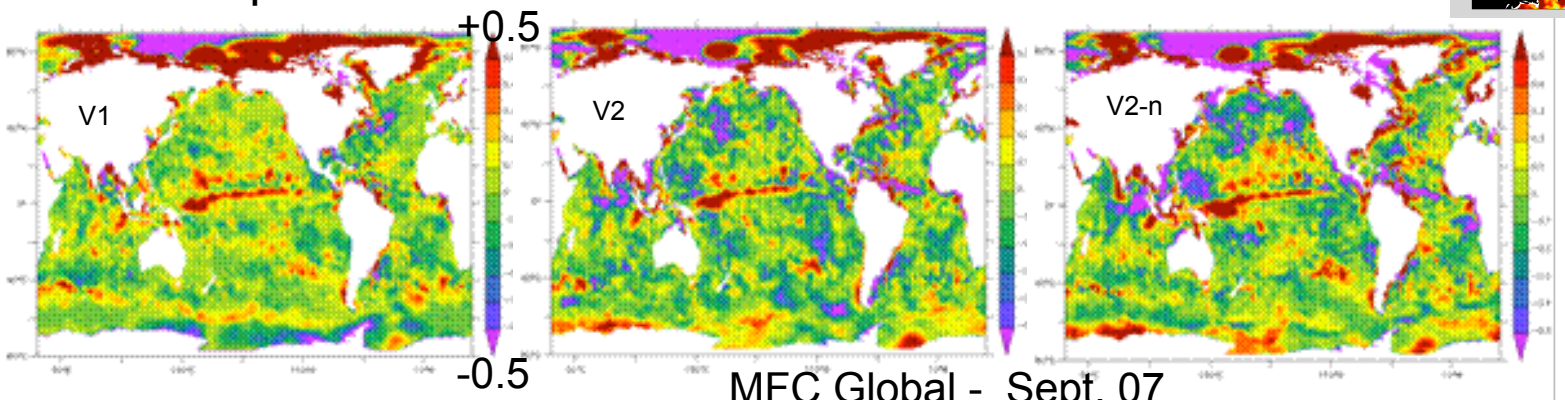
Aug. 07

Sept. 07



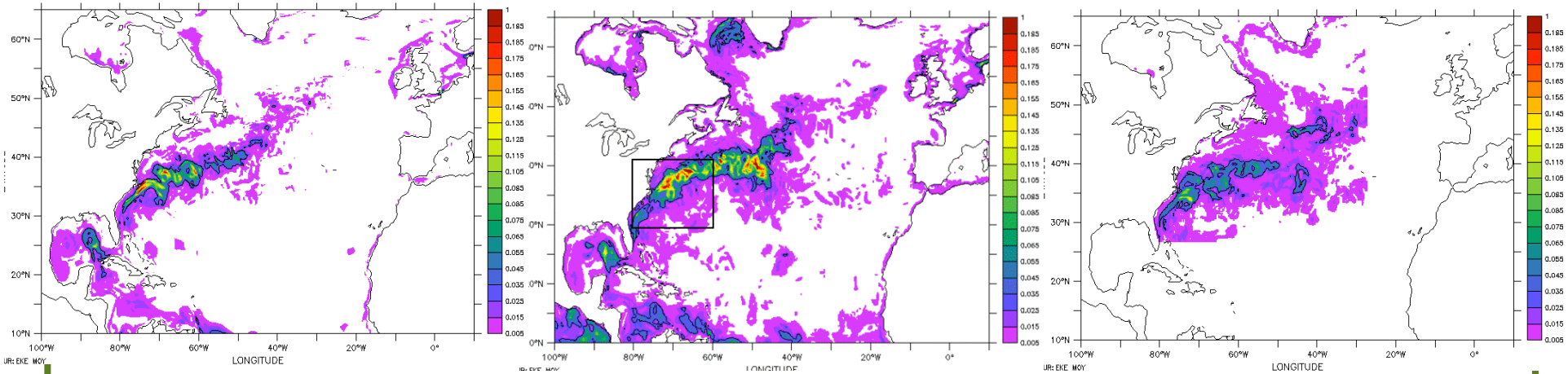
Arctic MFC

Comparison at the surface with WOA05



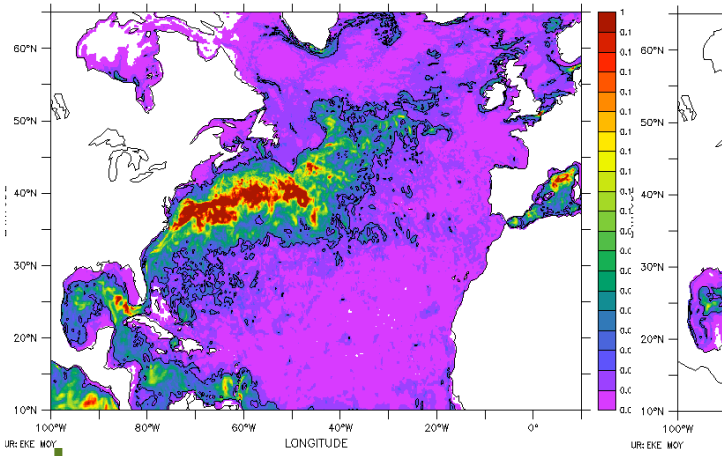
MFC Global - Sept. 07

Assessment of EKE (GODAE intercomparison)

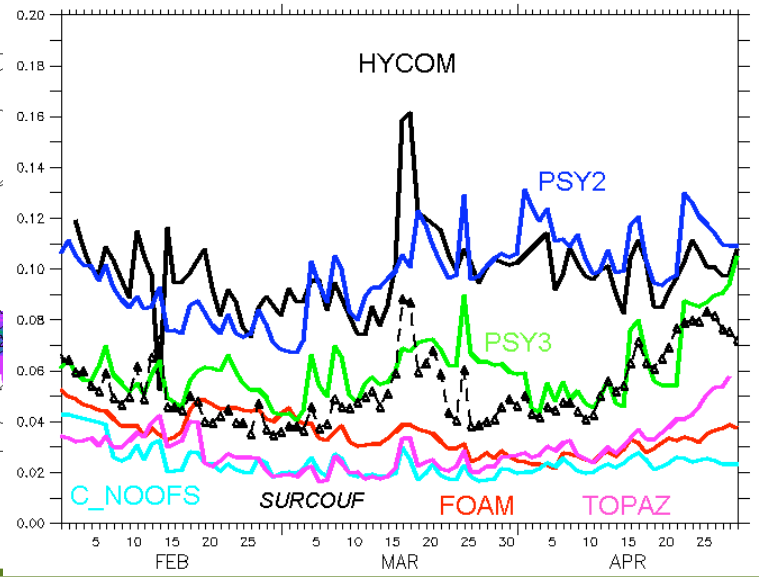


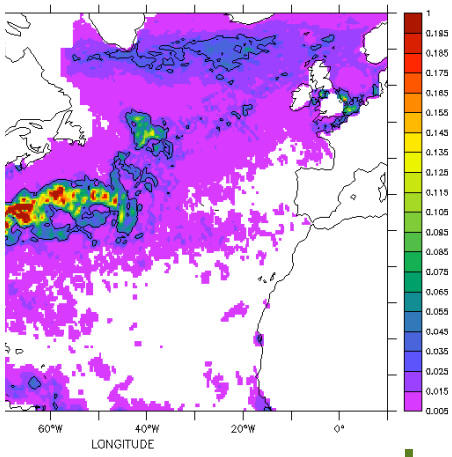
TOPAZ

C-NOOFS



HYCOM





SURCOUF

PQCV-WG 1st meeting outcomes: overview of PC's Cal/Val

1. All Production Centres had implemented in V0 some Cal/Val activity, usually associated with operations
2. Existing V0 metrics are usually linked with MERSEA / ECOOP and GODAE, and this heritage and methodology is well adopted
3. The concern is important: during this first year, all Production Centres have been improving their scientific assessment strategies, mostly focusing on system-data comparison performance assessment (ie, Class 4 for MFCs). Biogeochemical Cal/Val also taken into account.
4. These strategies are obviously managed at Production Centre level: many meetings, and Cal/Val plans performed during the past 9 months
5. Pro-active visibility at PCs or external levels: internal web portals, and also external reporting at daily, weekly, monthly, yearly rate

Internal activity

PQCV-WG 1st meeting outcomes: target products

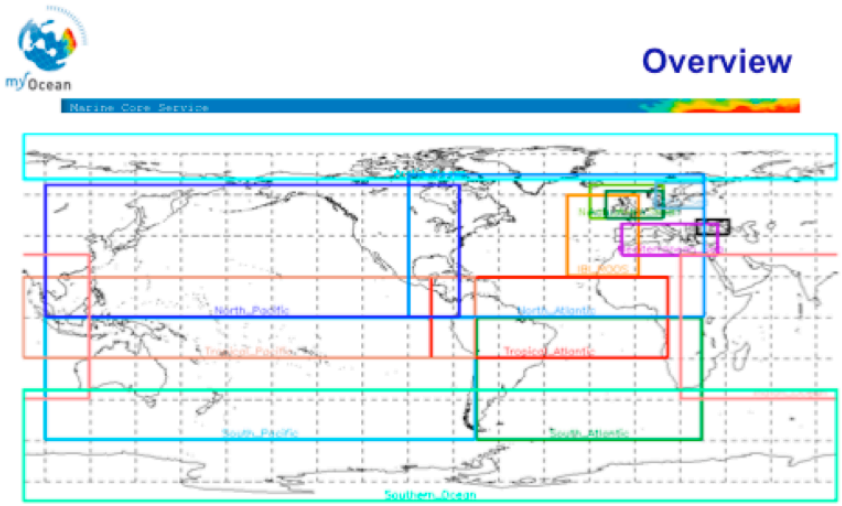
omogenized at V1?

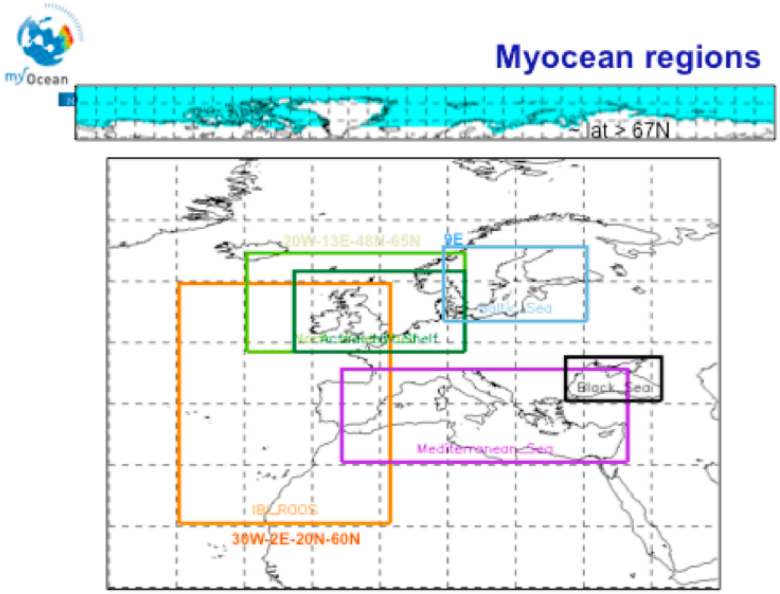
Production Centres	SST	Sea Level	Surface currents	T/S (3D)	Sea Ice
GLO	YES	YES	YES	YES	tbc
ARC[1]	YES (2)	YES (4)	YES (3)	Y	
BAL	YES	YES (tide gauges)	tbc (transport YES)		
NWS	YES	YES (tide gauges)	tbc (transport YES)		
IBI	YES	YES	(mooring)		
MED	YES	YES	yes		
BLS[1]	YES (1)	YES (2)	In delayed time if available (4)	In t ava	
SL TAC		YES L3 along track altimetry for others			
OC TAC					
SST TAC	YES				
SIW TAC					See action A. Melsom
INS TAC					

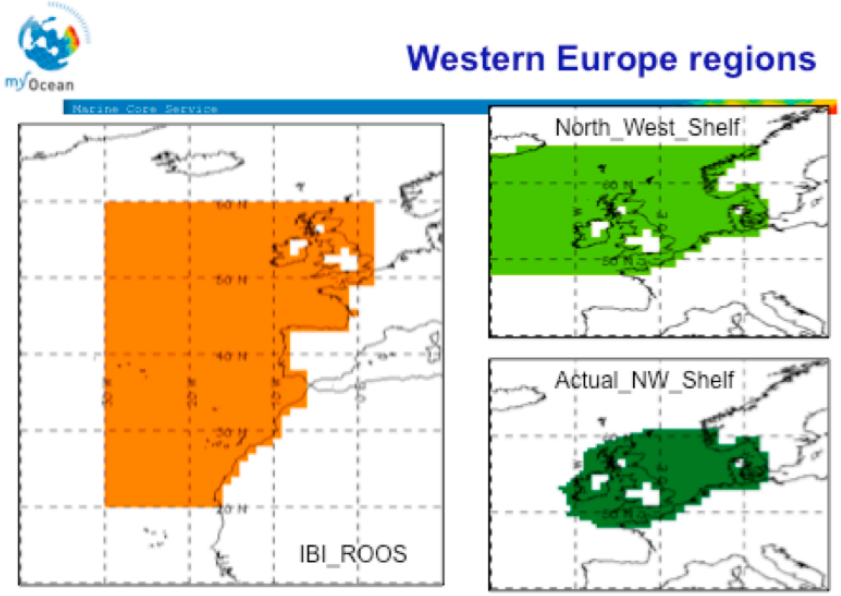
Production Centres	Chl-A	Dissolved oxygen	nutrient	Reflectance / IOP
GLO	tbc	tbc	tbc	
ARC[1]	?	?	?	
BAL	YES	YES		
NWS	YES	YES		
IBI	?	?	?	
MED	YES	?	YES	
BLS	?	?	?	
OC TAC	YES			YES

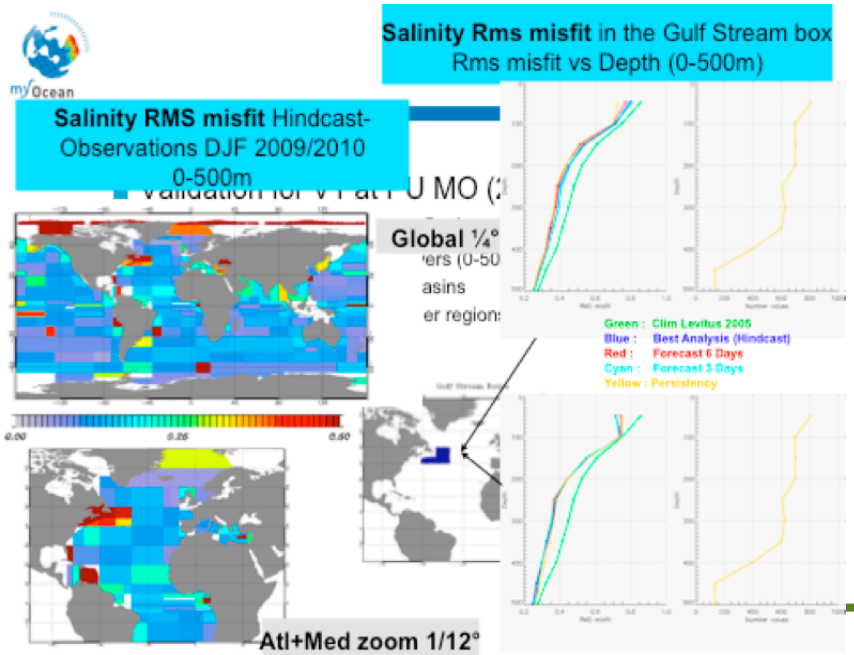
- Of course, other diagnostics, specific to PCs will remain performed
  - Product oriented (currents at different depth, fluxes, nutrients, CO2….)
  - Ocean processes oriented (MLD, mesoscale, large scale, trophic layers….)

POCV-WG 1st meeting outcomes:





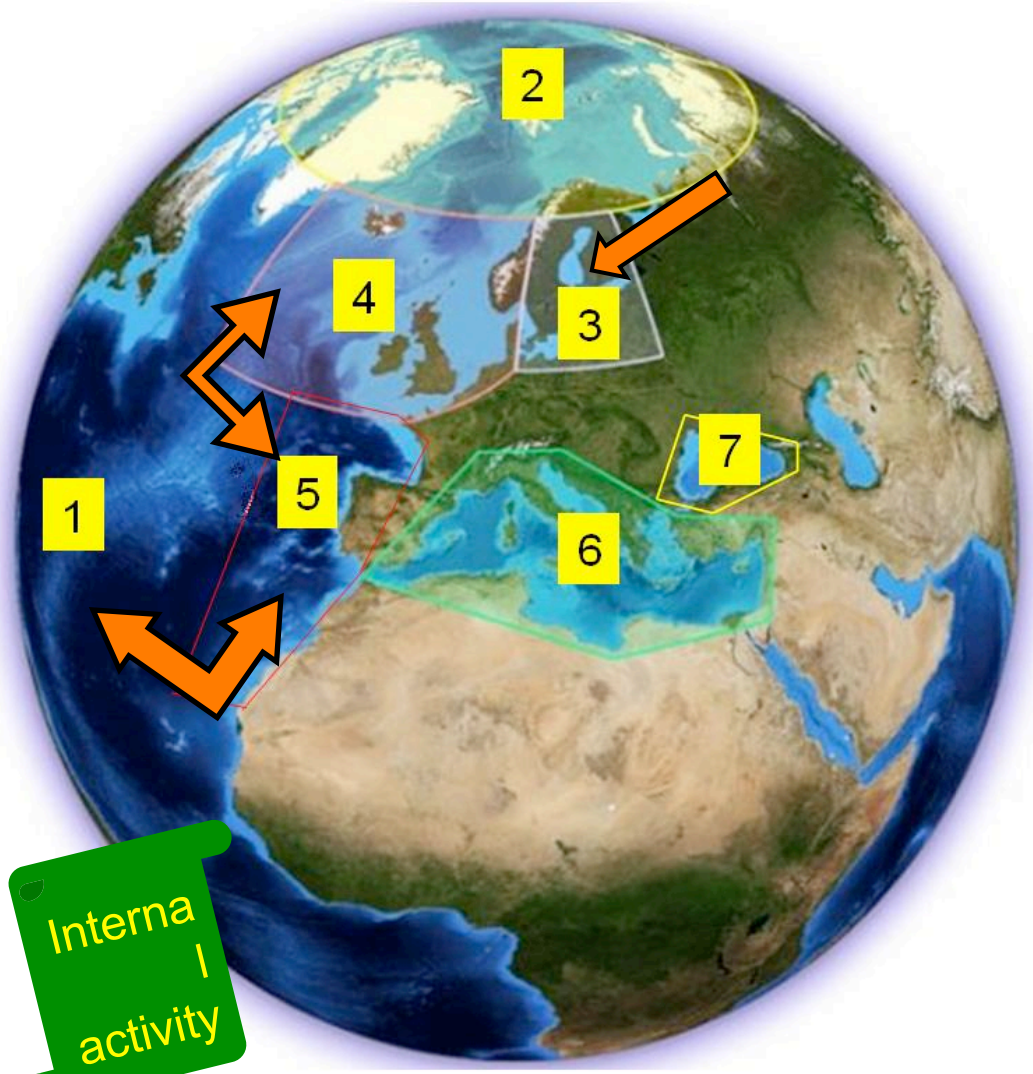




into account practi

masking etc…)

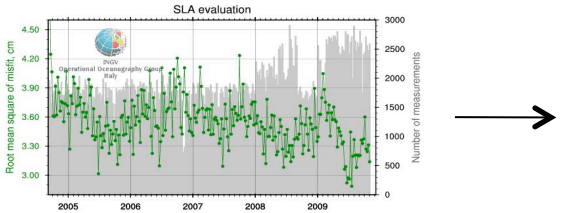
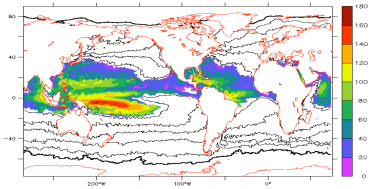
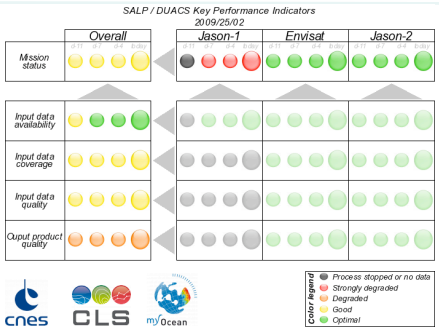
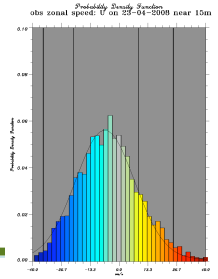
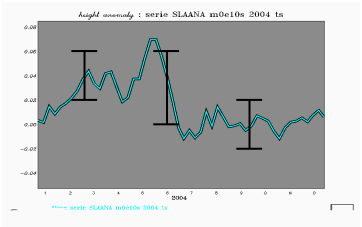
Intercomparison recommandations



- Intercomparison is not mandatory
- At PC level, possible comparison of Pus (BAL)
- At WP levels, intercomparison between overlapping systems (IBI/NWS)
- At WP levels, intercomparisons in the nesting framework (GLO/IBI)

- If needed, define new Class 1 following MERSEA methodology
- Use “Shared Areas” to intercompare through Class 2 / Class 4 metrics approach

PQCV-WG: proposition for link with Service Desk

information	V1	V2
Static:		
	?	YES
"precision" level given as meta-data	 → <e> → 	
Dynamic		
	no	YES
"flags"		
Error bars		
Extreme values		$\mathbf{P}^f = \mathbf{M}\mathbf{P}^a\mathbf{M}^T + \mathbf{Q} = \mathbf{B}_{ENS}$

WP 4 - Status

The administrative infrastructure of the marine environment forecasting systems in China, its marine environment forecast products and services.

The State Ocean Administration (SOA) of China with its organization of subordinates entities and their responsibilities include:

- the NMEFC activities, its products and services
- the National Marine Data and Information Service,
- the National Marine Environmental Monitoring Center,
- the Polar Research Institute of China
- the North China Sea Branch of The State Oceanic Administration
- the East China Sea Branch of The State Oceanic Administration
- the South China Sea Branch of The State Oceanic Administration
- the Mindong Marine Environment Monitoring Central Station
- the Whenzou Marine Environment Monitoring Central Station
- contributions to other institutes and organization to the different extreme event pre-warning services.

WP 4 - Status

WP 4: Dr. Liying Wan, Review of ocean and coastal information products and services

- State Ocean Administration of China (SOA) is responsible for the marine environment forecasting and information products and services

- China Meteorological Agency (CMA) provides marine weather forecast services.
  - Overview of short-term forecast products
    - Sea Surface temperature (NMEFC and other centers)
    - Ocean wave and swell (NMEFC and other centers)
    - Tide (other centers)
    - Beach (water quality, temperature, wave height, tide etc (NMEFC)
    - Ship Routing (NMEFC)
  - Medium range forecast
    - Ten-day SST
    - Ten-day Sea Ice (winter)
  - Long-term forecasting - El Nino

  - Marine disaster pre-warning systems

WP 4 - Status

WP 4: Prof Z. Chaofang, Oceanic research and numerical modeling by different institutions in China

- Informed about evolution and status of Chinese ocean/wave models
- Sea ice monitoring and forecasting

WP 4: Prof Y. Gao, Ocean/climate models at IAP/Nansen-Zhu/NERSC

- MICOM
- Bergen Climate Model, coupled model, Solar radiation is the only driving source
- Nested Air Quality Level (MM5). Used to predicst air quality during Beijing olympics
- Regional HYCOM (M. Fang can work on this setup during upcoming stay at NERSC)

WP 4: Dr. H Etienne,

- About GODAE, GMES and MERSEA
- Next Step: MyOcean

Chinese model systems seem to be more developed to also catch local/coastal systems. However, automatic online distribution of data to users seems to be more developed in Europe with more websites and servers. Chinese websites mostly distribute images, not so often data.

Executive Summary

- The major task for this second period was to evaluate the potential use and sustainability of products and services for ocean environmental monitoring and security by using spaceborne, in-situ observing data and modelling, especially for those that can be transferred from current GMES and GEOSS services.
- China has established national standards for the Marine environment forecast. One of them is the "Storm tide, Ocean waves, Tsunami and Sea Ice Disaster Emergency Plans". The other one is the "Marine forecasting And Warning Announcement". The Wave forecast and warning announcement (GB/T19721) has been implemented officially in 2006.
- Finally, this report presents the following project to construct the future European Marine Core Service.

Main differences between China and Europe

- **Area:** China's marine forecasts focus on coastal area, and also develop extended regional forecast as the basis of coastal forecast. Europe starts from regional and global to coastal areas. No real operational European coastal products. Downscaling is in preparation.
- **Fund:** In Europe, research fund is gained from many sources, national, international, private, commercial. While in China, the major sources of research fund are government and projects.
- **Forcing field:** Forcing fields of Europe marine forecast are provided by ECMWF. It is high frequency but not ideal for local. In China the forcing fields are produced by numerical forecasting group of NMEFC which makes them advantaged in pertinence and flexibility.
- **Service:** In Europe, access to forecasting products are mostly freely via web site. In China, forecasting products are published by broadcast and TV besides web site.

Main differences between China and Europe

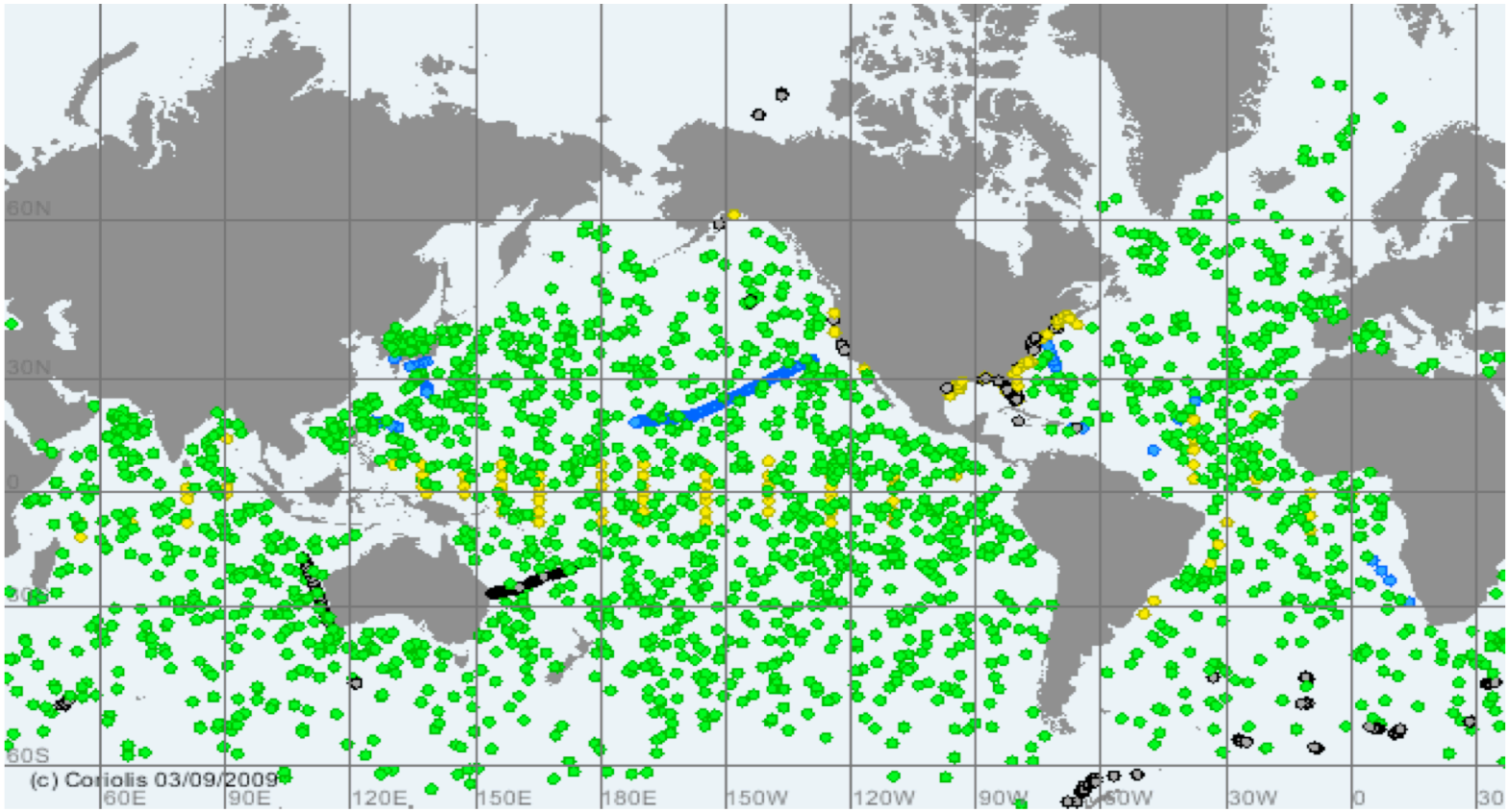
- **Data and assimilation:** In Europe, observation data is widely used. All of the operational ocean forecasting systems are using sophisticated assimilation schemes. The optimal interpolation, different forms of Kalman filters, SEEK filter (ensemble base scheme) and variational methods are widely used. Some are fully multivariate and multi data schemes. There are weekly to daily analysis and forecast.
- Satellite data (sea level anomaly, sea surface temperature, sea surface wind, sea ice) and in-situ measurements (temperature, salinity and current) are assimilated in most of the operational systems.
- In China, assimilation schemes include Nudging, optimal interpolation, 3DVar, and EnOI.
- Data consists of volunteer ship data, station data, various buoy data, and satellite remote sensing data. Assimilation

Main differences between China and Europe

Table 1 Service to users

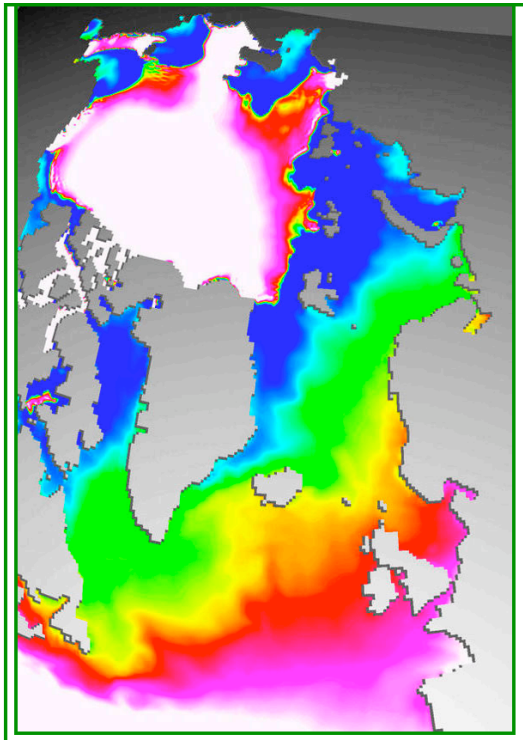
Users / variables	Oil companies	Marine Security	Fishery	Ship	Military affairs	Travels	Others
Storm surge	√	√	√	√		√	
Sea current	√	√	√		√		√
Ocean wave	√	√	√	√	√	√	√
Tsunami	√	√	√		√	√	
Sea Ice	√	√	√	√			
Oil spill	√	√					
Typhoon	√	√	√	√	√	√	
Salinity tide							√
Sea temperature			√			√	
Weather	√	√	√	√	√	√	√
Pole research				√			
Red tide			√				

Global In-situ data

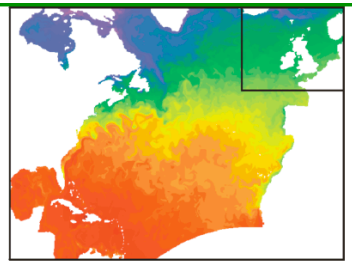


Argo floats, XBT, CTD, Buoys, gliders, Moorings, Others

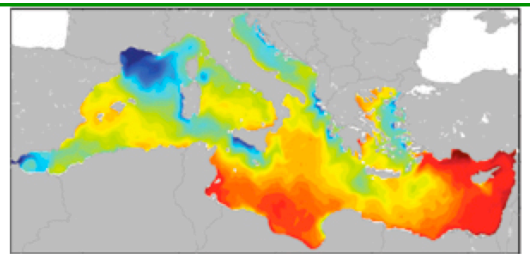
Model and Forecasting Centre



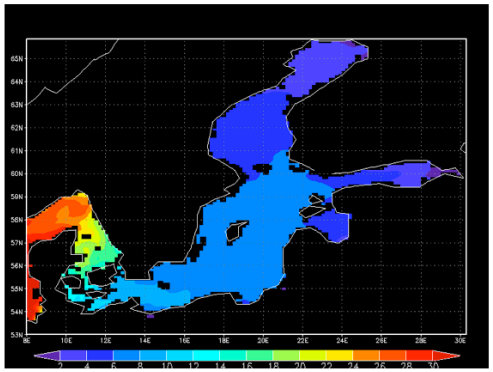
Arctic Ocean Sea Surface temperature and sea-ice concentrations



Sea surface temperature from the NCOF FOAM 1/9 degree ocean model. The upper right box forms the MERSEA NE Atlantic TEP area

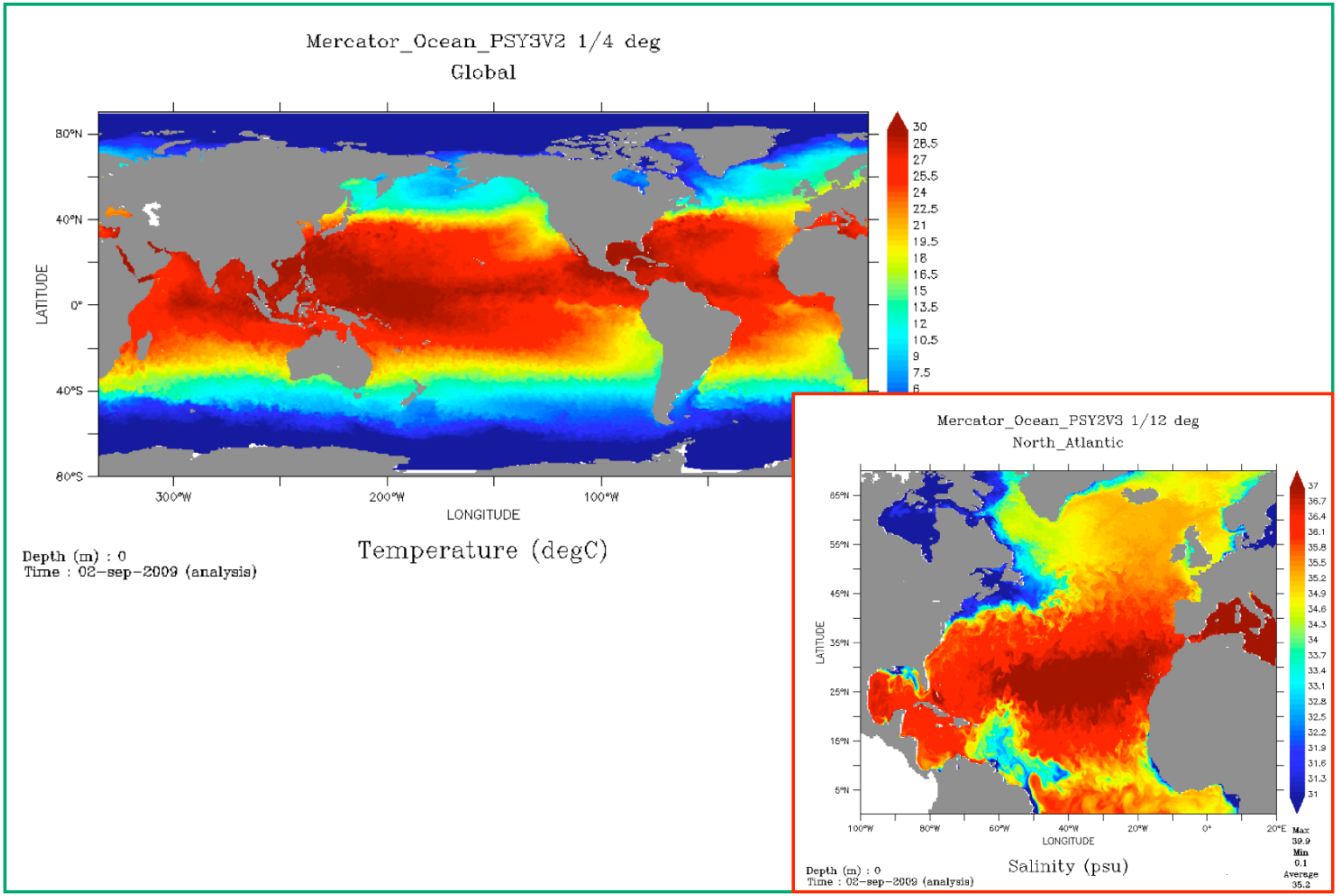


Mediterranean Sea SST as seen by the MFS 1/16° forecasting system



Baltic Sea surface salinity from DMI-BSHCmod

Model and Forecasting Centre



WP 5 - Status

WP 5. Prof L. Shao and Dr. Y. Bai, China and Europe Marine Capacity Building Investigations

This WP relies on input and achievements from WP 1-4 and it will also take benefit of Dragon 2

- Comprehensive overview of Chinese universities and laboratories complying marine research
- Broad list of European marine research institutes
- Specific content for three yearly reports of WP5:
  - 1. Capacity building identifications
  - 2. Identify and describe major gaps
  - 3. Future Chinese and European building design, in compliance with GMES/GEOSS

Executive Summary

Chinese and European marine monitoring systems including in-situ observing systems, space-borne observing systems, data integration and information management, ocean and coastal information products and services are reviewed. Major gaps are identified.

EU member countries and China have established marine monitoring system independently and effectively. But European side has more advanced technology on the monitoring arrangement, accuracy, data products both in quantity and quality.

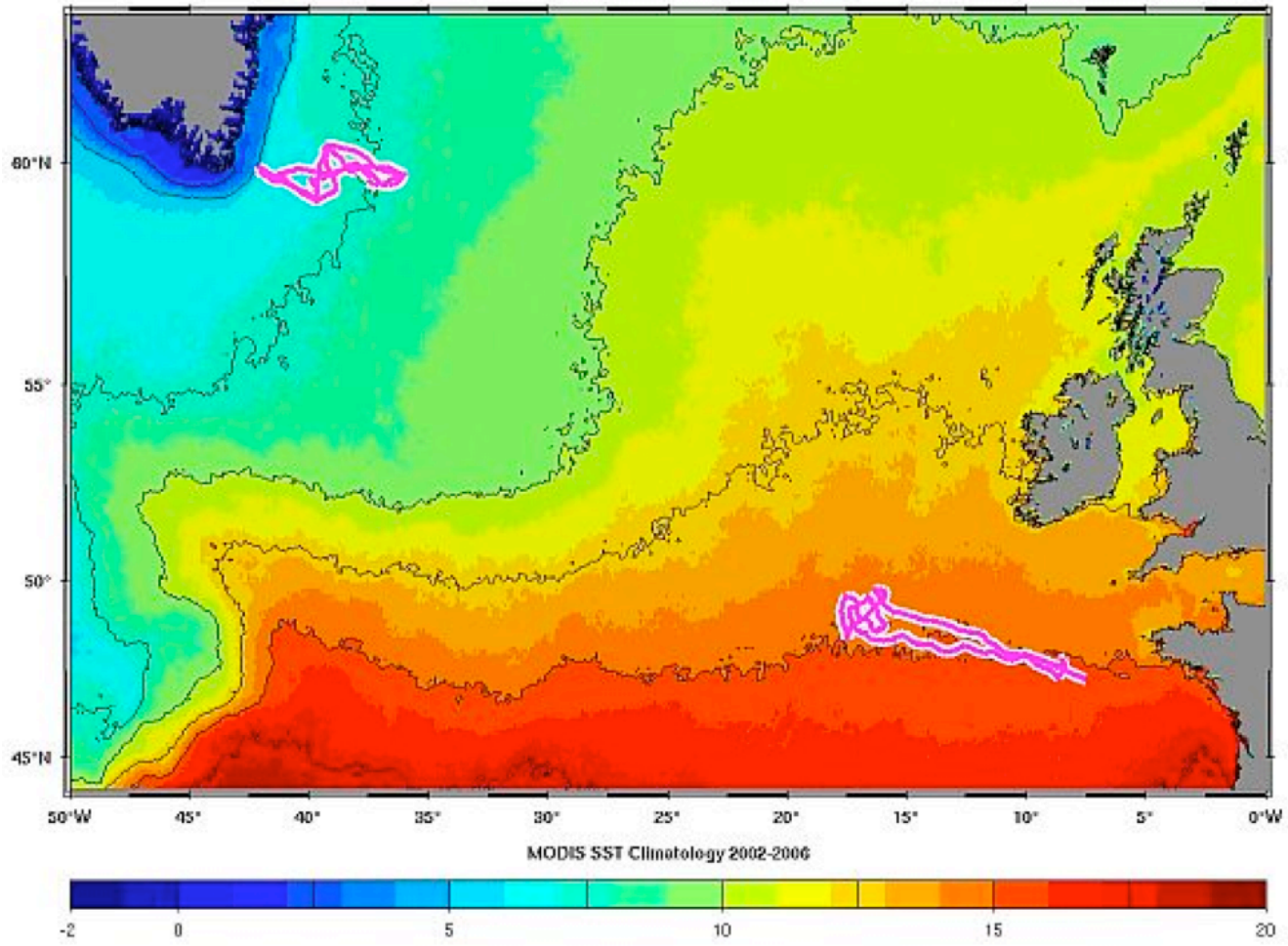
China and Europe marine observations have obvious respective geographical characteristics. For example, besides with their own coastal area, Europe side pays more attention to Arctic Ocean region, Atlantic ocean and global ocean, and China has more interests to watch north-west Pacific, the Equator area, South China Sea and India Ocean, because Asia Monsoon, west pacific ocean warm pool, the Tibet plateau are important factors to China's and world climate.

Further cooperation between Europe and China in marine monitoring will be very useful which will greatly contribute to GMES and GEOSS.

The limited capacity of ocean monitoring and forecasting

- Ocean forecasts are provided on a regular basis by a dozen of operational oceanography centers in the world; forecasts are built through routine assimilation of real-time space observation and in situ data into numerical models for the global ocean and its regional seas. While Europe has this capacity; China only has the regional capacity.
- China has already established various in-situ observation platforms, including the marine observation station, buoys and survey ships. But China has not yet formed a rational layout and advanced in-situ observation system. Many of the marine observation stations still use individual and not standardized scales and readings, and sustained observations are not ensured. Lack of maintenance hampers the quality.
- In view of the size of the Chinese marine area, the existing number of marine observation stations and buoys is too small. Hitherto, China has only deployed 46 floats in the Western Pacific and Eastern Indian Marines. So far there are only 44 tide observation stations and 38 wave measuring points.
- In contrast to Europe, China has not yet carried out relevant work using Gliders.

Glider Experiment



Spaceborne Observations

- There are 7 satellite series with the onboard sensor capable for marine environmental monitoring and application. The meteorological satellites (FY-n), oceanic satellites (HY-n), resource satellites (CBERS, ZY-n) and environment satellites (HJ-n) are jointly implemented by China National Space Administration (CNSA) and related application sectors which are China Meteorological Administration (CMA), State Oceanic Administration (SOA), Ministry of Land and Resources (MLR) and Ministry of Civil Affairs (MCA) / Ministry of Environmental Protection (MEP) respectively. Shenzhou spacecrafts (SZ-n) and Chinese Remote Sensing satellites (CRS-n or YG-n) are implemented by CNSA. Disaster Monitoring Constellation / BeiJing-1 micro-satellite (DMC / BJ-1 micro-satellite) are implemented by Ministry of Science and Technology of China (MOST).

Spaceborne Observations

- All above satellite and spacecraft series are capable of ocean observation, and therefore comprise the Chinese satellite ocean observing system, carrying ocean color sensors, infrared and microwave radiometers, microwave altimeters, microwave scatterometers, microwave SARs and high spatial resolution optical sensors, respectively.
- The technical performance of Chinese satellites and sensors are roughly similar to the satellites and sensors launched in this century by NASA, ESA, JAXA etc
- Few of the Chinese oceanic satellites have the capacity of global monitoring.
- Few of the sensors onboard the Chinese satellites have in-orbit calibration system
- The data availability is varying. Among 19 in-orbit sensors, only the service for products of ocean color parameters and SST are available. Only L1 data of microwave sensor and hyperspectral sensor can be achieved

Outlook

- The research priority differences directly reflects the gaps and limitations between Europe and China. To give a further boost to oceanographic technology, offshore development and marine environment protection, the Chinese government has worked out the Medium- and Long-Term Program for the Development of Oceanographic Science and Technology, the Oceanographic Technology Policy (Blue Paper) and a number of concrete development plans.
- The main tasks for oceanographic technology development in the future are: To strengthen research into basic oceanographic science; tackle the key technologies of marine resources exploitation and environmental protection; promote the application of oceanographic technologies to marine industries; improve marine resources development and service support for marine disaster prevention and reduction; improve marine environmental protection; and narrow the gap between China and the developed countries in oceanographic technology.

WP 6 - Status

WP 6: Workshops, summer school and symposium

- DRAGONESS symposia should be held in conjunction with Dragon2-symposia. No explicit Dragoness symposium will be held.

- Future Dragoness meetings:

  - Progress meeting/Final meeting or workshop to be planned in connection with Dragon 2 symposium in China in 2010.

Work Package List, Person-months and Deliverables

WP No.	WP TITLE	Lead contractor	Person months	Start month	End month	Deliverable number
0	**Management and Coordination**	NERSC ORSI	2,5 3	1	36	D0.1 D0.2 D0.3
1	Review and utilization of in-situ observing system	ORSI/ NERSC	18,9	1	34	D1.1 D1.2 D1.3
2	Review and utilization of spaceborne observing system	ORS/ ORSI	18,6	1	34	D2.1 D2.2 D2.3
3	Review of level of data integration and information management	ORSI/ IFREMER	24,7	1	34	D3.1 D3.2 D3.3
4	Review of ocean and coastal information products and services	NMEFC/ CLS	32,1	1	34	D4.1 D4.2 D4.3
5	Capacity building in view of gaps and eventual European capabilities	MOST / GKSS	22,8	6	36	D5.1 D5.2 D5.3
6	Workshop, Summer school and Symposium	NERSC / NZC/ ORSI	12,6	6	36	D6.1 D6.2 D6.3
	Total (person months)		**135.2**			

Deliverables list

Deliverable number	Deliverable Title	Delivery month (#)	Nature RE: Report	Dissemination level PU:Public
D0.1 D0.2 D0.3	First Annual report Second Annual report Final DRAGONESS report	12 24 36	RE RE RE	PU PU PU
D1.1 D1.2 D1.3	1st, 2nd and final report on existing in situ observing systems, methods and protocols with recommendations to fill possible gaps and harmonize measurement protocols.	12 24 34	RE RE RE	PU PU PU
D2.1 D2.2 D2.3	1st, 2nd and final report on existing spaceborne systems, their performance, algorithms and data processing procedures with recommendations for harmonizing data products.	12 24 34	RE RE RE	PU PU PU
D3.1 D3.2 D3.3	1st and 2nd report on available data + information systems including the identification of gaps and a strategy to develop integrated systems. Report on methods for use of data in models	12 24 34	RE RE RE	PU PU PU
D4.1 D4.2 D4.3	1st and 2nd report on current ocean/coastal information services in P.R. China. Report on the service structure for Chinese monitoring for coastal environment and security.	12 30 34	RE RE RE	PU PU PU
D5.1 D5.2 D5.3	1st, 2nd and final report on existing gaps and a strategy and recommendations to build up the capacity by training and education	12 24 34	RE RE RE	PU PU PU
D6.1 D6.2 D6.3	Workshop report Summer school /CD-ROM for lecture material Final symposium report	12 24 34	RE RE RE	PU PU PU

Year 2 reporting

Filling in Form C

Legal name: According to contract
Cost model according to contract
Audit costs under Management of the consortium and also of which subcontracting.
Legal name of the audit firm and cost and the certificate.

Conversion rate on the first date of the first day of the first month following Form C. Conversion rate according to ECB.
Name and signature of authorized persons according to the contract.
Excel format of Form C to be sent by E-Mail and 2 signed originals together with Audit certificate to be sent by post (courier).
Audit Certificate with amount similar to Form C. Cost of the certificate mentioned and according to the Commission's requirements for audit certificate.

Planning and timetable

Year	2007	2008				2009				2010		
Quarter	4	1	2	3	4	1	2	3	4	1	2	3
WP0 Management												
T0.1:												
T0.2:												
T0.3:												
T0.4:												
WP1 Review and utilization of in-situ observing systems												
T1.1												
T1.2												
T1.3												
WP2 Review and utilization of spaceborne systems												
T2.1												
T2.2												
T2.3												
T2.4												
WP3 Review of level of data integration and information management												
T3.1												
T3.2												
T3.3												
WP4 Review of ocean and coastal information products and services												
T4.1:												
T4.2:												
T4.3:												
T4.4:												
WP5 Capacity building in view of gaps and eventual European capabilities												
T5.1:												
T5.2:												
WP6 Workshop, Symposium and Summer School												
T6.1:												
T6.2:												
T6.3:												

谢谢！

Thank you for your attention